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20	CIMS2021-0173	Wanderer: Mars rover prototype with a modified four-link suspension system	Dhruvi Shah, Gaurav Patel, Uchit Shriyan*, and Chetna Sharma	132-137
21	CIMS2021-0189	Process modelling of Electrical Discharge Machining by Artificial Neural Networks: A review	Piyush Pant*, Pushpendra S. Bharti	138-148
22	CIMS2021-190	A systematic review of TMJ (Temporomandibular joint) Prosthetic: Dysfunction Index, Design and Success Rate	Deepak Sharma*, Parveen Kalra, Shagun Sharma	149-159
23	CIMS2021-193	PHYSICAL RISK AND MUSCULOSKELETAL INJURIES ASSESSMENT AMONG WORKERS IN CLEANING OCCUPATION	Rajat Pratap Singh*, Prof. Parveen Kalra, Dr. Suman Kant	160-166
24	CIMS2021-208	A Systematic Review on Color Homography Estimation System	Geetanjali Babbar*, Rohit Bajaj, Yogesh Kumar	167-172
25	CIMS2021-214	A Review on Advancements and Characteristics of Cryogenic Propulsion Rocket Engine	Gokul Raj R*, J V Muruga Lal Jeyan	173-178
26	CIMS2021-221	Effect of Working Posture, Feed Force, and Drill Speed on Productivity and Perceived Discomfort	Umair Arif, Saman Ahmad	179-185
27	CIMS2021-228	Study on Fluoride Uptake by Modified Polyaniline with Doped Chloride	Sarungbam Pipileimaa*, Potsangbam Albino Kumarb	186-192
28	CIMS2021-230	STUDY OF BIOMASS TORREFACTION FUNDAMENTALS AND PROPERTIES	Jaswinder Singh*, Madhur Chauhan, Sumit Kumar, Prateek Srivastava	193-199
29	CIMS2021-234	DESIGN AND MODELLING OF PERFORATION MACHINEFOR SDC CHILLIES	Pesarlanka Damodara Nagasaia, Mohammed Asif.Ma*, Yaragani Saidaraoa, T.Niranjanb, Vardhan Eswera,	200-209
30	CIMS2021-247	A review of performance and emission characteristics of single cylinder diesel engine fuelled with different alcohols.	Somit Shivhare*, Aryan Kumar and Ashish Kumar Singh	210-214
31	CIMS2021-0277	A Comprehensive Study of Lean Manufacturing Approaches and Applications in Industries JIT, Lean and Agile Manufacturing	Nittin, Mahesh Chand	215-225
32	CIMS2021-0286	An Algorithm for Minimum Zone Sphericity Evaluation from Coordinate Data	G Rajamohan*	226-232
33	CIMS2021-0291	Current voltage relationships in electrochemical wastewater treatment	Vinod Kumar Meena, Himadri Roy Ghatak * (ORCID 0000-000-9-78)	233-237

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Process modelling of Electrical Discharge Machining by Artificial Neural Networks: A review

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Abstract

Electrical discharge machining (EDM) has emerged as a promising unconventional method to machine electrically conductive parts irrespective of their hardness. It finds applications in numerous sectors such as aerospace, die and mould making, medical and miniature parts. Various techniques such as regression is used for process modelling. However, due to the complex and stochastic nature of the process and also the underlying non linear interactions, soft computing techniques such as artificial neural network (ANN) is utilized to model the process as well as to predict the responses. ANN draws its inspiration from human nervous system. In this work, the applications of ANN in the field of EDM have been detailed. It may serve a ready reference for researchers who are planning to use this soft computing technique in the field of EDM.

Keywords – EDM, ANN, SR, MRR, MLP

1. INTRODUCTION

ANN can be referred to as a processing unit that has wide distribution parallelly. It comprises of neurons [1]–[3], which are the units of processing, and are naturally capable to figure out and store experimentally related information to be credible for usage [4], [5]. ANN possess admirable attributes such as robustness [6], [7], adaptiveness [8], capability related to mapping [9] and these are responsible for making ANN a strong and clever tool instrument used for modelling and prediction in practical applications of non linear nature [10]–[14] and resulting in saving time and expenses [15]. Generally, the model of neuron applied to design large number of ANN model comprises of connection link groups, possessing their own weights [16]–[18], referred to as synapse. These are multiplied by individual inputs and all summed up, along with bias. Later on, an activation function gets applied to this (Fig. 1) [19].

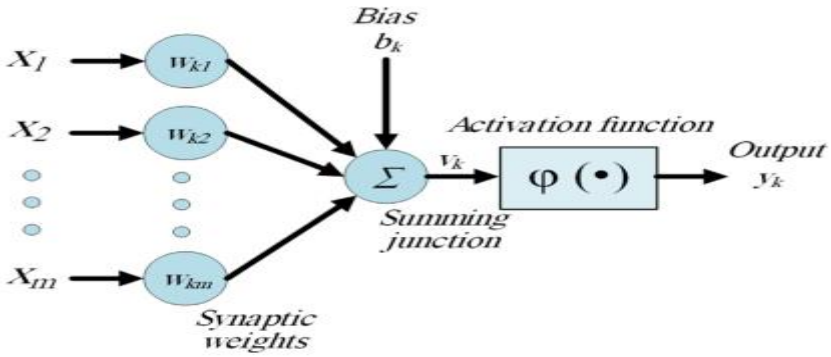


Fig. 1. Neuron's non-linear model [19]

ANNs belong to the category of machine learning and draw their inspiration from the functioning of human brain [20]–[22]. These primarily consist of input layer, hidden layer and output layer [23]–[33]. ANN does the learning of relations in between the parameters and understanding of the situation being investigated [34].

AIP Conference Proceedings

Duality in mathematical fractional programming optimality under convexity

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Duality in Mathematical Fractional Programming Optimality under Convexity

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Abstract- In this paper, weir-type dual with idea of effectiveness is used to utter duality theorems, under generalized (F, ρ) convexity assumption for multi objective fractional programming problem. This work is an extension of the outcome of Mustafa in the environment of multi-objective fractional programming using generalized (F, ρ) convexity assumption.

INTRODUCTION

Egudo derived specialtheorems of duality for multi objective fractional programming [4] (MFP) problem, using the concept of effectiveness tied with universal ρ-convexity [10]. After that Mukherjee gave the extension of the outcomes of Egudo in the perspective of multi objective fractional [13] programming, using parametric approach. For multi-objective nonlinear programming [2] problem, inequality and equality constraints are involved in this, Preda used the idea of effectiveness to state the results of duality under universal (F,ρ)-convexity. Yong extended and unified the results of Mukherjee. He established specialtheorems of duality for multi objective fractional programming problem [1], via the method of effectiveness fixed with special universal convex assumption.

Consider the following fractional programming issue with many objectives:

(MFP) Minimize$\left(\frac{f_1(x)}{g_1(x)}, \frac{f_2(x)}{g_2(x)}, \ldots\ldots\ldots, \frac{f_p(x)}{g_p(x)}\right)$ Subject to $h(x) \leq 0$ ----------(1)

Where the functions which satisfy differentiability [11] and$g_i > 0$ are given by $f_i: R^n \to R, g_i: R^n \to R \; for \; i = 1,2,3, \ldots., p \; and \; h: R^n \to R^m$

I. The following definition will be used in establishing results of this paper

DEFINITION 2.1:

x^0 is a feasible solution for (MFP) which is suitable result for (MFP) if for (MFP)feasible solution does not exist like x* such that $\frac{f_i(x^*)}{g_i(x^*)} < \frac{f_i(x^0)}{g_i(x^0)}$ for some $i = 1,2,3, \ldots, p$

And $\frac{f_j(x^*)}{g_j(x^*)} \leq \frac{f_j(x^0)}{g_j(x^0)}$ *for all* $j = 1,2,3, \ldots, p$

Consider Weir type dual as follows for (MFP):

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(MFD) $Maximize\left\{\frac{f_1(y)}{g_1(y)}\frac{f_2(y)}{g_2(y)}\ldots\ldots\ldots\frac{f_p(y)}{g_p(y)}\right\}$

$y_i t_i \sigma$

Subject to $\sum_{i=1}^{p}\tau_i\nabla\frac{f_i(y)}{g_i(y)}+\nabla\sigma^t\square(y)=0$ ----------(2)

$\sigma^t\square(y)\geq 0$ ----------(3)

$\sigma\geq 0,\tau_i\geq 0,\quad i=1,\ldots\ldots\ldots,p,\quad \sum_{i=1}^{p}\tau_i=1$ ----------(4)

The following outcomes will be necessary in order to prove strong duality [12].

Lemma-2.1x* is an appropriate solution for (MFP) iffx* solves ($MFP_k(\delta^0)$), for each

($MFP_k(\delta^0)$) Minimize $\frac{f_k(X)}{g_k(X)}$

Subject to$\frac{f_j(X)}{g_j(X)}\leq\delta_j^0$for all j≠k

h(x)≤0 where $\delta_1^0=\frac{f_j(X^*)}{g_j(X^*)}$

If $g_i(x)>0$ for every $j=1,2,3,\ldots,p$ so ($MFP_k(\delta^0)$) can be write as

($MFP_k(\delta^0)$)Minimize $\frac{f_k(X)}{g_k(X)}$

Subject to $f_j(x)-\delta_j^0 g_j(x)\leq 0$ for all $j\neq k$ ----------(5)

$h(x)\leq 0$

Lemma-2.2**:** If in (MFP) assume$g_j(x)>0$ when$j=1,2,3,\ldots,p$ then x^* solves ($MFP'_k(\delta^0)$) for each $k=1,2,3,\ldots,p$ iffx^* is a suitable solution of (MFP).

Lemmas 1 & 2 given by Egudo are similar to Lemma 2.1 &2.2.

II. Duality theorems [3] with Generalized [9] F-Convexity:

Under this section, weak and strong duality results between (MFP) & (MFD) are established, using generalized F-convexity assumption on the functions involved.

Theorem 3.1.(Weak duality) If x^0 is feasible for (MFP) and (y^0, τ, σ) is feasible for (MFD), f_i,is nonnegative and F-convex, g_i, is positive & F-concave for everyi=1…, p and σ^t is F-quasi-convex for y^0. If also either of the given hypotheses holds,

(a) $\tau_i>0$for all i=1…....., p.

(b) $\sum_{i=1}^{p}\tau_i\frac{f_i(.)}{g_i(.)x}$is strictly F-pseudo [7] convex at y^0,

then the following never hold,

$\frac{f_j(X^0)}{g_j(X^0)}\leq\frac{f_j(Y^0)}{g_j(Y^0)}$ for all j=1,……,p ------- (6)

and

$\frac{f_i(X^0)}{g_i(X^0)}\leq\frac{f_i(Y^0)}{g_i(Y^0)}$ for some i=1,…....,p ---------- (7)

Proof: Since x^0 is feasible to (MFP) and (y^0,τ,σ) is feasible to (MFD), then we have

$\sigma^t h(x^0)\leq\sigma' h(y^0)$ *Since $\sigma^t\square$ is F-quasi convex*

⇒ F (x^0, y^0, $\nabla\sigma^t h(y^0)$)≤0 ----------(8)

equations (2) and (8) imply $F\left(x^0, y^0, \sum_{i=1}^{p} \tau_i \nabla \frac{f_i(y^0)}{g_i(y^0)}\right) \geq 0$ ----------(9)

Suppose if the results (6) and (7) of the theorem hold in contrary. From hypothesis (a) it follows that

$$\tau_j \frac{f_j(X^0)}{g_j(X^0)} \geq \tau_j \frac{f_j(y^0)}{g_j(y^0)} \quad \text{for all j = l,….,p} \qquad \text{----------(10)}$$

and

$$\tau_i \frac{f_i(X^0)}{g_i(X^0)} \geq \tau_i \frac{f_i(y^0)}{g_i(y^0)} \quad \text{for all i = l,….,p} \qquad \text{----------(11)}$$

If $f_j(x^0) \geq 0$ and $g_j(x^0) > 0$ for each $j \in P=\{l,\ldots,p\}$, it follows that

$T_j \frac{f_j(X^0)}{g_j(X^0)}, j = 1, \ldots\ldots, p$ are F-pseudo convex at y^0

Hence (10) and (11) imply

$$F\left(x^0, y^0, \sum_{i=1}^{p} \tau_i \nabla \frac{f_i(y^0)}{g_i(y^0)}\right) < 0$$

which contradicts (9)

Now on applying $\tau_j \geq 0$, i=1,….,.. p (since τ is feasible for (MFD)) in (6) and (7) we obtain

$$\sum_{i=1}^{p} \tau_i \frac{f_i(X^0)}{g_i(X^0)} \leq \sum_{i=1}^{p} \tau_i \frac{f_i(y^0)}{g_i(y^0)} \qquad \text{----------(12)}$$

Hypothesis (b) and (12) now imply

$$F\left(x^0, y^0, \sum_{i=1}^{p} \tau_i \nabla \frac{f_i(y^0)}{g_i(y^0)}\right) < 0$$

which again contradicts (9).

Hence weak duality [3] follows.

Theorem 3.2*:* (Strong duality) Suppose x^0 be a suitable result to (MFP) & suppose it also satisfy constraint qualification to ($MFP_k(\delta^0)$) for at least one k=1,..,p. So $\exists \tau^0 \in R^p$ with $\sigma^0 \in R^m$ so that (x^0, τ^0, σ^0) is a feasible result to (MFD). If weak duality between (MFP) and (MFD) holds, then (x^0, τ^0, σ^0) is an proficient solution [6] for (MFD).

Proof: From Lemma 2.1, x^0 solves ($MFP_k(\delta°)$) for all $k \in P=(1,\ldots,p)$ and efficient [5] for (MFP). Then $\exists$ a $k \in P$ so that x^0 satisfies constraints qualification for ($MFP_k(\delta^0)$), by hypothesis.
Now from Kuhn-Tucker necessary condition for $\tau_i \geq 0$ for all $i \neq k$ and $\sigma \geq 0$ such that

$$\nabla\left[\frac{f_k(X^0)}{g_k(X^0)} + \sum_{i \neq k} \tau_i \frac{f_i(X^0)}{g_i(X^0)} + \sigma^t \square(X^0)\right] = 0 \text{----------(13)}$$

and $\sigma^t \square(x^0) = 0$----------(14)

If we put $\tau_k^0 = \frac{1}{1+\sum_{i \neq k} \tau_i} > 0$ and divide all terms in (13) and (14) by, $1 + \sum_{i \neq k} \tau_i$ we find

$$\tau_k^0 = \frac{\tau_j}{1+\sum_{i \neq k} \tau_i} \geq 0 \quad \text{and} \quad \sigma_1^0 = \frac{\sigma}{1+\sum_{i \neq k} \tau_i} \geq 0$$

Here it is concluded that (x^0, τ^0, σ^0) is also feasible for (MFD) and weak duality between (MFP) and (MFD) holds. It shows $(x^0, \tau^0, \sigma^0)$is an effective result for (MFD).

I. Duality Theorems with Generalized (F, ρ) – Convexity:

Again,weak and strong duality results [8] were established by us, but for universal (F,$\boldsymbol{\rho}$)-convexity assumption on the functions involved in the (MFP) and (MFD).

Theorem 4.1: (Weak duality): If with each feasible x° to (MFP) and each feasible $(y^0, \tau, \sigma)$to (MFD), f_i is nonnegative and (F, $\boldsymbol{\rho}^i$)-convex g_i is positive and F-concave for each i=1,…,p and that σ^th is (F, $\boldsymbol{\rho}^0$)-quasi-convex at y^0. If also either of the given hypotheses holds,

(a) $\tau_i > 0$ forall i=1,**…**,p.

(b) $\sum_{i=1}^{p} \tau_i \frac{f_i(.)}{g_i(.)}$ is strictly (F, $\boldsymbol{\rho}^1$) pseudo convex at y^0

and if$\boldsymbol{\rho}^0+\boldsymbol{\rho}^1 > 0$,

then the following cannot hold,

$$\frac{f_j(X^0)}{g_j(X^0)} \le \frac{f_j(y^0)}{g_j(y^0)} \quad \text{for all j=1,…....p,} \qquad \text{….....(15)}$$

and

$$\frac{f_i(X^0)}{g_i(X^0)} < \frac{f_i(y^0)}{g_i(y^0)} \quad \text{for some i = l,…,p} \qquad \text{…….....(16)}$$

Proof: For the feasibility of x^0 and (y^0, τ, σ) in (MFP) and (MFD) , we have

$\sigma^t \square(x^0) \le \sigma^t \square(Y^0)$ Sinceσ^Th is (F,ρ^0) quasi convex at y^0

$\Rightarrow F(x^0, y^0, \nabla \sigma^t \square(y^0)) \le -\rho^0 d^2(x^0, y^0)$ ---------- ….....(17)

Since $\rho^0 + \rho^1 > 0$ and from (2) and (17) we have

$F\left(x^0, y^0, \sum_{i=1}^{p} \tau_i \nabla \frac{f_i(y^0)}{g_i(y^0)}\right) > -\rho^1 d^2(x^0, y^0)$….....(18)

Now suppose the contrary, that the results (15) and (16) of the theorem hold. From hypothesis (a) it follows that

$$\tau_j \frac{f_j(x^0)}{g_j(x^0)} \le \tau_j \frac{f_j(y^0)}{g_j(y^0)} \quad \text{for all j=1,…....,p} \qquad \text{….....(19)}$$

and

$$\tau_i \frac{f_i(x^0)}{g_i(x^0)} \le \tau_i \frac{f_i(y^0)}{g_i(y^0)} \quad \text{for some i=1,…..,p} \qquad \text{….....(20)}$$

If $f_j(x^0) \ge 0$ and $g_j(x^0) > 0$ for all j∈P it follows that $\sum_i^p \tau_j \frac{f_j(x^0)}{g_j(x^0)}$ is (F, ρ^1)-pseudo convex at y_0.

Hence (19) and (20) imply$F\left(x^0, y^0 \sum_{i=1}^{p} \tau_i \nabla \frac{f_i(y^0)}{g_i(y^0)}\right) < -\rho^1 d^2(x^0, y^0)$ which contradicts (18)

Now using $\tau_i \ge 0$, $i = 1,\ldots,\mathbf{p}$ (since$\tau$is feasible to (MFD)) in (15) & (16), we find

$$\sum_{i=1}^{p} \tau_i \frac{f_i(x^0)}{g_i(x^0)} \le \sum_{i=1}^{p} \tau_i \frac{f_i(y^0)}{g_i(y^0)} \qquad \text{….....(21)}$$

Hypothesis (b) and (21) now imply

$$F\left(x^0, y^0 \sum_{i=1}^{p} \tau_i \nabla \frac{f_i(y^0)}{g_i(y^0)}\right) < -\rho^1 d^2(x^0, y^0)$$

it againcontradicts (18). Hence weak duality follows.

Theorem 4.2: (Strong duality) If x^0 be an exact solution to (MFP) and suppose it also satisfy constraint qualification to ($MFP_k(\delta^0)$) for at least one k=1,….,p. Then $\exists \tau^0 \in R^p$ and $\sigma^0 \in R^m$ so that (x^0, τ^0, σ^0) is a feasible solution to (MFD). If weak duality theorem between (MFD) and (MFP) holds, then (x^0, τ^0, σ^0) is exact solution for (MFD). Proof is similar to that of Theorem 3.2.

CONCLUSION

The goal of this paper is to demonstrate that for mathematical programming optimality and duality theorems involving standard duals with convexity assumptions, they can be obtained in a variety of ways: first, in modified convexity, then in complex spaces, third, in a modified dual, and finally, in the setting of non-smooth programmers.

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An inventory model for deteriorating items when demand depends on advertisement and stock with partial backlogging

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An Inventory Model for Deteriorating Items When Demand Depends on Advertisement and Stock with Partial Backlogging

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Abstract: It is not always feasible that demand is constant or varying according to a particular fashion, there are lots of factors which affect the rate of demand such as advertisement, level of stock etc. In this presented inventory theory of deteriorating items demand is dependent on two factors, first is stock level and second is media advertisement. Shortage is allowed and when happened then it is partially backlogged and rate of backlogging is variable and is a function of waiting time for next replenishment. Optimized objective cost function is convex and obtained minimum cost. We have taken a numerical example to elaborate the presented model. In last sensitivity analysis is also discussed.

Keywords: Deterioration, advertisement and stock dependent demand, Partial backlogging

1. INTRODUCTION

Generally, we explain deterioration as damage or change in product which affect the usefulness of the item Such as dairy products, fruits, vegetables etc. If we explain the existing literature of research. Many researchers have included this factor in their research but in practical situations deterioration is a major factor in inventory management. And another most valuable component of the marketing progress is advertisement. In the current competitive era to fight competitions, to increase sales and to launch a new product in the market we use advertisements. Stock level is also an important factor which affects the demand. In malls we can see that lots of items showcase in bulk in front racks which attract the customer and increase sales of product.

In this way, the management of inventory may have been there since the beginning of civilization. But First, **Within (1957)** introduced fashion accessories in its inventory model, which was meant for perishable goods. After a much longer time span, **Ghare and Schrader (1963)** developed an inventory model for perishable goods involving the exponential decay of inventory. **Aggarwal [1978]** presented his model, eliminating the errors of **Shah and Jaiswal's [1977].** In this sequence of inventory research which is for deteriorating items, many researchers have developed their inventory models. In the sequence of inventory research for deteriorating items, many researchers have developed their inventory models keeping in mind the actual market conditions. some of which are as follows **Teng et al. (2002)**established a partially backlogged replenishment policy with time varying demand. **Nita H. Shah (2009)** provided an inventory policy for weibull deterioration under declining market. **Mishra et al. (2010)** assumed linear time dependent demand with constant deterioration rate. **Min et al. (2010)** presented a model with demand as a variable of stock quantity and credit period along with no shortage. **Mishra et al. (2010)** find an optimal value of total cost by assuming linear demand rate with partial backlogging.**A. K. Bhunia et. al. (2011)**assumed the demand rate of this item is dependent on continuous time, selling price of the item and the frequency of advertisement. **Vipin**

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Kumar et al. (2011) was developed an Inventory Model for Deteriorating Items with Permissible Delay in Payment Under Two-Stage Interest Payable Criterion and Quadratic Demand. **Vipin Kumar et al. (2012)** prescribed a model two level credit-linked demands under permissible delay in payments. **Mishra et al. (2013)** included carring cost in his EOQ model and treating it as a variable of time. **Shukla et al.** (2013) assumed constant deterioration rate and demand is varingexponentially. **Trilokyanath et al. (2013**) investigated the inventory model with tworate of demand and time varying deterioration rate. **Bhanu Priya (2014)** proposed a model with exponential decline demand rate. **Shah et al. (2014)** investigated an inventory model having expiry rate and stock dependent demand. A multivariate demand and exponential distributed deteriorated rate were assumed by **Pandey (2014).R. Uthayakumar (2014)** considered deterministic demand and inflation in their inventory model for decaying items. **Sushil Kumar (2015)**considering inflation and trade credit in his EOQ model along with fix deteriorating items and linear demand rate. **Debashis Dutta and Pavan Kumar (2015)** considered time varying demand with constant deterioration rate. **Tyagi et al. (2015)** presented a model for weibull deterioration under storage of two level. **Deepa Khurana (2015)** developed an inventory model for two warehouses under inflation. **R.P Tripathi (2015)** included trade credit period and created an optimal policy with weibull time dependent demand.**P. Muniappan (2015**) developed an inventory model with constant demand rate, inflation and delayed payments. **Stanly et al. (2015)** used fuzzy to develop an inventory model with shortage. **Wen-Sheng Chou (2015)** improved the paper of **Ouyang (2015)** and provided a new optimal policy. **Sushil Kumar (2016)** created a probabilistic inventory model with exponential demand rate under inflation. **Jaggi et al. (2016)** presented a fuzzy inventory model and included shortages under inflation. **Khurana et al. (2016)** created an optimal policy for deteriorating items and taken demand as a function of two variables rate and stock level. **Kaliraman et al. (2016)** developed a model for decreasing demand and trade credit periods in payment. **K.K Agarwal (2016)** developed a joint replenishment inventory policy when demand depend upon credit period.

Geetha, K.V., et al. (2016) developed an optimal lot sizing policy for non-instantaneous deteriorating items with price and advertisement dependent demand. **Shaikh et al. (2017)** presented a model for non-instantaneous deterioration with fully backlogged shortage. **Krommyda et al. (2017)** presented two warehouse systems with delay in payments. **Saha (2017)** developed an inventory policy for probabilistic deterioration and negative exponential demand. **Sanni et al. (2017)** presented a paper on optimal replenishment policy with tree weibull parameters. **Krommyda et al. (2017)** obtained an inventory policy for seasonal deteriorating products. **Yadav et al. (2017)** find out the effect of inflation on inventory model with shortage and two warehouses. **R. Chakrabarty (2018)** investigated a model for two ware houses for a single deteriorating item. **Vipin Kumar et al. (2019)** discussed the inventory model for with multivariate demand and non-instantaneous deteriorating items **Masoud et al. (2021)** presented a sustainable inventory model with deterioration and advance payment. **Umakant et al. (2021)** presented an optimal policy with controllable deterioration. **Sahar Masudi (2021)** developed an inventory model for stocasting deterioration rate and credit period. **J I Ichwanto et al. (2020)** presented a paper with time dependent demand.

In this paper, we develop an inventory model for Instantaneous perishable items. The demand is assumed to be dependent on advertisement and stock level. The rate of deterioration is constant and shortages are allowable and partially backlogged. The objective of this paper is Numerical examples are taken and the sensitivity analysis is carried out to demonstrate the effects of changing parameter values on the optimal solution of the system.

2. ASSUMPTIONS AND NOTATIONS

2.1 ASSUMPTIONS

(i) The replenishment rate is infinite and the lead time is zero

(ii) Demand rate is a function of the frequency of advertisement A and the displayed inventory level defined as $D(t) = \begin{cases} A^{\mu}\big(a + bI(t)\big), & 0 \le t \le \nu \\ aA^{\mu}, & \nu \le t \le T \end{cases}$

(iii) A single instantaneous deteriorating item is assumed

(iv) Shortages are allowed and partial backlogged with the rate dependent on the length of the waiting time for the next replenishment and defined as $\frac{1}{1+\delta(T-t)}$, where$\delta \ge 0$and $\nu \le t \le T$

2.2 NOTATIONS

$I(t)$: Inventory level at any time t.
$\theta(t)$: The parameter of deterioration rate of the stock.
ν :the time from which the shortage of goods begins (Decision variable).
T : Length of each ordering cycle (Decision variable).
C_0 : Ordering cost of inventory, \$/per order.
C_1 : Holding cost, \$/per unit/per unit time.
C_2 : Deterioration cost \$/per unit.
C_3 :shortage cost, \$/per unit/per unit time.
C_4 :opportunity cost due to lost sales, \$/per unit.
W :the maximum inventory levels.
S :the maximum amount of demand backlogged.
Q : the total order quantity.

3. MODEL FORMULATION

Here in this section an inventory model is presented in which items are deteriorating in nature and during shortage of inventory they are partially backlogged. Aim of this problem is to search out the optimized order quantity and the ordering cycle length so that the total cost can be minimize.

The inventory level during the interval $[0, \nu]$ is decreasing due to complete the orders and at time $t = \nu$ it becomes zero due to the combined effect of deterioration and demand. W is the maximum level of inventory in the stock at time $t = 0$. After this period [0, ν] shortage occur during time [ν , T] and it is backlogged partially. At the end at time $t = T$ shortage level is maximum and now it is time to refill the inventory. The whole phenomena have shown in the figure 1 (**Liang-Yuh OUYANG (2005)**)

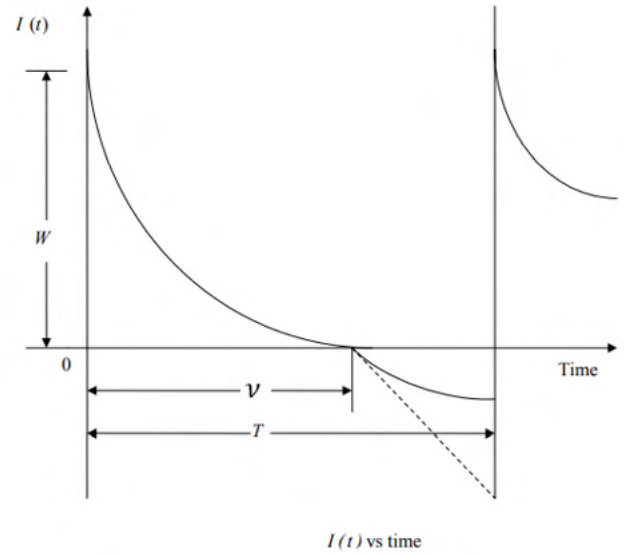


Figure 1: Inventory level *I(t)* vs. time

Therefore, the positive inventory system in $[0, \nu]$representing by the differential equations (1) as

$$\frac{dI(t)}{dt} + \theta I(t) = -A^{\mu}\left(a + bI(t)\right), 0 \leq t \leq \nu, \quad (3.1)$$

With I (ν) = 0.

The solution of the differential equation (3.1) is

$$I(t) = \frac{aA^{\mu}\left(e^{(A^{\mu}b-\theta)(t-\nu)}-1\right)}{A^{\mu}b-\theta},\ 0 \le t \le \nu \tag{3.2}$$

The maximum inventory level W is obtained by putting $t = 0$ in (3.2), we get

$$W = I(0) = \frac{aA^{\mu}\left(e^{(-A^{\mu}b+\theta)\nu}-1\right)}{A^{\mu}b-\theta} \tag{3.3}$$

The shortages inventory system in $[t_1, T]$ representing by the differential equation

$$\frac{dI(t)}{dt} = -\frac{aA^{\mu}}{1+\delta(T-t)},\qquad \nu \le t \le T\ , \tag{3.4}$$

With I(ν) = 0.

The solution of the differential equation (3.4) is

$$I(t) = -\frac{a}{\delta}A^{\mu}(\text{In}[1+\delta(T-t)] - \text{In}[1+\delta(T-\nu)]), \nu \le t \le T \tag{3.5}$$

The maximum negative inventory level S is obtained by putting $t = T$ in (3.5), we get

$$S = -I(T) = -\frac{aA^{\mu}}{\delta}\text{In}[1+\delta(T-\nu)] \tag{3.6}$$

Hence,the total ordering quantity

$$Q = W + S = \frac{aA^{\mu}\left(e^{(-A^{\mu}b+\theta)\nu}-1\right)}{A^{\mu}b-\theta} - \frac{aA^{\mu}}{\delta}\ \text{In}[1+\delta(T-\nu)] \tag{3.7}$$

4. COST ANALYSIS

The different inventory cost associated with the model percycle are calculated as

(i) Setup Cost

$$OC = C_0$$

(ii) Holding Cost

$$HC = \int_0^{\nu} c_1\ I(t)dt$$

$$= C_1\frac{aA^{\mu}(1-e^{(-A^{\mu}b+\theta)\nu}-A^{\mu}b\nu+\theta\nu)}{(\theta-A^{\mu}b)^2} \tag{3.8}$$

(iii) Deterioration Cost

$$DC = C_2\left(W - \int_0^{\nu} D(t)\,dt\right)$$

$$= C_2\left(\frac{aA^{\mu}\left(-1+e^{(-A^{\mu}b+\theta)\nu}\right)}{A^{\mu}b-\theta} - \frac{a\theta^2\nu-aA^{\mu}b\left(-1+e^{(-A^{\mu}b+\theta)\nu}+\theta\nu\right)}{(-A^{\mu}b+\theta)^2}\right) \tag{3.9}$$

(iv) Shortage Cost

$$SC = C_3\left(-\int_{\nu}^{T} I(t)dt\right)$$

$$= C_3\frac{aA^{\mu}(\delta(T-\nu)-\text{In}[1+T\delta-\delta\nu])}{\delta^2} \tag{3.10}$$

(v) Opportunity Cost Due to Lost Sales

$$BC = C_4\left(\int_{\nu}^{T}\left(1-\beta(T-t)\right)\right)D(t)dt$$

$$= C_4\frac{aA^{\delta}(\delta(T-\nu)+\text{In}[1-\delta(T-\nu)])}{\delta} \tag{3.11}$$

Therefore, the total average cost

$$TAC = TAC(\nu, T)$$

$$= \frac{1}{T}\{OC + HC + DC + SC + BC\}$$

$$= \frac{1}{T}\left\{C_0 + C_1\frac{aA^{\mu}(1-e^{(-A^{\mu}b+\theta)\nu}-A^{\mu}b\nu+\theta\nu)}{(\theta-A^{\mu}b)^2} + C_2\left(\frac{aA^{\mu}\left(-1+e^{(-A^{\mu}b+\theta)\nu}\right)}{A^{\mu}b-\theta} - \frac{a\theta^2\nu-aA^{\mu}b\left(-1+e^{(-A^{\mu}b+\theta)\nu}+\theta\nu\right)}{(-A^{\mu}b+\theta)^2}\right) + C_3\frac{aA^{\mu}(\delta(T-\nu)-\text{In}[1+T\delta-\delta\nu])}{\delta^2}\right\} + C_4\frac{aA^{\delta}(\delta(T-\nu)+\text{In}[1-\delta(T-\nu)])}{\delta} \tag{3.12}$$

The objective of this paper is to reduce the total average costto the optimum value of v and T which must satisfy the following equations.

$$\frac{\partial TAC(v,T)}{\partial v} = \frac{1}{T}\left[-\frac{aA^{\mu}\left(A^{\mu}b-\theta+e^{(-A^{\mu}b+\theta)v}(-A^{\mu}b+\theta)\right)C_1}{(-A^{\mu}b+\theta)^2}+\right.$$

$$\left.\frac{a\left(-\theta^2+A^{\mu}e^{(-A^{\mu}b+\theta)v}(A^{\mu}b-\theta)(-A^{\mu}b+\theta)+A^{\mu}b\left(\theta+e^{(-A^{\mu}b+\theta)v}(-A^{\mu}b+\theta)\right)\right)C_2}{(-A^{\mu}b+\theta)^2}+\frac{aA^{\mu}\left(-\delta+\frac{\delta}{1+T\delta-\delta v}\right)C_3}{\delta^2}++\frac{aA^{\mu}(-\delta+\frac{\delta}{1-T\delta+\delta v})C_4}{\delta}\right] \tag{3.13}$$

$$\frac{\partial TAC(v,T)}{\partial T} = \frac{\frac{aA^{\mu}\left(\delta-\frac{\delta}{1+T\delta-\delta v}\right)C_3}{\delta^2}+\frac{aA^{\delta}\left(\delta-\frac{\delta}{1-T\delta+\delta v}\right)C_4}{\delta}}{T}$$

$$-\frac{1}{T^2}\left[\begin{array}{c}-\frac{aA^{\mu}\left(A^{\mu}b-\theta+e^{(-A^{\mu}b+\theta)v}(-A^{\mu}b+\theta)\right)C_1}{(-A^{\mu}b+\theta)^2}\\ +\frac{a\left(-\theta^2+A^{\mu}e^{(-A^{\mu}b+\theta)v}(A^{\mu}b-\theta)(-A^{\mu}b+\theta)+A^{\mu}b\left(\theta+e^{(-A^{\mu}b+\theta)v}(-A^{\mu}b+\theta)\right)\right)C_2}{(-A^{\mu}b+\theta)^2}\\ +\frac{aA^{\mu}\left(-\delta+\frac{\delta}{1+T\delta-\delta v}\right)C_3}{\delta^2}++\frac{aA^{\delta}(-\delta+\frac{\delta}{1-T\delta+\delta v})C_4}{\delta}\end{array}\right] \tag{3.14}$$

5. NUMERICAL EXAMPLE

This example is based on the following values of used parameter

$C_0 \to 250, C_1 \to 0.5, C_2 \to 1.5, C_3 \to 2.5, C_4 \to 2, A \to 12, \mu \to .03, a \to 200, b \to 4, \theta \to 0.08, \delta \to 2$

After solution, we obtain the optimal value are as follows

$$v^* = 0.79217, T^* = 0.93371, TAC^* = 97.9782$$

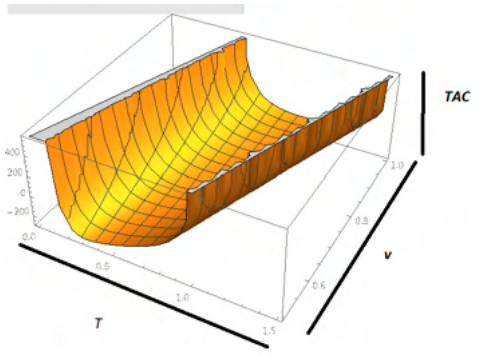


Figure 2: Total Profit per unit time

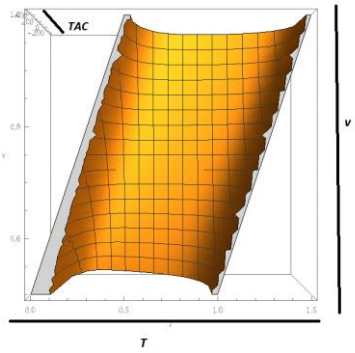


Figure 3: Total Profit per unit time Top View

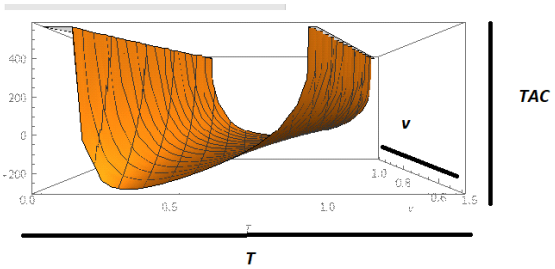


Figure 4: Total Profit per unit time Front View

6. SENSITIVITY ANALYSIS

To study the sensitivity, the parameters used are analyzed by changing -20%, -10%, 10%, 20%, and all other parameters are kept unchanged, whose results are displayed in Table 1 below

TABLE 1. Sensitivity Analysis with different Parameters

Parameter		% Change	ν	T	W	Q	TAC
C_0	300	20%	0.77124	0.97124	19.21256	48.56289	139.61189
	275	10%	0.78921	0.95321	17.59543	49.11598	114.61189
	250	0	0.79217	0.93371	14.1105	49.96399	97.97818
	225	-10%	0.8044	0.91347	12.97591	50.03954	73.34057
	200	-20%	0.89463	0.89921	10.97894	50.89153	39.61189
C_1	0.6	20%	0.79494	0.91959	19.00788	49.90362	97.79123
	0.55	10%	0.79311	0.92117	16.91982	49.93335	97.86321
	0.5	0	0.79217	0.93371	14.11050	49.96399	97.97818
	0.45	-10%	0.79191	0.93675	12.87531	50.12471	95.12147
	0.4	-20%	0.79019	0.938997	10.79982	50.92335	93.51949
C_2	1.8	20%	0.79512	0.902369	23.81478	49.82483	61.15250
	1.65	10%	0.79664	0.92117	18.82197	49.90051	69.91458
	1.5	0	0.79217	0.93371	14.11605	49.96399	97.97818
	1.35	-10%	0.79129	0.93912	11.32659	49.99114	101.96238
	1.2	-20%	0.78986	0.94149	10.00781	50.00074	117.78191
C_3	3	20%	0.77245	0.82907	19.22168	47.28099	74.48187
	2.75	10%	0.79042	0.81104	17.60455	47.83408	82.03134
	2.5	0	0.79217	0.93371	14.1105	49.96399	97.97818
	2.25	-10%	0.80561	0.7713	12.98503	48.95764	104.65171
	2	-20%	0.89584	0.75704	10.98806	49.60963	120.79521
C_4	2.4	20%	0.77003	1.11341	19.20344	47.84479	75.48180
	2.2	10%	0.788	1.09538	17.58631	48.39788	83.03144
	2	0	0.79217	0.93371	14.1105	49.96399	97.97818
	1.8	-10%	0.80319	0.85564	12.96679	51.32144	105.65070
	1.6	-20%	0.89342	0.74138	10.96982	52.17343	121.68951
A	14.4	20%	0.79164	0.93411	13.83195	49.96567	98.05597
	13.2	10%	0.79190	0.93392	13.87127	49.96442	98.01946
	12	0	0.79217	0.93371	14.1105	49.96399	97.97818
	10.8	-10%	0.79245	0.93346	14.37118	49.95341	97.93104
	9.6	-20%	0.79297	0.93312	14.81236	49.95098	96.87652
μ	0.036	20%	0.79064	0.93476	12.82693	50.01175	98.17793
	0.033	10%	0.79144	0.93425	13.47992	49.98830	98.08295
	0.03	0	0.79217	0.93371	14.1105	49.96399	97.97818
	0.027	-10%	0.79394	0.93302	15.10998	49.95231	97.89267
	0.024	-20%	0.79557	0.93292	16.85211	49.94942	97.75269
a	240	20%	0.67226	0.80461	19.34766	59.10106	75.48180
	220	10%	0.71541	0.91684	17.00007	54.88054	83.03144
	200	0	0.79217	0.93371	14.11051	49.96399	97.97818
	180	-10%	0.82946	0.94987	12.21451	44.12543	105.65070
	160	-20%	0.85289	0.95125	10.96927	41.56897	121.68951
b	4.8	20%	0.849581	1.00214	10.54654	40.14745	115.11236

TABLE 1. Sensitivity Analysis with different Parameters

Parameter		% Change	ν	T	W	Q	TAC
	4.4	10%	0.82356	0.98655	12.25258	44.36945	103.39386
	4	0	0.79217	0.93371	14.1105	49.96399	97.97818
	3.6	-10%	0.76294	0.88505	16.59025	54.75913	88.28202
	3.2	-20%	0.74124	0.83259	18.25814	59.12458	53.58290
θ	0.096	20%	0.78879	0.93672	22.29298	60.36541	97.54712
	0.088	10%	0.79088	0.93446	18.72816	55.19968	97.74374
	0.08	0	0.79217	0.93371	14.11050	49.96399	97.97818
	0.072	-10%	0.79398	0.93214	12.98951	15.26574	98.03257
	0.064	-20%	0.79554	0.93012	10.29541	11.26598	98.36251
δ	2.4	20%	0.78144	0.97324	18.362157	48.66585	95.61189
	2.2	10%	0.79947	0.95497	16.43735	49.21794	96.61189
	2	0	0.79217	0.93371	14.11050	49.9639	97.97818
	1.8	-10%	0.79586	0.91245	12.84483	50.23556	98.15487
	1.6	-20%	0.79797	0.89525	10.89451	50.39551	98.98597

The study manifested the following facts:
If C_0 variable decreases then variable ν , Q and TAC increases while variable T and W decreases.
If C_1 variable decreases then variable T, Q and TAC increases while variable ν and W decreases.
If C_2 increases then , W first increases then decreases while T, Q and TAC decreases.
If C_3 increases then , Q* and TAC decreases while T and W increases.
If C_4 variable decreases then variable ν , Q and TAC increases while variable T and W decreases.
If A decreases then ν and W* increases while T, Q and TAC decreases.
If μ decreases then ν and W increases while T, Q and TAC decreases.
If a decreases then ν and T increases while W, Q and TAC decreases.
If b decreases then W and Q increases while ν ,T and TAC decreases.
If θ decreases then ν and TAC increases while T, Q and W decreases.
If δ decreases then ν ,Q and TAC increases while T and W decreases.

7. CONCLUSION

In the present paper, a mathematical model is developed for instantaneous deteriorating items to minimize the total cost per unit time when demand is advertisement and stock level dependent. The rate of deterioration is fixed. In this paper shortages are allowed and partial backlogged and a function of waiting time for next replenishment. A numerical analysis was illustrating the total cost. Sensitivity analysis indicates the total cost function was more sensitive to change the value of holding cost.A further study would be to extend the purposed model for time dependent deteriorating rate, price dependent demand, fuzzy demand, and many more.

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Abstract- Peak demand is major problem in electrical grid in running days. This problem can be solved by increasing generation capacity which is not good one. However, a good option is the load side demand electrical power management with integration of the renewable energy. Solar energy is reliable, clean, and most fundamental renewable resource.

Design of Hybrid Microgrid using Homer

Utkarsh Bajpai, Vishal Bajpai, Tej Prakash, Masood Rizvi
Dept. Electrical and Electronics, KIET Ghaziabad, India

Abstract: The aim of this research is to model a hybrid microgrid systems for a hospital, which is economically optimal and technically feasible. The system is modeled by integrating photovoltaics in the microgrid. Due to intermittent nature of solar energy the model also includes diesel generator and battery backup. Batteries allow generator-off operation for short outages, and allow the generators to run at more efficient load ratios for longer grid outages. Sensitivity analysis is done for PV investment prices, solar insulation, converter costs, and fuel price. The simulations are carried on the net present costs, cost of energy and renewable fraction of the given hybrid configuration. The result indicates that the PV/diesel/battery hybrid renewable system configuration is found to be optimum.

PID Controller Design For Three Tank System

Arpita Bajpai, Akash Rana, Dr. Natwar Singh Rathore, Prof Alok Kumar Pandey
Electrical and Electronics Engineering, KIET Group of Institutions, Delhi-NCR Ghaziabad, India.

Abstract- Through the paper, we come to know how a PID controller is useful in the designing of a Three Tank System. The aim behind the design is to acknowledge the ratio and mixing process level in the tanks. In this procedure, we let know about the processes carried out and PID controller design. ZN method which is popularly known as Ziegler Nicholas is used for obtaining the control parameters and recognizing the process. Ziegler Nicholas is a Rule-Based Design Criterion method.

FIR Management Portal

Tarun Tyagi, Anubhav Trivedi, Udisha Agarwal
KIET Group Of Institutions Delhi–NCR Ghaziabad, India

Abstract: - With a very fast-changing World and even faster-changing country. It is very important for a country with the population size of India to be able to govern itself properly. One major pillar of good governance is law enforcement. But if we compare India's law enforcement agencies to the agencies of the countries India wants to compete against, there lies a huge gap in varied aspects that help the agencies. One major factor that hinders the agencies apart from the lack of a sizeable budget is the use of technology. As of 2022, a huge chunk of datakeeping or record maintenance is done on papers, and no corresponding record of those documents is digitalized. Major agencies like the Central Bureau of Investigation (CBI), the Narcotics Control Bureau (NCB), etc are still not connected to the local police stations according to the National Crime Records Bureau (NCRB) annual report. This affects the functioning of the agencies as without proper data, the agencies are virtually blind to lot of happenings in the constituent areas and justice due to that is either served late or not at all. According to the report of Reuters, nearly 50% of the crimes go unreported in metro cities alone due to the ignorance of police and other agencies. And the story is not different from this in other states as well. Moreover, due to lack of data sharing among the states, the criminals run to other states without getting properly punished for their deeds. And may repeat the crime again. To solve this issue the Criminal Procedure (Identification) bill has also been introduced in the lower house of the Indian parliament. The bill aims to integrate all the stations together. an FIR management portal also is very crucial both for the government to keep better records and for the people to report the incidents to be handled by enforcement agencies. Therefore not just an app or a portal but a user friendly and efficient portal is needed to bridge this gap.

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Novel Scheme to Minimize Speed Variation in DC Series Motor

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Abstract—A DC series motor has high starting torque but with a drawback that increase in load results significant fall in speed. In this paper it is proposed that with the use of thermistor in field winding of DC series motor, speed variation can be minimized. In case of increase in load, motor will draw more current than subsequently temperature of NTC thermistor will increase and current through field winding will decrease, result in decrease in flux which will oppose fall in speed

Stock Price Prediction using Machine Learning

Sameer Kumar, Ajay Agarwal, Rishabh Mudgal, Siddharth Gautam
Information Technology KIET Group of Institutions Ghaziabad, India

Abstract— The future is unknown and uncertain, but there are ways to forecast upcoming events and reap the rewards safely. One such possibility is the use of machine learning and artificial intelligence to forecast stock markets. It is an extremely tough job due to eruptive and unpredictable identity of the markets. This study introduce a contrast of the forecasting by initializing discrete models. In this work we use four different machine learning models for the cost foretelling of Reliance stock listed in NSE and correlate their accuracy. The accuracy of the models were estimated using MAE.

Solar Power Based Reverse Osmosis Desalination System

Ankit Yadav, Ankit Chauhan, Kamil Sheikh, Natwar Singh Rathore
Department of Electrical and Electronics, KIET Group of Institutions, Delhi NCR,Ghaziabad,India

Abstract: - Safe and easily available water is important for public health whether it is used for drinking, domestic use, feed production or recreational purposes. But the world is facing scarcity of pure water due to increasing of population and rapid growth if industrialization using various water treatment technologies like desalination of saline water by RO process the scarcity of pure water can be reduced. This proper deals with the controller design using Artificial bee colony optimization algorithm for solar power based water treatment plants. In this work PID controllers are used to optimize the efficiency of desalination system and the aim of photovoltaic RO desalination system is to operate in remote areas.

Cost Optimisation of Microgrid using HOMER Software – A case study of Botswana

Ravi Shanker Yadav, Nitesh Kumar Yadav, Nikhil Kumar, Masood Rizvi
Electrical and Electronics Engineering KIET Group of Institutions Ghaziabad, India

Abstract—The rapid depletion of fossil fuels, as well as their impact on the environment, stimulate the adoption of renewable energy sources as a power source. In this research, the ideal designing, size, planning and operating a micro grid for Botswana and proving a solution for the people living in Botswana, and is carried out for different scenarios while accounting for cost, environmental emissions, PV investment prices, converter costs, and fuel price. Solar PVs, generators are integrated into the Microgrid. HOMER (Hybrid Optimisation of Multiple Energy Resources), is used to carry out the simulations for optimizing Microgrid design and operational strategy for a hybrid renewable energy system which is based on these main tasks which are simulations, optimisation and sensitivity analysis.

IMF (B), 0.26 between the magnitude of intense geomagnetic storms and the peak value of associated disturbances in southward component of IMF (Bz), 0.15 between the magnitude of intense geomagnetic storms and the peak value of associated disturbances in southward component of IMF (Bz), and 0.18 between the magnitude of intense geomagnetic storms and peak value of solar wind plasma speed. Also, we have observed that out of 23 intense geomagnetic storms, 23 are associated with CMEs in which 14 (61%) halo CMEs and 9 (39%) partial halo CMEs are occurred. Hence we conclude that CMEs play crucial role for geomagnetic storms.

Car Parking Management System

Mansi Kushwaha, Utkarsh Srivastava, Lavish Chandani, Annanya Rajpal, Salim, Varun Gupta
Abhas Kanungo, Shard Gupta, Piyush Chander Ojha
KIET Group Of Institutions Delhi−NCR Ghaziabad,India

Abstract- As the development of road infrastructure is taking place at full scale, the number of private vehicles on the road is also increasing rapidly. This increase in number results in traffic congestion which affects the lives of citizens with busy schedules. A car parking management system is an affordable solution to solve this issue of heavy traffic management. This research paper consists of various steps and analyses to solve the major social issue. These advancements in the technology field of electronics and communication consist of four layers. These are Application, Middleware, Networking, and sensor layer. Totally environment friendly, reduce the emission of harmful substances during parking and is completely automated. In this research paper, we have tried to compare traditional parking systems with smart parking systems using IoT.

Fake news detection by using Machine Learning

Shivam Tripathi, Ajay Agrawal, Rakesh Gupta, Shivam Tayal
KIET Group of Institutions, Ghaziabad

Abstract: Fake information is all around us whether we can identify it or not. Individuals and organization publish fake news all the time to override the unfavorable truths. A good example of fake news is Covid -19 Vaccine Before the vaccine came out huge amounts of fake news and altered images were circulating on the internet. There were some sources stated that there was already a fully effective vaccine available, some stated that it was coming very soon, and other stated that it would take decade for safe and functional one to be released but trusting and following the wrong sources can lead to harm than good. This paper takes a look at the application of Support Vector Machine, Logistic Regression, Naïve bayes Learning techniques to identify fake news accurately. Our research looks into many textual qualities that can be used to tell the difference between bogus and genuine content. We train a variety of machine learning algorithms using various ensemble approaches and then evaluate their performance on real-world datasets using those properties. According to experimental results, the performance of our suggested ensemble learner strategy is superior to that of individual learners.

To Design an Optimal Hybrid Energy System for Havelock Island in India

Mohammad Shariz Ansari, Aishwary Gautam, Bhavishya Tomar, Madhuram Gautam
Electrical and Electronics Engineering Department, KIET Group of Institutions, Delhi-NCR, Ghaziabad, India

Abstract—The HOMER (Hybrid Optimization Model for Electric Renewables) software is used for optimization in the case of hybrid model designing. This task aims to decrease the overpriced Net Present Cost (NPC) and Cost of Energy (COE). It is a significant factor in minimizing the air pollution index by using non-conventional energy sources. The average daily radiation is 5.30 kWh/m^2/day for Havelock Island. The HOMER performs the proposed model simulation, optimization, and sensitivity analysis for thousands of combinations to give an optimal solution. Here we are using the diesel generator, PV, and battery storage for modelling purposes to obtain an optimal hybrid system. The minimized value of NPC and COE is obtained from this model. The run time and fuel cost of diesel generators are taken as sensitivity variables for simulation in HOMER. The parameter of sensitivity taken for the optimized model includes the diesel price as Rs77/L and the run times of the generators as 720 minutes. This technique of optimization leads to a decrease in pollution by 83.21%.

To design a PV/diesel/battery hybrid system for Agatti Island in India

Mohammad Shariz Ansari, Aditya Srivastava, Aditya Singh, Adesh Gupta
Electrical and Electronics Engineering Department, KIET Group of Institutions, Delhi-NCR, Ghaziabad, India

Abstract— Since diesel generators mainly generate energy in smaller isolated islands, the net present cost (NPC) and cost of energy (COE) are higher in smaller islands. The use of diesel generators is also contributing to increased pollution. As a result, this project aims to reduce NPC, COE, and pollution by utilizing renewable energy resources like solar and diesel. The study will take place on Agatti Island, the Indian union territory of Lakshadweep (UTL). At Agatti Island, the average daily radiation is 5.68 kWh/m2/day. HOMER software has been used to model, simulate, and optimize an optimal hybrid model. Diesel–PV–Battery is the model that provides the best solution. The NPC and COE are the lowest in this model. The fuel rate (Rs) has been included as a sensitivity factor in the investigation. The best system takes the sensitivity variable of Rs72/L diesel price. In addition, this ideal method cuts pollution by 90%

Stand Alone PV System with Battery Energy Storage

Shoaib Akhtar, Sachin Singh, Mayank Singhal, Yaduvir singh
Department of Electrical and Electronics KIET Group Of Institutions

Abstract: This research work is related to the learning of a Photovoltaic Storage based renewable(reversible) energy system delivering a Direct current type equipment. Here we present Photovoltaic module Single-diode model. Incremental Conductance is uses for (MPPT).It can be handled with the help of DC to DC boost Converter that is linked to each Photovoltaic arrangement unit. A storage system (battery) is straight linked to the Direct current bus; the prototypical of battery-based PV system is done with the help of MATLAB. Simulation results are done under the help of Simulink and MATLAB for a capacity energy demand and for flexible irradiation conditions of double Photovoltaic arrangements, show the rationality of the system approach

Review Paper on Face Detection and Recognition Techniques

Akshay Rathi, Abhinav Chaurasiya, Pragya
Information Technology KIET Group of Institutions (Dr.A.P.J Abdul Kalam Technical University) Ghaziabad, India

Abstract—Face recognition is a biometrics method of identifying an individual's facial features. Facial images are collected by people, and the photos are processed automatically by the recognition software. The paper discusses facial recognition research from several angles. The study explains thestages of development and the associated technologies of facial recognition. We discuss facial recognition research for realworld scenarios, as well as general assessment criteria and facial recognition databases. The description and limitations of the face datasets used to evaluate the effectiveness of these facial recognition algorithms are provided. We present the benefits and limits of these algorithms, as well as a fresh literature survey that encompasses their application beyond face identification. Finally, we conclude our study with some intriguing research topics to investigate

Competition in Retail Electricity Market – India vs USA

Sakshi Bhardwaj, Tanya Bajaj, Nitin Kumar Saxena, Vaishnavi Singh
Electrical and Electronics Engineering KIET Group of institutions, Ghaziabad, India

Abstract: Indian Power Market is a vast sector comprising several electricity generators, consumers, and organizational units such as CERC to maintain integrity several policies have also been enacted. Now compare it with the US market where Organizations like FERC maintain integrity but what happens when competition is introduced in a Regulated Market? What are the advantages and disadvantages of Competition in the Retail Electricity Market? How do the US and India deal with the challenges of Deregulation and what makes them different from each other? This paper deals with all such information in detail and also gives an outcome on how we can improve our Indian Electric Market by taking inspiration from the US market. There is a complete history of how deregulation took place in both countries and there are certain examples where the Indian Market learned from different countries about the mistakes which should be avoided while bringing competition into a Regulated Market including California i.e., the USA. Competition came earlier in the US market, so they got more experienced with its difficulties and ways of dealing with them. All such examples will also be discussed in this paper in detail.

to evaluate EV characteristics. This method cuts down on the time and money needed to create a prototype. Even if the outcomes are unsatisfactory, we can use simulation's trial-and-error methodology to obtain the desired results, which is not achievable when using the prototype implementation strategy. By installing the necessary library files, the simulation results from the software are sent to the monitor via a processor. The user can therefore utilize that monitor to examine the characteristics of his or her EVOur project uses MATLAB- SIMULINK as the simulation program. To track the parameters of the battery and motor, we built a virtual model of an electric vehicle in this software. A PID controller is created in the Simulink model to analyze the battery's operating circumstances. This battery powers an electric vehicle. Our project makes use of a Raspberry Pi 3 Model B+ processor/board.

Artificial Intelligence of things wearable System for Cardiac Disease Detection

Gaurang Srivastava,
Electrical and Electronics Engineering, KIET GROUP OF INSTITUTIONS

Abstract- cardiovascular diseases (CVDs) are a group of disorders of the heart and blood vessels. Cardiac arrhythmia is a common type of CVD that is thought to be responsible for the majority of sudden cardiac deaths. Cardiac arrhythmia is a common form of CVD that can signal a higher risk of stroke or sudden cardiac death. The ECG is the most commonly used tool for diagnosing and assessing arrhythmia risk. ECGs are devices that measure and display the electrical activity of the heart from the surface of the body. Arrhythmias may not be detected by simple ECG machines because the condition may not be present at the time. While Holter-based portable monitoring solutions can record ECGs for till 2 days, they can't provide real-time feedback for the thousands of heartbeats they collect, which must be analysed we are aiming to combine the portability of Holter monitors with the real-time processing capabilities of ECG machines to create a smartphone-based device. We created a smartphone-based wearable CVD detection platforms that can capture and display real-time ECGs, extract features, and classify beats.

Homer based optimization of solar wind diesel hybrid system for electrification in an Isolated Area

Suryansh Chahuan, Shashank Mishra, Pradeep Kumar, Mohammad Shariz Ansari
Electrical and Electronics Engineering Department, KIET Group of Institutions, Delhi-NCR, Ghaziabad, India

Abstract: - Renewable energy/elective energy-based hybrid energy systems have been considered as an effective instrument to create electrical power. For country Rural Electrification where grid expansion is uneconomical or not possible a decentralized or off-grid renewable energy-based hybrid energy system is a financial what's more, suitable choices. The motivation behind this study is to recommend the ideal hybrid energy system for Generation of Electricity from Energy sources to satisfy the energy requests of the town in India. The plan of hybrid energy system in view of SPV system, diesel generator and grid are viewed as in this review. The review depends on simulation and optimization of renewable energy system utilizing Hybrid Optimization Model for Electric Renewable (HOMER). The hybrid model has been intended to give streamlined system design in view of hybrid energy part costs, specialized determinations, and energy interest. The proposed hybrid energy system is harmless to the ecosystem which mitigates the CO_2 outflow and other ozone harming substance emanations.

Development of Grid connected Hybrid Energy System for a Technical Institute of India

Yash Vardhan Singh, Gaurav Pandey, Utkarsh Singh, Mohammad Shariz Ansari
Electrical and Electronics Engineering Department, KIET Group of Institutions, Delhi-NCR, Ghaziabad, India

Abstract—Hybrid power are the energy systems which usestwoor more different technologies/modes to produce power/Electricity. Hybrid energy system abbreviated as HESs bring together different technologies of generation methods, storage and consumption process and approaches in a single integrated system. Hybrid energy system are still an emerging technology. It is expected to that technology will continue to progress and evolve in future as it has great potential. This paper is a review of hybrid energy system (HESs) that aims for viable future options of energy sustainability. It highlights the introduction past and present research that talks about recent trends, optimization, unit sizing, modelling of components HESs etc.

Homer based optimization of a hybrid renewable energy system (HRES) for electrification in a rural area

Adishree Rastogi, Abhishek Yaduvanshi, Anjali Maurya, Mohammad Shariz Ansari, Masood Rizvi
Electrical and Electronics Engineering Department, KIET Group of Institutions, Delhi-NCR, Ghaziabad, India

Abstract--: A vast extent of the total population lives in remote rural areas that are geologically disconnected and scantily populated. The current review is based on modeling, simulation, optimization, Sensitivity Analysis, Capacity determination, and optimal sizing of hybrid renewable energy systems in rural areas of the country regions in India. Inexhaustible resource, in particular, solar photovoltaic (PV), wind turbine (WT) and Diesel are considered. We maybe realize that this will prompt the greatest expense proficiency. To limit the expense independent power framework is utilized. The HOMER software is used to study and design the proposed hybrid energy system framework model. In view of reenactment results, it has been found that renewable energy sources may replace conventional energy sources and would be a feasible solution for generating electric power at remote locations with a reasonable venture. The hybrid power system solution to electrify the region came about in the least cost combination of the hybrid power framework. This paper reviews the simulation and optimization strategies, as well as the devices existing that are expected to simulate and design hybrid renewable energy power frameworks for the generation of electricity.

Performance and Analysis of Different Drive Topologies of Electric Vehicle

Sahil Verma, Sadaf Hamid, Sakshi Kashyap
Department of Electrical and Electronics Engineering, KIET Group of Institutions Delhi NCR, Ghaziabad, India

Abstract-To move forward driving run in Electric vehicles (EV), parallel-series association of battery cells could be a need. Suppressing the circulating current within the battery board of parallel associated battery strings makes a difference progress the life expectancy of the batteries. This consider presents a comparison of the necessities of parallel strings of batteries in three distinctive wellknown topologies for open conclusion winding acceptance engine (IM) drives in EV. The topologies analyzed are a 3-phase voltage source inverter (VSI), a Double encouraged inverter and three singlephase H-Bridge VSIs. These converters are balanced utilizing Space vector beat width tweak (SVPWM) because it has way better execution compared to Sine PWM. MATLAB-Simulink models are created for the converter topologies. The reenactment comes about appear that the three singlephase inverter topologies nourishing the drive is the leading elective when compared on the premise of battery necessity and switch misfortune. Besides, each H-bridge inverter (within the three single-phase). In this survey a brief survey of the current patterns and future vehicles strategies are depicted.

Smart Electric Vehicle

Saurabh patel, Ritik soni
Electrical and Electronics Engineering Department Kiet Group Of Institutions

Abstract: Today, the entire economic, social and political life of a modern country depends on an efficient transport system. In such a case, hydrocarbon fueled vehicles, i. H. Internal combustion engines, mainly used in transport vehicles. However, the main disadvantage is the extinction of fossil fuels (hydrocarbons). To solve this problem, the electric vehicle (EV) was discovered. Compared to EV and IC motors, EVs have higher efficiency and power-to-weight ratio. Normally, electric vehicles use DC motors, which have a lower speed range compared to internal combustion engines, and therefore cannot effectively and efficiently meet customer needs. Recent studies show that AC induction motors have a higher RPM range, higher efficiency and higher power-to-weight ratio compared to DC electric vehicles and internal combustion engines. Arduino System is used as a controller.

Blockchain Application In Healthcare Industry

Dr. Varun Gupta, Keshav Agrawal, Harshit Varshney
Electrical and Electronics Engineering KIET Group Of Institutions Ghaziabad, India

Abstract— Patients in the current situation might have access to their health records at several hospitals in the local region. When this occurs, getting patients' access to fragmented health records from several sources into a single chain

to evaluate EV characteristics. This method cuts down on the time and money needed to create a prototype. Even if the outcomes are unsatisfactory, we can use simulation's trial-and-error methodology to obtain the desired results, which is not achievable when using the prototype implementation strategy. By installing the necessary library files, the simulation results from the software are sent to the monitor via a processor. The user can therefore utilize that monitor to examine the characteristics of his or her EVOur project uses MATLAB- SIMULINK as the simulation program. To track the parameters of the battery and motor, we built a virtual model of an electric vehicle in this software. A PID controller is created in the Simulink model to analyze the battery's operating circumstances. This battery powers an electric vehicle. Our project makes use of a Raspberry Pi 3 Model B+ processor/board.

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Adishree Rastogi, Abhishek Yaduvanshi, Anjali Maurya, Mohammad Shariz Ansari, Masood Rizvi
Electrical and Electronics Engineering Department, KIET Group of Institutions, Delhi-NCR, Ghaziabad, India

Abstract--: A vast extent of the total population lives in remote rural areas that are geologically disconnected and scantily populated. The current review is based on modeling, simulation, optimization, Sensitivity Analysis, Capacity determination, and optimal sizing of hybrid renewable energy systems in rural areas of the country regions in India. Inexhaustible resource, in particular, solar photovoltaic (PV), wind turbine (WT) and Diesel are considered. We maybe realize that this will prompt the greatest expense proficiency. To limit the expense independent power framework is utilized. The HOMER software is used to study and design the proposed hybrid energy system framework model. In view of reenactment results, it has been found that renewable energy sources may replace conventional energy sources and would be a feasible solution for generating electric power at remote locations with a reasonable venture. The hybrid power system solution to electrify the region came about in the least cost combination of the hybrid power framework. This paper reviews the simulation and optimization strategies, as well as the devices existing that are expected to simulate and design hybrid renewable energy power frameworks for the generation of electricity.

Performance and Analysis of Different Drive Topologies of Electric Vehicle

Sahil Verma, Sadaf Hamid, Sakshi Kashyap
Department of Electrical and Electronics Engineering, KIET Group of Institutions Delhi NCR, Ghaziabad, India

Abstract-To move forward driving run in Electric vehicles (EV), parallel-series association of battery cells could be a need. Suppressing the circulating current within the battery board of parallel associated battery strings makes a difference progress the life expectancy of the batteries. This consider presents a comparison of the necessities of parallel strings of batteries in three distinctive wellknown topologies for open conclusion winding acceptance engine (IM) drives in EV. The topologies analyzed are a 3-phase voltage source inverter (VSI), a Double encouraged inverter and three singlephase H-Bridge VSIs. These converters are balanced utilizing Space vector beat width tweak (SVPWM) because it has way better execution compared to Sine PWM. MATLAB-Simulink models are created for the converter topologies. The reenactment comes about appear that the three singlephase inverter topologies nourishing the drive is the leading elective when compared on the premise of battery necessity and switch misfortune. Besides, each H-bridge inverter (within the three single-phase). In this survey a brief survey of the current patterns and future vehicles strategies are depicted.

Smart Electric Vehicle

Saurabh patel, Ritik soni
Electrical and Electronics Engineering Department Kiet Group Of Institutions

Abstract: Today, the entire economic, social and political life of a modern country depends on an efficient transport system. In such a case, hydrocarbon fueled vehicles, i. H. Internal combustion engines, mainly used in transport vehicles. However, the main disadvantage is the extinction of fossil fuels (hydrocarbons). To solve this problem, the electric vehicle (EV) was discovered. Compared to EV and IC motors, EVs have higher efficiency and power-to-weight ratio. Normally, electric vehicles use DC motors, which have a lower speed range compared to internal combustion engines, and therefore cannot effectively and efficiently meet customer needs. Recent studies show that AC induction motors have a higher RPM range, higher efficiency and higher power-to-weight ratio compared to DC electric vehicles and internal combustion engines. Arduino System is used as a controller.

Blockchain Application In Healthcare Industry

Dr. Varun Gupta, Keshav Agrawal, Harshit Varshney
Electrical and Electronics Engineering KIET Group Of Institutions Ghaziabad, India

Abstract— Patients in the current situation might have access to their health records at several hospitals in the local region. When this occurs, getting patients' access to fragmented health records from several sources into a single chain

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Certificate of Presentation

This is to certify that

Dr. Mohammad Shariz Ansari

from *KIET Group of Institutions, Ghaziabad*

has presented his/her research paper ***To Design an Optimal Hybrid Energy System for Agatti Island in India***

in the **2nd International Conference on Signals, Machines & Automation (SIGMA) 2022,** held from 5th to 6th August 2022, at **Netaji Subhas University of Technology**, New Delhi, India.

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Prof. Asha Rani
General Chair, SIGMA-2022 &
HoD EE/ICE, NSUT

Dr. Bhavnesh Kumar
Organizing Chair
SIGMA-2022

at the appropriate time remains a significant problem, especially when they are in a critical state. This study uses blockchain smart contracts to provide a governed response to the needs of patients, doctors, and the healthcare industry. To develop a smart e-health system, the suggested solution proposes to share health data over a blockchain platform. Also, the consumers and suppliers of healthcare services continue to place a high priority on the security and privacy of electronic health records (EHRs). Sensitive health information is exposed when a healthcare system is breached. Typically, this data is maintained in centralized databases, which introduces security flaws and encourages cyberattacks. With cryptographic hash algorithms, this system offers great security and integrity. The suggested Blockchain-based architecture is intended to improve the sturdiness of healthcare management systems and to get around known security flaws in existing systems for smart healthcare. The proposed system's superiority and solidity in terms of security and privacy requirements, key components of blockchainbased healthcare systems, and performance measures including various throughput and latency have been demonstrated by performance evaluation results from Hyperledger Caliper and proper evaluation.

Renewable (Solar)Energy and Grid Integration

Dr. Surendra Tripathi, Shivam Juyal, Shubham Yadav, Utkarsh Goyal
KIET Group of Institutions

Abstract—This paper presents review/research on grid Integration and power quality issues associated with the integration of renewable energy systems in to grid. The aim of this research paper is to investigate the potential of solar grid integration in order to provide a comprehensive understanding of the current status and future perspectives of this technology. Solar grid integration has been identified as a key area of research in the field of renewable energy, due to its potential to significantly increase the share of solar PV in the global energy mix. Despite the considerable progress made in recent years, there are still many challenges that need to be addressed in order to make solar grid integration a reality. This research paper will provide an overview of the current state of solar grid integration research, as well as the challenges that need to be overcome in order to make it a viable option for the future.

Digital Sensor Based Temperature Control

Prashant Prakash, Viraj Kumar
Electrical & Electronics Engineering, KIET Group Of Institutions Ghaziabad

Abstract— Temperature beyond a certain limit can be dangerous and is totally the waste of energy so the main objective of this review paper is to basically control the temperature when it goes beyond a certain limit or to bring back the temperature to the desired level so that the wastage of energy can be reduced. It will also be helpful in monitoring the changes in the environment, in near future this can be used by the industries or in an electronic devices and also to assist people who are disabled and are unable to control the speed of the fan. Another objective of this review paper is to study and build an automatic system using microcontroller and its interfacing with other devices. Nowadays, in day to day life arduino is most common device used because of it's many advantages like it support many devices.

Energy Market, Value-Added Services (US-India Market Policies)

Shashwat Singh Maurya and Nitin Kumar Saxena
KIET Group of Institutions

Abstract: Power and Energy advancement is among the most critical part of foundation, vital for the financial development and government's (economical and welfare) assistance of countries. The presence and advancement of satisfactory framework is fundamental for supported development of the Indian economy. With the exponential growth in the power consumption in India, it becomes quite necessary to regulate the retail cost of power supply across the grids and opportunity to obtain Value Added Services (VAS). The role of Third-party providers comes into play under these opportunities, which will be evident in the latter part of the paper. Electric organization offers VAS which ought not be restricted to explicit population. In the event that the objective is to make a market where numerous VAS are accessible to numerous clients as it would be prudent (limiting the pool of market members isn't to the greatest advantage of clients). The goal is to make change the customers into 'Prosumers'.

IoT Based Conditioning Monitoring of The Battery

Atul Barthwal, Varun Sharma, Vaibhav Pathak, Nitin Kumar Saxena
Electrical and Electronics Engineering, KIET Group of Institutions, Delhi-NCR, Ghaziabad

ABSTRACT: This paper describes the application of the Internetof-things (IoT) in monitoring the performance of electric vehicle batteries. Electric vehicles (EVs) pull in around the globe because they have a benefit of energy saving and environmental protection. High Penetration of Electric Vehicles in the world market makes an additional demand on the power system at peak time. In this work, the idea of monitoring the performance of the vehicle using IoT techniques is proposed, so that the monitoring can be done remotely from anywhere in the world. This paper discusses the making and working of a battery management system (BMS) that can monitor the battery remotely from anywhere in the world through smartphones or laptops. With the help of a remote application for monitoring the battery user can check their batteries remotely.

Comparative Study of Solar Power Generation using boost converter and MPPT Technique

Sanskriti Sharma, Samarth Shukla, Vaasu Gupta, Shruti Pandey
Electrical and Electronics Engineering KIET Group of Institutions

Abstract--Sun based energy is considered as one of the quickest developing environmentally friendly power sources after wind energy for electrical power age and is bountiful and costless in nature. The power age from sun oriented photovoltaic framework for the most part relies on ecological circumstances like temperature and irradiation. Output power of PV system mostly depends on irradiation and its affects is shown on PV output current. To achieve constant voltage on load end closed loop control of DC -Dc boost converter is needed. The result from PV boards is DC subsequently for AC load applications two phase transformation circuits are required, for example DC-DC converter for Maximum power point tracking (MPPT) and a DCAC inverter to accomplish wanted AC voltage and recurrence. In this paper, perturb and observe algorithm is used as MPPT with Boost converter and then inverter is used which is intended to change the DC voltage over to cleaved AC voltage and separated to give unadulterated sinusoidal AC yield. Experiment of whole PV system is done on MATLAB Simulink. This paper is about extracting the maximum power output from PV panel under varying solar irradiance, temperature, and load conditions. P&O method helps in tracking the maximum power Point. MPPT technique algorithm is used here to adjust the impedance seen by the solar panel to keep the PV system operating at or close to the peak power point of PV panel under different condition of temperature and irradiance. Pure sine AC wave is getting generated as an output of the PV system after using suitable inverter.

Identification of plants using deep learning for medicinal purposes

Atulya Kairati, Prof. Arun Kumar, Adarsh Kumar, Avanish Maurya
Electrical and Electronics Dept. KIET Group of Institutions

Abstract—Identifying plant species from observations requires indepth knowledge of the plants which the average individual lacks. Traditional identification of plant species is nearly impossible for the general public, for farmers, forest workers, and even experts who routinely deal with plant problems. Species identification is often a difficult task, even for botanists themselves. The natural world contains many herbs and plants which can be used to treats various ailments but due to lack of knowledge these resources remains untapped by the general public. This paper presents an application which utilizes a deep learning model with a Convolutional Neural Network (CNN) to identify the plants contained in an image. And then present the general users with the uses and medicinal values of the plant. The classification results show that the CNN model is effective for plant detection with the highest accuracy of 99.22%.

Augmented Reality Based Geo Tagging Task Management System

Kritika Singh, Salim, Udit Agarwal, Abhas Kanungo, Dr. Varun Gupta
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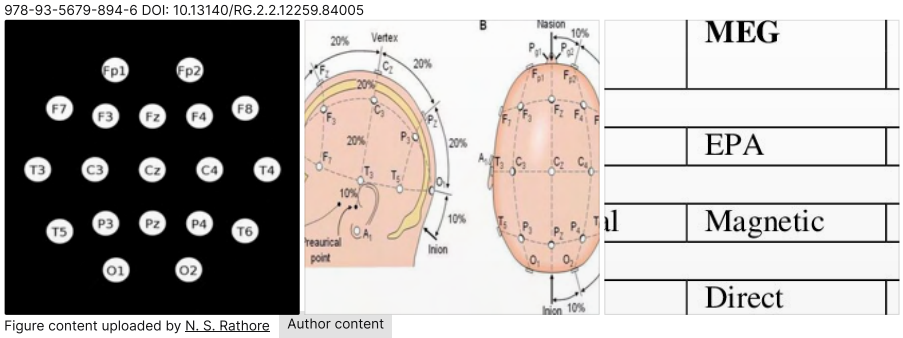


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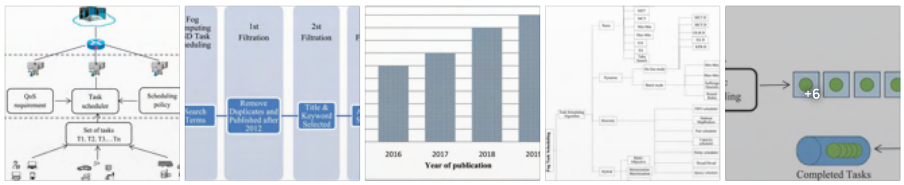
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Task scheduling approaches in fog computing: A systematic review

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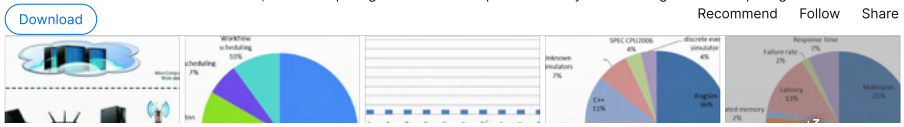
August 2020

International Journal of Communication Systems

Mohammad Reza Alizadeh · Vahid Khajehvand · Amir Masoud Rahmani · Ebrahim Akbari

The Internet of Things (IoT) interconnects billions of physical objects to collect and exchange information and makes available various applications. Despite all the advantages of the IoT, some of its applications are not feasible because of the existing restrictions in the IoT sensors. To overcome these restrictions, cloud computing has been developed in recent years. Although cloud computing has removed...

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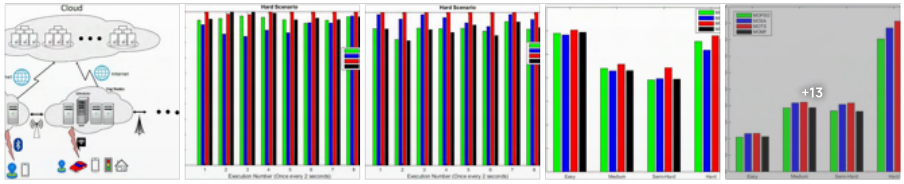
January 2021

International Journal of Networked and Distributed Computing

Khaled M. Matrouk · Kholoud Al-atoun

Over the last recent years, applications related to the internet of things have become the most important techniques in the world that facilitate interactions among humans and things to enhance the quality of life. So, the number of devices used in these applications will increase, leading to the creation of huge amounts of data. Cisco proposed fog computing in 2012, which located between the end-users...

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Cluster Computing

Abbas Najafizadeh · Afshin Salajegheh · Amir Masoud Rahmani · Amir Sahafi

Fog Computing continues to extend its usage by solving cloud computing challenges about Internet of Things (IoT). Fog nodes as a processing resource, can perform tasks generated by IoT devices. IoT as a client are concerned with the timely execution of their tasks and also lower cost services, and on the other hand, they are looking for a secured task execution. In this paper, we propose a multi-...

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Concurrency and Computation Practice and Experience

Muhammad Fahad · Mohammad Shojafar · Mubashir Abbas · [...] · Humaira Ijaz

Fog computing is a novel, decentralized and heterogeneous computing environment that extends the traditional cloud computing systems by facilitating task processing near end-users on computing resources called fog nodes. These diverse and resource-constrained fog devices process a large volume of tasks generated by various fog applications. These tasks are generated by various applications, some ...

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November 2022

Dinesh G. Harkut · Prachi Thakar · Lovely Mutneja

Internet applications generate massive amount of data. For processing the data, it is transmitted to cloud. Time-sensitive applications require faster access. However, the limitation with the cloud is the connectivity with the end devices. Fog was developed by Cisco to overcome this limitation. Fog has better connectivity with the end devices, with some limitations. Fog works as intermediate layer betwee...

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the period of solar cycle 24 and used to represent relation between intense geomagnetic storms and solar activity parameters. One of the main solar phenomenons is CMEs, when occurred earth directed, produce geomagnetic storms. It is also observed that these intense geomagnetic storms are associated with disturbances in solar wind plasma parameters. Positive correlation with correlation coefficient 0.48 has been found between the magnitude of intense geomagnetic storms and the peak value of IMF (B), 0.37 has been found between the magnitude of intense geomagnetic storms and the magnitude of IMF (B), 0.26 between the magnitude of intense geomagnetic storms and the peak value of associated disturbances in southward component of IMF (Bz), 0.15 between the magnitude of intense geomagnetic storms and the peak value of associated disturbances in southward component of IMF (Bz), and 0.18 between the magnitude of intense geomagnetic storms and peak value of solar wind plasma speed. Also, we have observed that out of 23 intense geomagnetic storms, 23 are associated with CMEs in which 14 (61%) halo CMEs and 9 (39%) partial halo CMEs are occurred. Hence we conclude that CMEs play crucial role for geomagnetic storms.

Car Parking Management System

Mansi Kushwaha, Utkarsh Srivastava, Lavish Chandani, Annanya Rajpal, Salim, Varun Gupta
Abhas Kanungo, Shard Gupta, Piyush Chander Ojha
KIET Group Of Institutions Delhi−NCR Ghaziabad,India

Abstract- As the development of road infrastructure is taking place at full scale, the number of private vehicles on the road is also increasing rapidly. This increase in number results in traffic congestion which affects the lives of citizens with busy schedules. A car parking management system is an affordable solution to solve this issue of heavy traffic management. This research paper consists of various steps and analyses to solve the major social issue. These advancements in the technology field of electronics and communication consist of four layers. These are Application, Middleware, Networking, and sensor layer. Totally environment friendly, reduce the emission of harmful substances during parking and is completely automated. In this research paper, we have tried to compare traditional parking systems with smart parking systems using IoT.

Fake news detection by using Machine Learning

Shivam Tripathi, Ajay Agrawal, Rakesh Gupta, Shivam Tayal
KIET Group of Institutions, Ghaziabad

Abstract: Fake information is all around us whether we can identify it or not. Individuals and organization publish fake news all the time to override the unfavorable truths. A good example of fake news is Covid -19 Vaccine Before the vaccine came out huge amounts of fake news and altered images were circulating on the internet. There were some sources stated that there was already a fully effective vaccine available, some stated that it was coming very soon, and other stated that it would take decade for safe and functional one to be released but trusting and following the wrong sources can lead to harm than good. This paper takes a look at the application of Support Vector Machine, Logistic Regression, Naïve bayes Learning techniques to identify fake news accurately. Our research looks into many textual qualities that can be used to tell the difference between bogus and genuine content. We train a variety of machine learning algorithms using various ensemble approaches and then evaluate their performance on real-world datasets using those properties. According to experimental results, the performance of our suggested ensemble learner strategy is superior to that of individual learners.

To Design an Optimal Hybrid Energy System for Havelock Island in India

Mohammad Shariz Ansari, Aishwary Gautam, Bhavishya Tomar, Madhuram Gautam
Electrical and Electronics Engineering Department, KIET Group of Institutions, Delhi-NCR, Ghaziabad, India

Abstract—The HOMER (Hybrid Optimization Model for Electric Renewables) software is used for optimization in the case of hybrid model designing. This task aims to decrease the overpriced Net Present Cost (NPC) and Cost of Energy (COE). It is a significant factor in minimizing the air pollution index by using non-conventional energy sources. The average daily radiation is 5.30 kWh/m^2/day for Havelock Island. The HOMER performs the proposed model simulation, optimization, and sensitivity analysis for thousands of combinations to give an optimal solution. Here we are using the diesel generator, PV, and battery storage for modelling purposes to obtain an optimal hybrid system. The minimized value of NPC and COE is obtained from this model. The run time and fuel cost of diesel generators are taken as sensitivity variables for simulation in HOMER. The parameter of sensitivity taken for the

from different countries about the mistakes which should be avoided while bringing competition into a Regulated Market including California i.e., the USA. Competition came earlier in the US market, so they got more experienced with its difficulties and ways of dealing with them. All such examples will also be discussed in this paper in detail.

Comparative Study on Brain Tumour Detection

Anurag Gautam, Saurabh, Abhishek Shankar, Mohd. Shahroon
Department of Information Technology KIET Group of Institutions, Ghaziabad, India

Abstract— In today's world, technologies such as machine learning, artificial intelligence and deep learning are growing exponentially. These technologies came up with a huge change in our healthcare system. Earlier we did not have such advanced medical machines and nowadays we can see many medical machines which are automated and provide accurate medical reports. There are many harmful diseases which on identifying late can cause life loss. One of them is Brain tumor. A brain tumor is a condition that can cause permanent harm to the brain and is potentially fatal. A brain tumor occurs when abnormal cells form within the brain. The average size of a brain tumor doubles in just twenty-five days, indicating that it grows quickly. If the treatment is inadequate, the patient's survival rate is usually less than half a year. In this paper we have studied many papers which give techniques to detect the brain tumor. We have analyzed these techniques and on the basis of those studies, we came up with a different solution which will show us if the tumor detected is malignant(cancerous) or benign(non-cancerous). There are various type of problems and challenges occurred in implementing the techniques discussed in this paper. However, we proposed a solution which can overcome those challenges and problems and helps in treatment of the tumor

F-Transform Based Brain Tumor Detection Using Classification Techniques

Anurag Gautam, Saurabh, Abhishek Shankar, Mohd. Shahroon
Department of Information Technology KIET Group of Institutions, Ghaziabad India

Abstract— In brain tumor detection and segmentation research, MRI images have shown to be extremely beneficial. We can see a brain tumor on MRI images. MRI images can be used to detect a typical tissue growth and blood blockages in the neurological system. The first step in detecting a brain tumor is examination of the symmetric and asymmetric shape of the brain, that will help to identify all the abnormalities. The following phase is segmentation, for segmentation, we used canny edge detection process and then Otsu algorithm to convert grey level image to binary image. In MRI, the two techniques are utilized to design the image: F-Transform and Morphological operation. After segmentation, we used feature extraction processes to extract correlation, contrast, energy, homogeneity, mean, standard deviation, entropy and root mean square (RMS). The extracted features are utilized in this case to provide specific information, such as rebuilding missing edges and extracting quiet edges. Then classification helps us to classify the tumor type. For classification, we have used support vector machines (SVMs) and Convolutional neural network (CNN). The accuracy and clarity of an MRI image are interdependent.

Performance analysis of grid connected solar energy power conservation system under varying conditions

Yogita, Shirshak Shukla, Vaibhav singh
Department of Electrical and Electronics Engineering KIET group of Institutions Ghaziabad

Abstract - The aim of the project is to comprehend the effect of grid disturbances on implementation of grid connected PV based solar energy conversion system. The disturbance and fluctuation targeted for the study may be due to external condition such as Irradiance, temperature at different atmospheric conditions. This study will be executed out on the system designed at distribution level (3ϕ, 415 Volts). Grid interconnectedness of photovoltaic (PV) power genesis systems is better off in effective application of yielded power as there are no reposition losses involved. The MATLAB environment run project model includes PV cell modelling, P&O Algorithm, Boost Device, Inverter, and a Phase Locked Loop along with some filters.

An efficient home automation system based on internet-of-things

Afraz Khan, Shubham Sachan, Suboor Azhar, Pushpendra Singh, Varun Gupta,

Abstract—Identifying plant species from observations requires indepth knowledge of the plants which the average individual lacks. Traditional identification of plant species is nearly impossible for the general public, for farmers, forest workers, and even experts who routinely deal with plant problems. Species identification is often a difficult task, even for botanists themselves. The natural world contains many herbs and plants which can be used to treats various ailments but due to lack of knowledge these resources remains untapped by the general public. This paper presents an application which utilizes a deep learning model with a Convolutional Neural Network (CNN) to identify the plants contained in an image. And then present the general users with the uses and medicinal values of the plant. The classification results show that the CNN model is effective for plant detection with the highest accuracy of 99.22%.

Augmented Reality Based Geo Tagging Task Management System

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Abstract—With the coming of the Android framework, smartphones are quickly created and through the convenience of getting to the web on the keen phones, a user's area data can be gotten to anyplace and anytime effectively. Expanded Reality Based Innovation empowers the arrangement of assortment data such as pictures and area of buildings within the route field. Most of the increased reality programs utilized Visual Follow Strategy (Marker strategy and Marker less Strategy). For the Visual Follow Strategy, the marker establishment, and computerized data ought to be doled out whereas the Non-visual Follow Strategy requires the utilization of equipment (G.P.S, sensors etc). Most route frameworks can as it were to appear the way from a user's current area to their goal. In this paper, the plan and usage of an expanded reality program is examined. It'll utilize the keen phone's inbuilt camera and GPS to show a user's encompass data in genuine time on the smartphone. The suggested system will mix G.P.S location-based technology with virtual trace technology to give users a task management tool for large scale physical organization for geotagging tasks.

Off Grid Solar Powered Room

Jyoti Srivastava, Sanskar Baliyan, Shivang Misra
KIET Group of Institutions Ghaziabad

Abstract- In today's world, the electricity demand and its price is continuously rising. Also, there are a lot of energy crisis as most of the energy is produced from non-renewable and exhaustible sources. To overcome this, the world starts looking at renewable energy sources for fulfillment of its power needs. In past decade, solar energy came out to be a promising alternative, renewable energy source because of its falling costs and improved efficiencies. Also, the solar energy produced by the sun is non-vanishing and renewable which is present in nature in abundance. Solar energy can be produced commercially or domestically according to its use in industries, commercial and domestic uses. In the present scenario, solar energy is also used for powering the whole house. In this paper, focus has been given on powering a single room of a house with different electrical appliances and on the challenges associated with it. In the same way analysis of each and every room of the house can be done and hence, whole load of the house can be connected to solar energy

Performance Analysis of a PMSG Based Wind Energy Conversion System

Arika Singh Shubham Upadhyay, Tanishka Singh
Dept of EN, KIET Group of Institutions, Ghaziabad, India

Abstract— Wind energy is one of the most promising renewable energy sources that is being used today. There is a system called as wind energy conversion system popularly known as WECS which is used in the conversion of this widely available wind energy source into different forms for further use. There are different types of generators that are used for this purpose such as Permanent magnet synchronous generator (PMSG), Squirrel cage Induction generator (SCIG), Doubly fed Induction generator(DFIG) etc. In this research paper we have studied

Performance Analysis of Solar PV System Under Partial Shading Conditions

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Abstract—Around the world, shading has been identified as one of the major problems associated with the successful and efficient operation of photovoltaic systems. Shading may be caused by adjacent development, fog, falling or litter from feathered animals, etc., which will reduce the amount of electricity generated by the PV system. Generations under PV partial shading can be extended by suitably selecting PV array configurations and reconfiguration schemes. This paper provides a comprehensive survey of various PV arrays under working configuration and reconfiguration conditions.Efficiency in terms of maximum power output, shedding loss, fill factor and mismatch loss configurations, i.e. series-parallel (SP), cellular (HC), total cross-tide (TCT), bridge (BL) and reconfiguration IE; for four Evaluating OddEven (OE) Case Study in Different Shedding Situations The results are compared with 7 7 PV array configurations for the same shading cases. The investigation has been extended to identify the consequences of including bypass diodes in the power output of each module. Research also shows that the shading scenario determines the maximum instantaneous power output of the PV array.The results show that for all shaded case studies considered, OE reconfiguration provides superior performance in terms of maximum power output.

Feasibility Check Of Existing Power System On Expansion Through Etap

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Rajeev Saxena AGM-Elect Reliance Industries Limited Gujrat, India

Abstract—Short circuit levels are increasing at various substations over the design limit as a result of grid growth, increase of thermal and renewable production, and addition of transmission lines in the transmission network. These shortcircuit currents produce thermal as well as mechanical stress to the equipment, which might lead it to fail. Short circuit current must therefore be reduced and controlled. One approach is updating the protective equipment so that the predicted fault-current stays within the limits of the system. This usually entails the substation being completely rebuilt. It is an extremely costly option. Due to large quantity of items that must be replaced, redesigned, and tested; Upgrading the existing substations can be a time-consuming procedure. Short circuit levels can be reduced using a variety of techniques, including (1) Current Limiting Reactors, (2) High Impedance Transformers, (3) Is limiters, (4) Bus Bar Splitting techniques in substations, (5) Disconnection of some lines from the critical substation, (6) HVDC links, (7) Design of Higher Voltage transmission networks, and so on. The goals of this paper are to simulate a case study using up-rating circuit breakers and high-impedance transformer approaches, and to find the best ways for controlling and reducing EHV Substation short circuit levels.

Artificial Bee colony Based Controller Design for Automatic Generation Control in Multi Area Power System

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Abstract- This paper presents an efficient and fast controller tuning method for automatic generation control (AGC) in multi area power system using artificial bee colony optimization (ABC) technique. Proportional integral and derivative (PID) controller with derivative filter is employed in the system to obtained minimized noise response in the input stage. The response of PIDN controller is obtained with the help of ABC optimization procedure. ABC algorithm proven its successful implementation in large scale nonlinear problems. In this procedure integral square error (ISE) is considered here as the performance measure. The multi area power system model is considered in the paper for the simulation purpose. The simulation studies are carried out in the MATLAB/ Simulink Software. The simulation results of the proposed ABC based controller is also compared with the wellknown Zeigler-Nichols (ZN) method of PIDN controller tuning method. The steady state responses are found satisfactory using proposed method of tuning for the multi area AGC system in terms of settling time, rise time, overshoot, and undershoot parameters.

PID Controller Design For Three Tank System

Arpita Bajpai, Akash Rana, Dr. Natwar Singh Rathore, Prof Alok Kumar Pandey
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Abstract- Through the paper, we come to know how a PID controller is useful in the designing of a Three Tank System. The aim behind the design is to acknowledge the ratio and mixing process level in the tanks. In this procedure, we let know about the processes carried out and PID controller design. ZN method which is popularly known as Ziegler Nicholas is used for obtaining the control parameters and recognizing the process. Ziegler Nicholas is a Rule-Based Design Criterion method.

FIR Management Portal

Tarun Tyagi, Anubhav Trivedi, Udisha Agarwal
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Abstract: - With a very fast-changing World and even faster-changing country. It is very important for a country with the population size of India to be able to govern itself properly. One major pillar of good governance is law enforcement. But if we compare India's law enforcement agencies to the agencies of the countries India wants to compete against, there lies a huge gap in varied aspects that help the agencies. One major factor that hinders the agencies apart from the lack of a sizeable budget is the use of technology. As of 2022, a huge chunk of datakeeping or record maintenance is done on papers, and no corresponding record of those documents is digitalized. Major agencies like the Central Bureau of Investigation (CBI), the Narcotics Control Bureau (NCB), etc are still not connected to the local police stations according to the National Crime Records Bureau (NCRB) annual report. This affects the functioning of the agencies as without proper data, the agencies are virtually blind to lot of happenings in the constituent areas and justice due to that is either served late or not at all. According to the report of Reuters, nearly 50% of the crimes go unreported in metro cities alone due to the ignorance of police and other agencies. And the story is not different from this in other states as well. Moreover, due to lack of data sharing among the states, the criminals run to other states without getting properly punished for their deeds. And may repeat the crime again. To solve this issue the Criminal Procedure (Identification) bill has also been introduced in the lower house of the Indian parliament. The bill aims to integrate all the stations together. an FIR management portal also is very crucial both for the government to keep better records and for the people to report the incidents to be handled by enforcement agencies. Therefore not just an app or a portal but a user friendly and efficient portal is needed to bridge this gap.

Novel Scheme to Minimize Speed Variation in DC Series Motor

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Abstract—A DC series motor has high starting torque but with a drawback that increase in load results significant fall in speed. In this paper it is proposed that with the use of thermistor in field winding of DC series motor, speed variation can be minimized. In case of increase in load, motor will draw more current than subsequently temperature of NTC thermistor will increase and current through field winding will decrease, result in decrease in flux which will oppose fall in speed

Stock Price Prediction using Machine Learning

Sameer Kumar, Ajay Agarwal, Rishabh Mudgal, Siddharth Gautam
Information Technology KIET Group of Institutions Ghaziabad, India

Abstract— The future is unknown and uncertain, but there are ways to forecast upcoming events and reap the rewards safely. One such possibility is the use of machine learning and artificial intelligence to forecast stock markets. It is an extremely tough job due to eruptive and unpredictable identity of the markets. This study introduce a contrast of the forecasting by initializing discrete models. In this work we use four different machine learning models for the cost foretelling of Reliance stock listed in NSE and correlate their accuracy. The accuracy of the models were estimated using MAE.

A Review on Various Techniques for Speed Control of DC Motor

Abhinav Verma, Aditya, Natwar Singh Rathore
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Abstract- In this paper, the tuning methods of PID controller are described which play a significant role in designing a speed controller for DC motor. PID controllers are operated using a tuning algorithm in association with a suitable performance criteria to get a highly accurate result. The comparison between ZN Algorithm, PSO and GA has also been made on the basis of their response and simplicity of algorithm.

Renewables Forecasting Analysis for ANN, Deep Learning and Fuzzy Time Series

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Abstract— Forecasting for renewable energy is becoming more important as the amount of energy generated from these sources increases. Forecast skill is improving, but so too is the way forecasts are being used. In this paper, a brief overview of the state-of-the-art of forecasting wind and solar energy is presented. Here approaches in statistical and physical modeling for time scales from minutes to days ahead, for both deterministic and probabilistic forecasting is described. Our focus changes then to consider the future of forecasting for renewable energy. We discuss recent advances which show potential for a great improvement in forecast skills. Beyond the forecast itself, we consider new products which will be required to aid decision- making subject to risk constraints. Future forecast products will need to include probabilistic information but deliver it in a way tailored to the end-user and their specific decision-making problems. Businesses operating in this sector may see a change in business models as more people compete in this space, with different combinations of skills, data, and modeling being required for different products. The transaction of data itself may change with the adoption of blockchain technology, which could allow providers and end-users to interact in a trusted, yet decentralized way. Finally, we discuss new industry requirements and challenges for scenarios with high amounts of renewable energy. New forecasting products have the potential to model the impact of renewables on the power system, and aid dispatch tools in guaranteeing system security.

Renewables Forecasting For a more sustainable Future

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Abstract — Renewable energy technologies have gotten a lot of attention in the previous ten years. They do, however, provide an element of unpredictability in terms of supply and demand. With the use of reliable forecasting techniques, the risk associated with these issues can be reduced. A forecasting tool could be immensely valuable for tasks such as electricity grid management and energy trading. This review paper includes a review of 10 such papers that used various technologies to develop a successful forecasting tool. The methodology is discussed and the conclusion is drawn for your reference. Improved forecasting techniques could help dispatch tools ensure system security and simulate how renewable energy will affect the electricity system.

Statistical Techniques for SFRA Diagnosis of Distribution Transformers

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Abstract— Distribution transformers are continually subjected to thermal stress in addition to electrical stresses. These stresses might be affecting the physical parts of the transformer such as windings or core. . SFRA diagnosis is dependent the on comparative analysis of SFRA signatures. Any substantial variations in the frequency band which vary from low to high region indicate that the electrical or mechanical framework of the transformer is affected. For

interleaving capability, multiple input and output capability and performance, Each converter topology have certain advantages over other in different aspect, efficiency Analysis have also been carried out for different scenarios, The simulation results are provided for both converter types.

Comparative Performance Analysis of PV Fed Boost Converter

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Abstract—The paper discusses the design and modelling of a DC-DC converter through the comparative study of the conventional controllers and fuzzy logic controller using voltage output as feedback to improve the overall performance of the boost converter significantly by using MATLAB and Simulink software. The purpose of the study is to develop a fuzzy logic controller for the optimal performance and enhancement of a boost converter. Fuzzy logic control algorithm is used to design the fuzzy logic controller. The design of the components and calculation has been done in such a way to ensure that the operation of the converter is in continuous stability. The comparison and the analysis of the output through the fuzzy logic controller and the traditional controllers has been performed with the help of simulation software using MATLAB between both, open loop as well as closed loop circuit. The result of the simulation and modelling proves that the output voltage is controlled in steady state condition for the boost converter by using this methodology.

Simulation for SOC estimation and performance analysis of batteries at FTP-72 Drive cycle

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Abstract – Battery technology has been a backbone in electric vehicles, renewable energy storage for later use, and hybrid electric vehicles (HEV), as batteries are used for a multitude of purposes in everyday life, ranging from providing the initial power needed to start vehicles' engines to acting as a power source in the event of a power outage. Lithium Ion (Li-ion), Lead acid are the most common batteries used in electric vehicles. An Electric Vehicle model is constructed using the software MATLAB Simulink for a full comparison of these batteries' base upon discharge of the battery (SOC DISCHARGE) for a specific range. For simulating the model, the FTP – 72 Drive cycle is used, and the Simulink model runs for a specific range. It is noticed how much battery is depleted that is, SOC degradation of different batteries, for the same range. The wind speed is set to 10 km/hr.

Arc Flash Analysis using Electrical Transient Analyzer Program (ETAP)

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Abstract — The explosion caused by arc flash can damage the life of mortal beings it has intensity equal to the face temperature ofthe sun. This is as dangerous as it can burn the whole body and leadto the death of the person who near the outfit. Along with producing heat the arc flash also produces a high quantum of pressure and high quantum of sound which can cause critical issues like blindness and blast injuries. In this work the our end isto do analysis of occurrence of arc of the area by the use of ETAP Software and calculate the flash boundary and amount of incident energy at the distance in which a person can work and it suggest us to which position of PPEkit a person should wear to perform a testing or work in the live position.

Solar Power Based Reverse Osmosis Desalination System

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Abstract: - Safe and easily available water is important for public health whether it is used for drinking, domestic use, feed production or recreational purposes. But the world is facing scarcity of pure water due to increasing of population and rapid growth if industrialization using various water treatment technologies like desalination of saline water by RO process the scarcity of pure water can be reduced. This proper deals with the controller design using Artificial bee colony optimization algorithm for solar power based water treatment plants. In this work PID controllers are used to optimize the efficiency of desalination system and the aim of photovoltaic RO desalination system is to operate in remote areas.

Cost Optimisation of Microgrid using HOMER Software – A case study of Botswana

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Abstract—The rapid depletion of fossil fuels, as well as their impact on the environment, stimulate the adoption of renewable energy sources as a power source. In this research, the ideal designing, size, planning and operating a micro grid for Botswana and proving a solution for the people living in Botswana, and is carried out for different scenarios while accounting for cost, environmental emissions, PV investment prices, converter costs, and fuel price. Solar PVs, generators are integrated into the Microgrid. HOMER (Hybrid Optimisation of Multiple Energy Resources), is used to carry out the simulations for optimizing Microgrid design and operational strategy for a hybrid renewable energy system which is based on these main tasks which are simulations, optimisation and sensitivity analysis.

Cloud Service Providers Comparative Study and Analysis: AWS, Azure and GCP

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Abstract—The cloud refers to servers that are accessed over the internet, the software and databases that run over those servers. For an enterprise, buying and maintaining IT hardware and software resources is not feasible. Cloud computing plays an important role to provide on demand computing services. Choosing an appropriate cloud service provider is crucial for an organization. This research paper provides a detailed comparison between three major cloud service providers available in market. This paper will be helpful for a user or an enterprise to choose between all three cloud providers wisely based on the requirements and budget of the organization

Solar Based Irrigation System

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Abstract— In recent times, the employment of solar based irrigation system is in news. As in today's time the facility crisis in India the facility is out there for 4 to six hours for agriculture purposes but alternative energy is free and requires only initial investments. So, Basically this paper focuses on the solar based irrigation system with some enhanced functionalities like use osf soil moisture sensors and other varieties of controllers which had made it more efficient and energy conserving method.

Analysis of Different Topologies of Controller of Electric Vehicle.

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Electrical and Electronics Engineering KIET Group of Institutions

farming approaches. As a result, we're attempting to demonstrate IoT in an automatic irrigation system. The approximate moisture content in the soil is monitored and maintained using an automatic watering system.

Design And Implementation of Fitness Tracking Device

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[1,3]Department of Electrical & Electronic Engineering, [2]Department of Electrical & Communication Engineering,
KIET Groups of institution, Ghaziabad-201206, U.P, INDIA

Abstract— Health monitoring is seemed as a hot subject matter inside, the arena of research. although the number of aged people is growing, it is irrefutable that the want of a disperse medical care gadget providing far off tracking intending to reduce the escalating healthcare expenditure may be very urgent. Today need to shift on healthcare system is a comprehensive system that includes a centralized gadget wherein we measure six exclusive body parameters specifically, frame Mass Index (BMI), coronary heart charge, Lung potential, Muscle fatigue, frame Temperature, Blood strain and ECG. For the measurements of these frame parameters, we use NI LabVIEW sensors together with Hand Dynamometer, Spirometer, Hand grip coronary heart fee sensor, load mobile. via measuring those parameters, we increase a file that's saved at central machine. This file may be accessed via the E-fitness+ android app and consistent with various parameters, we conclude a fundamental precaution to be taken. furthermore, we supply a opportunity of disease that would be taken. This system conveys all distinctive centers like patients, doctors and medical checkup at one centralized line through which information may be extracted and can be used for fitness blessings. thru this information distinction organizations can analyze (authorities) the need of clinical assistant to the specified locations. it is able to also help the authorities to create health regulations. Our venture meets the requirement of the authorities' groups wherein earlier accommodation of statistics is health manually now it will do digitally (i.e., E-fitness+ App wherein medical file might be dispatched through app) via our machine.

IoT Based Health Monitoring and Self Healing of Power Distribution Network

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Abstract—Healthcare can be defined as the betterment of health by taking preventive measures, treatment, diagnosis etc. In today's world with the advent of new diseases and viruses it is imperative to take a pre-emptive step to counter these health problems. For this to happen it is necessary to monitor our health through certain parameters. Health monitoring is the set of activities undertaken to maintain our body functions operable by observations, measurement and maintenance. Health monitoring is primarily done by doctors, medical facilities or by certain specific patient monitoring devices such as Pulse oximeters, Electro-cardiograph (ECG), temperature, blood pressure measuring devices etc. IoT has been recently came to picture to interconnect the advanced medical facilities and to offer smart and optimum healthcare services to the people.An automatic health monitoring system is used to measure patient's body temperature, blood pressure and the Heart rate using IOT technology.This project talks about previous researches and developing a system which gives body temperature and heart rate by using LM35 and pulse sensor respectively. These sensors are interfaced with Arduino board. Wireless data transmission is done through Arduino using a Wi-Fimodule.ESP8266 is used for wireless data transmission on IoT platform. The associated hospital will receive the patient's health information through the internet. This enhances the whole medical process in terms of accessibility of resources, maintaining records, fasten treatment etc.

Designing of Controlling for VSWT

Alok Pandey, Ajay Singh
Electrical and Electronics Department KIET Group of Institutions Ghaziabad, Uttar Pradesh, India.

Abstract— Wind energy utilization for power generation purposes is becoming high interest in electrical power production because of easy access to the wind and it does not affect the environment and it is a sustainable source of energy. In this research modelling of wind turbines and different control techniques used in VSWT are studied. As we know that the speed of wind is not constant which leads to the variable speed of the wind turbine. This makes the control of wind turbines a very important part of the wind energy system. These control techniques can be used to maximize the power output of the wind turbine which increases the efficiency of the wind system, and

Web based home automation using LAB-VIEW

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Abstract: A "smart home" is a residence that use information technology to map the landscape, manage electrical devices, and connect to the outside world. In order to get a more comfortable and simple living environment, a smart home automation system has been devised to automatically achieve some conditioning conducted continuously throughout the day. An innovative mechanical device called a home automation system enables interactive control of household appliances for stoners. Instead of using electrical grounded circuits and subsystems, advanced software can be used to implement home automation. Utilizing disassembled, tested, and controlled infrastructures on a platform with a software-based foundation is the most efficient method to respond to these needs. A home automation system encompasses the electric outfits and connects them to the outside world via information technology. It is a developing field of technology. In order to make daily life even easier and more comfortable, a home automation system has been created to automate some of the conditioning that would be conducted continuously. The system, which is built on the LabVIEW programme, can serve as the house's security guard. The system is capable of regulating the house's temperature, moisture levels, lighting, fire and burglar alarm, and gas viscosity. The system also features an internet connection, enabling remote monitoring and management of the home automation system. The strategy includes hardware and software innovations. This paper describes the usage of LabVIEW to implement a multiplatform control system for home automation. Such a system falls within the category of "smart house systems," in general.

Smart Plant Monitoring System

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[1] *Electrical and Electronics Engineering Department Kiet Group Of Institutions*
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Abstract— Since the last few decades, environmental factor monitoring has become increasingly crucial. Monitoring agricultural settings for numerous parameters like temperature, moisture, and water drops , as well as other factors, has become increasingly important. The automated plant monitoring system is made up of a feedback control system that monitors environmental parameters such soil moisture, temperature, and humidity, all of which are vital for the crop's overall development and productivity. By maximising these factors, water and other resources can be conserved. Individuals manually taking measures and evaluating them at various periods was a conventional way for monitoring these elements in an agricultural environment. In this work, plant monitoring systems based on wireless protocols that have been employed by many researchers to improve agricultural productivity utilizing the most advanced technology are discussed. The paper also goes over the numerous sensors that can be used to monitor the above-mentioned environmental factors, with a focus on smart plant monitoring for these types of applications. In this paper, we'll go through the fundamentals and key principles of IoT, as well as its potential in the future. This article examines the need for IOT in everyday life for a variety of applications and provides background information on IOT. IOT makes a big contribution to revolutionary farming approaches. As a result, we're attempting to demonstrate IoT in an automatic irrigation system. The approximate moisture content in the soil is monitored and maintained using an automatic watering system.

Design And Implementation of Fitness Tracking Device

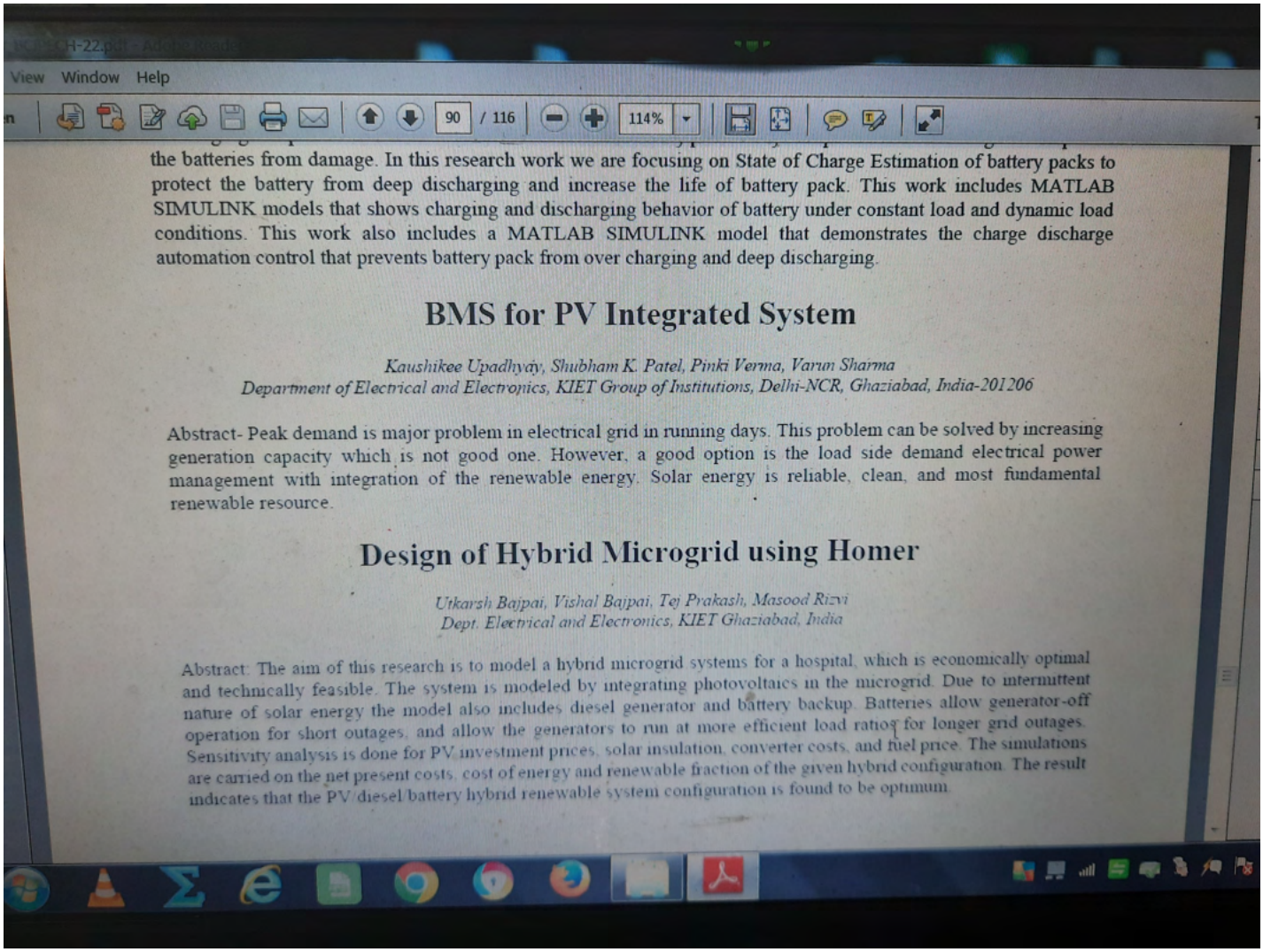
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Abstract— Health monitoring is seemed as a hot subject matter inside, the arena of research. although the number of aged people is growing, it is irrefutable that the want of a disperse medical care gadget providing far off tracking intending to reduce the escalating healthcare expenditure may be very urgent. Today need to shift on healthcare system is a comprehensive system that includes a centralized gadget wherein we measure six exclusive body parameters specifically, frame Mass Index (BMI), coronary heart charge, Lung potential, Muscle fatigue, frame Temperature, Blood strain and ECG. For the measurements of these frame parameters, we use NI LabVIEW sensors together with Hand Dynamometer, Spirometer, Hand grip coronary heart fee sensor, load mobile. via measuring those parameters, we increase a file that's saved at central machine. This file may be accessed via the E-fitness+ android app and consistent with various parameters, we conclude a fundamental precaution to be taken. furthermore, we supply a opportunity of disease that would be taken. This system conveys all distinctive centers like patients, doctors and medical checkup at one centralized line through which information may be extracted and can be used for fitness blessings. thru this information distinction organizations can analyze (authorities) the need of clinical assistant to the specified locations. it is able to also help the authorities to create health regulations. Our venture meets the requirement of the authorities' groups wherein earlier accommodation of statistics is health manually now it will do digitally (i.e., E-fitness+ App wherein medical file might be dispatched through app) via our machine.

LabVIEW and DAQ-based Data Monitoring in RealTime for PV Solar Panel

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ABSTRACT — This prototype emphasizes calculating the value of voltage, current, and temperature under different conditions. However, the performance is varying due to various parameters and environmental conditions. Hence, a remote and real-time monitoring system is needed to assess its performance. Voltage is measured by using a voltage divider module, the current is measured by using acs712, the temperature is measured using DHT-22, and the acquired data are processed in USB6009 and sent to LabVIEW. This paper also includes the detail of the P-V and I-V sketch under load conditions. The advancement and functions in this model are made possible using the LabVIEW schema built during the project.



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the batteries from damage. In this research work we are focusing on State of Charge Estimation of battery packs to protect the battery from deep discharging and increase the life of battery pack. This work includes MATLAB SIMULINK models that shows charging and discharging behavior of battery under constant load and dynamic load conditions. This work also includes a MATLAB SIMULINK model that demonstrates the charge discharge automation control that prevents battery pack from over charging and deep discharging.

BMS for PV Integrated System

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Abstract- Peak demand is major problem in electrical grid in running days. This problem can be solved by increasing generation capacity which is not good one. However, a good option is the load side demand electrical power management with integration of the renewable energy. Solar energy is reliable, clean, and most fundamental renewable resource.

Design of Hybrid Microgrid using Homer

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Abstract: The aim of this research is to model a hybrid microgrid systems for a hospital, which is economically optimal and technically feasible. The system is modeled by integrating photovoltaics in the microgrid. Due to intermittent nature of solar energy the model also includes diesel generator and battery backup. Batteries allow generator-off operation for short outages, and allow the generators to run at more efficient load ratios for longer grid outages. Sensitivity analysis is done for PV investment prices, solar insulation, converter costs, and fuel price. The simulations are carried on the net present costs, cost of energy and renewable fraction of the given hybrid configuration. The result indicates that the PV/diesel/battery hybrid renewable system configuration is found to be optimum.

Digital Sensor Based Temperature Control

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Abstract— **Temperature beyond a certain limit can be dangerous and is totally the waste of energy so the main objective of this review paper is to basically control the temperature when it goes beyond a certain limit or to bring back the temperature to the desired level so that the wastage of energy can be reduced. It will also be helpful in monitoring the changes in the environment, in near future this can be used by the industries or in an electronic devices and also to assist people who are disabled and are unable to control the speed of the fan.**

Another objective of this review paper is to study and build an automatic system using microcontroller and its interfacing with other devices. Nowadays, in day to day life arduino is most common device used because of it's many advantages like it support many devices, is compact in size, and its need simple programming to run.

Keywords— **Arduino, Liquid crystal display, LM35, Temperature control, Controlling, Microcontroller, Temperature sensor**

INTRODUCTION

This paper "Digital Sensor based temperature control" deals in controlling the cooling system automatically according to the room temperature so that the energy loss can be reduce and room temperature be well maintained.

The system is designed with the arduino which a microcontroller is based on easy to use hardware and software. Arduino boards are able to read inputs, light on sensor, a finger on a batton, or a twitter message and turn these things into an output – activating a, motor turning on an LED, publishing something online, seeing these advantages these are increasingly being used to implement control system. Since in this paper arduino is intended to control the cooling system so firstly it is important to understand arduino controlled system well. Nowadays all the activities in our day to day living are depending upon information technology. Especially in our field of work microcontrollers have helped a lot and with this our work is done with ease. A microcontroller basically contains components like it has CPU, clock circuitry, ROM, RAM, and I/O circuitry on a single integrated circuit package.

The basic purpose of this paper work is to present a control theory that is relevant to the analysis and design of the controlled system with an emphasis on basic components and idea. It is assumed that a digital microcontroller chip with reasonable software is available for computation and simulation. So that much tedious detail can be left to the microcontroller to handle it well. The control system design is also carried out upto the stage of implementation in the form of microcontroller program. In this paper work we write the program in the arduino IDE which facilitates the difference of the temperature, the arduino provides the display to the relay which is thus making the control system automatically being depend on the temperature read by the arduino. As we know temperature nowadays is the most fundamental parameter in industries. Not maintaining or controlling the temperature level in oven, furnace, boiler, etc. Can spoil the material due to temperature variation thus making it essential in the industries. The temperature sensing device or the probe is kept at that exact location where the temperature is to be maintained at desired level. Thus here the steps also become important which is used to check the accuracy during and after the test.

Since, temperature is evolved in most physical, chemical, mechanical, and biological system making it the most often measured quantity. Here, the temperature factor plays an important role in day to day living in any field of live. Correct temperature level is also favourable in many formations of compounds. A good favourable maintained level of temperature works well for people in industries as it is suitable for the product manufacturing in that particular industry. In the field of chemistry certain chemical reactions are performed within certain temperature range, many biological processes require a limited temperature range. This field of process has completely grown rapidly since its inception in the 1959s. It has become one of the core areas of chemical engineering. In many chemical engineering plants it has become important to control the temperature of liquid use in chemical. Hence suitable temperature controller is required for controlling temperature of water bath. Temperature rise due to resultant increase in molecular activity of substances on application of heat, which also connotes an increase in internal energy of the

material. Heat exchange, heat balances, safe temperature limits of various equipment's and multitude of other problems involving temperature are important in all phases of power generation and process industries. The means of indicating, recording and controlling temperatures are important in design, fabrication, operation, and testing power generating and utilizing equipment and associated apparatus. Correct measurement of temperature is of paramount importance to power and process engineers and great strides have been made in this branch. The ultimate aim is to measure temperatures correctly and reliably, at the same time keeping the cost of instruments down.

1. EXISTING SYSTEM

There are many existing system used for monitoring and controlling of temperature, these existing system generally uses micro – controller ATMEL89C51 (MC8051). The microcontroller contains four parts essentially the process, the analog to digital converter, the control algorithm and the cock. Sampling instants is the time when the measured time is converted to digital form on the other hand sampling period is the time period is the time between successive sampling and is denoted by M. The output from the process is called continuous test signal which is converted to digital signal by A-D converter; the conversion is at sampling times.

Problems that are associated with the existing system:

There are many existing system proposed in order to monitor and control temperature, these existing system uses microcontroller ATMEL 89C51 (MC8051). Due to use of this microcontroller the process of making whole device becomes not only complex but also difficult and tedious. For operation it requires A-D converter, external clock, microcontroller development board.

The problems are as follows:-

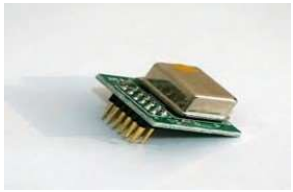
- Processing time is more.



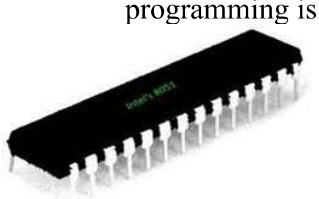
- An additional device is required for it's operation.



- An external clock is also required.



- For the microcontroller 8051, its programming is difficult.



- It also requires a development system for programming.



- The circuit size becomes large.



- PCB making becomes Complex ,difficult ,tedius.



1. PROPOSED SYSTEM

As seen in above section the microcontroller 86501 has many disadvantages. To overcome this problem e use another microcontroller that is arduino which solves the problem or having

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Impact of Digitization in Banking Services on Customer Habits

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***Abstract*— Digitalization has brought a revolutionary change in the mindset and habits of people and also playing a pivotal role to run economic activities. It has made the things faster and user friendly in every field, but the contribution of this innovation is incredible in banking sector. Innovative practices in banking sector have increased the productivity of this sector and simultaneously new changes in the system resulted reduced time cycle of service with large gamut of services, wide area, anytime anywhere services which is win-win situation for both parties' bank officials as well as customers. But the dark side of this innovative practice is safety and security issues which are the main constraint that preclude the people to use e- banking services. Present study has been done to know the mind-set, satisfaction level and degree of safety and security while using e-banking. Chi-square test has been used to validate hypotheses and results show that 90 percent people are digital banking services and 50 percent of total net banking users accepted that they have switched to Digi-banking due to its 24 hrs. availability and simple process.**

Keywords*— *E-banking, Digitalization, Banking operations, Satisfaction level.

I. INTRODUCTION

Digital world is fast, attractive and free from time boundaries. It has recorded and set new paradigms in every field, this was the result of digitalization that during covid, in lockdown situation, economic and non-economic activities have been run smoothly and escaped the world economy to enter in depression. No sector of world economy is untouched from the paybacks of digitalization, it has created an arena for all sectors to work and grow. Digitalization has transformed the things in a new and interesting manner, the contribution of it is visible in every field at present but the contribution of this innovation is incredible in banking sector. Innovative practices in banking sector has increased the productivity of this sector and simultaneously new changes in the system resulted reduced time cycle of service with large gamut of services, wide area, anytime anywhere services which is win-win situation for both parties' bank officials as well as customers. Indian Banking Sectors has actually reached its peak in terms of growth in last few years which has resulted in higher amount of capital formation. Digitalization has led to major growth in the banking sector. In today's world, people have around-the-clock access to the banks due to the online banking. Digitalization has led to a major fall in the Manual operations; customers specifically do not have to visit the banks for withdrawal or disposal of the cash.

It has been seen as strategic resources for efficiency, improved productivity and faster the rate of occurrence of operations in banking system. The manual process of banking transaction has been changed. The money transaction in business has become rapid, which results in the expansion of business and economic growth. Eventually the disclosure of digitalization reduces the manual operations of bank employees, increases the work effectiveness and also saves the time of bank officials and customers both.

Various e- banking services ease the process of online shopping. Its allows the customer to transfer the money though electronically and pay their bill. Indian banking sector is reach massive growth in recent years encouraging higher amount of capital formation which is done because of digitalization has taken place. It is true that digitalization will bring revolution in the economy those countries which are easily adapting to it are perform extra ordinal well compared to those countries which are full behind in adopting a process of digitalization.

II. IMPORTANCE OF DIGITALIZATION IN BANKING SYSTEM

A. Digitalization has improved the quality of service of the banking sector in terms of time, 24 hrs. availability of services and easy to use as compared to traditional banking.

B. Digital banking is cost effective and environment friendly as it avoids paper work.

C. Digital banking leads to quick and easy access to various Banking services and thereby increases the investment activities in the country.

D. Digital banking reduces the cost of printing currency notes as it thwarts use of cash.

E. Digital banking also helps to eradicate the corruption as records are maintained digitally about

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transactions which is helpful to control on illegal transactions and black money in economy.

III. Objectives of Study

- To know the opinion of people about digital banking system.
- To know the preference of people whether they prefer manual banking or digital banking.
- To know the most preferred service of digital banking used by people.
- To know the level of confidence and satisfaction amongst people about digital banking.
- To know the opinion of people about services and charges, charged by private and nationalized banks.

IV. Literature Review

Kuzmina, I. I., & Semenov, N. A. (2020). [1] studied the influence of digitalization on the transformation of the banking system, taking into account current innovative development trends. Jain Vipin et al [2] threw the light on modernization of banking sector, that has benefitted both the customers as well as banks by using digital platforms and eradicated all barriers of limited transactions in the branches. Bhatia K. G. and Tyagi M. [3] also stated the importance of digitalization to draft the saving patterns of household. Joao Reis et al [4] accepted the significance of digitalization to set new paradigms by changing the landscapes of business functions. The study of Raghavendra Nayak [5] advocated the promotion of digital banking services in rural sector through digitalization money laundering can be eradicated as well as proper collection of taxes could be possible. Mohana Sujana [6] also revealed that digital banking services could be improved by conducting orientation programmer, educating the illiterate people regarding the services and properly explaining the rules. Savita Sukumar [7] also explained the importance of e- banking but concluded that digitalization of banks carried the threat of cyber security and added that digital banking trust of customers it becomes easier and banking becomes relevant. Libretti j.m. & Peterson M.A [8] they defined hard information as quantitative, easy to store and transmit in impersonal ways. They added that technology is driving a greater reliance on hard relative to soft information in financial transactions. In year 2017 another author named Anithamary C; Harini M [9] observed that people were aware of the digital banking but were not using it because of the lack of knowledge. There are many channels of digital banking but they used very few of them. Anthony Rahul golden [10] concluded that customer was convinced by adoption of e-banking services and did not have to visit banks on daily. in boot [11] suggested that online platforms could offer a supermarket type model facilitating access to various products and services of disparate provider's along with record keeping, Another author Carbo-Valverde and Kahin [12] observed that regulation of financial services are required to be shifted from institution based to activity-based in order to create a more level playing field for managing risks. Rifkin [13] found in his study that operating principles assume a competitive market. However, in the long-run, the new players come along and introduce breakthroughs in technology that increases productivity and lower the prices. Another Vadavadahi Prakash K, Allagi R.G. [14] observed that mobile banking was not used in rural areas as compared to urban areas due to lack of awareness, risks of fake messages and lack of security in transaction. At last Richard Nyangosieteal [15] he studied about the usage, adoption of digitalizing the banking services. The conclusion of the study was related to policy maker and technology and provides to take viable decisions on the future of online banking. Singh Anurag B, Tandon Priyanka [16] concluded that some of the reasons restrict the system to reach the poor society. Some people work in the banking sector just for salary and not for achieving the national goal. At last, Cecchetti S.G [17] he revealed the new economy challenge for macroeconomic policy. His research also included the findings about the bureau of economic research and other working papers. Sanwal, T., & Sareen, P. [18] concluded that engagement is enhanced through social cognition and social skills in different sectors. Arora, A. K., & Yadav, S. [19] identified that digitalization helps an individual to connect through various modes but the effectiveness is depended on the various factors. Sanwal, T., Avasthi, S., & Saxena, S [20] studied on the relevance of digital banking on business activities that has given a new platform to do the activities at fast rate.

V. Hypotheses

H_{01}: There is no difference in the satisfaction level of customers of different banks.

H_{11}: Satisfaction level of customers of different banks is varying.

H_{02}: There is no difference in the opinion of different banks customer regarding Service charges.

H_{12}: Opinion of different banks customer regarding Service charges is different.

H_{03}: No difference in degree of confidence on e-banking usage among different bank users.

H_{13}: Degree of confidence on e-banking usage among different bank users varies.

VI. Research Methodology

The present study is exploratory research and primarily is based on first hand data, secondary data has also been used to collect relevant information related to the research and for the same secondary sources like internet, magazines, research papers etc. have been used. Primary data has been collected through questionnaire. The questionnaire was prepared with a set of multiple-choice questions relevant for research. The questionnaire was provided Convenience user or respondents therefore; Convenience sampling method is used. Online mode like mails and WhatsApp have been used to deliver the questionnaire. The various reasons to choose questionnaire are: -

It is quick, cheap and efficient way of collecting information in large geographic area it is free from biasness of the interviewer.

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For data analysis, chi- square test has been used to test hypotheses and graphs have also been used to present data in an attractive manner.

VII. Data Analysis & Interpretation

Based on relevant information which was captured through primary data collection process, data has been analyzed by using different statistical methods.

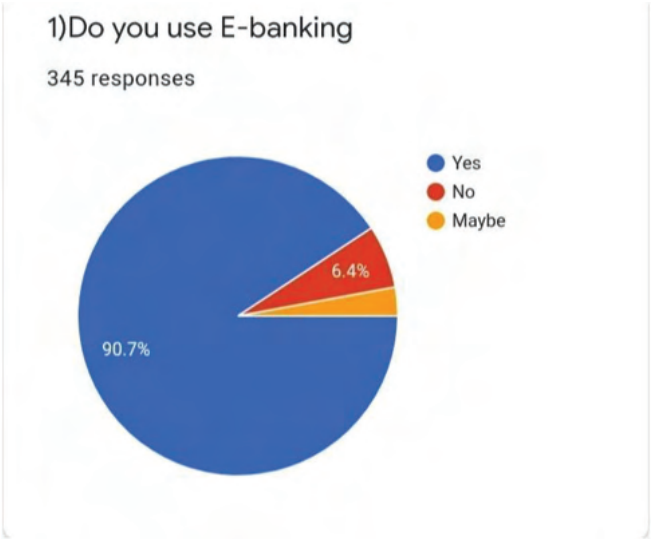


Fig. 1.

Figure 1 reveals that 90.7% respondents use E-banking because of lower services charges, easy availability of cash from ATMs, low possibilities of errors. Further, 6.4% respondents do not use E-banking because of technology issues, inconvenience, security issues and many others. The rest 2.9% people may or may not uses E-banking because they might find it difficult for the beginners and other limitations.

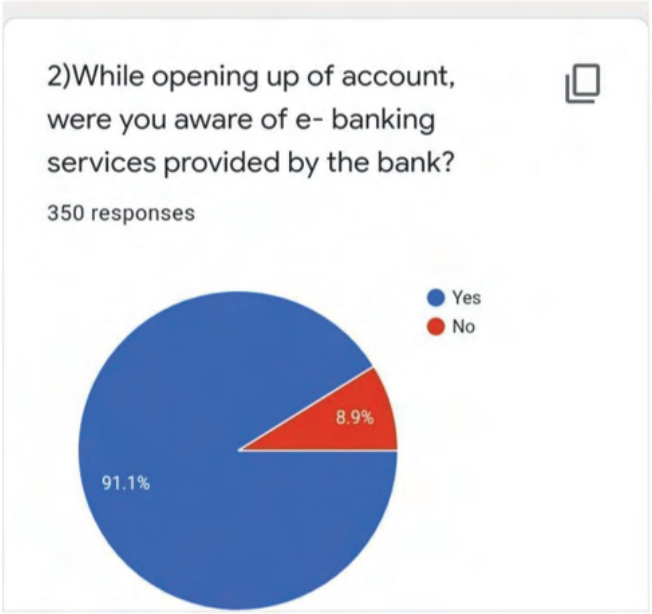


Fig. 2.

Figure 2 reveals that 91.1% of respondents are aware about the E- banking facilities as they are always updated with the new services which is made available for the customer's benefits and convenience.

Almost 8.9% of people are not aware because of lack of knowledge or maybe they are of not educated enough.

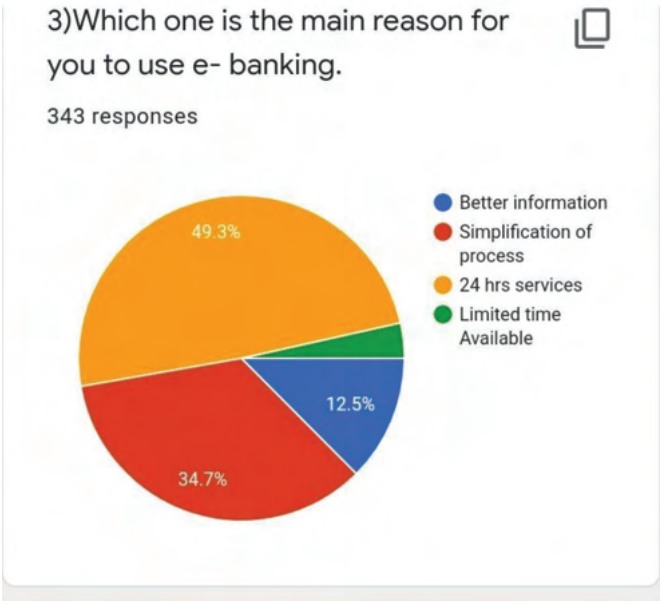


Fig. 3.

Figure 3 depicts that out of 100 % population almost 49.3% respondents prefer using E- banking because of its 24*7 facility, as it is convenient to every user out there.

Secondly, simplification of process also attracts users to opt E-banking. Even a beginner can avail the services with clear instructions and guidelines.

The second least preferred reason is providing better information if users go for E- banking.

The least preferred reason is the lack of time available to the users. It might be difficult for the beginners as they need time to process the information.

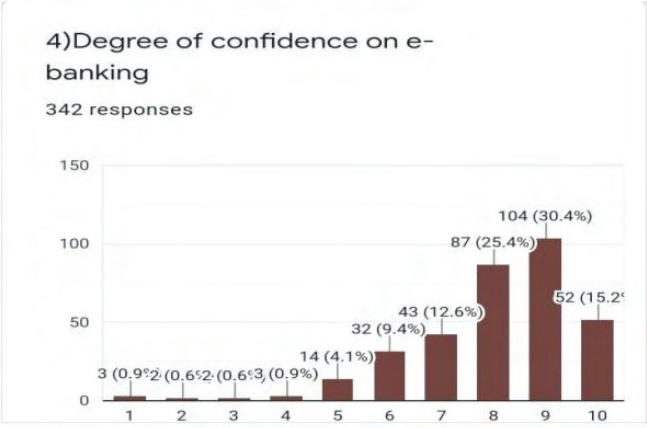


Fig. 4.

Figure 4 depicts that 30.4% respondents have high level of confidence on E-banking because of its Security reasons, better customer services available, faster transactions, other benefits and rewards.

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Also, 12.6% of respondents have medium level of confidence on E-banking as they believe both in advantages and demerits of the services.

Also 4.1% of users have least confidence on E-banking.

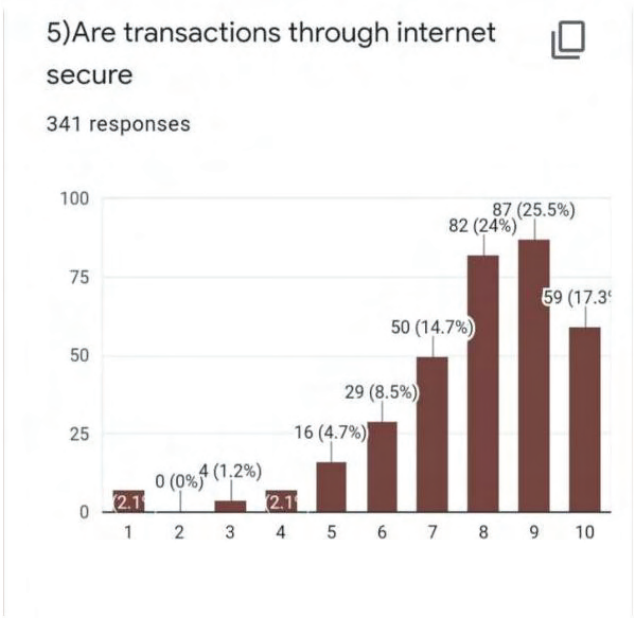


Fig. 5.

Figure 5: Here, 25.5% of the respondents say that transactions through internet is secure and can be trusted. Sometimes people prefer to send or receive even bigger figures through E-banking.

Almost 14.7% of the users may or may not trust the security of the transactions through internet.

Lastly, 4.7% of the population have least faith in online transaction security and does not prefer to use it. They always go for the manual banking.

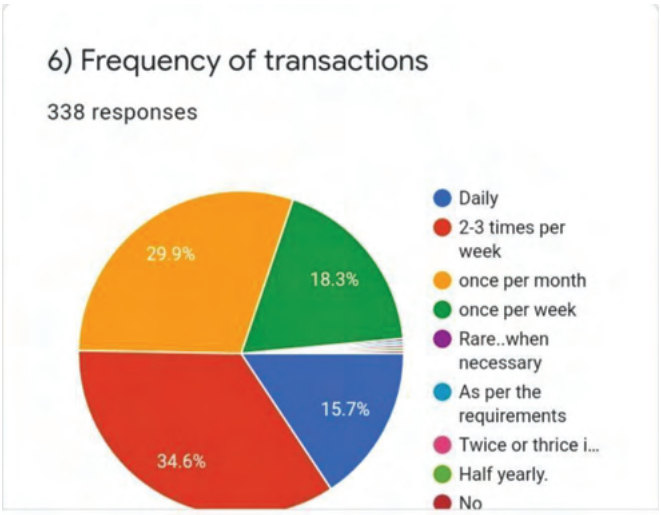


Fig. 6.

Figure 6 as in today's era, almost 34.6% of the respondent's uses E- banking 2-3 time's p/w. They might be businessmen.

Almost 29.9% of the respondents says that they prefer using E-banking every once a month as per their convenient. They can be government employees or corporate ones.

Nearly 18.3% of the respondents prefer using E-banking every once a week. Transactions could be related to businesses etc.

Lastly, 15.7% of the users prefer using E-banking on the daily basis. This might include the transactions of MNCs or charity work.

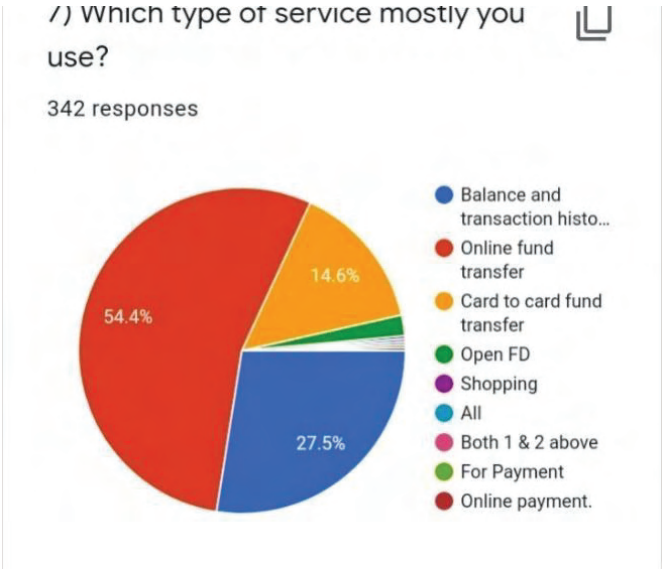


Fig. 7.

Figure 7: Almost 54.4% of the respondents uses E-banking for online fund transfer due to security reasons and faster mode of transactions.

Nearly 27.5% of the respondents prefer using E-banking for checking the balance and having a look at the transaction's history.

14.6% of the respondents uses E-banking for availing its card to card fund transfer service as per the convenient.

Rest of the respondents uses E-banking for availing other services like opening FD, shopping purposes, for other payment purposes, online payments

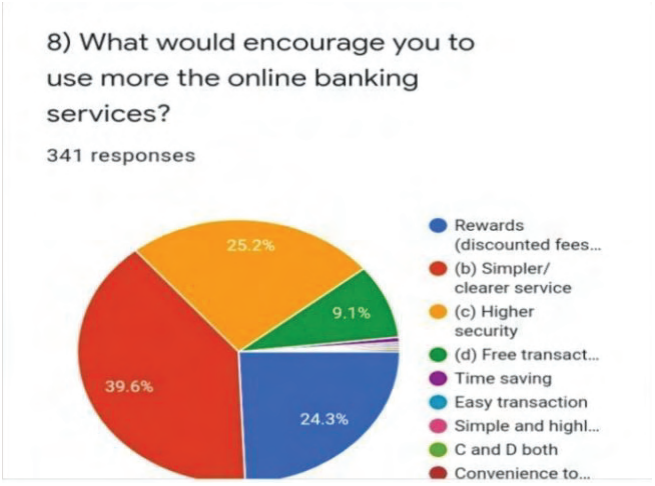


Fig. 8.

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Figure 8 represents that 39.6% respondents are motivated towards digital because it's simpler/clearer service.

The next 25.2% of the people are using online services because they find it simpler and the clear services. They don't really have to go through many procedures just like offline banking.

The Figure 8 shows that 24.3% of the people are using online banking services because of the rewards and discounted fees as they feel benefited from that and now a days many applications are giving these sorts of benefits to their user.

The graph also shows the lowest percentage that is 9.1% and this percent belong to those people who are using online banking Because the transaction is free of cost, they can easily transfer fund from one account to another.

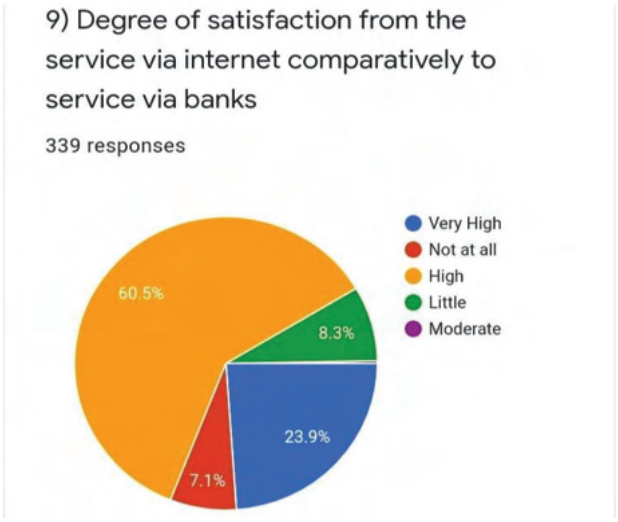


Fig. 9.

Figure 9 represents that 60.5% respondents have high satisfaction level by using banking via internet.

The graph shows that 23.9% of the people have very high level of satisfaction by using banking via internet. They are highly satisfied because they mostly rely on internet.

Figure 9 also show a percentage of 8.3%and 7.1% which tells us that people have very little faith in banking services via internet and some people don't rely on internet at all respectively.

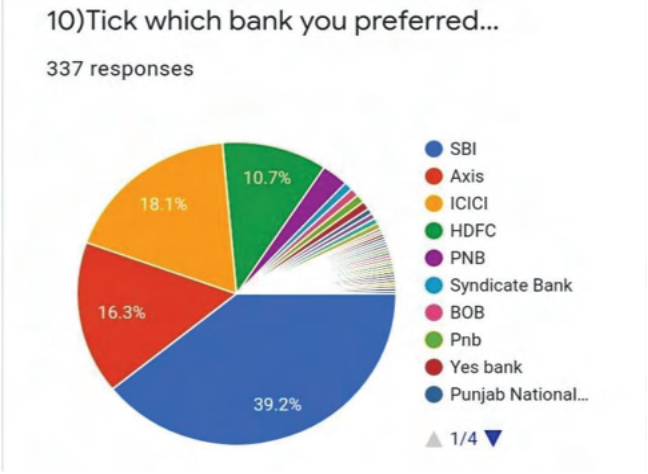


Fig. 10.

Figure 10 represents that 39.2% respondents are prefer SBI bank the most and also 16.3% respondents had trusted the axis bank.

This Figure 10 shows people personal choice of bank in which they have opened them personal bank account. There are many financial institutions and it's completely the choice of the people that which bank they want to prefer.

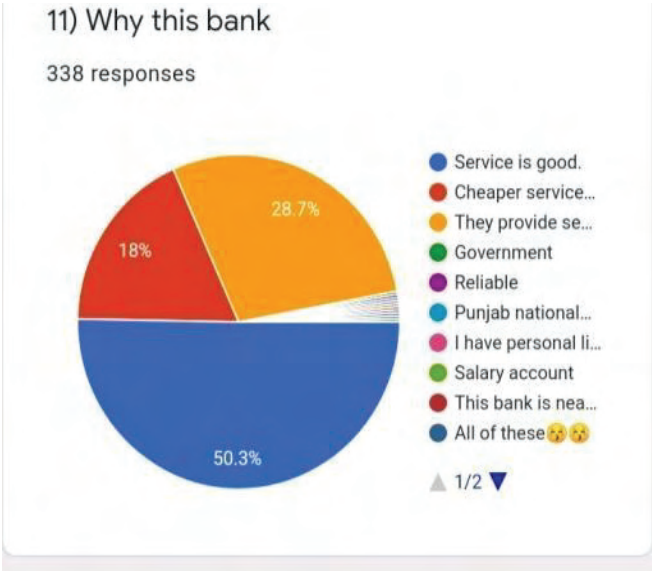


Fig. 11.

Figure 11 represents that 50.3% respondents are prefer SBI bank because service is good.

This graph shows that why they have selected the particular bank. Every bank has their unique services and different way of dealing things and each have some of their specialization. Mostly people select bank particular bank by looking into their services they provide.

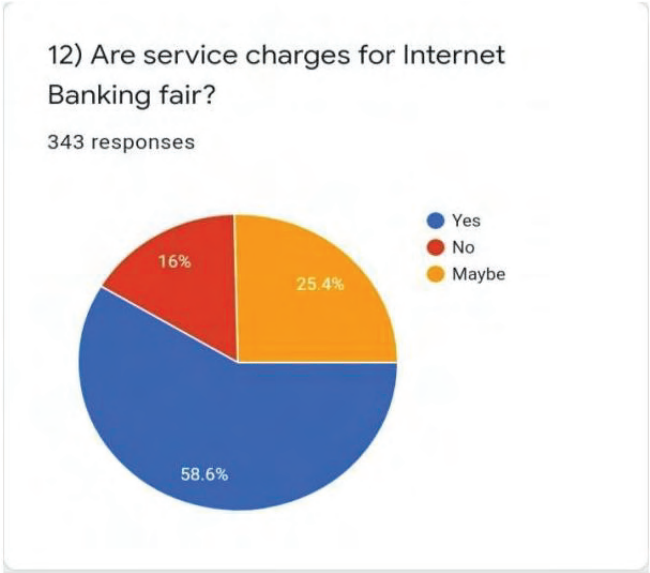


Fig. 12.

Figure 12 represents that 58.6% respondents are think service charges are fair and this percentage belong to that group of people who are very well aware about internet and online banking services.

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The Figure 12 also shows that there are 25.4% of people who have a neutral response neither they consider it to be fair nor unfair and there also comes a percentage of 16% that have a saying that internet charges that banks are charging are not fair.

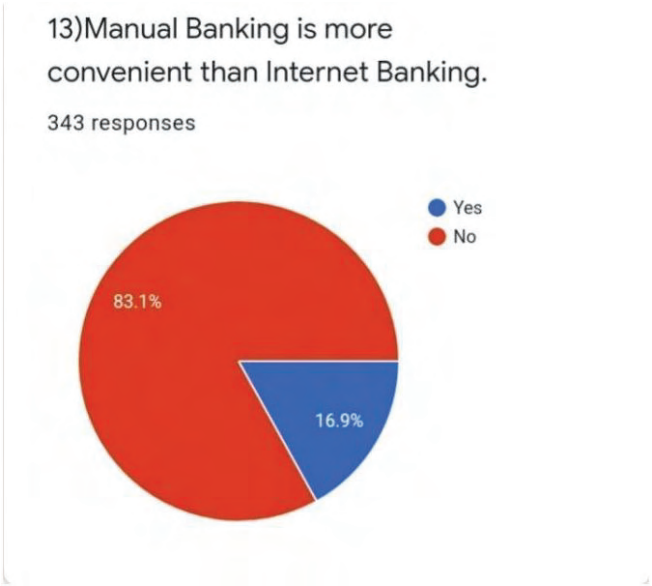


Fig. 13.

Figure 13 represents that only 16.9% respondents prefer traditional banking. 83.1% respondents prefer digital banking over traditional banking because as the new generation is growing the reliability towards digital mode is growing at a faster rate. People are mostly using internet and digital mode for doing day to day chores.

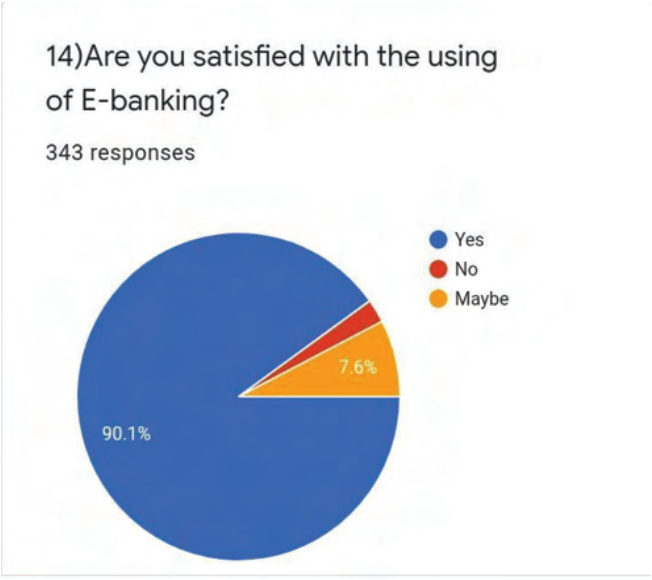


Fig. 14.

Figure 14 represents that 90.1% respondents are satisfied with the using of e banking because internet banking reduces the work pressure and in a single sitting people can do a lot of stuff on their mobile phone and laptop just with the single click, they are easily making payment of all their bills and easily make transfer from one account to another.

VIII. Hypothesis Testing

To validate Null Hypothesis (H01) i.e., there is no difference in the satisfaction level of customers of different banks. Chi- square has been used, Table -I shows p value – 0.059, means it's more than .05 (confidence level), so Null hypothesis is not rejected. It means that level of satisfaction among the customers of different banks is equal.

TABLE I LEVEL OF SATISFACTION AMONG THE CUSTOMERS OF DIFF. BANKS

Case Processing Summary

	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Bank * Satisfaction level	332	100.0%	0	0.0%	332	100.0%

Value		Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	47.746[a]	34	.059
Likelihood Ratio	28.436	34	.737
N of Valid Cases	332		

As per Table II, p value is 0.001 that shows null hypothesis (H02) i.e. there is no difference in the opinion of different banks customer regarding service charges is rejected. It means that customer's opinion regarding fairness of charges is varying.

TABLE II OPINION OF DIFFERENT BANKS CUSTOMER REGARDING SERVICE CHARGES

Case Processing Summary

	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Bank Name * Service charges	332	100.0%	0	0.0%	332	100.0%

Value		Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	109.092[a]	68	.001
Likelihood Ratio	104.475	68	.003
N of Valid Cases	332		

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As per Table III, p value is 0.000 means it's less than .05 (confidence level), that shows null hypothesis H03: No difference in degree of confidence on e-banking usage among different bank users is rejected.

TABLE III DEGREE OF CONFIDENCE ON E-BANKING USAGE AMONG DIFFERENT BANK

CASE PROCESSING SUMMARY

	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Banks * Confidence level	332	100.0%	0	0.0%	332	100.0 %

	Value	Df	Asymptotic Significance(2-sided)
Pearson Chi-Square	478.550[a]	105	.000
Likelihood Ratio	96.411	105	.713
N of Valid Cases	332		

IX. CONCLUSION

Changes in banking system are one of the biggest changes in the economy that has brought umpteen changes in the landscape of banking functioning therefore the perception of customers relative to banking system has also changed. Present study shows that though e- banking users have increased and as study shows that 90.7 percent respondents use e- banking. Most of the respondents are satisfied with the services provided by the various banks and their satisfaction level is equal in this regard. But about Safety and Security, respondents' opinion varies so banks need to take some stands for making this system safe and secure on priority basis and to make digital banking hassle free and include the excluded section. Though there are some weaknesses in the system yet majority respondents have preferred e-banking in comparison of traditional or manual banking. However, few respondents are unsatisfied due to the lack of safety and other things so banks need to gain the full trust in customers by making them aware how to escape from the traps of digital frauds. By spreading awareness about e –banking, banks can upturn the level of safety and security amongst the consumers. Digitalization has also helped to eradicate the world of black money by maintaining the records of transactions that will help in the growth of nation and bridge the gap between rich and poor. Along with baking support, users also need to be properly educated and cognizant so that they could escape themselves from e frauds and enjoy unlimited facilities of Digi-banking. Digitalization is helpful in taking India towards corruption free country in the world and also help in anti-money laundering and proper collection of taxes. Digital Banking is the most preferred door step service which has been accepted by the customers as they find that Digi- banking is easy to access and saves time as well as it has opened the doors for availing banking services beyond the time without any time restrictions.

X. LIMITATIONS

- For the purpose of this research a small size of 350 respondents has been significant increase in the sample size can provide an enhanced outcome.
- It can be used only when respondents are educated and cooperating.
- It is difficult to know whether willing respondents are truly representative.
- In this research, data was collected from people residing in Delhi /NCR region.
- A larger demographic area under consideration can provide more variation and diversity in data.

XI. FUTURE SCOPE

Economic world has become immense globalized, liberalized, privatized and competitive, in order to survive in this dynamic environment banking sector has also changed its traditional way of banking. To satisfy consumers, this sector has put number of efforts to raise the bar of consumer satisfaction as well as profitability. This study will help to understand the factors that check people to use digital banking and to frame policies in that directions to make the system safe and free from frauds so that consumer could enjoy hassle free Digi banking.

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Software Defined Networking: A View Towards Security Challenges

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Abstract. Software Defined Networking (SDN) is new paradigms type of networking that is a programmable network and overcomes the challenges like, network scalability and management of the traditional networks. While programmable network is growing, the security challenges are increasing for different applications. Software Defined Networking manages control planes and data planes separately, where the controller at control planes decides the path at run time and data plane forwards the packets based on controller's decisions. The applications of software are increasing day by day including in communication traffic in SDN, and therefore different applications of different industries and societies faces various challenges related to it. This paper examines the software defined programmable network and view the challenges due to security issues of programmable networking. Finally, this paper discussed with its security impacts and gives concluding remarks.

Keywords: Software Defined Networks (SDN), Data Planes, Control planes, Controllers.

INTRODUCTION

Software Defined Networkings (SDNs) is emerging networking which simplifies networks managements to enable flexibility in communications network. Traditional networks are not flexible due to combination of control planes and management planes in one single device. Software Defined Networking provides a simple add on over the traditional network i.e. the centralized and programmable [1]. This will help to take smart decision like traffic routing. The programmable networks motivates to vendors to add Open Flow protocol to the forwarding device during implementation to change of route during change in the requirement [2]. In such network, the control plane is separated with forwarding plane, e.g., switch and router, and the data forwarding route is decided in a centralized controller. So, the data planes become the set of simple forwarding devices which is controlled by a central controller. These separations of data planes and control planes enables the networks programmable hence the underlying infrastructure becomes abstracted for networks services [3]. The control planes are the logical centralized device and the forwarding planes becomes a simple device which acts on the decision of control planes[4]. Hence the control planes can govern and supervise the network's flow and can manage loads, optimize and prioritize traffic, and other network services [4]. Figure 1,describes the basic architecture of SDN comprises the following three functional planes.

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Design of Metamaterial-Based Multilayer Dual Band Circularly Polarized Microstrip Patch Antenna



Chirag Arora

Abstract This chapter presents a miniaturized multilayer circularly polarized dual band microstrip antenna, operating at 5.8 GHz and 2.45 GHz, which is inspired with a metamaterial. The two layers are placed one over the other in such a way that there is no air gap between the two layers. To achieve circular polarization, single feed and suitable mitering is introduced on the upper patch and is fed by a single probe. Further, dual band characteristics have been achieved by using a plus shaped slot on this lower patch. The antenna so designed provides the gain of 9.6 dBic and 3 dB bandwidth of 525 MHz at the resonant frequency of 5.8 GHz. Also, at 2.45 GHz, this antenna provides the gain of 5.9 dBic and 3 dB bandwidth of 270 MHz. Now to enhance the performance of this antenna, the help of metamaterial has been taken, which is realized by introducing via holes and L-shaped slots on the lower patch. This metamaterial-inspired antenna provides the three dB axial ratio bandwidth of 590 MHz and 325 MHz at 5.8 GHz and 2.45 GHz, respectively. However, its gain remains almost same at both the frequencies. The antenna has been designed on low-cost FR-4 substrate.

Keywords Patch antenna · Circular polarization · Metamaterial · Via holes

1 Introduction

Reduction in multipath effect and suppression of interference due to rain can be easily achieved by circularly polarized antennas. Therefore, such antennas are good candidates for various applications such as satellite communication [1–7]. Researchers have adopted various techniques to enhance the gain and three dB axial ratio bandwidth of the circularly polarized antenna [8–14]. In [8], Guo and Tan designed a multilayered circularly polarized patch antenna. This antenna uses single feed and provides wide bandwidth but its fabrication is quite tedious since very high precision is required to maintain the desired gap between different layers of the antenna.

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Wang et al., in [10], proposed a circularly polarized antenna with surface integrated waveguide. The proposed antenna shows characteristics of good circular polarization but this feeding technique is not much easy to implement practically. The design proposed by Cheng and Dong, in [11], provides wide three dB axial ratio bandwidth of 22.58% and −10 dB impedance bandwidth of 48.75%. But these characteristics have been obtained by use of two suspended metal rods, making the antenna bulky. Pan and Dong proposed circularly polarized stacked antenna for radio frequency reader applications [14]. This antenna produces good bore sight gain but at the cost of a director patch, which is in addition to the parasitic patch. Thus, from the literature survey presented above, it is concluded that the most common technique adopted to enhance the performance of circularly polarized antenna is the use of multilayered structure with air filled between the different layers. This technique results in less fabrication cost, low antenna profile, and low dielectric loss. However, this technique requires some dielectric posts to support the upper patch, thus causing difficulty in fabrication. To the best knowledge of author, limited work has been done toward performance improvement of circularly polarized patch antenna using multilayered structure, where different layers are not filled with air, rather they are fixed together with help of glue.

In this chapter, a two-layered circularly polarized microstrip patch antenna has been explored, where the two layers are not separated by the air gap, rather they are stuck together with some pasting material. The upper layer of this proposed antenna is composed of a mitered square patch to acquire circular polarization. The help of metamaterials have been taken to improve the performance of this antenna. These are specially designed structures which possess peculiar properties that are not found in naturally occurring materials. These materials were proposed by Veselago in 1967 [15] and then in 1990s, Pendry et al. showed electric plasma from wire-shaped structures [16] and then magnetic plasma from ring-shaped structures [17]. However, these structures were not planar in nature and hence, difficult to fabricate. Since then, various two-dimensional metamaterial structures have been designed by various researchers and are being widely used in antenna as well as other microwave and millimeter wave applications [18–28]. The metamaterials can be incorporated with conventional antennas in several ways, out of which the most common techniques include their loading as substrate [29, 30] or superstrate [31–34]. Though these two techniques provide significant betterment in the performance parameters of patch antennas, but at the cost of tedious technique of designing array of metamaterial unit cell or increased profile, respectively.

In this paper, authors have realized the metamaterial characteristics through thin slots on lower patch and via holes which extend from L-shaped patch to the ground plane. The narrow slots provide left-handed series capacitance and via holes contribute to left-handed shunt inductance. Thus, this technique of metamaterial realization eliminates the requirement of designing the array of metamaterial unit cell.

Moreover, to squeeze the profile of the patch antenna, use of multi-band patch antennas prove to be very beneficial. Several techniques have been discussed in the literature to design multi-band antennas, such as stacking of two different structures

[35], using stubs [18], using defective ground plane [36], slotting the radiator to create perturbations [37]. Out of various above-said techniques, perturbation creation to achieve multi-band operation by slotting the radiator appears to be the simplest; as it does not increase the profile of the antenna as well as no special arrangements are required for its fabrication. Taking the advantage of this fact, in this chapter authors have etched a plus-shaped slot on the lower patch so that dual band operation can be achieved. Thus, the lower patch of the proposed patch antenna serves the two functions—one it realizes the metamaterial effect and second it helps in achieving dual band operation with the help of a plus-shaped slot.

Thus, in this literature a metamaterial-based multilayer two band circularly polarized microstrip patch antenna is proposed. This antenna comprises of two layers, and both these layers are pasted together with some glue, thus eliminating the problem of aligning the two layers. The upper layer has a mitered square patch to achieve circular polarization. The lower layer possesses a plus-shaped patch to obtain dual band behavior. Further to improve the performance of this antenna metamaterials have been used. The realization of metamaterial has been done by using the L-shaped slots and via holes. The antenna is simulated on FR-4 substrate of thickness $(h) = 1.48$ mm, dielectric constant $(\varepsilon r) = 4.3$, and loss tangent $= 0.01$.

2 Antenna Design

A. Configuration of Antenna

The top view of this antenna is presented in Figs. 1 and 2. Whereas, the rare view of the composite structure is given in Fig. 3. The designed antenna is composed of two layers, which are pasted together with the help of some glue. The upper layer is composed of a square mitered patch of length 12 mm $\times$ 16 mm. The dimensions of lower patch are also same. Both the substrates possess the length and width of 60 mm $\times$ 60 mm. The perturbation caused by this mitered patch leads to achieve the circular polarization. The width of all slots on lower patch is 4 mm. Radius of each via hole is 0.3 mm. The upper patch is mitered at the length of 4 mm. The antenna is excited using a probe feed. The lower patch possesses a plus-shaped slot to obtain dual band behavior. The performance improvement of this antenna is achieved by using the metamaterials. The metamaterial behavior is realized by etching L-shaped slots on the four corners of the lower patch and making via holes from each slot to the ground plane. The L-shaped patches account for left-handed series capacitance, whereas via holes contribute for shunt inductance. These four patches are etched on four corners of the lower patch, symmetrically with respect to the central plus-shaped patch. The location of via holes is selected in such a way that their presence does not affect the circular polarization. Since the current intensity at the corners is usually weak, hence via holes are introduced at the corner of the patches.

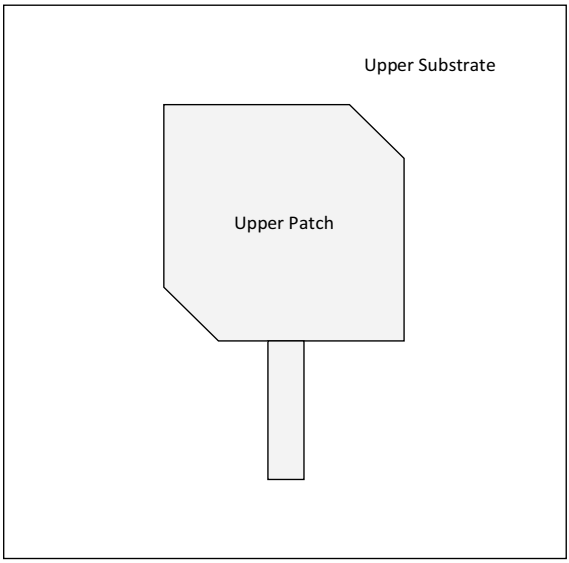


Fig. 1 Geometric sketch of perturbed square patch (upper patch)

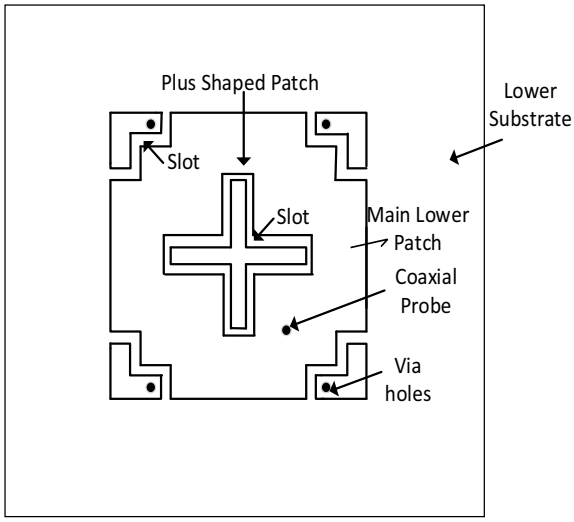


Fig. 2 Geometric sketch of lower patch comprising of plus-shaped patch with capacitive slots and inductive via holes

B. **Theory**

As discussed in the literature [38], the metamaterial-based antennas are considered as composite right/left-handed transmission line with a terminal open, whose equivalent circuit is shown in Fig. 4. As observed from Fig. 4, a metamaterial structure not only comprises traditional RH shunt capacitance and series inductance, but it also possesses left-handed shunt inductance and series capacitance. These left-handed characteristics can be realized by thin slots on microstrip patch and via holes

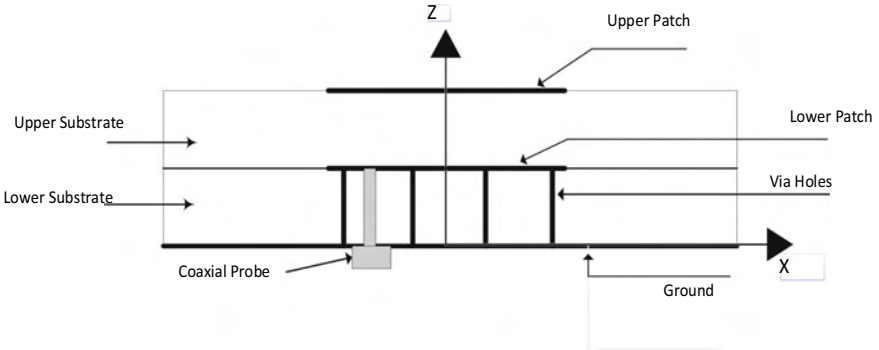


Fig. 3 Side view of the two-layered metamaterial-inspired dual band circularly polarized microstrip patch antenna

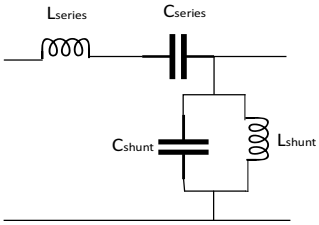


Fig. 4 Equivalent circuit of composite transmission line (right/left-handed)

to the ground. This results in simultaneous negative and positive phase constant. As compared to a conventional half wavelength antenna of same electrical length, the metamaterial antennas possess lower resonant frequencies. Hence, metamaterial structures can be used to realize compact antennas. Moreover, due to the presence of multiple left- and right-handed resonant frequencies, metamaterial antennas also provide dual band operations.

The two opposite cut corners help to produce the perturbation needed for the circular polarization by using single feed. The location of via holes is decided in such a way that it coincides with the direction of current so that the performance of circular polarization is enhanced.

3 Results

This segment describes the simulated results of the proposed antenna with and without metamaterial loading. Figure 5 shows the simulated return loss characteristics of the conventional dual band circularly polarized microstrip patch antenna and metamaterial loaded antenna at 5.8 GHz and 2.45 GHz. It is seen that the unloaded antenna array resonates at 5.8 GHz and 2.45 GHz with bandwidth of 525 MHz and

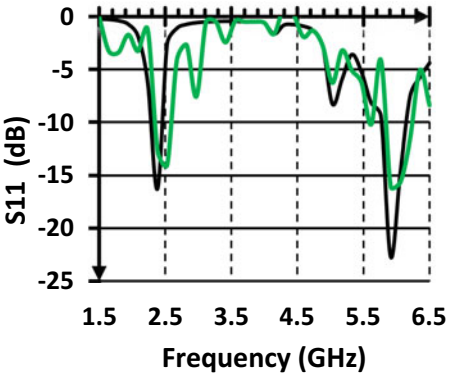


Fig. 5 Return loss curve of unloaded (shown in black colour) and loaded (shown in green colour) antenna at 5.8 GHz and 2.45 GHz

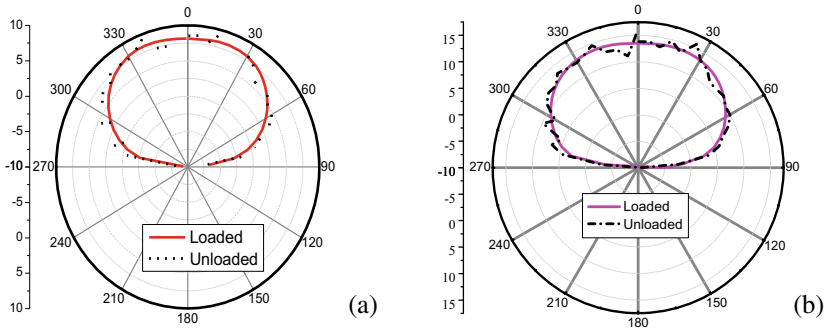


Fig. 6 Elevation plane radiation pattern curves of unloaded and loaded proposed antenna at **a** 5.8 GHz **b** 2.45 GHz

270 MHz, whereas when this traditional patch antenna is loaded with metamaterial, bandwidth reaches to 590 MHz at the resonant frequency of 5.8 GHz and 325 MHz at resonant frequency of 2.45 GHz. From Fig. 6, it is observed that gain of the proposed antenna is almost same at both the resonant frequencies for loaded and unloaded conditions.

4 Conclusions

A multilayered dual band circularly polarized metamaterial-inspired microstrip patch antenna has been proposed. This antenna resonated at 5.8 GHz and 2.45 GHz. The performance of the proposed antenna has been improved using metamaterials, which are realized using slots and via holes. The performance of the proposed structure has been improved at no additional hardware price and size. Performance comparison of a traditional and designed metamaterial-inspired antenna shows that the metamaterials are budding candidates for improving the parameters of traditional antennas.

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Software Defined Networking: A View Towards Security Challenges

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Four Element Pattern Diversity MIMO antenna with Parasitic Decoupling structure and SRR WLAN notch for UWB application

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Anubhav Kumar ; Navneet Sharma ; Divya Saxena ; Pankaj Jha ; Paramanand Sharma **All Authors**

Abstract

Document Sections

I. Introduction

II. Four Element Uwb Antenna Design and Evolution Analysis

III. Simulation Analysis

IV. Performance Analysis

V. Conclusion

Authors

Abstract:
A UWB 4-element antenna with SRR WLAN notch and four L-shaped parasitic decoupling is discussed. The proposed antennas impedance bandwidth of 10dB varies from 3.8 GHz to 11 GHz and is operated on 5G and UWB applications. The four L-shaped parasitic strip is used to enrich the isolation more than 20 dB. The highest gain of antenna is measured to be 4.5 dB. The SRR notch placed near to the feed is used to prevent the interference with WLAN frequencies and varies from 5.05 to 5.88 GHz.

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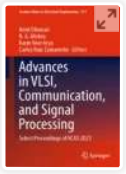
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Performance Analysis of LiF and Graphene Based Long-Range SPR Sensor

Vipin Kumar Verma, Sarika Pal, Alka Verma & J. P. Saini

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Abstract

In this paper we have proposed a novel long-range surface plasmon resonance sensor (LRSPR) based on LiF and graphene having single metallic layer. Angular interrogation method is used for the detection of biomolecules. Imaging sensitivity for conventional SPR sensor and LRSPR sensor has been calculated and compared. Also, the imaging sensitivity is analyzed with increasing layers of graphene. In our result imaging sensitivity of LRSPR sensor with single layer of graphene is found to be 867 RIU^{-1} while for the conventional SPR is 308 RIU^{-1}, which shows around three times enhancement. The detection accuracy of LRSPR with single layer of graphene is found to be 5.94 Deg^{-1}, which also shows around three times improvement than that of conventional SPR.

Keywords

Graphene **Long Range Surface Plasmon Resonance Sensor (LRSPR)**

Detection accuracy **Imaging sensitivity**

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Chapter 20
Performance Investigation of RoF Link in 16 Channel WDM System Using DPSK Modulation Technique

Balram Tamrakar, Krishna Singh, and Parvin Kumar

1 Introduction

The present scenario of the wireless network is demanding higher data rates, higher bandwidth, better connectivity and low distortions. These can be easily achieved by applying the radio over fiber system. The radio over fiber systems provide compatibility in the different applications as e-health, IoT-based applications, broadband and auto-adjustable mobiles/vehicles. The millimeter waves (mm-wave) operated with frequency range from 30 to 300 GHz are the most suitable frequency spectrum for radio over fiber communication systems. The RoF systems are categorized into three parts as: (1) central station (CS), optical distribution networks (ODNs) and base station (BS). The downlink process is started with the central station to base station.

Page 262 / 475

RESEARCH-ARTICLE

Performance investigation of MZM base employing Digital and Analog data trans

Authors: Aayushi Gupta, Parvin Kumar, Vibhav Kumar Sachan,

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ABSTRACT

References

Recommendations

Comments

performance of both digital and analog data transmission ove lengths has been investigated in which digital signal is generate coding and analog signal is transmitted at 10 GHz frequency by Zehnder Modulator (MZM). The performance of digital RoF li through eye patterns which show Bit Error Rate (BER) and Qu factor) of the received signal. The findings of digital data transı which shows that Q-factor varies from 22.04 dB to 21.23 dB f to 30km. The performance of analog data transmission is analyzed through peak Signal-to-Noise Ratio (SNR) value and the peak SNR value is obtained, which varies from -95.30 dB to -106.31 dB for fiber length 1km to 30km. The reduction in SNR has been found as 11.01 dB concerning the optical fiber impairments from 1km to 30km.

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Software Defined Networking: A View Towards Security Challenges

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Abstract. Software Defined Networking (SDN) is new paradigms type of networking that is a programmable network and overcomes the challenges like, network scalability and management of the traditional networks. While programmable network is growing, the security challenges are increasing for different applications. Software Defined Networking manages control planes and data planes separately, where the controller at control planes decides the path at run time and data plane forwards the packets based on controller's decisions. The applications of software are increasing day by day including in communication traffic in SDN, and therefore different applications of different industries and societies faces various challenges related to it. This paper examines the software defined programmable network and view the challenges due to security issues of programmable networking. Finally, this paper discussed with its security impacts and gives concluding remarks.

Keywords: Software Defined Networks (SDN), Data Planes, Control planes, Controllers.

INTRODUCTION

Software Defined Networkings (SDNs) is emerging networking which simplifies networks managements to enable flexibility in communications network. Traditional networks are not flexible due to combination of control planes and management planes in one single device. Software Defined Networking provides a simple add on over the traditional network i.e. the centralized and programmable [1]. This will help to take smart decision like traffic routing. The programmable networks motivates to vendors to add Open Flow protocol to the forwarding device during implementation to change of route during change in the requirement [2]. In such network, the control plane is separated with forwarding plane, e.g., switch and router, and the data forwarding route is decided in a centralized controller. So, the data planes become the set of simple forwarding devices which is controlled by a central controller. These separations of data planes and control planes enables the networks programmable hence the underlying infrastructure becomes abstracted for networks services [3]. The control planes are the logical centralized device and the forwarding planes becomes a simple device which acts on the decision of control planes[4]. Hence the control planes can govern and supervise the network's flow and can manage loads, optimize and prioritize traffic, and other network services [4]. Figure 1,describes the basic architecture of SDN comprises the following three functional planes.

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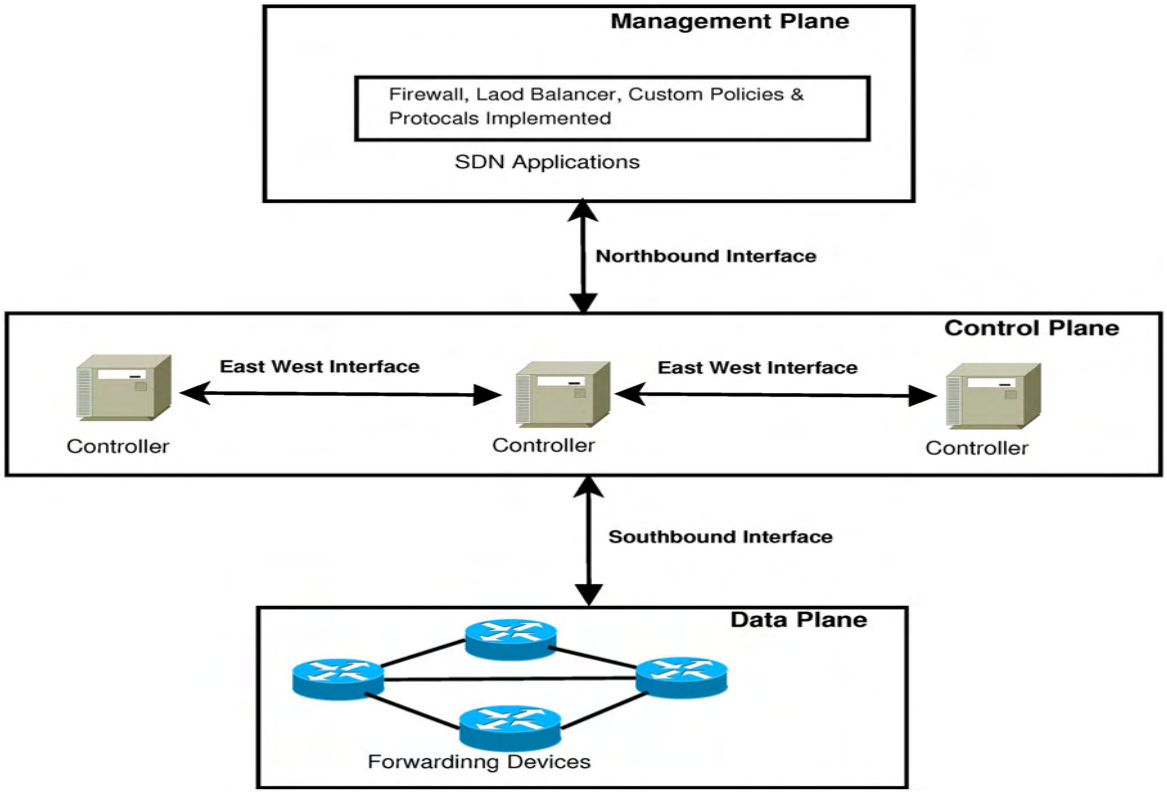


Figure: 1. SDN Architecture

1. Control Planes: In this layer of SDN exchanging gadgets, one of its principal configuration difficulties lives on the efficient utilization of on-board memory. In a general sense, memory utilization in an exchanging gadget relies upon the system scale specifically, exchanging gadgets in a bigger scale system would require a bigger memory space; else, they may require consistent equipment moves up to maintain a strategic distance from memory weariness. If there should arise an occurrence of not enough memory space, parcels would be dropped or coordinated to controllers for further choices on the most proficient method to process them, bringing about a corrupted system execution. [4],[5],[6].
2. Data Plane: The fundamental capacity of a SDN exchanging gadget's information plane is parcel sending. Specifically, after accepting of a bundle, the exchanging gadget first identifies the sending decides that matches with the parcel and afterward advances the bundle to next bounce as needs be. Contrasted with parcel sending in inheritance systems dependent on Internet Protocol or MAC addresses, SDN bundle sending can likewise be founded on different parameter, for instance, UDP/TCP ports and Virtual Local Area Networks (VLANs) tags, and entrance switch ports. Utilizing the long vectors for sending choice would without a doubt expands handling multifaceted nature in calculation, coming about a crucial exchange off among expense and efficiency in SDN bundle preparing [4],[5],[6].
3. Application Plane: SDN Applications are programs that expressly, legitimately, and automatically imparts their systems prerequisites and wanted system conduct to Software Defined Networkings controllers by means of NBIs. Likewise, they may expends a preoccupied perspectives on the systems for their inside basics leaderships purposes [4],[5],[6].

Motivation

There are several security issues in SDN like: intrusion detections (IDs), Distributed DoS (DDoS) detections, managing traffic flows information etc. are addressed by various researchers.

There is also need to focus on few more issues like access control and accountability procedures for nested application. There is no such mechanism which establishes the trust relationships among controllers and applications. So, SDN security is the concern area for the researches as there are many unresolved security issues.

Brief Review of the Previous Work

Kreutz et al. [7]described the threat-vectors that discuss the security vulnerability in programmable network. Author proposes different techniques to address the different security threat, which includes diversity, replications and secure component. This paper explains that there are no perfect mechanisms to establishes the trusts relationships among the controllers and applications in programmable networks. So, the malicious applications may access the network resources and may modify the data flow. The SDN controllers provides the abstraction and translates the applications plane requests to configurations commands for SDN infrastructures. Author also highlights that, if the application servers which stores the users credentials also may compromise, legal users authentications can be used to injects authorized, and may forged flows in SDN networks

Hadigolet al.[8] discussed that use of a prototype-network-debugger, which allows the SDN developers to re-constructs events that may leads to buggy and identifies its root cause. The authors introduced andb, which is the prototype of networks debuggers inspired by gdb, which implement two primitives utilize to debugging the SD-Network: break-points and packet-back traces. This paper further includes that then db modify forwarding states and logs packets digests to rebuilds the sequences of events leading to an errant packets, providing SD-Network programmer and operator with the valuables tools for tracking down the roots causes of bugs.

Braga et al. [9]discussed that the Distributed-Denial of Services (DDoS) attacks detections methods based on different traffics-flows. Such systems uses the C++ based NOX controller platforms which provided a programmatic environment to manage the handling of switches informations. NOX controllers access switch at fix interval and use Self-Organizing-Map to detect abnormal-flow. Denials of Services attack are categorized in three modules placed within the detection-loops of the NOX controllers – 1)The flows collectors 2)The Feature-Extractors and 3)The Classifier-module. The first module is responsible to periodically-requesting flows data from various Flow-Table of Open-Flow-switch. The second Features-Extractors-modules received collected flow, and extract features which are importants to DDOS-flood-attacks detections, The Classifiers-modules analyzes whether the given tupples correspond to a DDoS-flood attacks or it is a legitimate-traffics.

Patil et al. [10] briefed few security-challenges and analyzed the existing security-solutions like: Flow-Checkers is used to handle mis-configurations due to users conflicting-rules for a single-flow-table. It identifies intra-switch mis-configurations within single-flow-table. Fort-Nox manages the violations of securities policy. Which detect rules, contradictions and also check that the new data-flows violates security rules. Veri-Flows are used when it is difficults to modify implementations of policies during complexities and lacks of visibilities. Hyper-Flows handle scalabilities problems and reduced responses-times and error-controls. Denial of services detections deal with huge numbers of fake-requests by extracting feature by Self Optimizings-Maps and Unsuperviseds-Neural-Networks.

H. Zhang et. al. [11] discussed about SDN architecture and various security challenges. Authors briefed about current security conditions in SDN technology and concluded latency and bandwidth issues and some detected security threats. Then Author discussed some security threat issues. First, due to the excessive scale of networks, it is impossible for one controller to monitor entire network services and handles all outburst of network malfunction. Second, current measurement technology has their own scope of application. And third, every measurement approaches has their apparent advantages to catch one's eyes, but it is always accompanied with some disadvantage.

Alsmadi, et. Al.[12] discusses the security threats to SD-Networks accordings to it's effects, i.e., IP-Spoofings, Data-tamperings, Repudiations, Information disclosures, Denial of Services, and Elevations of Privileges. Also few SD-Networks security controls are discussed such as firewall, IDS/IPS, access controls, auditing, and policy managements.

For the future research to evaluate different security scenarios a vulnerability assessment tool needs to be developed. For the future research, a security embedded routing protocol is needs to be developed to guide the secure traffic.

Security in SDN

Software-Defined-Networks have their own significant challenges e.g. security, scalability, and supportability. Security in SDN is a key challenges [13],[14]. The control plane is a centralized manager having the information like, intelligence, securities compromises of controllers, which may leads insecurity in the programmable networks [16],[17]. Further, the applications at application-layer, communicates to controllers at control-layer which access the networks resources and maintain the networks activities. So, the authentications for different activities while increasing the numbers of different applications in SD-networks in centralized controllers architecture are the key challenge to provide security [15],[17].The centralized-controllers are capable enough to provide security-authentications to various applications, and authorizes different resources also. Denial-of-Services (DoS) and distributed-DoS attacks are the major threats in networks-security challenges in SDN-controllers [17],[18].

Furthermore, if any intruder or illegitimate access got permissions to enter into network the lapse in security may mislead to controller to controller or controller to data plane communications. The foremost security challenge in Data plane is differentiating genuine flows and forwarding rules from malicious rule. The control-planes and data-planes separations may allow an intruder to modify or change data-flow by the manipulations of Open-Flows rules and hence, results in different types of active-networks-attacks, e.g man-in-the-middle attacks[7],[19].

Therefore, Network security is the crucial component for maintaining successful communication network in SDN.

Analysis and Expected impact

Programmable SDN networks are slowly working towards its real impacts while increasing demands of networks day by day. Software-Defined-Networks implementation shave key challenge due to network security issues. The role of softwares are increasing day by day including in communication network, and therefore different applications of different industries and societies faces various challenges related to that. Even Societies are becoming more relies on software-controlled-systems. The security of software applications are more critical, e.g., controlling cars with software, aero-planes and many other high-speed transportations. The Large volumes of softwares are critical-businesses, e.g., software running in cell phones, web servers and many data canter. Defects in such types of softwares may leads to significant data and financial losses. Buggy softwares can misbehaves and causes huge financial losses and security breaches.

To rely on softwares there must be access control and a security checking mechanism in any crises situations. To rely, security must always top priority over efficiency due to various reasons: e.g. cheap and fast computers machines, more unreliable softwares, corrupt and system failure costs, difficult to improve the untrusted softwares, unreliable systems may cause information loss.

So the fundamental roles should be reliability of system softwaresare on priority basis. Therefore enhancing the software reliability in SD-networking is very important.

Software Defined Networking already has drawn their attentions of in both academia and industries. This emerging network-technologies are attracting more and more due to combinations of latest technology. A good secure and congestions avoidance algorithms might improves software controlled networks efficiency.

CONCLUSION

Software Defined Networkings (SDNs) is emerging Software network which simplifies networks managements to enable flexibility in communications network. Traditional networks are not flexible due to combinations of control planes and management planes in the single switch device. SDN separates control planes and data planes, where the controller at control plane decides the path at run time and data plane forwards the packets based on controller's decisions. Software Defined Network (SDN) already has drawn their attentions of in both academia and industries. These emerging network-technologies are attracting more and more due to combinations of latest technology. A good secure and congestions avoidance algorithms might improves software controlled networks efficiency. Network security is the crucial component for maintaining successful communication network in SDN.

This paper examines the software defined programmable networking and reviews the security challenges issues of SDN. Finally the paper discussed with its security impacts and gives concluding remarks.

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A Review on Presently Available Anti-Malarial Treatments and Focus on *Artemisia annua* Dry Leaf Antimalarial Therapy

Richa Goel*, Praveen Kumar Dixit, K. Nagarajan

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Abstract: Since a lot of drugs that were used for the treatment of malaria have shown resistance to the Plasmodium species. Even the Artemisia combination therapy is not effective in certain cases. There is a need to look for some alternatives, which are effective in the clinical treatment of malaria and affordable for the general population. A therapy called *Artemisia annua* dry leaf antimalarial therapy (ALT) has recently been tested for its effectiveness against malaria and certain other infectious diseases. ALT has been shown to be effective against artemisinin-resistant malarial infections and its treatment is resilient to resistance development in animal model systems. This proves to be an effective alternative to presently available antimalarials. This review defines the characteristics of different species of malaria-causing parasites, their vectors, endemicity, and features of the disease development; followed by chemical, biological, and antimalarial properties of currently used antimalarials. The choices and methodologies of administration of antimalarials to adult, child, pregnant, and lactating women patients with acute and complicated malaria are described, followed by strategies to combat drug-resistant malaria. A special emphasis on the origin, empirical basis, evidence on clinical efficacy, and cost aspects of ALT is given, along with the focus on the possibilities of repurposing ALT as a treatment for a variety of autoimmune, metabolic, and cancerous diseases.

Keywords*: Malaria, Artemisia annua Dry leaf antimalarial therapy, Artemisinin, Currently used antimalarial drugs.*

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Store-sales Forecasting Model to Determine Inventory Stock Levels using Machine Learning

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Abstract—Predicting sales had been a common practice. Sales prediction plays a crucial role in the business world. It gives accurate and dependable information related to current and previous events, also the events that are expected to occur in the future. However, because traditional sales approach lack insight into customers' buying patterns, they can no more help businesses in keeping up with the pace of a competitive business world. Machine Learning evolvements have resulted in major changes in sales and marketing fields. Many key aspects like consumers' buying patterns, target audiences, and estimating sales for upcoming years can be determined easily, all thanks to the advancements in machine learning and thus helping the sales team in the companies for making plans for a boost in sales.

In the proposed methodology, the study of several forecasting methods used in the forecasting of the future sales of stores keeping previous year's sales in view. We tried linear regression model, Random Forest and XGBoost regressor. But linear model performed poor, so it is not included here. The prediction models implemented herein are random forest regressor and XGBoost regressor. Both of the regression techniques give better accuracy and less RMSE (Root Mean Squared Error) value than linear model. XGBoost perform best in all the three models.

Keywords—Regression, Random Forest, Gradient boosting, VG-Boost(Extreme Gradient Boosting)

I. INTRODUCTION

Interesting as well as difficult sales forecasting problems are pretty common. Forecasting sales has always been a critical area to concentrate on. “The sales forecast can be viewed as an accurate guess regarding consumer demand for a vendor's products and services over a specific time period, based on the set of assumptions about the environment.” Forecasts are critical in calculating inventory stock levels, and effectively anticipating future demand for goods, particularly in the Super-markets and Grocery Stores industry, has been a long-standing difficulty. If items are not readily available or if supply exceeds demand, total profit may be compromised.

Predicting sales is the process of analyzing data from variety of sources, like market trends, customer behavior, and some other factors. It includes historical sales data and data regarding internal factors like company's policy and also external factors competitions, economic situations, and market changes, seasonality etc. which affects sales. Earlier sales forecasting was used to be done through statistical methods. But in today's fast pacing and competitive world, where competitive margins are shrinking and decisions needed to be quick but well- informed, an effective and efficient forecasting system has become necessary for all business. When it necessary for companies to stretch their resources broad and when customers have a number of options to choose from, any advantage an organization can extract out matters and could be table-turning for them. If a company can supply the correct amount of product stocks, sales will not be lost due to a lack of supply, and also no money will go to waste due to overstocking of the products. The, manual execution of this task could result in significant errors, resulting in poor management of business, and, more precisely, will take lot of time, which is not preferable in today's fast-paced environment. Also, with the addition of new areas with distinct needs, new items, ever- changing seasonal tastes, and unpredictable product promotion, the situation gets much more complicated. This is where machine learning can be quite useful. Machine learning is the field in which computers learn to surpass humans in specific tasks. They are utilized to perform specific jobs in a rational manner in order to achieve better results for the advancement of present society.

In this paper, the performance of a variety of machine learning models for the application of sales forecasting is measured. And best performing machine learning model is chosen for the given dataset.

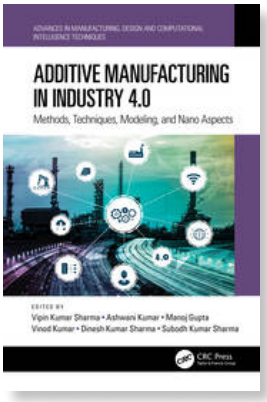
Section II includes the Literature review of research work done by the various authors. It describes the existing research work done in this area or research findings and their limitations. Also discussed the problems with the existing research work. Section III contains the proposed methodology using various machine learning techniques and the solution to overcome the limitations which will be discussed in the literature review.

Section IV includes the result and discussion of the outcomes. Then, Section V contains the conclusion and future scope of the proposed work so that the researchers can further proceed this work by using deep learning.

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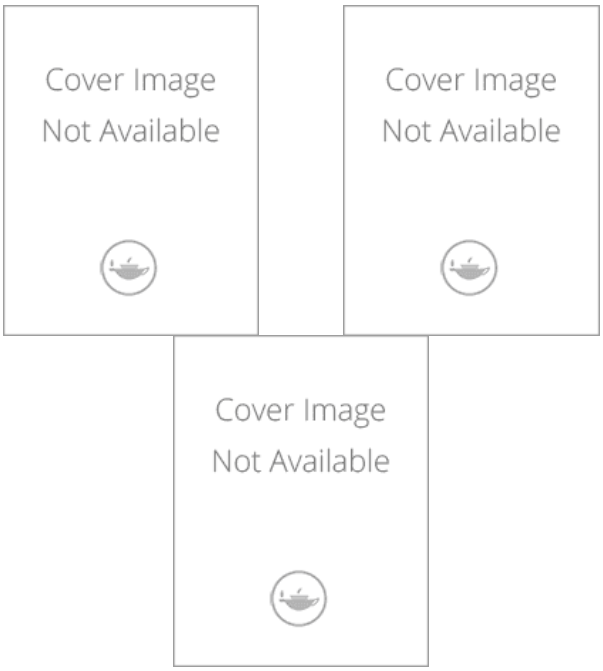
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Emerging Trends in Mechanical and Industrial Engineering pp 391–404

Power Generation with Raindrops

Alok Kumar, Amrit Kushwaha, Kritika Srivastava, Kirti Vardhan Singh, Mayank Upadhyay, Sarjeet Chaudhary, Ankur Sachdeva & Ramesh Singh

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Abstract

India being an emergent nation has increased stipulations for power. Significantly more than half of India's electricity generation is based on coal, wind, etc. However, these energy-generating resources have significant drawbacks that avert them from being employed in all situations. Furthermore, until 2040, annual energy consumption is expected to rise by more than 1%. Understanding this scenario and the need of the nation, researchers experimented with the efficacious use of raindrops to supplement existing power-producing methods. Many places like Sikkim and Meghalaya get year-round high rainfall. Many approaches have been developed to utilize raindrops as a source of energy. The most commanding feature of this method is that for raindrop energy money will be spent only at the time of installation. Raindrops are an indispensable source of energy, but the form in which they occur is a major obstacle in their use for power generation. As a result, developing a system that can productively convert the energy associated with raindrops to electrical energy while maximizing conversion efficiency is tough. 'Droplet-Based Electricity Generation (DEG), Hybrid solar panels, Superhydrophobic Magnetoelectric Generator (SMEG), and Piezoelectric Sensor Working' are some of the approaches described in this study for the same. The method that we found most effective and want to work on further with improved efficiency is DEG (Droplet-Based Electricity Generation).

Keywords

Power Generation Renewable Energy DEG (Droplet-Based Electricity Generator) Raindrops

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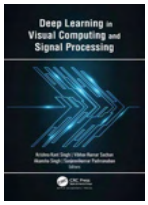
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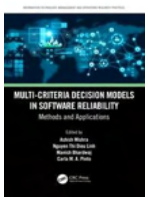
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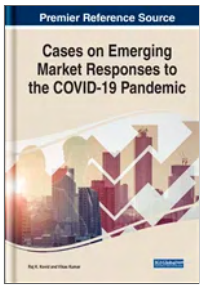
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Crisis Management: From a Stage of Shock to Reassurance in the Hospitality Industry

Puja Roshani, Shivani Agarwal

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ter discusses the adverse impinging of COVID-19 on Indian hotel business in nd on Hyatt Regency in particular. Large hospitality firms have major difficulties finances from financial institutions as the banks continued to have a poor r the hospitality sector. In early phases of the pandemic, the measures which dopted in pandemics were related to prevention, pricing strategies, and nce efforts. The aid provided by government and human resources approaches s to be looked into. The hospitality and tourism industry needs to focus on their hemes, which needs to be lower as compared to previous times. During the of the pandemic, a few of the hotels appeared to be forcing their workforce to ı-paid leave and postpone business office and instrumentation upkeep. government aid or resources, the hotel industry appeared only be used as a . The study confirms the bad shape of the hotels and their slow recovery after ting the various techniques of crisis management.

Chapter Preview

Top

luction

nagement is a significant school of philosophy of management that works with es, institutions, or the country at large in periods of major catastrophes & Clark, 2009). Research on this topic has been a popular issue since the OVID-19 (Zhao and Xu, 2020). The importance of tourism, particularly the industry, has really been plunged into a whirl as a consequence of this ed crisis. 150 Hilton hotels in China had been forced to close due to the pandemic (HNN, 2020; Walters et al., 2019). In the hotel and tourism here seems to be paucity of studies conducted, particularly on how to cope in ndemic.

to the World Health Organization (WHO) preliminary report on January 21, IO, 2020a), the WHO had to review its outbreak as an international health n January 31, 2020 (WHO, 2020b), to be declared an pandemic worldwide on 2020 (WHO, 2020c). In fair 2 calendar months, the main centre of the COVID- n heavily traveled from China to Italy, Spain and the United States and covered the entire globe (Kumar & Gupta, 2021). During the first stages of which led to the pandemic that started in the month of January to the end of numerous holidaymaker place in Continent, where the Chinese appear to be tourists, established disaster management systems in the tourism sector in to the pandemic. The road to hospitality corporation towards planning has nificantly over time as the pandemic spreads around the world, and difficulty ation plan of action need to be developed and concluded in certain time period. research on problem management strategies (Israel, 2007; Israel and 003; Israel et al., 2011) and pandemic problems (Lee, 2009; Wan, 2013) n a specific period (Israel, 2007; Israel and Reichel, 2003; Israel et al., 2011). lt, the research space should be filled by conducting consistent research risis situation in order to address the research challenge of what problem- ocedures should be used from time to time during a crisis. An unexpected y situation. Although several surveys have identified them as business problems (Backer and Ritchie, 2017; Ritchie and Jiang, 2019), to the highest rmer studies have focused on disaster risk management, preparation (Hilliard 1; Novelli et al., 2018).

nanagement refers to something like the hotel's ability to cope with a disaster appens (Israel et al., 2011). At the same time, it often provides businesses with event local and global catastrophe (Benaben et al., 2016). Tse et al. (2006) list that classifies problems into multiple clauses. They believe that external are caused by the environment and the environment, rather than by the ictory. Disasters can occur as a result of natural disasters or by man-made r example - bacteria, tsunamis, floods, and other natural disasters. Depending el of organizational responsibility, natural disasters, technological error risks, n error risks, there are three types of potential disasters (Kumar & Malhotra,

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oking Value (/dictionary/gross-booking-value/110478): Gross booking value is s the full amount of payments (including host payments, service, and cleaning excluding cancellations) processed on the platform.

lictionary/rupee/110479): Indian currency.

: (/dictionary/pandemic/37697): It refers to the Corona Virus Disease which e its spread in 2019, globally.

Year (/dictionary/financial-year/110477): A financial year (FY) is the accounting
ıich you make money, which runs from April 1 to March 31 in India.

ıvel Agency (/dictionary/online-travel-agency/95925): Companies with websites
customers to order a variety of travel-related services directly over the
They are third-party agencies who resell other people's excursions, hotels,
es, flights, vacation packages, and so on.

/ Industry (/dictionary/hospitality-industry/49785): A set of companies offering
lated to stay, food and other care of travelers.

anagement (/dictionary/vendor-management/110480): It refers to the
ıent of retailers, hotels should verify and evaluate supplier capacity and
ation of all working assets, especially perishable, in essence, the procurement
uld ensure proper stockpile.

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Gutiérrez-Leefmans
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sra Ahmed, Harold Andrew Patrick
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Case Study of China (/chapter/innovative-
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96) (pages 59-89)

Yu, YuHan Wang, Emanuela Hanes

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Investigation of Human Resource Management Practices After COVID-19: Challenges and Opportunities

Shivani Agarwal, Shubham Aggarwal, Anshika Tyagi

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ɔmy of every country relies on its human resources. COVID-19 has impacted e, socio-economic development, and national relations. The worldwide has been ferociously crushed by the coronavirus pandemic. It barrels all ons, making a complicated and tough setting for managers in the domain of source management. International agencies need to facilitate their employees ɔwn this extraordinary crisis. The type of work, worker enlisting and choice, aching, performance management, and compensation management have lified fully. In the study, COVID-19 crisis's impact on HRM is investigated. It the prospects that have arisen from the pandemic, and it presents sion for managers in the domain of human resource management. The study d the adoption of e-HRM to reduce employee physical interactions.

Chapter Preview

Top

oduction

uses area unit a colony of contagion' happiness to the family of coronaries that ate each human (male-female) and animals. Corona-viruses area unit named ner appearance: "corona" suggests that "crown". The virus's outer layers are d with spike proteins that surround them sort of a crown. Human uses will cause delicate diseases just like communicable diseases, whereas iinspring additional severe diseases (such as MERS - Mideast metastasis). A replacement coronavirus that previously has not been celebrated in merged in the city, China in Dec 2019. Signs and symptoms embody s symptoms and embody fever, cough, and shortness of breath. In further ses, the infection can cause disease, severe acute metabolism syndrome, and ly death. Commonplace recommendations to prevent the flowering of covid-19 equent cleansing of hands victimization alcohol-based hand rub or soap and vering the nose and mouth with a flexed elbow or disposable tissue once and sneezing. On another aspect, covid-19 has in addition impact on Human management (HRM) (Aitken-Fox, 2020). It is the application of recruiting, ɔloying, associate degreed managing the employees. An organization or on's hour department is usually accountable for creating, golf stroke into ıd overseeing policies governing employees and thus the connection of the on with its employees. The term human resources were initially utilized within eriod, then further wide among the Sixties, to clarify those that work for the on, within the mixture. Several functions of the HRM unit of measurement are :

ruitment

source management is the potency of individual leadership and controls at n a company. The HRM is liable for facilitating the goals of the cooperation ffective management of human capital — specializing in workers because of any's most vital quality. Accomplishment is the commencement in building an organization's human capital. At a high level, the goals area unit to seek out he foremost effective candidates, on time, and at intervals budget.

ining and development

ınd rearing square measure one of the foremost necessary functions of HRM in eration. The target of this coaching is to boost workers' skills behavior and e by golf stroke them into understanding new techniques of doing work. ɔaching and development helps in changing employees' skills and data for g arts employment which ends in increasing their work potency and increasing ctivity of a corporation. It ensures that Associate in Nursing employee's oddity icity is reduced and learning or behavioral modification ought to occur in a tured format. Coaching development or learning and development area unit going educational activities designed for goal fulfillment and enhancing the ıce of workers. Employee employment and development in HRM is printed as used by a company to spice up the skills and performance of the staff. It's a ɔl that consists of information and directions to make existing skills sharp, new concepts and knowledge to spice up employee performance. Decent ent & development initiative supported employment desires assessment helps any to spice up the skills to workmen and improve productivity.

rformance management

ıg, continuous way of human activity and instructive work tasks, priorities, ıce objectives, and Associate in Nursing growth that optimizes an individual's ıce and aligns sessions with structure strategic goals When people perceive performance management, the annual analysis may be the first thing that mind. However, an effective performance management strategy entails much ı a simple annual review. Human resources have developed modules to aid in

gement of employee performance. In addition to setting goals at the start of the eriod and evaluating performance at the end of the analysis period, human recommend that feedback be given throughout the year.

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vi Tsoutsa, Vyron Damasiotis, Evdokia Tsifora

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Basile, Federica Caboni, Lucia Pizzichini

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and Digital Technologies in the Omnichannel Post-9 Era (/chapter/humans-and-digital-technologies-in-the-nnel-post-covid-19-era/309601) (pages 55-75)

echopoulos, Chris Lazaris, Georgios Doukidis

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es and Emerging Strategies for a Global Automotive
e Towards a Post-COVID-19 Era: The Impact of Digital
nation (/chapter/challenges-and-emerging-strategies-
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r 6

c Crisis in Colombia Due to COVID-19: From Pandemic
Pandemic Actions (/chapter/economic-crisis-in-colombia-
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g Cycle of Prochaska and DiClemente With Ethically
ible Behavior Theory for Social Change Management:
VID-19 Social Cognitive Perspective for Change
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responsible-behavior-theory-for-social-change-
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r 8

act of a Global Recession on Millennials in the Job
chapter/the-impact-of-a-global-recession-on-millennials-
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ences of the Pandemic for Ukrainian Agriculture in the
f Public Administration (/chapter/consequences-of-the-
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r 15

f COVID-19 on Businesses and Consumers 2020/2022: : Measures Adopted by Companies (/chapter/impact-of--on-businesses-and-consumers-20202022/309612) 91-307)

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r 16

ng Blockchain and Decentralized Finance in the Post-9 European Union: The Case of the Circular Economy /harnessing-blockchain-and-decentralized-finance-in-covid-19-european-union/309613) (pages 308-327)

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r 17

l Health Coverage (UHC): Case Study on World's merging Strategy After the COVID-19 Pandemic /universal-health-coverage-uhc/309614) (pages 328-

Sharma, Reenu Kumari, Neha Goel

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r 18

n Plan for the Post-Pandemic on Supply Chain ns Among Buyers and Distributors (/chapter/mitigation-the-post-pandemic-on-supply-chain-disruptions-among-nd-distributors/309615) (pages 342-353)

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r 19

tion of Human Resource Management Practices After 9: Challenges and Opportunities (/chapter/investigation-n-resource-management-practices-after-covid-16) (pages 354-365)

Agarwal, Shubham Aggarwal, Anshika Tyagi

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(/viewtitlesample.aspx?id=309616&ptid=273728&t=Investigation of Human Resource Management Practices After COVID-19: Challenges and Opportunities&isxn=9781799888567)

r 20

ng as a Driving Force for Post-COVID-19 Economic
: Investors, Consumers, and Corporations
/networking-as-a-driving-force-for-post-covid-19-
c-behavior/309617) (pages 366-385)

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(/viewtitlesample.aspx?id=309617&ptid=273728&t=Networking as a Driving Force for Post-COVID-19 Economic Behavior: Investors, Consumers, and Corporations&isxn=9781799888567)

r 21

s Between Digital Transformation and Sustainability Post
9: The Pillars of ESG (/chapter/relations-between-
nsformation-and-sustainability-post-covid-19/309618)
86-404)

Bem Machado, Marc François Richter, João Alvarez

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(/viewtitlesample.aspx?id=309618&ptid=273728&t=Relations Between Digital Transformation and Sustainability Post COVID-19: The Pillars of ESG&isxn=9781799888567)

r 22

or Curse?: Challenges Working Mothers Faced Post
9 in Brunei Darussalam (/chapter/blessing-or-
9619) (pages 405-421)

ıh Adilah Hj Abd Rahman, Heru Susanto

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(/viewtitlesample.aspx?id=309619&ptid=273728&t=Blessing or Curse?: Challenges Working Mothers Faced Post COVID-19 in Brunei Darussalam&isxn=9781799888567)

r 23

roaches to Business Strategies After COVID-19
/new-approaches-to-business-strategies-after-covid-
20) (pages 422-433)

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(/viewtitlesample.aspx?id=309620&ptid=273728&t=New Approaches to Business Strategies After COVID-19&isxn=9781799888567)

r 24

ting Place on Social Media for the Luxury Fashion
to Support and Strategically Communicate SDGs
/the-meeting-place-on-social-media-for-the-luxury-
ndustry-to-support-and-strategically-communicate-
9621) (pages 434-455)

ngel-Perez, Belén López

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(/viewtitlesample.aspx?id=309621&ptid=273728&t=The Meeting Place on Social Media for the Luxury Fashion Industry to Support and Strategically Communicate SDGs&isxn=9781799888567)

r 25

/ID-19 Pandemic and Its Impact on the Global Market: A nomic Perspective (/chapter/the-covid-19-pandemic-npact-on-the-global-market/309622) (pages 456-479)

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r 26

us Between Forensic Tax and Accounting Knowledge ıdemic COVID-19 in Indonesia (/chapter/the-nexus-forensic-tax-and-accounting-knowledge-after-c-covid-19-in-indonesia/309623) (pages 480-494)

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VANETs and the Use of IoT: Approaches, Applications, and Challenges

Sandhya Avasthi, Tanushree Sanwal, Shivani Sharma, Shweta Roy

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ıct

ular ad-hoc network (VANET) has emerged as the most sought-after y due to its wide range of applications. In this modern era, people are looking ent systems that include intelligent transport systems, which is not possible e use of modern techniques such as the internet of things (IoT), VANETs, and ıputing. With the growing demand for luxury cars, and people's need for safety, c car network is experiencing growth. The connectivity between the vehicle is ısing sensor communication among vehicles in the network. For transmitting ıg traffic information in case of a vehicle accident, car connectivity plays a vital ınect to other vehicles so that appropriate actions can be taken. In this ıpplications, protocols, trust models, and challenges of VANETS are discussed. ɔse of this chapter is to discuss and elaborate on various aspects related to ınd IoT. In addition, the chapter discusses characteristics, challenges, and oncerns in VANETs-based applications.

Chapter Preview

Top

luction To Vanets And Iot

f Things (IoT), which is fast emerging as a powerful technology, coupled with and integrated sensor network systems and domestic sensor networks are d to have an impact on people's daily lives and stimulate a significant market ıe Internet of Things is a network of connected things such as mobile devices, sors in the vehicle, digital machines, other computing devices, and even T has expanded into the field of smart vehicles and turned into something Internet of Vehicles (IoV) (Ahmood, 2020). The proper functioning of IoV is Vehicular Ad-Hoc Network. An integral component of any “Intelligent Transport (ITS) is VANET, who’s growth is accelerating fast. VANET and IoT are he most crucial components of the “Intelligent Transport System” (ITS). The study in the past decade on VANET and IoT indicates that both have a impact on intelligent transportation systems. Road accidents, congestion, fuel ion, and environmental pollution have all become major global challenges as er of automobiles increases. In both developed and developing countries, idents frequently cause massive loss of property and human life. ITS formed mented VANETs to provide infrastructure for transportation of all types. The e lies in dealing with prevalent issues in transportation to make the journey for safer, effective, hassle-free, and enjoyable (Hossain et al.,2012).

bile ad-hoc network, an integral part is VANET and therefore, nodes operate networking region and devices operating in that area. Transfer of information ınother through single-hop or multi-hop through a road-site unit (RSU) (Patel et VANET’s advantage is to improve vehicle safety by switching caution s among vehicles. VANET's main concern is to improve passenger safety and nge of security messages between locations. Security is very important for ıecause of the scarcity of centralization, and powerful arrangement of nodes extreme difficulty in recognizing nodes or network vehicles that are dangerous cious (Hussain et al., 2015). Vehicles are in direct contact with some other in case, there exists the availability of wireless connection; it is called a single vehicle (V2V). All the motor vehicles operating within the network are d to Road-Side-Unit (RSU) which further expands the network vehicle cation by sending a message and getting details from them.

s, the two primary types of applications are *safety and non-safety applications*. se of sending safety messages, safety applications are used such as warning s. Warning messages help and assist vehicles on the road in case of collisions s a life. Messages regarding road safety include reports of car accidents, traffic d construction, and alerts from emergency vehicles (Hartenstein & ux,2010). Non-safety applications, on the other hand, make driving easier and ıfortable. Traffic management and information and entertainment are the two on-safety applications. Traffic management enhances smooth traffic flow and s traffic congestion by incorporating advanced applications. The applications, infotainment applications entertain passengers by providing Internet access, to store data, stream videos, make video calls, and information related to ıugh GPSs (Global Position Systems). Unlike safety applications, these ns are not required to be extremely reliable and quick. In case of crucial cident reports can be disseminated fast and this is reliable over VANETs. ıgh VANETs can be used to disseminate event information, it is still difficult to tical messages to the appropriate location and time in a dynamic vehicular

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axena, Devansh Chauhan, Shilpi Sharma

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ional Neural Networks and Deep Learning Techniques Surface Defect Inspection (/chapter/convolutional-etworks-and-deep-learning-techniques-for-glass-defect-inspection/313096) (pages 67-99)

José Villegas-Jaramillo, Mauricio Orozco-Alzate

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r 5

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e of AIoT-Based Automation Systems Using UAVs in griculture (/chapter/the-role-of-aiot-based-automation-using-uavs-in-smart-agriculture/313098) (pages 100-

A., Poonguzhali S.

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r 6

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on the Use of IoT in Agriculture to Implement Smart (/chapter/a-study-on-the-use-of-iot-in-agriculture-to-nt-smart-farming/313099) (pages 118-135)

ik, Anurag Singh Baghel

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r 7

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AUS: An Optimized Framework for Secure and Efficient /chapter/autohaus/313100) (pages 136-159)

harma, Tushar Chand Kapoor, Misha Kakkar, Rishi

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r 8

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led Smart Homes: Architecture, Challenges, and Issues /iot-enabled-smart-homes/313101) (pages 160-176)

ik, Arpit Bhardwaj, Harshit Bhardwaj, Aditi Sakalle

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Preview Chapter (/viewtitlesample.aspx?id=313101&ptid=293188&t=IoT-Enabled Smart Homes: Architecture, Challenges, and Issues&isxn=9781668449912)

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n: An Approach to Design Smart Waste Management for ties (/chapter/smart-bin/313102) (pages 177-200)

adhyay, Ayushi Agarwal

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r 10

pervised Traffic Modelling Framework in IoV Using ation of Road Slicing (/chapter/an-unsupervised-traffic-g-framework-in-iov-using-orchestration-of-road-13103) (pages 201-212)

nka, Selvaradjou Kandasamy

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r 11

g CNN for Driver Drowsiness Detection Towards Smart Development (/chapter/exploring-cnn-for-driver-ss-detection-towards-smart-vehicle-nent/313104) (pages 213-228)

Singh, Raghav Sharma, Yash Tomar, Vivek Kumar, a Singh

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r 12

ce Automation for Total Security Using Voice Activation art Touch (/chapter/workplace-automation-for-total-using-voice-activation-and-smart-touch/313105) (pages)

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Design and Applications of Nature Inspired Optimization pp 179–197

Social Media Analysis: A Tool for Popularity Prediction Using Machine Learning Classifiers

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Abstract

The main aim of our paper is to predict the popularity of a person using ML classifiers. We will be able to predict whether the person is popular or not by analyzing the comments about that person from his/her social media platform, such as Twitter. The task is performed out of NLTK (Natural Language Toolkit) library, Python using pandas function, NumPy, and some concepts of machine learning. The analytics was done using NLP (natural language processing) as the predictions become easier with the help of it. The methodology proposed by us is to initially clean the data, using data mining approach, take out the useful information, and make the dataset ready. After which, the prepared dataset will be fed into the classifier, and we'll fit the classifier accordingly. Now, the cleaned testing data will be used to get the desired outcome.

Keywords

Natural language processing | Sentiment analysis | Opinion mining analysis | Naive Bayes classifier | Unsupervised learning algorithm | Data filtering | Data gathering | Decision tree | K-nearest neighbor (KNN) | Logistic regression | Support vector machine | Random forest | Stochastic gradient descent | Data mining | Application of NLP

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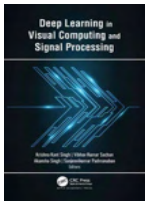
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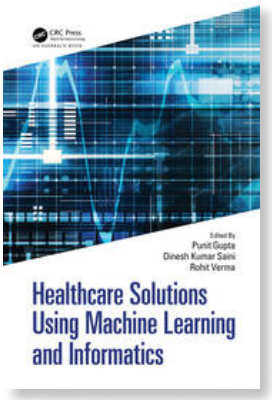
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Table of Contents

1. Introduction to Artificial Intelligence in Healthcare
Divyani Jigyasu, Sunil Kumar, Rajveer Singh Shekhawat and Shally Vats

2. Machine Learning in Radio Imagining
Nitesh Pradhan, Punit Gupta and Anita Shrotriya

3. Solutions Using Machine Learning for Diabetes
Jabar H. Yousif, Kashif Zia and Durgesh Srivastava

4. A Highly Reliable Machine Learning Algorithm for Cardiovascular Disease Prediction
Horesh Kumar, Tarun Jain, Kartik Soni, Amisha Gupta, Aditya Sinha, Rishi Gupta and Arjun Singh

5. Machine Learning Algorithm for Industry Using Image Sensing
Aakash Dhall, Hemant K Upadhyay, Sapna Juneja and Abhinav Juneja

6. Solutions Using Machine Learning For COVID-19
Kashif Zia, Jabar H. Yousif and Muhammad Shafi

7. Big Data Analytics in Healthcare Data Processing
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8. Reliable Biomedical Applications Using AI Models
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10. IoT Application for Healthcare
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Back To Top

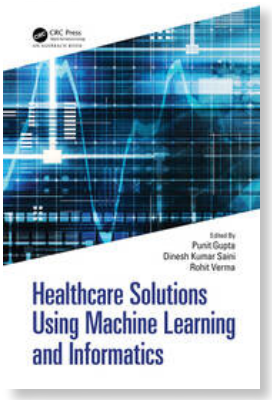
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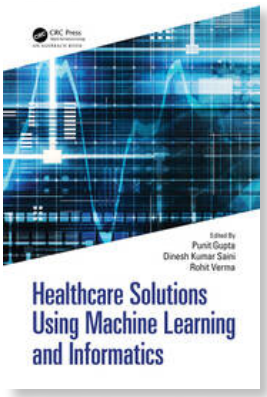
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Research Article

Synthesis and Characterization of Sol–Gel Screen Printed Zn:CdO (ZCO) Film for Optoelectronic Technologies

Vipin Kumar, Renu Kumari, Dhirendra Kumar Sharma, Sweta Shukla, Akansha Agrwal, V. K. Sachan

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Abstract

In present report on Zn doped (5%) CdO thick film is synthesized on to the glass substrate (pre-cleaned) via sol–gel screen printing process. The synthesized sintered Zn:CdO film are then characterized via XRD, SEM, EDX, UV–vis spectroscopy, PL spectroscopy, and dark conductivity measurement examinations. The XRD examination of sintered film informs the polycrystalline nature and authenticates that Zn:CdO film holds the cubic crystalline structure. SEM examination dispenses the information on morphology of Zn:CdO film. The EDX examination supports the existence of Cd, O, and Zn in the sintered film. The UV–vis spectroscopy via reflectance mode substantiates the direct transition of band gap with a value of 2.60 eV. PL spectra of the sintered film manifest a strong near band edge emission located around 500 nm. The Arrhenius plot (log σ_{DC} vs 1000/T) attests the semiconducting nature for the sintered film.

Conflict of Interest

The authors declare no conflict of interest.

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Data Availability Statement

Research data are not shared.

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Back

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Surbhi Gupta [a], Shefali Kanwar [a], Neelam Sharma [b]

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Abstract

The numerous procedures that control a manufacturing system determine how effective it is. Many manufacturing systems contain certain redundancies for specific operations since failure would result in considerable losses. As a result, the system operates in many efficiency levels known as multi-state elements. To calculate the system's efficiency, various procedures of a metal sheet manufacturing unit were classified as subsystems in this paper. The Boolean function (BF) technique was used in this paper to evaluate the performance of metal sheet manufacturing plants. A matrix containing all possible paths of the successful operation of the system has been prepared for modeling the system and the same has been solved to obtain the reliability function of the system. A numerical example has been taken to assess the system, with its sub-units under two different lifetime distributions, the Weibull distribution, and the exponential distribution, which yields two distinct failure rates. We have investigated how these two distributions affect a system's reliability function over time. The respective Mean Time to Failures (MTTF) has also been compared at different failure rates. The findings have been applied to identify changes in profit over time. The analysis of optimal cost during wears out and useful life period has also been done.

Introduction

A well-established manufacturing procedure is considered to produce the highest-quality product at the lowest possible cost. However, these processes are prone to failure due to a variety of factors. In order to minimize losses during process corrective maintenance, most manufacturing processes are intended to accommodate parallel redundancy with reduced plant functionality. As a result, various levels of efficiency exist throughout the system. These states are known as multi-state elements (MSE), and the system that contains these states is referred to as a multi-state system (MSS) [1], [2]. Predicting the probability of these multi-states is critical for making many important decisions, from choosing a suitable maintenance policy to other measures to reduce downtime probability. The most common method for assessing MSS reliability is to use a suitable Markov Model [3], [4], [5] and Bayesian Network [6], [7]. Evaluating Steady State Probabilities is useful for determining a system's reliability over a long period of time. Many authors [8], [9], [10] have already developed reliability-based models for a wide range of process industries. There are numerous uncertainties that can be classified as random or non-random during the modeling process. Complex systems can generate both types of uncertainty [8], [9]. As a result, quantifying uncertainty in the analysis of reliability [10] is critical for making sound decisions. Long-term state probability analysis is preferred over steady-state probability analysis for high-demand industrial process systems like Metal sheet manufacturing plants. Metal Sheet Manufacturing Plants are in high demand because they must be in continuous mode for the majority of their useful life in order to meet industry demands. It is used in many industries, including automobiles, railroads, construction, and machinery [11]. Another important application of metal sheets is Steel houses which are becoming more popular in architecture. A steel home is less expensive, takes less time to build, is more durable, and has a

more modern appearance [12], [13]. Because of the rising demand for metal sheets, assessing the dependability of the metal sheet manufacturing process has become critical. The metal sheet manufacturing process is made up of several operations [14], [15], [16]. To form sheets, the metal first goes through a casting process. The standard metal sheet manufacturing process then starts. Following that, metal sheets are produced using the processes [17], [18], and [19].

Bending: Bending is a process in which die, metal blocks used to give various shapes, are used to bend the sheets as per final usage. A typical bending process involves V-shaped bending at the edges using appropriate dies. The product may also require another rotatory or miscellaneous bending. In this process, there is a likelihood of fault being introduced due to over-bending or under-bending.

Shearing: In this process, the metal sheets are placed in a spinning apparatus and a tool applies appropriate pressure to work on the metal and reduce it down to the appropriate thickness.

Blanking: The metal sheet coming out of sheering is cut into prescribed size using blanking machines. Sometimes, blanking may cause residual cracks or hardening of edges which reduces the reliability of the final product. To minimize these faults metal sheets subsequently go through fine blanking.

Punching: Since the metal sheet could be used in any part of the construction building, holes are punched into them by punching machines. These holes are generally made for incorporating rivets or nut bolts during the construction process.

Trimming & Slitting: The sheets are trimmed to remove excess metal and then slitting is done to remove any additional left-over metal after trimming.

Cut Off: The metal sheets are cut off into required sizes as per the requirement of the final product.

Deep Drawing: In this process, the sheets are converted into appropriate simple-curve shapes (boxes, cylindrical) or complex-curve shapes.

Roll forming: In this process, the machine cuts the continuous parts to get the required final product.

Dye and Coloring: The final product is colored or painted as per the requirement.

This paper is structured as follows: First, in section 2, we discussed the methodology. With the help of an example, we discussed the formulation, assumptions, and some specific cases using graphical representation in Section 3. Section 4 concludes the work.

Section snippets

Methodology

Boolean function technique is used for reliability modelling of non-repairable items. This technique has been used by many researchers [18], [19], [20], [21] due to its capability to solve complex system configurations with ease.

The numerous procedures necessary for this plant's operation were determined, and a block diagram for its effective operation was created as a logic matrix. This matrix was then solved to determine the system's reliability function and other reliability metrics. Because …

Formulation and solution of model

The system configuration presented in Fig. 1. is a typical series–parallel configuration system.…

Conclusion

In this study, metal sheet manufacturing plant has been considered for examination of reliability parameters using Boolean function technique and logics of algebra. The reliability of this plant with time during its “useful life” shows slow and gradual descend, while it shows catastrophic decline during “wear-out period” in the absence of repair facility. Under same assumption, there is a considerable difference in MTTF of system for “Useful life” and for “wear-out period” with increase in…

Funding

This research received no external funding.…

CRediT authorship contribution statement

Surbhi Gupta: Conceptualization, Formal Analysis. **Shefali Kanwar:** Investigation, Methodology. **Neelam Sharma:** Writing – review & editing.…

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.…

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Time series acquisition of the snowline data and easy forecasting of hydro power generation in down-hills of Himalaya

Sandeep Singh ; K. P. Mishra; Deepti Seth

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AIP Conf. Proc. 2597, 040001 (2022)
https://doi.org/10.1063/5.0115947

Hydropower is the oldest renewable energy resource in our planet. Innovations were done in this resource of energy generation and modern shape has given to it. Water availability certainly affects the generation. This work is based on the forecasting of water availability to a power plant in the down hills. Snowline measurement or snow availability in altitude is the primary parameter of forecasting. The SENTINEL satellite time series data has been utilised and it is then compared with the UJVNL power generation data on random dates of corresponding years. In the results, proportional variation of snowline with power generation is certainly reliable and this is an easy way of forecasting. Standard deviation of images has been calculated among images. The variations are clearly discussed and seen in the histograms of the images. The power generation variation is changed according to the snowline change. Higher generation is all dependent on the snow fall in the top Himalaya. Water availability in rivers is fluctuated with the snowfall and it affects power generation.

Topics
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Dilkeshwar Pandey ✉; Seema Maitrey; Deepti Seth

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AIP Conf. Proc. 2597, 030002 (2022)
https://doi.org/10.1063/5.0116687

ADINA stands for 'Artificially Developed Intelligent Assistant' which is developed as an application software. The purpose is to fulfill the basic requirements of its users and based on the usage of the user to predict its behavior. The basic requirement of this user that this application covers include making web-based as well as Wikipedia searches, event scheduling of users (calendar and planner), exploring real time news headlines throughout the globe as well as exploring new places. We have developed our own artificial intelligence assistant 'ADINA' using python language. This paper provides what services a modern assistant can provide along with scalability to add more existing services and also incorporate the services of the future. It can also be used to incorporate and control 'IOT' applications as they majorly use Raspberry Pi processor which can be easily integrated.

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Human actions involved in the development activities have put a pressure on natural and existing landscape. Changes in the Land Use Land Cover (LULC) were the most significant disturbances which are being induced by human beings. Such Land Use Land Cover Changes (LULCC) can be linked with the environmental and climate changes taking place at local, regional and global levels with the increasing growth of impermeable surfaces like built-up areas or highways which has direct impact on Land Surface Temperature (LST). The effects of LULC on LST have been the subject of numerous researches. This article represents the linkage between LULC and LST by using satellite data. After reviewing the current scope of the study, it can be concluded that in the various LULC types, built-up experienced more LST as compared to other Land types and vegetation land experienced the lowest LST.

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Remote sensing is a technique to obtain information about object, through analysis of data acquired by a device without being in contact with the object. (Chandra, 2002b). It deals with the EM energy in terms of reflection or emission (Mather, 1999). Solar spectrum can be observed with and without the influence of the earth's atmosphere. (Lilliesand & Kiefer, 1999). Land use refers to the term that how people use the land whereas land cover refers to the physical characteristics of the earth's surface. LULC is well known phenomenon that is contributing in the land degradation and biodiversity loss. The urbanization is increasing day by day, due to which the different land types are converting into the built-up areas which further leads to contribute in increasing impervious surfaces and may be reason behind the increase in land surface temperature (LST). Conversion of forests to other LULC classifications may alter the hydrologic cycle on a small scale and have impacts on water yields, water quality, and stream flow dynamics. RS and GIS were used in various fields in town planning (Krishnaswamy & Kalyanaraman, 2002), Ground water mapping (Sahai et al, 1991), Flood plain mapping (Ramamoorthi et al, 1991) by using various indicators (Sollers, 1974), Flood mapping using temporal composites (Deutsch and Ruggles, 1974), Waste land mapping (Rao et al, 1991), District level mapping (Rao et al, 1991) and to minimize the risk of disaters (Barret and Curtis, 1982) also used for the extraction of topographic attributes & Landscape features (Moore et al, 1991). Most common method to extract line topographic features or hydrological approach (Mask, 1984) & (Lo & Young, 2002). We also use this for military purpose (Buijal 2002). A system which used a spatial database to provide answers to queries of a geographical nature (Good Child, 1991). A computer assisted system for the capture, storage, retrieval, analysis and display of spatial data within a particular organization (Clark, 2001). Different components of GIS (Burrough et al, 2000). For 2-D dimension data more precisely explained by (Tobler, 1987). Accuracy of data is defined as the degree of closeness of and data value to true value (Chandra, 2002a). There is a need for improved evaluation of changes in land use and land cover, that comprehend previous changes and forecasting of future patterns for the benefit of human kind.

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India is a country that is going to become the most populated country in the world in the coming years. It has a large population of youth. Today's youth enjoy riding bikes and often ignore safety precautions such as wearing a helmet. Because of these, two-wheelers accidents are increasing day by day, which causes deaths and several types of serious injuries. Significant causes of death are head injuries, which can be prevented by wearing a helmet and taking proper safety precautions. One can also see that drinking and driving have also increased, leading to road accidents. Overspeeding is also one of the major factors. The increasing rate of road accidents made us develop a smart helmet using the internet of things, which reduces accidents and the risk of death. It has a feature where the bike starts only if the rider wears a helmet. If the rider is over-drunk or not wearing the helmet, the ignition will automatically switch off. If any accident occurs, the GSM modem and the GPS modem will send the message to the registered contact number by using a SIM card. In addition, if the bike or helmet is stolen, the owner can easily find out the exact location of the bike and the helmet using this device. This feature is necessary for a country like India, where bike theft cases are frequent and high.

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In our country today, 57% of bike users do not wear helmets while riding. We encounter many cases of road accidents and death in our daily lives. Where the common people do not follow the rules and regulations of road safety. They neglect the guidance and refuse to follow the safety procedures.

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Supply Chain Management in Blockchain Using Hyperledger



Arun Kumar Kushwaha, Soumya Singh, Anshay Rastogi, Vipin Deval, Pravesh Singh, and Vikas Goel

Abstract A track of the products is kept from producer to consumer as a test of combining the digital and physical worlds. The final consumer has access to a comprehensive record of information and can be confident that the information is correct and precise. Because it employs a distributed public book of account, one of the emerging technologies, blockchain could be a useful approach in handling supply chain management. As a result, building supply chain on blockchain helps improve overall supply chain management as it eliminates counterfeit products, improves visibility and transparency as well in the supply chain. The following qualities of blockchain technology make it useful in the supply chain sector: it lowers errors, avoids product delays, eliminates fraudulent activities, improves management, promotes consumer/supplier confidence, and so on. As a result, we use blockchain to deploy supply chains to improve overall supply chain management. Blockchain records information on a wide range of products and/or service transactions, which are tracked in real time to address a lack of transparency.

Keywords Supply chain · Blockchain · Hyperledger fabric · Hyperledger composer · Hyperledger playground

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People who have hearing loss utilise sign language to communicate. It enables gestures and spoken language to communicate with one another by connecting letters, words, and phrases. The hearing-impaired community could benefit from a machine that can translate spoken language into sign language English, allowing them to interact with the general public. They will be helped to improve their skills and become more conscious of what they can do to advance humanity. In this study, we attempted to create an automated system that could identify sign language in challenging environments. It is possible to extract the part of the signer's hand that matches their skin tone from a video of them signing. From the hand image, Extractive and categorical features that can identify the sign are used. Support vector machine is used for the categorization. India is diverse in terms of religion, culture, and language. There is no recognised sign language in India. There are numerous ISL dialects with verbal variations spoken in India. There are numerous varieties of Sign language, even in Kerala, a small state. In order to recognise the signs unique to our region, we are working to construct a SLR system.

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Due to the general public's lack of interaction and ignorance of sign language, the hearing-impaired grow alienated and lonely. It will have an impact on their social and professional lives. When speaking with someone who has hearing loss, a translation is preferred; yet, qualified interpreters are hard to come by. Interacting with hearing-impaired people can be made easier by a machine that can translate spoken English into sign language. Their skills may be improved, enabling them to take on greater responsibilities for the advancement of humanity. From a technical standpoint, as well as for its effects on society, recognition of a sign language is important.

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II. Related Work

III. Implementation

IV. Result and Discussion

V. Comparing Different Train-Test Ratios for All

Abstract:
Medical sciences have developed a lot in previous years which has significantly boosted the average lifespan of Humans. Researchers have developed medications and therapies to cure many deadly diseases including Cancer. This has contributed to the healthcare sector as many 'common' deadly diseases like breast cancer have got effective treatment procedures. Advanced Technologies like Artificial Intelligence assist practitioners in the treatment of the same. Machine Learning and Neural Networks serve the purpose of predicting possible stages, symptoms, and patient-specific treatment of breast cancer. This manuscript suggests methods (algorithms) which can predict the type of breast cancer and categorize cases as Malignant or Benign. Also, it presents the comparison of the accuracy of different Algorithms over different Train-Test Ratios. Also, the accuracy of previously done research is compared with self-experimental results and reviewed for better accuracy.

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Comparative analysis of Rainfall Prediction using Machine Learning and Deep Learning Techniques

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***Abstract*—Since the previous decade, weather has changed rapidly, raising concerns about unpredictable rains. Humidity, pressure, wind, and temperature affect rainfall. Thus, studying such characteristics to predict rainfall is intriguing. Machine learning and deep learning have simplified rainfall prediction, which is still under development. This study implements machine learning and deep learning models trained on 145460 rows and 25 characteristics. These models are tested on a test dataset using measures like accuracy and PRF score to determine the best model for rainfall prediction. Tuning each model's hyper-parameters improves results. A comparative study examined how different factors affect rainfall. This study covers preprocessing, feature engineering, model selection, and implementation. This work aims to offer an acceptable and accurate model for predicting rainfall in a web-app. This study compares machine learning and deep learning methods and provides easy access to them.**

***Index Terms*—Rainfall prediction, Machine Learning, Deep Learning, ANN, RNN**

I. Introduction

Prediction of rainfall is very important or else it may result in various disasters and mishappenings. Twisted rainfall may lead to destruction of crops, heavy floods, and droughts that eventually exploits animal, human life and its associates. Asian countries such as India, rainfall defines crop production as it is one of the main sources of water for agricultural processes. Agriculture and plantation is one of the primary sources of the Indian economy. Due to enormous increase in technology, problems like global warming have also increased resulting in irregular rainfall and air flow patterns. Rainfall is key to recharge ground water and changes in it lead to haptic hydrological cycles. Various techniques have been developed to predict rainfall which includes technology like machine learning and deep learning which are in trend to predict various patterns and amount of rainfall with the help of historical data. These predictions are based on different algorithms which may be supervised or unsupervised. Further these algorithms can be divided into Regression, Classification or clustering problem. In this research work various classification algorithms of both machine learning and deep learning domain are implemented in order to predict whether rainfall on coming next day based on provided inputs. Each algorithm is evaluated to find best optimal model which is further used in designed web-app which can be solution at user end level.

II. Literature Review

Rain forecasting algorithms vary. Two approaches anticipate future rainfall. These are empirical and dynamic. Empirical methods use historical weather data and its relationship to atmospheric variables, while dynamic methods use numerical approaches and mathematical equations to predict rainfall. MLR, ASTAR, ARIMA, and BPNN are all useful methods for predicting rainfall. These are some of the algorithms that are currently in Rainfall forecasting [1]. The authors have created a supervised machine learning algorithm, the Naive Bayes algorithm for rainfall prediction. The algorithm examines historical data on temperature, region, area, and year. It accepts historical data as input and produces a result as a result. The method has been shown to decrease human labour and offer a seamless workflow [2]. The authors employed the Linear Regression technique, as well as the Neural Network, SVM, and Random Forest algorithms, to forecast rainfall in this article. The LR algorithm [3] achieves the maximum accuracy. For prediction, the authors employed time-series data. Scientific data, financial applications, GPS, weather data, and other sources of time-series data are examples of temporal data. The Artificial Neural Network (ANN) approach is well-known for modelling nonlinear and dynamic systems. The model was created to forecast one-month and two-month outcomes [4]. The authors of this research used correlation data to conduct their analysis and then used the Multiple Linear Regression [MLR] model to predict the outcome. Cloud cover, precipitation, vapour pressure, and average temperature are

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among the four factors used by the model. For the forecast of rainfall, they used the Udaipur rainfall dataset [5]. The authors have provided a comprehensive analysis of non-parametric methods such as the Mann-Kendall test, the Pettitt Test (a rank-based test), the Method for Change Point Detection, the Method for Innovative Trend Analysis, the Method for Analysing Rainfall Changes, and other methods for analysing rainfall patterns. It contains a comprehensive examination of India's weather dataset [6]. Shreekanth Parashar and Tanveer Hurra conducted a rainfall prediction experiment utilising Data Mining Techniques. To determine which algorithm best fits the circumstance, they tried the Naive Bayes algorithm, ANN, Decision Trees, Random Forest, and k-nearest neighbour Algorithm [7]. They also discovered that decision trees and random forest-based models are the most effective in forecasting rainfall [8]. D.R. Nayak found artificial neural networks (ANN) better for rainfall prediction than traditional and numerical methods. BPN, RBFN, SVM, and SOM are popular neural networks. A unique artificial neural network. The rain prediction algorithms that employ MLR, SVM, BPN, and SOM are more advantageous [9], and the study can be more helpful for those who use ANN for their forecasts. Author [10] compared machine learning methods for rainfall prediction. They employed decision-tree, Random Forest, and SVM classification techniques. They measured precision, accuracy, recall, and F-measure values for all of the algorithms, with Random Forest providing the highest accuracy .

III. Methodology

This paper studies prediction of rainfall on the next following day by inputting various parameters related to various environmental factors such as temperature, humidity, wind direction and wind speed etc. This is a binary classification, where after providing inputs output will be whether there is going to rainfall tomorrow or not i.e., y {0,1}metrological and weather forecasting departments which can be considered as traditional methods. These methods are a little bit tedious, time taking and require experienced human resources. Here, machine and deep learning based methods can be deployed to overcome such tedious tasks. Machine learning is a computer program which learns and adapts without following instruction explicitly with the help of an algorithm and sort of mathematical modeling based on assessed inferences from the data [11]. Deep Learning can be categorized as a subset of machine learning. Field of machine learning consists of various regression and classification algorithms such as Linear Regression, Logistic Regression, Decision Tree, Random Forest, Naive Bayes and many other algorithms. Since, this is a classification task therefore in this research work Logistic Regression [12], Random Forest [13], and Xgboost classifier [14] is implemented as machine learning algorithms and in deep learning domains [15] [16] [17] [18] are implemented. A comparison of all applied models is made in order to get the best optimal model capable of predicting rainfall. Further, this model is used in deployed web-apps to provide end user level solutions.

IV. Dataset

In this research, a dataset is collected from the kaggle website which consists of a total of 14506 rows and 23 columns. These columns contain features such as Date, Location, Temperature, rainfall, evaporation, humidity, pressure, cloud and wind speed in different directions and at different times etc. which are input to the models. Since it is a supervised binary classification task therefore the last column is the target/label variable which is to be predicted.

A. Preprocessing and feature extraction

Machine learning and deep learning algorithms require data preprocessing because they cannot work with raw data. This method formats raw data. Replace all null values with mean and mode values, then remove outliers. Normalization follows cleansing. Label-encoder removes categorical variables from the dataset by converting them to numbers. It has been observed that the dataset is not balanced as shown in fig 1 therefore SMOTE oversampling technique is used to get a balanced dataset in order to avoid the biasing of the model. The balanced dataset is shown in fig 2. After feature extraction to select important features mutual classif info technique is used. Ten most important features are selected as shown in fig 3. This whole dataset is split into training and test dataset in ratio 80:20 with the help of the train test split method.

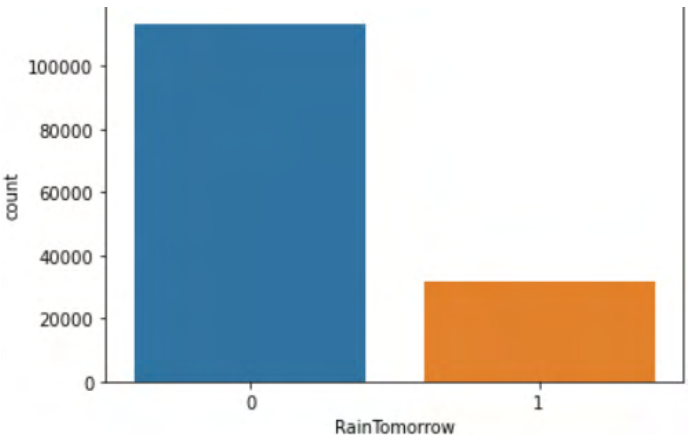


Fig. 1. Dataset before balancing

V. Experimentation

Logistic Regression: Logistic regression uses independent factors to predict the dependent variable. Categorical output variables include true, false, yes, and no. It instead predicts probabilistic values between 0 and 1. The sigmoid function translates anticipated values to probability values between 0 and 1 in this algorithm. Preprocessed data trains this algorithm.. The figure 4 depicts the roc_auc curve following the

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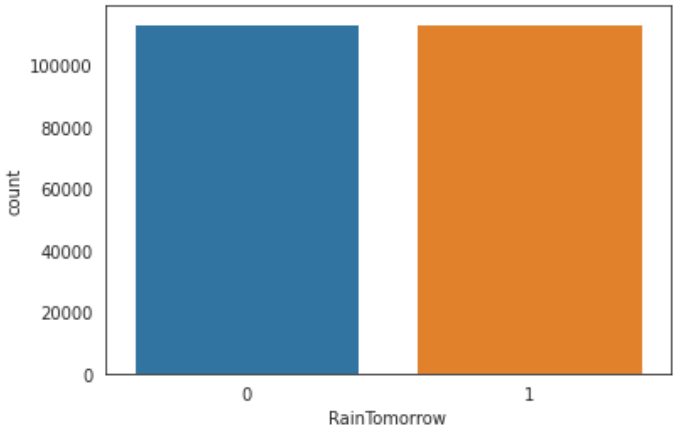


Fig. 2. Dataset after balancing

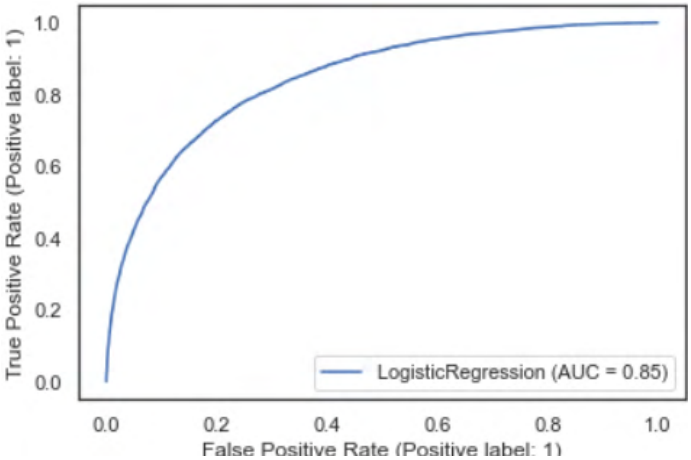


Fig. 4. Roc_Auc_curve of Logistic Regression Model

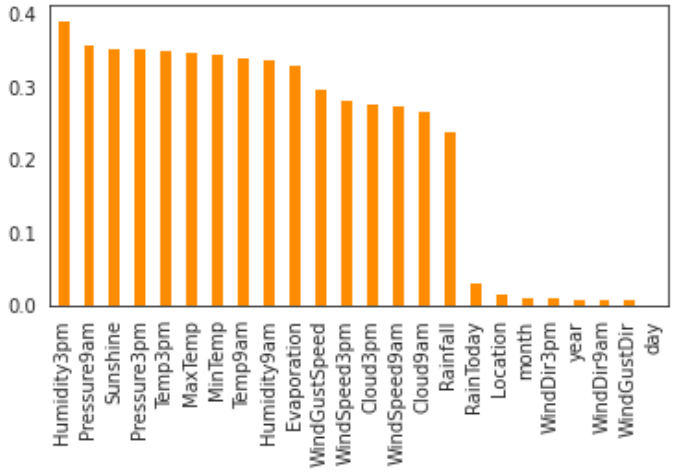


Fig. 3. Relative comparison of impacts of features

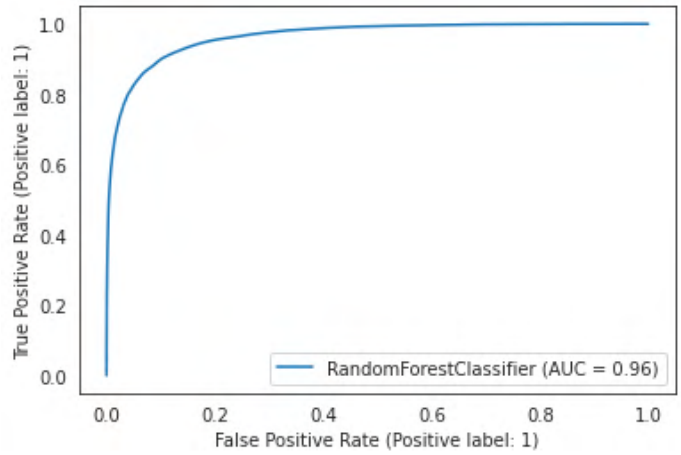


Fig. 5. Roc_Auc_curve of Random Forest Model

completion of model training and testing on test data.

Random Forest: Machine learning ensemble algorithm random forest. Ensemble combines numerous methods for optimal output. This method works for classification and regression. First, the dataset is partitioned into random data points to initialise different data sets. Second, the user chooses n decision trees for optimal results. Random forests use many decision trees randomly. The final findings are estimated by averaging all trees. 1000 estimators run this algorithm. Figure 5 depicts the roc_auc curve following the completion of model training and testing on test data.

Xgboost: Gradient Boosting (Xgboost). Classification and regression. It improves. Sorting. This open-source technology predicts heights, categories, prices, and populations. Gradient boosting predicts classification or regression using ensemble machine learning. Like boosting, each decision tree solves problems independently. GD optimises the cost of randomly fitting the model using XgBoost using a differentiable loss function. Gradient descent. Below are both algorithms. Gradient boosting reduces model training cost since the cost function (loss function) decreases as it grows. Boosting completes model training. Height reduces model training cost. The training dataset informs this approach's parameters.After finishing the training of the model and performing tests on test data, the roccurve can be seen in the figure labelled 6.

Deep Neural Network(DNN): Neural networks resembled brains in the 1990s. Artificial neurons, unlike biological neurons and mathematical functions in a computer programme, regulate all actions like in a human brain. Deep neural networks store, process, and learn data from each neuron. Deep neural networks use three components. Data enters these networks. Networks' hidden layer follows. These layers process and learn. Output completes this network. This layer contains number of neurons equal to the number of predicting classes [19]. In this work a six layer DNN is made from scratch using keras [20].Since it's a binary classification, the last layer with one neuron uses sigmoid activation instead of

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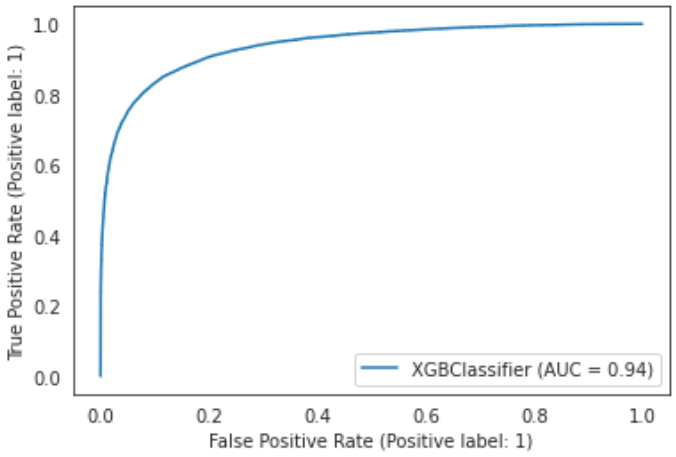


Fig. 6. Roc_Auc_curve of XgBoost Model

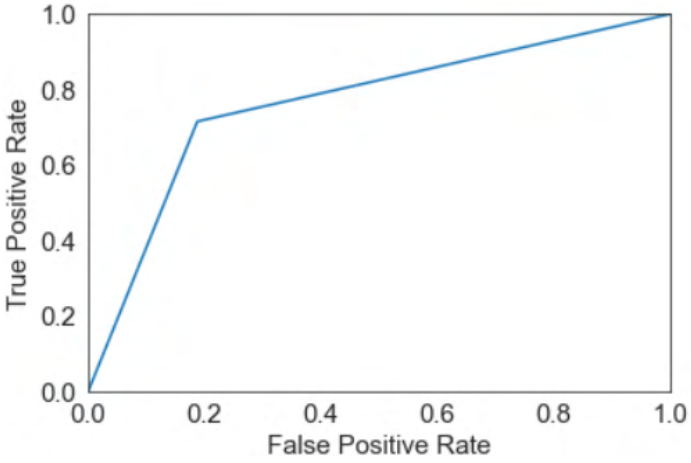


Fig. 7. Roc_Auc_curve of DNN Model

relu. Adam optimises binary cross entropy loss function. After fifty epochs, this model is tested on test dataset.
Relu Activation: Relu is a popular activation function since it is non-saturating and non-linear. Its simple derivative speeds training and convergence.

$$F(X) = max(0, X) \tag{1}$$

Sigmoid Activation: This is a popular saturating, non-linear activation function generally known as logistic function which is slow to train and a bit costly in computational terms. This function works better in binary classification problems as its results y $\{0,1\}$.

$$F(x) = \frac{1}{1+\epsilon^{-}x} \tag{2}$$

Binary Cross entropy: It is a loss function which is generally used for multi class classification problems also known as log loss. This loss function is based on quantifying the difference between two probability distributions.

$$Loss = -\frac{1}{N}\sum_{i=1}^{N} Y_i.\log p(Y_i) + (1-Y_i).\log\left(1-p(Y_i)\right) \tag{3}$$

where Y_i is the target/label and p(y_i) is the probability prediction

The fig 7 represents the roc_auc curve after the complete training of model and testing on test data.

RNN: Sequential data is well-modeled. RNN layers use a for loop to encode prior time steps while keeping internal state. Training starts with one time step before forward propagation. Forward propagation calculates network state from preceding state output. Each neuron stores current and prior state in this network. All time steps calculate network output. Data labels compare this result. Loss and optimization functions reduce network training back propagation error. RNNs learn from back propagation. Relu activates a seven-layer model. Five dense layers above two RNN layers are relu activated, whereas the last layer is sigmoid activated with one neuron for binary classification. The fig 8 represents the roc_auc curve after the complete training of model and testing on test data.

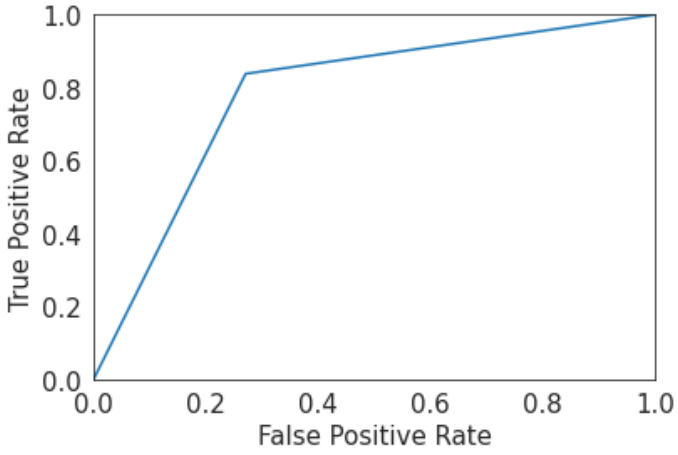


Fig. 8. Roc_Auc_curve of RNN Model

LSTM: LSTM neural networks overcome RNN gradient vanishing and exploding issues (RNN). They solve RNN issues. Advanced RNNs remember important facts using different methods. RNN's short-term memory is problematic. RNNs forget important data. Short-term retention hurts RNNs in language translation. RNNs memorise everything. LSTM gates avoid this. LSTM network ignores extraneous data via forget gates. Algorithms memorise words and pass information via gates. LSTM neuron gates use sigmoid, tanh, and mathematical operators like addition and multiplication. LSTM works better with this method. RNNs train faster than LSTMs. LSTMs remember relevant information. Two LSTM layers and five dense layers are used. Since it's a binary classification, the last layer has one neuron and utilises sigmoid activation. Each dense layer employs relu function. After 20 epochs, the test

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dataset is tested. The fig 9 represents the roc_auc curve after the complete training of model and testing on test data.

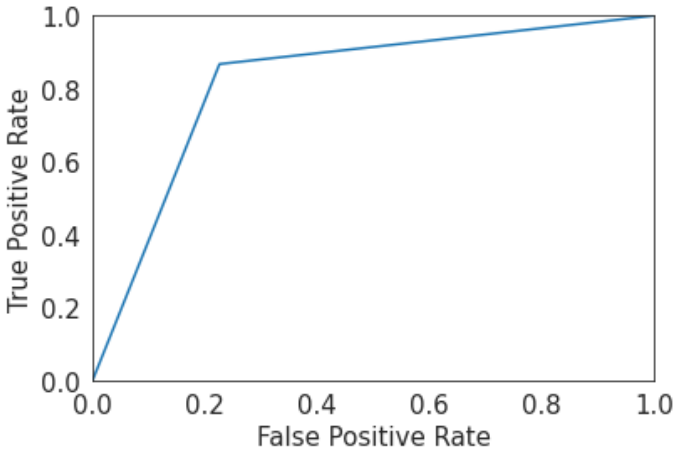


Fig. 9. Roc_Auc_curve of LSTM Model

VI. Results

This research implements six algorithms: three machine learning and three deep learning. All algorithms are trained and tested on the same data points. Different metrics are used to measure the performance of the model. Since it is a classification task therefore accuracy, precision, recall, F1-score and roc_auc score are used as evaluation metrics.

Accuracy: Model accuracy is the ratio of correct outcomes to observations. It describes model success. Table I displays test data accuracy before and after fine tuning each model.

Precision: Classification performance. False positive data set

TABLE I
Accuracy of all implemented models

Implemented Model	Training Accuracy(in 100%)	Testing Accuracy(in 100%)
Random Forest	89.76	90.00
Logistic Regression	72.24	76.35
XGBoost	83.24	86.65
DNN	73.31	77.19
RNN	79.41	78.35
LSTM	83.07	82.06

score. Precision scores reduce false-positives. After training each model, Table II provides test data precision values.

Recall: Like Precision, recall represents the number of false negatives in the data set. Table II shows test data recall after model training on training dataset.

F1 score: F1-Score is employed when model performance depends on precision and recall.

Roc_Auc_score: Success counts as a percentage of pairs. The area under the Roc curve specifies the curve with false positive rate on x-axis and true positive rate on y-axis.

Table III exhibits test data F1-score values and roc auc scores before and after fine tuning in each developed model.

TABLE II
Precision values of all implemented models

Implemented Model	Precision	Recall
Random Forest	0.90	0.90
Logistic Regression	0.77	0.76
XGBoost	0.88	0.85
DNN	0.73	0.85
RNN	0.70	0.84
LSTM	0.79	0.87

TABLE III
F1-score of all implemented models

Implemented Model	F1-score	RoC_AuC Score
Random Forest	0.90	0.89
Logistic Regression	0.76	0.76
XGBoost	0.86	0.87
DNN	0.79	0.77
RNN	0.79	0.80
LSTM	0.83	0.82

The results reveal a fascinating fact about learning algorithms. Xgboost outperforms other machine learning methods. This method has 85.01% test accuracy, followed by Random Forest (RF) at 83.75%. Ensemble-based models did well here. All models show similar Precision, Recall, and F1-score (PRF score) tendencies. LSTM model outperformed all other deep learning models with 91.01% accuracy on test data. DNN and RNN models outperformed other machine learning models. Due of its cell state retention, LSTM model outperforms all others. This model scores 0.89, 0.90, and 0.89 PRF. Below in fig 10 comparison of all implemented models based on test accuracy is shown. Fig 11 and fig 12 represent comparison of all models based on other metrics such as PRF score and Roc_Auc score.

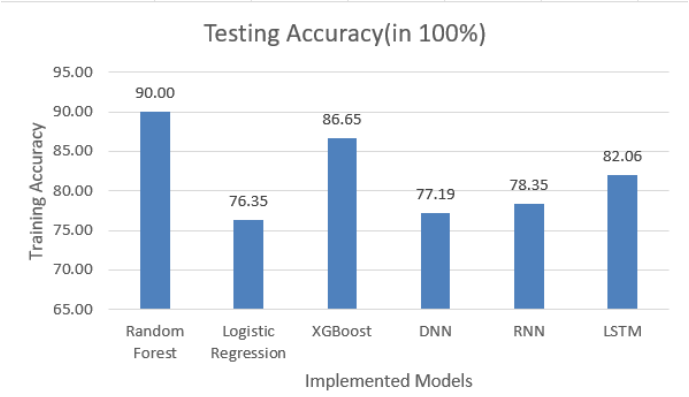


Fig. 10. Accuracy comparison of all models

VII. Conclusion

Predicting natural events such as rainfall is an open area of research and a challenging task. In this research, three machine

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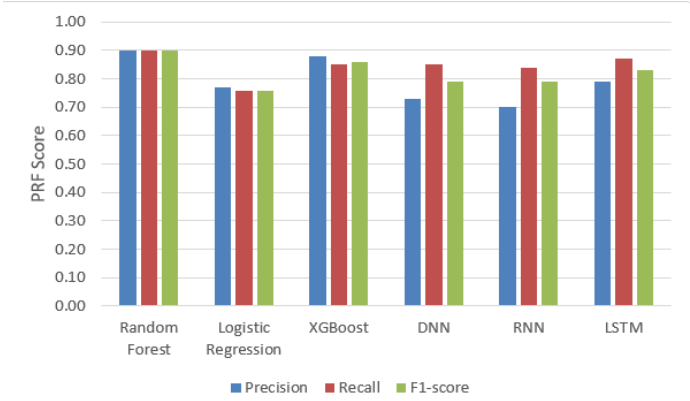


Fig. 11. PRF score comparison of all models

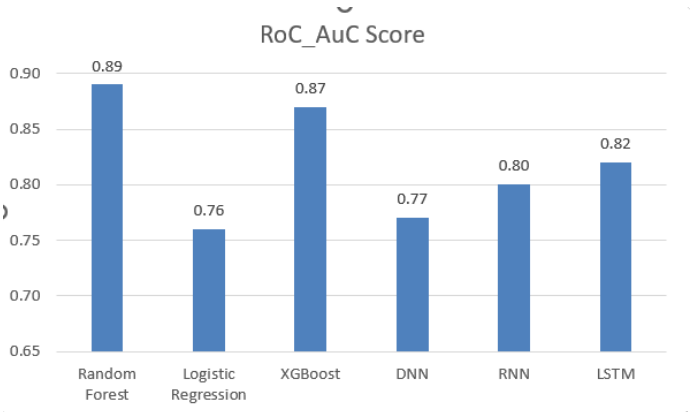


Fig. 12. Roc_Auc_score comparison of all models

learning and three deep learning models are implemented which are trained over the same training dataset and tested over the same test data. It has been observed that Xgboost algorithm (accuracy: 85.01%, Precision: 0.84, Recall: 0.85, F1-score: 0.84, roc_auc score:0.73) has outperformed all other algorithms in the machine learning domain while LSTM algorithm (accuracy: 91.01%, Precision: 0.89, Recall: 0.90, F1-score: 0.89, roc_auc score:0.70) has performed outstanding in deep learning domain and overall too. By analysis of data it has also been observed that location does not play a significant role in prediction and various other correlations among other variables are also observed. Every algorithm is evaluated on various metrics such as accuracy, prf score etc in order to get the best optimal model.A web app uses this technique to accurately predict rainfall. Training models on vast datasets can boost results in future studies. Good computational resources improve findings and make these methods more consistent for real-world use.

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Comparative Analysis of Various Machine Learning Techniques to Predict Breast Cancer

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Abstract:
A number of advantages are provided by efficient routing algorithms in MANET networks. Some of these include better network performance overall in terms of higher throughput, lower jitter, and end-to-end delay. An evaluation of the MANET routing protocols' performance is presented in this research paper. This study compares three different MANET routing protocols such as fisheye state routing (FSR), zone routing protocol (ZRP), and dynamic MANET on demand (DYMO), and that are proactive, reactive, and hybrid respectively. Utilizing QUALNET Developer, comparisons have been done with constant bit rate (CBR).

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Contents

I. Introduction

In MANET, wireless mobile nodes are taken into account. These mobile nodes are controlled via decentralized, ad-hoc mechanisms. Mobile nodes are connected to them through the self-configuring, structured MANET. With the aid of a router, mobile nodes are received and forwarded. In this study, we focus on the performance analysis of routing because it is a very important issue in MANET. We compared the three routing protocols such as DYMO, ZRP, and FSR. QUALNET [1] is the simulation software that we employ. These routing methods perform well on end-to-end delay, jitter, and throughput. We have a thorough conversation on the nodes' and our things' performance at speed toward the nodes. The routing protocols are the basis for comparison, and we then examine them in conclusion mode.

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Comparative analysis of Rainfall Prediction using Machine Learning and Deep Learning Techniques

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***Abstract*—Since the previous decade, weather has changed rapidly, raising concerns about unpredictable rains. Humidity, pressure, wind, and temperature affect rainfall. Thus, studying such characteristics to predict rainfall is intriguing. Machine learning and deep learning have simplified rainfall prediction, which is still under development. This study implements machine learning and deep learning models trained on 145460 rows and 25 characteristics. These models are tested on a test dataset using measures like accuracy and PRF score to determine the best model for rainfall prediction. Tuning each model's hyper-parameters improves results. A comparative study examined how different factors affect rainfall. This study covers preprocessing, feature engineering, model selection, and implementation. This work aims to offer an acceptable and accurate model for predicting rainfall in a web-app. This study compares machine learning and deep learning methods and provides easy access to them.**

***Index Terms*—Rainfall prediction, Machine Learning, Deep Learning, ANN, RNN**

I. Introduction

Prediction of rainfall is very important or else it may result in various disasters and mishappenings. Twisted rainfall may lead to destruction of crops, heavy floods, and droughts that eventually exploits animal, human life and its associates. Asian countries such as India, rainfall defines crop production as it is one of the main sources of water for agricultural processes. Agriculture and plantation is one of the primary sources of the Indian economy. Due to enormous increase in technology, problems like global warming have also increased resulting in irregular rainfall and air flow patterns. Rainfall is key to recharge ground water and changes in it lead to haptic hydrological cycles. Various techniques have been developed to predict rainfall which includes technology like machine learning and deep learning which are in trend to predict various patterns and amount of rainfall with the help of historical data. These predictions are based on different algorithms which may be supervised or unsupervised. Further these algorithms can be divided into Regression, Classification or clustering problem. In this research work various classification algorithms of both machine learning and deep learning domain are implemented in order to predict whether rainfall on coming next day based on provided inputs. Each algorithm is evaluated to find best optimal model which is further used in designed web-app which can be solution at user end level.

II. Literature Review

Rain forecasting algorithms vary. Two approaches anticipate future rainfall. These are empirical and dynamic. Empirical methods use historical weather data and its relationship to atmospheric variables, while dynamic methods use numerical approaches and mathematical equations to predict rainfall. MLR, ASTAR, ARIMA, and BPNN are all useful methods for predicting rainfall. These are some of the algorithms that are currently in Rainfall forecasting [1]. The authors have created a supervised machine learning algorithm, the Naive Bayes algorithm for rainfall prediction. The algorithm examines historical data on temperature, region, area, and year. It accepts historical data as input and produces a result as a result. The method has been shown to decrease human labour and offer a seamless workflow [2]. The authors employed the Linear Regression technique, as well as the Neural Network, SVM, and Random Forest algorithms, to forecast rainfall in this article. The LR algorithm [3] achieves the maximum accuracy. For prediction, the authors employed time-series data. Scientific data, financial applications, GPS, weather data, and other sources of time-series data are examples of temporal data. The Artificial Neural Network (ANN) approach is well-known for modelling nonlinear and dynamic systems. The model was created to forecast one-month and two-month outcomes [4]. The authors of this research used correlation data to conduct their analysis and then used the Multiple Linear Regression [MLR] model to predict the outcome. Cloud cover, precipitation, vapour pressure, and average temperature are

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among the four factors used by the model. For the forecast of rainfall, they used the Udaipur rainfall dataset [5]. The authors have provided a comprehensive analysis of non-parametric methods such as the Mann-Kendall test, the Pettitt Test (a rank-based test), the Method for Change Point Detection, the Method for Innovative Trend Analysis, the Method for Analysing Rainfall Changes, and other methods for analysing rainfall patterns. It contains a comprehensive examination of India's weather dataset [6]. Shreekanth Parashar and Tanveer Hurra conducted a rainfall prediction experiment utilising Data Mining Techniques. To determine which algorithm best fits the circumstance, they tried the Naive Bayes algorithm, ANN, Decision Trees, Random Forest, and k-nearest neighbour Algorithm [7]. They also discovered that decision trees and random forest-based models are the most effective in forecasting rainfall [8]. D.R. Nayak found artificial neural networks (ANN) better for rainfall prediction than traditional and numerical methods. BPN, RBFN, SVM, and SOM are popular neural networks. A unique artificial neural network. The rain prediction algorithms that employ MLR, SVM, BPN, and SOM are more advantageous [9], and the study can be more helpful for those who use ANN for their forecasts. Author [10] compared machine learning methods for rainfall prediction. They employed decision-tree, Random Forest, and SVM classification techniques. They measured precision, accuracy, recall, and F-measure values for all of the algorithms, with Random Forest providing the highest accuracy .

III. Methodology

This paper studies prediction of rainfall on the next following day by inputting various parameters related to various environmental factors such as temperature, humidity, wind direction and wind speed etc. This is a binary classification, where after providing inputs output will be whether there is going to rainfall tomorrow or not i.e., y {0,1}metrological and weather forecasting departments which can be considered as traditional methods. These methods are a little bit tedious, time taking and require experienced human resources. Here, machine and deep learning based methods can be deployed to overcome such tedious tasks. Machine learning is a computer program which learns and adapts without following instruction explicitly with the help of an algorithm and sort of mathematical modeling based on assessed inferences from the data [11]. Deep Learning can be categorized as a subset of machine learning. Field of machine learning consists of various regression and classification algorithms such as Linear Regression, Logistic Regression, Decision Tree, Random Forest, Naive Bayes and many other algorithms. Since, this is a classification task therefore in this research work Logistic Regression [12], Random Forest [13], and Xgboost classifier [14] is implemented as machine learning algorithms and in deep learning domains [15] [16] [17] [18] are implemented. A comparison of all applied models is made in order to get the best optimal model capable of predicting rainfall. Further, this model is used in deployed web-apps to provide end user level solutions.

IV. Dataset

In this research, a dataset is collected from the kaggle website which consists of a total of 14506 rows and 23 columns. These columns contain features such as Date, Location, Temperature, rainfall, evaporation, humidity, pressure, cloud and wind speed in different directions and at different times etc. which are input to the models. Since it is a supervised binary classification task therefore the last column is the target/label variable which is to be predicted.

A. Preprocessing and feature extraction

Machine learning and deep learning algorithms require data preprocessing because they cannot work with raw data. This method formats raw data. Replace all null values with mean and mode values, then remove outliers. Normalization follows cleansing. Label-encoder removes categorical variables from the dataset by converting them to numbers. It has been observed that the dataset is not balanced as shown in fig 1 therefore SMOTE oversampling technique is used to get a balanced dataset in order to avoid the biasing of the model. The balanced dataset is shown in fig 2. After feature extraction to select important features mutual classif info technique is used. Ten most important features are selected as shown in fig 3. This whole dataset is split into training and test dataset in ratio 80:20 with the help of the train test split method.

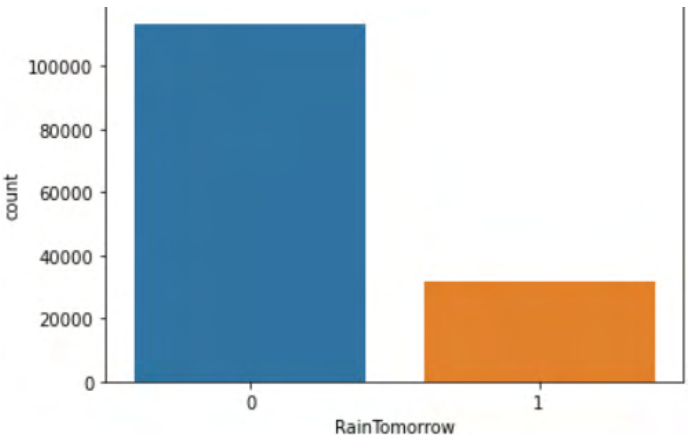


Fig. 1. Dataset before balancing

V. Experimentation

Logistic Regression: Logistic regression uses independent factors to predict the dependent variable. Categorical output variables include true, false, yes, and no. It instead predicts probabilistic values between 0 and 1. The sigmoid function translates anticipated values to probability values between 0 and 1 in this algorithm. Preprocessed data trains this algorithm.. The figure 4 depicts the roc_auc curve following the

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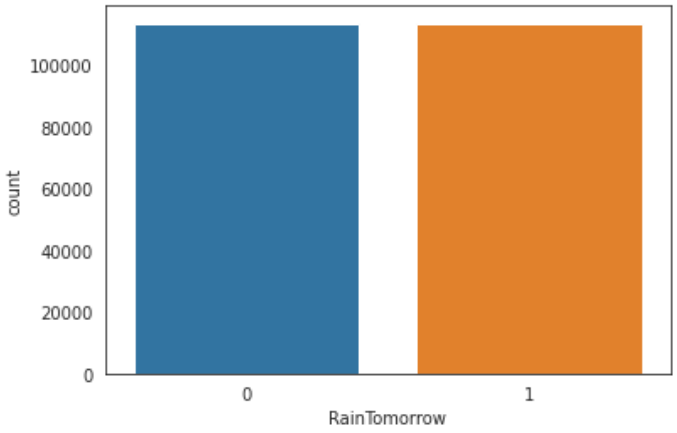


Fig. 2. Dataset after balancing

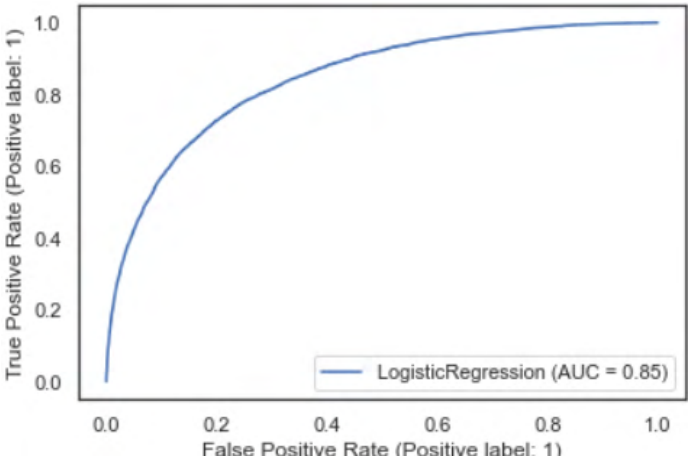


Fig. 4. Roc_Auc_curve of Logistic Regression Model

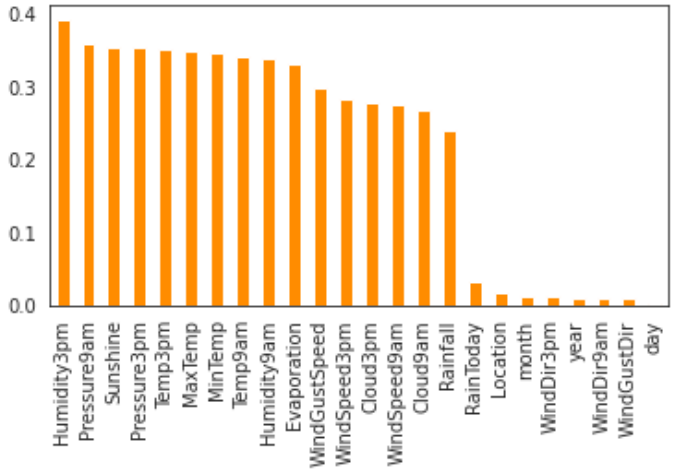


Fig. 3. Relative comparison of impacts of features

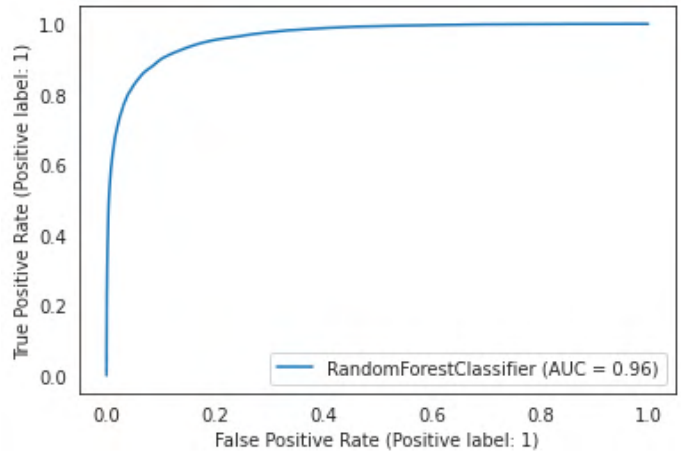


Fig. 5. Roc_Auc_curve of Random Forest Model

completion of model training and testing on test data.

Random Forest: Machine learning ensemble algorithm random forest. Ensemble combines numerous methods for optimal output. This method works for classification and regression. First, the dataset is partitioned into random data points to initialise different data sets. Second, the user chooses n decision trees for optimal results. Random forests use many decision trees randomly. The final findings are estimated by averaging all trees. 1000 estimators run this algorithm. Figure 5 depicts the roc_auc curve following the completion of model training and testing on test data.

Xgboost: Gradient Boosting (Xgboost). Classification and regression. It improves. Sorting. This open-source technology predicts heights, categories, prices, and populations. Gradient boosting predicts classification or regression using ensemble machine learning. Like boosting, each decision tree solves problems independently. GD optimises the cost of randomly fitting the model using XgBoost using a differentiable loss function. Gradient descent. Below are both algorithms. Gradient boosting reduces model training cost since the cost function (loss function) decreases as it grows. Boosting completes model training. Height reduces model training cost. The training dataset informs this approach's parameters.After finishing the training of the model and performing tests on test data, the roccurve can be seen in the figure labelled 6.

Deep Neural Network(DNN): Neural networks resembled brains in the 1990s. Artificial neurons, unlike biological neurons and mathematical functions in a computer programme, regulate all actions like in a human brain. Deep neural networks store, process, and learn data from each neuron. Deep neural networks use three components. Data enters these networks. Networks' hidden layer follows. These layers process and learn. Output completes this network. This layer contains number of neurons equal to the number of predicting classes [19]. In this work a six layer DNN is made from scratch using keras [20].Since it's a binary classification, the last layer with one neuron uses sigmoid activation instead of

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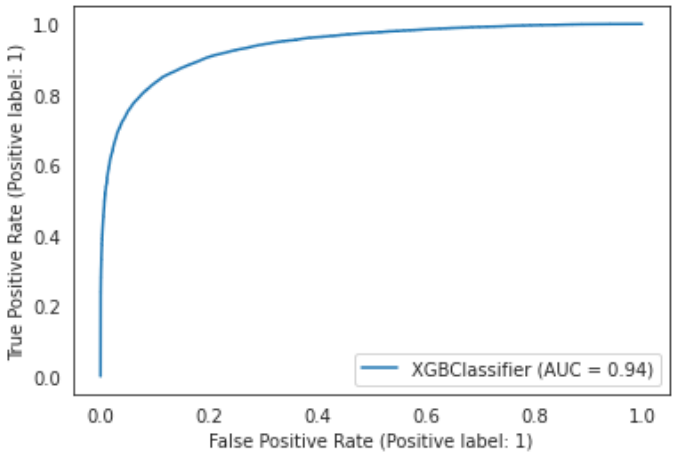


Fig. 6. Roc_Auc_curve of XgBoost Model

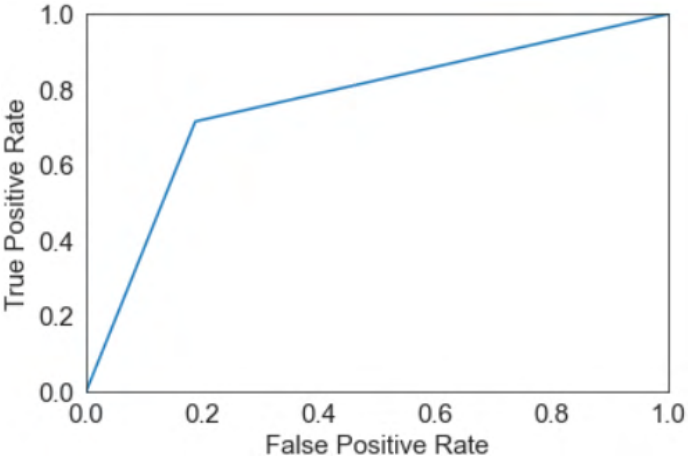


Fig. 7. Roc_Auc_curve of DNN Model

relu. Adam optimises binary cross entropy loss function. After fifty epochs, this model is tested on test dataset.
Relu Activation: Relu is a popular activation function since it is non-saturating and non-linear. Its simple derivative speeds training and convergence.

$$F(X) = max(0, X) \tag{1}$$

Sigmoid Activation: This is a popular saturating, non-linear activation function generally known as logistic function which is slow to train and a bit costly in computational terms. This function works better in binary classification problems as its results y $\{0,1\}$.

$$F(x) = \frac{1}{1+\epsilon^{-}x} \tag{2}$$

Binary Cross entropy: It is a loss function which is generally used for multi class classification problems also known as log loss. This loss function is based on quantifying the difference between two probability distributions.

$$Loss = -\frac{1}{N}\sum_{i=1}^{N} Y_i.\log p(Y_i) + (1-Y_i).\log\left(1-p(Y_i)\right) \tag{3}$$

where Y_i is the target/label and p(y_i) is the probability prediction

The fig 7 represents the roc_auc curve after the complete training of model and testing on test data.

RNN: Sequential data is well-modeled. RNN layers use a for loop to encode prior time steps while keeping internal state. Training starts with one time step before forward propagation. Forward propagation calculates network state from preceding state output. Each neuron stores current and prior state in this network. All time steps calculate network output. Data labels compare this result. Loss and optimization functions reduce network training back propagation error. RNNs learn from back propagation. Relu activates a seven-layer model. Five dense layers above two RNN layers are relu activated, whereas the last layer is sigmoid activated with one neuron for binary classification. The fig 8 represents the roc_auc curve after the complete training of model and testing on test data.

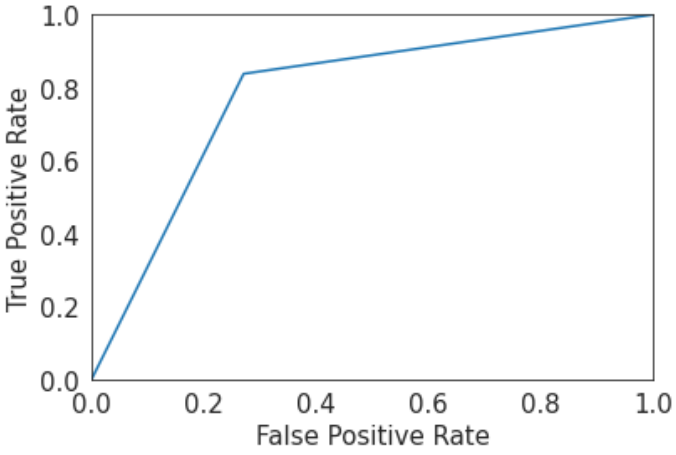


Fig. 8. Roc_Auc_curve of RNN Model

LSTM: LSTM neural networks overcome RNN gradient vanishing and exploding issues (RNN). They solve RNN issues. Advanced RNNs remember important facts using different methods. RNN's short-term memory is problematic. RNNs forget important data. Short-term retention hurts RNNs in language translation. RNNs memorise everything. LSTM gates avoid this. LSTM network ignores extraneous data via forget gates. Algorithms memorise words and pass information via gates. LSTM neuron gates use sigmoid, tanh, and mathematical operators like addition and multiplication. LSTM works better with this method. RNNs train faster than LSTMs. LSTMs remember relevant information. Two LSTM layers and five dense layers are used. Since it's a binary classification, the last layer has one neuron and utilises sigmoid activation. Each dense layer employs relu function. After 20 epochs, the test

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dataset is tested. The fig 9 represents the roc_auc curve after the complete training of model and testing on test data.

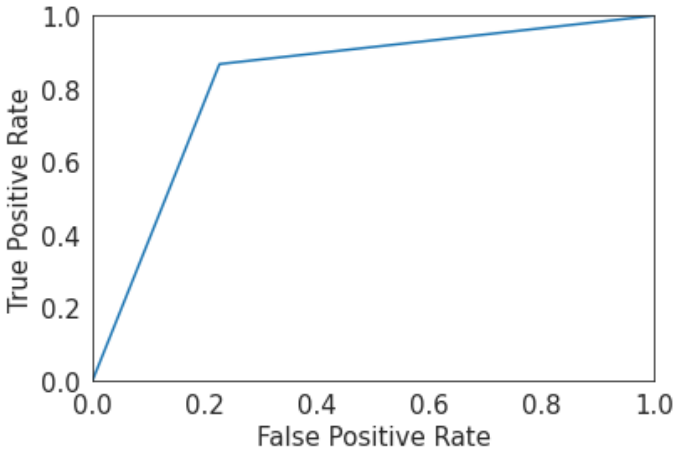


Fig. 9. Roc_Auc_curve of LSTM Model

VI. Results

This research implements six algorithms: three machine learning and three deep learning. All algorithms are trained and tested on the same data points. Different metrics are used to measure the performance of the model. Since it is a classification task therefore accuracy, precision, recall, F1-score and roc_auc score are used as evaluation metrics.

Accuracy: Model accuracy is the ratio of correct outcomes to observations. It describes model success. Table I displays test data accuracy before and after fine tuning each model.

Precision: Classification performance. False positive data set

TABLE I
Accuracy of all implemented models

Implemented Model	Training Accuracy(in 100%)	Testing Accuracy(in 100%)
Random Forest	89.76	90.00
Logistic Regression	72.24	76.35
XGBoost	83.24	86.65
DNN	73.31	77.19
RNN	79.41	78.35
LSTM	83.07	82.06

score. Precision scores reduce false-positives. After training each model, Table II provides test data precision values.

Recall: Like Precision, recall represents the number of false negatives in the data set. Table II shows test data recall after model training on training dataset.

F1 score: F1-Score is employed when model performance depends on precision and recall.

Roc_Auc_score: Success counts as a percentage of pairs. The area under the Roc curve specifies the curve with false positive rate on x-axis and true positive rate on y-axis.

Table III exhibits test data F1-score values and roc auc scores before and after fine tuning in each developed model.

TABLE II
Precision values of all implemented models

Implemented Model	Precision	Recall
Random Forest	0.90	0.90
Logistic Regression	0.77	0.76
XGBoost	0.88	0.85
DNN	0.73	0.85
RNN	0.70	0.84
LSTM	0.79	0.87

TABLE III
F1-score of all implemented models

Implemented Model	F1-score	RoC_AuC Score
Random Forest	0.90	0.89
Logistic Regression	0.76	0.76
XGBoost	0.86	0.87
DNN	0.79	0.77
RNN	0.79	0.80
LSTM	0.83	0.82

The results reveal a fascinating fact about learning algorithms. Xgboost outperforms other machine learning methods. This method has 85.01% test accuracy, followed by Random Forest (RF) at 83.75%. Ensemble-based models did well here. All models show similar Precision, Recall, and F1-score (PRF score) tendencies. LSTM model outperformed all other deep learning models with 91.01% accuracy on test data. DNN and RNN models outperformed other machine learning models. Due of its cell state retention, LSTM model outperforms all others. This model scores 0.89, 0.90, and 0.89 PRF. Below in fig 10 comparison of all implemented models based on test accuracy is shown. Fig 11 and fig 12 represent comparison of all models based on other metrics such as PRF score and Roc_Auc score.

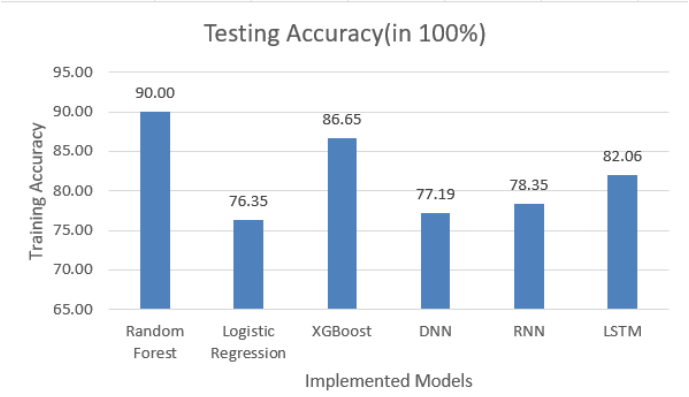


Fig. 10. Accuracy comparison of all models

VII. Conclusion

Predicting natural events such as rainfall is an open area of research and a challenging task. In this research, three machine

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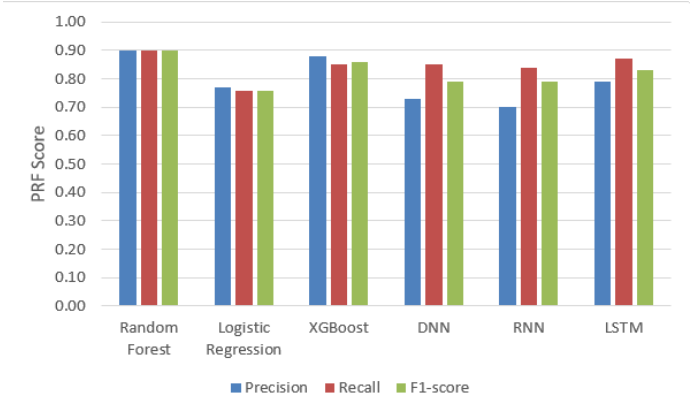


Fig. 11. PRF score comparison of all models

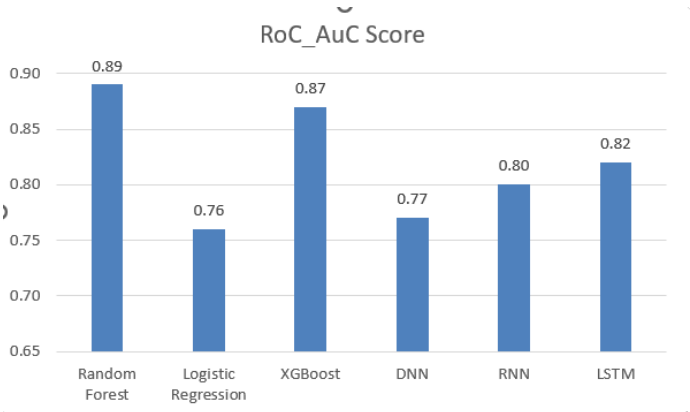


Fig. 12. Roc_Auc_score comparison of all models

learning and three deep learning models are implemented which are trained over the same training dataset and tested over the same test data. It has been observed that Xgboost algorithm (accuracy: 85.01%, Precision: 0.84, Recall: 0.85, F1-score: 0.84, roc_auc score:0.73) has outperformed all other algorithms in the machine learning domain while LSTM algorithm (accuracy: 91.01%, Precision: 0.89, Recall: 0.90, F1-score: 0.89, roc_auc score:0.70) has performed outstanding in deep learning domain and overall too. By analysis of data it has also been observed that location does not play a significant role in prediction and various other correlations among other variables are also observed. Every algorithm is evaluated on various metrics such as accuracy, prf score etc in order to get the best optimal model.A web app uses this technique to accurately predict rainfall. Training models on vast datasets can boost results in future studies. Good computational resources improve findings and make these methods more consistent for real-world use.

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Satellite images suffer from poor resolution and spatial content in the images because of inappropriate illumination, certain environmental conditions or the noise induced in the images during capture. With so many challenges involved in order to provide information from these images, several image processing steps are to be undertaken such as image enhancement, image segmentation, image restoration, morphological processing, representation and description, and object recognition [1]. Among the many steps in image processing, image segmentation is critical because it gives information that is essential for image analysis. Thresholding, a type of segmentation technique which is on one hand simple to implement for gray scale bi-modal images but has its own set of challenges for multi modal images or coloured images. Satellite images which mostly fall in the category of multi modal images and are usually coloured, much experimentation can be performed with how thresholding can be implemented for satellite images. Thresholding segmentation technique is automated and needs very less human intervention. The segmented images can either be used for visual evaluation or can be utilised as an input for other image processing steps as needed.

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In MANET, wireless mobile nodes are taken into account. These mobile nodes are controlled via decentralized, ad-hoc mechanisms. Mobile nodes are connected to them through the self-configuring, structured MANET. With the aid of a router, mobile nodes are received and forwarded. In this study, we focus on the performance analysis of routing because it is a very important issue in MANET. We compared the three routing protocols such as DYMO, ZRP, and FSR. QUALNET [1] is the simulation software that we employ. These routing methods perform well on end-to-end delay, jitter, and throughput. We have a thorough conversation on the nodes' and our things' performance at speed toward the nodes. The routing protocols are the basis for comparison, and we then examine them in conclusion mode.

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Abstract

Faults are common during any software development phase, causing the system susceptible to land in a failure state thereby degrading the overall quality of software. There is an abundance of fault-finding tools and methodologies accessible to the developers, testers and end-users, but none of them is viable and cost-effective enough when dealing with the complex software-based computation system. The paper discusses the specifics of fault diagnosis and

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Attack Detection on Internet of Things Devices using Machine Learning Techniques

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***Abstract*—Today, the exponential growth of technology and the boom in connection demand has resulted in significant growth of Internet of Things (IoT) devices. In light of the enormous increase in smart devices, secure communication between them has become a major challenge due to an increase in cyber-attacks. Adding hardware-based security is challenging due to the complex architecture of IoT devices and limited computation ability. Since IoT devices produce enormous amount of data, machine learning (ML) can be utilized to detect attacks on IoT devices. This study proposes some Machine Learning models to detect and prevent Botnet IoT attacks. The Network-based Detection of Bait-and-Switch IoT Attacks (N-BaIoT) dataset is used to train the models. The performance of models is analyzed using precision, recall and F1-score by carrying out multiclass classification. Experimental result shows that some of the proposed models are efficient in detecting botnet attacks with 99% accuracy. The model can also extend to use complete dataset and new ML techniques.**

Keywords— IoT, machine learning, attack Detection, Botnet, N-BaIoT, Mirai, Bashlite.

I. INTRODUCTION

Kevin Ashton in 1999 independently came up with the term "Internet of Things" or IoT. IoT devices are physical computing devices that include smart home devices, sensors, wearables, security devices and other machines. It collects and exchange data online.
[1] With IoT improvements, it has now become possible to meet digitally and cooperate with others. It has also connected various electrical, electronic and mechanical machines to the internet. This gives us the advantage of controlling these machines from anywhere in the world.

With the advancement in technology, it is crucial for us to protect and secure our devices from cyber-attack. In the past year, an increase in attack numbers and complications are observed. Attackers use new and sophisticated attacks. Vendors that have been a victim of cyber-attack have increased by 27% and affected IoT devices have increased by 19% from the mid of 2021[2].

Currently, IoT networks are attacked through various methods and techniques. [3] Jin Yier provides hardware-assisted protection mechanisms that are more effective in defending against threats and provide less performance overhead. However, it is difficult to install hardware-assisted security defenses in the IoT network. Researchers intend to predict attacks on IoT devices via machine learning techniques.

II. IOT ATTACKS

IoT attacks are cyber-attacks that access sensitive user information using any IoT device. Attackers typically install malware on the device, damage the device, or access other company personal information. Since IoT devices are not built with proper security as a result they pose a huge security attack. Devices, Communication Channels, and applications and software are some attacking zones.
Different forms of IoT attacks are:

- Physical Tampering – Attackers physically control the devices and steal data from them.
- Eavesdropping – The attacker can take advantage of a weak network between an IoT device and the server to steal data.
- Man-in-the-middle-attack – Cybercriminals can access the data passed between the device and the server by exploiting insecure networks.
- Malicious code injection – The attacker injects malicious code into an application via a web page field.
- Botnet attacks – In this, botnets (networks of infected computers) are used to perform malicious activities and cyberattacks

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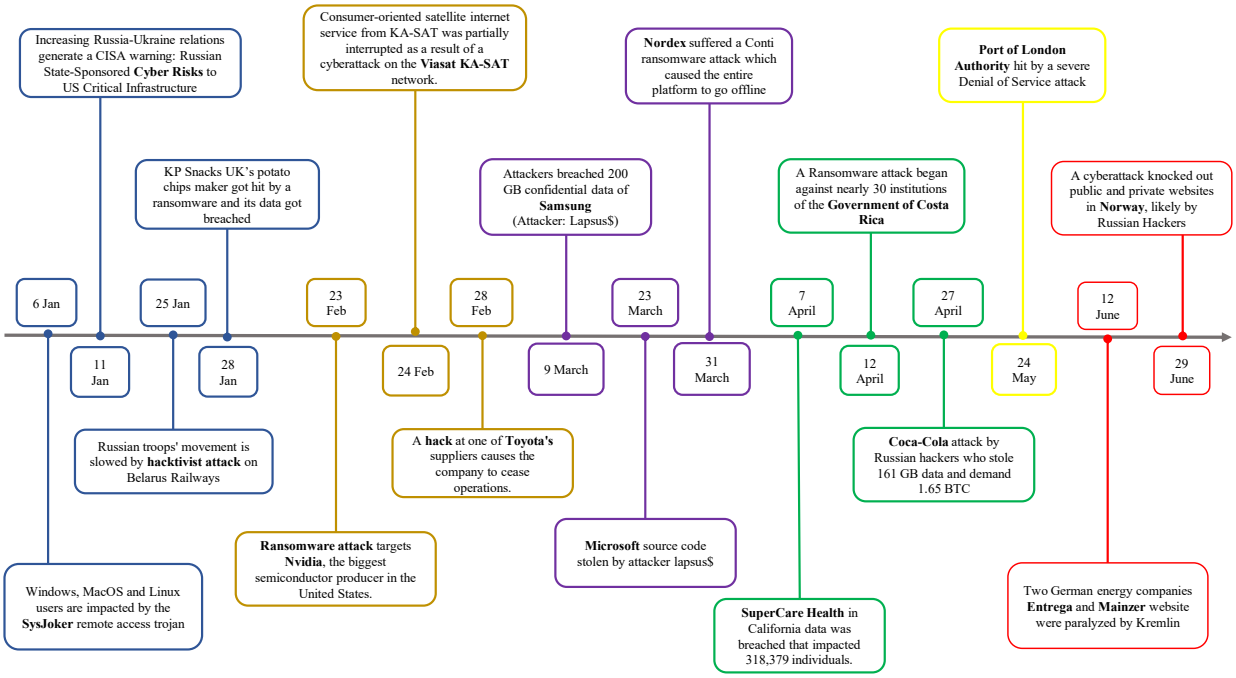


Fig.1 2022's first-half cyber happenings

In this study, we detect IoT Botnet attacks. There are four phases in the botnet lifecycle - the occurrence phase, the command-and-control phase, the attack phase, and the post-attack phase [4]. Botnets are mostly used for financial theft, information theft, sabotage of services, etc.

Distributed Denial-of-Service (DDoS), Spambots, and Brute force attacks are its types.

DDoS is one of the most vulnerable attacks and can be launched from botnets.

Security specialists have devoted their efforts to describe those botnets and develop countermeasures [5], [6], [7], [8].

Bashlite Botnet (first founded in 2014 [5]), and Mirai Botnet (first founded in 2016 [7]) are the most famous families of IoT Botnets.

BASHLITE (also known as Gafgyt) is a botnet that launches DDoS attacks. It not only exploits upcoming IoT vulnerabilities, but also employs botnet strategies like using Tor to cloak its activities. The most common method to infect recently acquired devices is to leverage Metasploit modules. It targets devices like DVR(s).

Mirai botnet is malware that infects networked devices like security cameras, and smart home devices, converting the network into remotely controlled bots. Mirai botnets are used by hackers to target systems in mass DDoS attacks. Fig. 1 demonstrates cyber-attack on various industries in the first half of 2022. Among them manufacturing, energy and healthcare are the most affected industries.

In this study, we will devise methods to detect Bashlite and Mirai Botnet attacks using machine learning methods.

III. Machine Learning

If a picture of a Lion or Tiger is shown, will you be able to classify them? Yes, because since childhood, we are taught by our elders how a tiger or lion looks and we can visualize after feeding some data that is machine learning. Machine Learning is a process by which a system improves performance from experience, in other words, the science of machine learning has enabled computers to learn without explicit programming. Tom Mitchell proposed that machine learning is the study of algorithms that:

- improve their performance P
- at some tasks T
- with experience E

There are seven steps involved in implementing machine learning models

1) Data is collected. The accuracy of our model depends on the amount and quality of data. This stage generally results in a representation of data that will be used for training.

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2) Data is pre-processed, cleaned, randomized to avoid ambiguity, and then prepared for training.
3) Dataset was split into testing and training set, using different distributions/approaches. One of the most used distributions is K-fold cross-validation.
4) Choosing a model. Based on the methods and way of learning, machine learning is categorized into Supervised, Unsupervised and Reinforcement Learning.
5) Train the model. This selected model is trained. This step aims to produce a model that can make predictions correctly.
6) Assessing the model utilizing metrics to assess the model's performance. This model is validated using previously unknown data.
7) Parameter tuning refers to hyperparameter tuning. Hyperparameters cannot be learned during the training process. These can be fixed before the actual training process begins. They are used to control the learning rate. They play a crucial role in the fitting of machine learning algorithms. Two well-known strategies for hyperparameter tuning are GridSeachCV and RandomizedSearchCV.

Machine learning algorithms have demonstrated their efficiency and effectiveness in numerous use cases and applications. [9] P. P. Shinde, Pramila P acknowledged the use of machine learning for classification, predicting denial of service attack, etc. And they have been successfully implemented. [10] C. Sinclair, L. Pierce and S. Matzner used genetic algorithm and decision tree for the production of rules to detect complex network intrusions to maximize the utility of the system.

IV. IoT And ML Integration

IoT and machine learning (ML) are complementary technologies that can be integrated to provide significant benefits in various applications. IoT devices generate an enormous volume of data that is leveraged to improve decision-making and enhance user experiences. However, analyzing this data can be challenging without the use of advanced analytical techniques such as ML.

Integrating IoT and ML involves using machine learning algorithms. This can help to identify patterns, predict future events, and optimize processes in real-time. For example, in the industrial sector, IoT sensors can collect data from machinery, and ML algorithms can be used to analyze this data to detect anomalies, predict equipment failures, and optimize maintenance schedules.

To integrate IoT and ML, there are several steps that need to be taken, including:

- Data collection: IoT devices need to be set up to collect and transmit relevant data to a centralized database or cloud platform.
- Data preprocessing: The collected data needs to be cleaned, filtered, and transformed into a format suitable for ML analysis.
- Model selection: The appropriate ML model needs to be selected based on the type of data, the problem being addressed, and the desired outcomes.
- Training: The selected ML model needs to be trained on the preprocessed data to learn patterns and make predictions.
- Deployment: The trained ML model needs to be deployed in the IoT system to analyze real-time data and provide insights.
- Continuous improvement: The ML model needs to be continuously monitored and updated to improve its accuracy and effectiveness.

V. Proposed Approach

In this section, we will illustrate the dataset used, data preprocessing, and an experimental scenario.

A. Experimental Dataset (N-BaIoT)

The absence of publicly available botnet datasets, especially for IoT is addressed with the N-BaIoT dataset [11]. It implies actual traffic data acquired from nine commercial IoT devices that were infected by Mirai and Bashlite attacks and consists of 115 features. The malicious traffic includes several types of bait-and-switch attacks. Each network flow file in the N-BaIot dataset contains a range of features, including protocol type, source and destination IP addresses and ports, payload size and packet count, and flow duration. The dataset is labeled with three different classes of traffic: benign, attack, and background.

Table I demonstrates the name of the devices used to generate this dataset.

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TABLE I. DEVICES IN THE N-BAIOT DATASET

S.No.	Device Name
1	Danmini Doorbell
2	Ecobee Thermostat
3	Ennio Doorbell
4	Philips B120N10 Baby Monitor
5	Provision PT 737E Security Camera
6	Provision PT 838 Security Camera
7	Samsung SNH 1011 N Webcam
8	SimpleHome XCS7 1002 WHT Security Camera
9	SimpleHome XCS7 1003 WHT Security Camera

The dataset was used in previous studies to develop and evaluate intrusion detection systems for IoT devices and thus, is already pre-processed and no further cleaning is exercised on the data [12][13]. However, we have taken a fraction of some attack types of the dataset to make it balanced. This is discussed by Dr. D. Ramyachitra [14] since there was an unequal distribution of classes in the dataset.

B. Data Pre-processing

The objective of pre-processing is to formulate the data into a form that will help in boosting the efficiency of machine learning models. We have used the Standardization of data that converts the structure of the dataset into one common format of data. It's a data pre-processing technique for machine learning used to scale data with a standard deviation of 1 and a mean of 0 for the data. This helps to remove any bias in the data and ensures that all features have the same scale. Standardization is applied column-wise in the dataset. This can be achieved using the subsequent equations:

$$x_{standardized} = \frac{x - \mu}{\sigma}$$

$$\text{Where, } \mu = \frac{1}{N}\sum_{i=1}^{N} x_i \text{ ,}$$

$$\sigma = \sqrt{\frac{1}{N}\sum_{i=1}^{N}(x_i - \mu)^2}$$

where:

- $x_{\text{standardized}}$ is the standardized value.
- x is the original value.
- μ is the mean value of the column.
- σ is the standard deviation value of the column.

C. Experiment setup

Machine learning models' performance is significantly influenced by hardware. We used the same hardware throughout the experiment. The following configurations were used to conduct the experiment:

1) Hardware - Intel® Core™ i5-8265U CPU @ 1.8 GHz, 8 GB RAM, NVIDIA GeForce MX230 GPU @ 1.5 GHz, 2GB Memory running on Windows 10
2) Software – Python 3.7

We have used some python libraries to assist us in our implementation:

Keras: It is an API developed by Google using python language for implementing neural networks.
Numpy: NumPy is a library for Python language that can be used for complex mathematical operations. NumPy provides support for working with large-sized multi-dimensional vectors and arrays.
Pandas: A python library that imparts fast, flexible, and expressive data structures designed to work with classified data not only with ease but also intuitively. It is built on top of the NumPy package.
Sklearn: Scikit-learn provides a range of supervised and unsupervised learning algorithms. David Cournapeau started developing sklearn as a Google Summer of Code (GSoC) project in 2007.
Tensorflow: TensorFlow is an open-source software library for high-performance numerical computation. It compiles numerous machine learning models, deep learning models and various algorithms. It allows developers to create dataflow graphs and can be deployed on most devices.

VI. EXPERIMENT RESULT

We have selected 2 devices, namely Provision PT 737E Security Camera and Ecobee Thermostat.
For botnet attack detection, we have used widely known and used machine learning algorithms. We have employed six Machine Learning algorithms (Sequential Model, Decision Tree classification, Support vector machine (SVM), K-Nearest Neighbor (KNN), Gaussian Naïve Bayes (GNB) and Random Forest. M.Alshamkhany [15] applied four classifiers to the Bot-IoT dataset, namely Naïve Bayes, K-Nearest Neighbor, Support Vector Machine, and Decision Trees.

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N-BaIoT Dataset contains 10 different protocols that are utilized for botnet attacks. Thus, we have chosen multiclass classification machine learning algorithms. They can classify each of the protocols used for Mirai and Bashlite attacks.
We have unbiasedly divided the dataset into 75% training and 25% testing data using the Sklearn library. The selected ML models are trained via the training set and tested against the testing set. Table II represent the number of instances of different attack type we have used in our study.

TABLE II. NUMBER OF INSTANCES USED IN THIS STUDY

Type of attack	Provision PT 737E Security Camera	Ecobee Thermostat
Benign	31077	13113
Gafgyt Combo	30690	13253
Gafgyt Junk	21629	15156
Gafgyt Scan	20508	13747
Gafgyt TCP	31353	14253
Gafgyt UDP	31203	15719
Mirai Ack	30277	16993
Mirai Scan	29034	17277
Mirai Syn	32873	17521
Mirai UDP	31250	15148
Mirai Udpplain	28340	13105

We have designed these models using Sci-kit learn and Keras. Table III characterizes the design of our models. All the parameters used while training the model are listed in it.

TABLE III. DESCRIPTION OF OUR MODELS

Model	Description
Sequential Model	Number of Layers: 5 Kernel Initializer: Normal Activation: Softmax Early Stopping: Difference in val loss is 10^{-3}
Decision Tree	Criterion: Gini Impurity Splitter: Best
K-nearest Neighbour	Number of Neighbour:7 Weight: Uniform
Support Vector Machine	Kernel: Linear C(Regularization Parameter): 30
Gaussian Naïve Bayes	Portion of the largest variance of all features: 10^{-9}
Random Forest	Number of trees:50 Criterion: Gini Impurity

To measure the performance of our model we use the following metrics:

$$\text{Accuracy} = \frac{TN+TP}{TP+FP+TN+FN}$$

$$\text{Precision} = \frac{TP}{FP+TP}$$

$$\text{Recall} = \frac{TP}{FN+TP}$$

$$\text{F1-score} = 2 \times \frac{Precision \times Recall}{Precision+Recall}$$

where:

- True positives (TP) are situations that the model accurately recognized as positive.
- False positives (FP) are situations when the model wrongly identified them as positive when they were actually negative.
- True negatives (TN) are situations that the model accurately recognized as negative.
- False negatives (FN) are occasions when the model wrongly categorized them as negative when they were actually positive.
- Accuracy is defined as the ratio of properly identified instances among all cases.
- Precision is the fraction of real positive instances among all cases projected to be positive.
- Recall is the percentage of true positive instances accurately recognized by the model out of all real positive cases.
- The F1-score is a statistic that combines precision and recall to create a single score that describes a binary classification model's performance.

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TABLE IV. CLASSIFICATION REPORT OF PROVISION PT 737E SECURITY CAMERA.

ML Model	Metrics	Benign	Mirai					Bashlite					Accuracy
			UDP	ACK	Scan	SYN	UDP plain	Combo	Junk	Scan	TCP	UDP	
Sequential	Precision	1	0.98	1	1	0.98	1	0.97	1	0.5	0	1	0.901
	Recall	1	0.97	0.99	1	1	1	0.98	1	1	0	0.98	
	F1-score	1	0.97	1	1	0.99	1	0.98	1	0.67	0	0.99	
KNN	Precision	1	1	0.98	1	1	1	1	0.99	1	1	1	0.996
	Recall	1	0.98	0.99	1	1	1	0.99	1	1	1	1	
	F1-score	1	0.99	0.99	1	1	1	1	1	1	1	1	
SVM	Precision	1	1	1	1	1	1	0.98	0.84	1	0.5	0	0.888
	Recall	1	1	1	1	1	1	0.81	0.98	1	1	0	
	F1-score	1	1	1	1	1	1	0.89	0.91	1	0.66	0	
Random Forest	Precision	1	1	1	1	1	1	1	1	1	1	0.95	0.994
	Recall	1	1	1	1	1	1	1	1	1	0.94	1	
	F1-score	1	1	1	1	1	1	1	1	1	0.97	0.97	
Gaussian Naïve Bayes	Precision	1	1	0.82	1	1	1	0.51	0.7	0.68	0.5	0	0.758
	Recall	0.56	0.97	1	1	1	0.81	0.97	0.07	1	1	0	
	F1-score	0.71	0.98	0.9	1	1	0.89	0.67	0.13	0.81	0.66	0	
Decision Tree	Precision	1	1	1	1	1	1	1	1	1	1	1	0.999
	Recall	1	1	1	1	1	1	1	1	1	1	1	
	F1-score	1	1	1	1	1	1	1	1	1	1	1	

Table IV shows the classification report with metrics for Provision PT 737E Security Camera.

Table V shows the classification report with metrics for Ecobee Thermostat.

The dataset consists of 10 attacks and Benign. Our model considers them as multiple classes. Each of the 6 machine learning models produced diverse results. [13] C. OKUR and M. DENER were able to get nearly the same accuracy, but they used binary classification whereas our model can classify attack type into one of the 11 types with similar accuracy.

TABLE V. CLASSIFICATION REPORT OF ECOBEE THERMOSTAT

ML Model	Metrics	Benign	Mirai					Bashlite					Accuracy
			UDP	ACK	Scan	SYN	UDP plain	Combo	Junk	Scan	TCP	UDP	
Sequential	Precision	1	0.89	1	1	1	1	1	1	0.48	0	1	0.893
	Recall	1	1	1	1	1	1	0.89	1	1	0	1	
	F1-score	1	0.94	1	1	1	1	0.94	1	0.65	0	1	
KNN	Precision	1	0.99	0.98	1	1	1	1	0.99	1	1	1	0.995
	Recall	1	0.98	0.99	1	1	1	0.99	1	1	1	1	
	F1-score	1	0.98	0.98	1	1	1	0.99	0.99	1	1	1	
SVM	Precision	1	1	1	1	1	1	0.98	0.89	1	0.5	0.53	0.901
	Recall	1	1	1	1	1	1	0.86	0.98	1	0	1	
	F1-score	1	1	1	1	1	1	0.92	0.93	1	0	1	
Random Forest	Precision	1	1	1	1	1	1	1	1	1	1	0.98	0.998
	Recall	1	1	1	1	1	1	1	1	1	0.98	1	
	F1-score	1	1	1	1	1	1	1	1	1	0.99	0.99	
Gaussian Naïve Bayes	Precision	1	0.91	0.99	0.36	1	0.91	1	0.56	0.99	0	0	0.737
	Recall	1	0.99	0.95	1	1	0.99	0.12	1	1	0	0	
	F1-score	1	0.95	0.97	0.53	1	0.98	0.22	0.71	0.99	0	0	
Decision Tree	Precision	1	1	1	1	1	1	1	1	1	1	0.98	0.998
	Recall	1	1	1	1	1	1	1	1	1	0.98	1	
	F1-score	1	1	1	1	1	1	1	1	1	0.99	0.99	

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VII. Result Discussion

It can be seen in Table IV and Table V, a comparison of six machine learning methods: Sequential, Support Vector Machine (SVM), K-Nearest Neighbor (KNN), decision tree, random forest, and Gaussian Naive Bayes (GNB). Decision tree and Random Forest have almost same results. KNN, Decision tree and random forest have achieved an accuracy of approx. 99%, with a striking high F1-score.

SVM shows poor performance in detecting Bashlite TCP and UDP attacks.

Sequential model achieved an accuracy of 90%, but its F1-score dropped down to 0.67 in Bashlite scan and it is unable to predict Bashlite TCP since it had a 0 F1-score.

GNB has achieved an accuracy of 75% approx., which is the worst among all the implemented models, it was able to predict Mirai scan and Mirai syn with a high F1 score but was not able to predict Bashlite UDP and TCP.

Moreover, Mirai attack was predicted correctly by almost all the models with high accuracy, but only KNN, Decision Tree and Random Forest were able to predict Bashlite attack with high accuracy.

VIII. Conclusion and Future Works

The growth rate of the IoT industry is difficult to quantify precisely because it encompasses a wide range of technologies, devices, and applications across various industries. However, according to market research projections, between 2021 and 2026, the global IoT market is expected to grow by around 25% compound annual growth rate (CAGR). This growth is being driven by the increasing adoption of connected devices and the rising demand for automation and data analytics in various industries. The IoT market is expected to reach a value of $1.5 trillion by 2026, with significant growth expected in areas such as smart homes, industrial automation, healthcare, and transportation. Decision Tree, K nearest neighbor and random forest showed extremely high accuracy in detecting Mirai and Bashlite Botnet attacks. But, IoT attacks are becoming more complex with the advancement in technology and knowledge about connected systems. Cybercriminals have now become more efficient and can attack different components of an IoT network. Thus, the study should devise new methods and techniques to counter IoT cyberattacks.

Future work of this study would be to

1) Extend models by using the complete dataset and at the same time ensure that the data remain balanced to avoid overfitting.
2) Hyperparameter tunes the proposed models to achieve higher F1 scores in predicting Bashlite attacks.
3) Use new machine learning techniques that provide advanced and accurate models for detecting botnet attacks.

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Food loss and waste have increased significantly over the past approximately ten years, putting the world's population at risk of a developing food catastrophe in the coming century. This assessment of literacy is being done to see how much research is being done on waste and loss of food and what approaches are most frequently employed. Inside this study, we work to end hunger in society by providing for the underprivileged and utilising food in the right ways. However in the near, we could be able to transform food scraps into a useful and cost-effective energy source. Therefore, with the aid of our concept, we also hope to lessen food waste while serving as a source of recyclable energy and thereby improving the environment.

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[1] There is a large amount of food that is wasted and lost when edible parts of both animals and plants are grown and produced for human use, but are eventually not consumed by humans. Food that was generated with the intent of feeding humans and is instead utilized for renewables and fodder are still seen as forms of waste and lost food. The phrases "food lost" and "food scraps" are sometimes used, but in actuality , it refers to numerous losses in the food chain stage. The food supply chain includes the steps that food must travel through to get as a result of agricultural production and harvests to the consumer. Harvesting is one of the phases in agriculture production. Other steps include post-harvest storage and management processing (such as slaughtering animals or making food products like bread from wheat), distribution (via marketplaces and merchant), and consumption. When less food is supported in the food system post harvesting before it can be delivered to the client, it is referred to as' food loss." These losses are typically caused by limits on agricultural crops or challenges with processing technology (i.e., food spoiling due to poor storage). Food waste, in contrast hand, is defined as healthy meals that are discarded before consumption, [1] either in the retail location or by the final client. Food waste in this circumstance is mostly the result of huge merchants and customer behavior.

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Market segmentation is an approach whose aim is to identify and outline the market segments on which an organization can target for its marketing plans. Market Segmentation is used not only for selling a commodity and various services but also plays a crucial role in meeting the customer's needs because without customers there is no business. So satisfying a customer's need is really important and hence the need for market segmentation. The general objective of this research service is to analyze various factors which influence the student's admission process in various private institutions. Various factors like teaching staff, quality of education, and facilities play an important role in influencing students while selecting a college or university. But as Technology is increasing, we can say digital advertisement also plays an important role in luring a student to select a particular college/university through various online platforms such as websites, emails, etc., and just like that several factors need consideration. So the main aim of this research is to analyze all the factors and their broad segments which can be used by various higher education managers to develop strategies and customize their plans for making their businesses more profitable. A student survey allows students to share their issues, needs, and desires, giving feedback on how a teacher can change his or her instruction to help them perform better in class. By implementing certain measures, it is possible to enhance student engagement and motivation, resulting in better academic outcomes and higher levels of student achievement.

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Customer Segmentation using ML is a process of dividing a customer base into particular groups with similar features. ML methods are the best and most precise way to find patterns and insights in customer data. Organizing/Clustering customers' data using their specific characteristics is known as customer segmentation. Market segmentation helps an organization minimize risks by providing the product and services to the right segments in the right way. Here instead of targeting generic customers, it targets specific customers in a specific manner.

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Weeds lower agricultural production because they siphon nutrients away from more con-ventional plant species. Traditional methods of weed control include the use of herbicides and pesticides, however, these products lower the fertility of the soil and hinder crop yield. The traditional ways of applying pesticides can over- or under-dose the area. Under-dosing spray chemicals result in inefficient plant protection and, as a result, lower yields. However, using excessive amounts of spray chemicals is expensive and dangerous for the environ-ment. To increase yields per acre and safeguard crops from disease, precision spraying is therefore dependent on the detection and identification of weeds and crops. In recent years, a number of researchers have utilized a range of computer vision approaches in order to accomplish this objective. In order to detect and categorize weeds and crops, the goal of this paper is to create a hybrid model that combines robust CNN and SVM techniques. CNN is utilized as an automatic feature extractor in the suggested hybrid model, while SVM is uti-lized as a binary classifier in its place. The findings of the experiments demonstrate that the proposed structure is capable of obtaining an efficiency of 95.80% in terms of its detection accuracy. When it comes to precision agriculture, the results that were acquired can be put to use by an automated weed identification system.

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Weeds that have become invasive into an area might be difficult to eradicate because of their rapid growth rate and their strong competition with other crops. It is possible for fungi, bacteria, and nematodes to become established, which significantly decreases the grower's harvest production as well as their earnings [4]. The use of herbicides for weed management is not only costly, but it also cuts into the cultivator's profit.

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III. Methodology

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Abstract:

Over time, people’ s stress increases for various reasons, leading to dangerous diseases in the future. In our implementation, we tried to categorize stress to help people by determining the severity of stress and providing guidance based on the severity of the stress. Stress levels are divided into 5 levels, and depending on the level of stress, different features are unlocked for coping up with stress as well as warn you of possible health problems in the future.Mental stress is a serious problem today. Increased stress now leads to numerous problems such as depression, suicide, a heart attack and stroke. This article calculates people's internal stress. Our ideal is to analyze people's stress at different times in their lives. The effect of internal pressure on a particular person often goes unnoticed. Our results will analyze how different factors affect people's minds and help them cope with stress.Through this paper, there is an attempt to contribute in this field and optimize the existing accuracy statistics.

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Using enormous volumes of data, machine literacy has expanded tremendously and now produces results that are as accurate as those produced by humans. It provides regard into the future when massive quantities of sophisticated data, analytics, and logical models unite to prop millions of individuals with health issues. This composition gives a general review of machine literacy being used in healthcare assiduity, along with information on its downsides, prophetic analytics, and areas that are challenging to diagnose and bear further study.

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An Innovative Approach to Project Management and ePortals

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Document Sections
I. Introduction
II. Related Literature Review
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IV. Result
V. Conclusion
Authors
Figures
References
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Software Project Management requires exhaustive and comprehensive efforts to ease and digitalize the whole process. Students and industry employees can easily access, store, and retrieve their information with this projects management portal for Educational Institutions and industry which is based on an innovative approach to project management. This approach to project management is based on innovations in ePortals. This approach provides the institutions with a portal which keeps track of all the projects being developed in the Institutions. The portal keeps track of all the records of all projects running for different sessions. It provides the project guides, project mentor and different authorities with certain accessibility privileges, dedicated login gateways and normal individual view accessibility and a common login gateway to each student or employee. This view accessibility is provided by using the uniquely allotted student or company email ids which are already there in the institution's digital infrastructure. This study is aimed at understanding satisfaction and effectiveness of this project management portal implemented by our team. The outcome of this study establishes that our portal is successful and efficient in data management, accessibility, storage, and retrieval.

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References

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Contents

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As the focus of education shifts to project-based learning, project management becomes crucial for smooth handling of that project-based learning [1] Poor project management leads to the failure of many projects and the use of right project management methodologies increases efficiency as well as chances of success. One such study illustrates the use of IPD (Integrated Project Delivery) in digital collaborative management model for project development and management [2]. Some other studies emphasise the importance of deepening software project management research for integration of computer information management systems [3], [4]. Critical success factors are to be necessarily considered for the success of the project management [5]. Dealing with the project-based learning for academic institutions and specifically academic education for software engineering, agile management of software management projects is crucial [6], [7]. An institutional project management portal became a necessity to facilitate the project management work in different departments. Different tools technologies and various other institutional portals were considered and analysed based on our comprehensive study of the research [8], [9]. An exhaustive project management portal was developed for management of major projects being developed in the institution. Study is conducted to check for efficiency, performance, and user satisfaction of the portal.

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Document Sections
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II. Objectives
III. Competitors
IV. Literature Review
V. PROPOSED METHODOLOGY
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Authors
Figures
References
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Metrics
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Abstract:
Amidst the challenges presented by the pandemic, companies have had to adapt their recruitment strategies to ensure business continuity and access to the best talent. This has resulted in a shift towards virtual hiring and remote assessments, which have enabled recruiters to continue assessing and interviewing candidates while adhering to social distancing guidelines. In addition to the use of technology for virtual hiring, the pandemic has also highlighted the importance of soft skills such as adaptability, resilience, and the ability to work remotely. Remote technical assessments come in different forms, including coding challenges, live coding interviews, along with facial analysis. These assessments allow candidates to showcase their technical abilities, problem-solving skills, and creativity in a structured and standardized format. This helps recruiters to evaluate candidates fairly and objectively, while also providing a better experience for candidates. In conclusion, the pandemic has disrupted traditional recruitment practices and forced companies to adopt virtual and remote hiring strategies. While this has presented challenges, it has also created opportunities for innovation and the adoption of new technologies. As we move forward, companies will need to embrace these changes and leverage technology to attract and retain top talent in the competitive tech industry.

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References is n

Contents

I. Introduction

SkillDrill is a platform designed to streamline technical interviews for both candidates and interviewers alike. Our platform offers a suite of powerful tools that enable real-time collaboration between interviewers and candidates, including a collaborative whiteboard and code editor. They are asked to code in a programming language of their choice. In addition to being remote, the conversation is as natural as a physical conversation. It is also significantly more realistic than the traditional whiteboard coding and pen-and-paper interview approach. It offers the interviewer an accurate picture of how the candidate thinks and collaborates and how they use different languages, frameworks, libraries, or APIs.

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FIR Registration System Using Blockchain

Publisher: IEEE

Siddharth Agarwal ; Sahil Jain ; Vaibhav Singh ; Garima Singh All Authors

24
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Document Sections
I. Introduction
II. How Bloackchain Do this
III. Literature review
IV. Algorithms Used
V. Proposed Method
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Authors
Figures
References
Keywords
Metrics
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Abstract:

In a research paper on FIR registration by blockchain, the authors may explore the potential benefits of using blockchain technology to register and manage FIRs. Enhanced security and tamper-resistance are two potential advantages of adopting blockchain for FIR registration. This means that the information contained in a blockchain-based FIR system would be more secure and less likely to be altered or corrupted. The research paper on fir registration by blockchain proposes a new method for registering first information reports (FIRs) using blockchain technology. The traditional method of FIR registration, which involves manual paperwork and recordkeeping, is prone to errors and can be time-consuming. This system addresses the current challenges faced in traditional FIR registration and provides an improved solution through the use of blockchain technology. The data entered is secure, tamperproof and can only be accessed by authorized parties. The efficient and transparent nature of this system provides a significant improvement over the traditional methods. The results show that the blockchain-based FIR registration system is able to provide a reliable and efficient means of recording and accessing critical information.

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References is n

Contents

I. Introduction

A distributed ledger system called blockchain enables the safe and open recording of transactions. Without the use of a centralised organisation or middleman, this decentralised method enables data storage and management over a network of computers. The capacity of blockchain technology to verify transactions is one of its fundamental characteristics. Transactions are organised into blocks in a blockchain network and added to the chain in a sequential, chronological order. In each block of the blockchain, important information such as a timestamp, transaction details, and a cryptographic hash of the previous block are included. [3] The system employs well-known consensus mechanisms, including proof-of-work, proof-of-stake, and Byzantine fault tolerance, to validate and authorize blocks [4].

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Identification and Classification of Waste using CNN in Waste Management

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Ashish Pandey ; Harshit Jain ; Harshit Raj ; Prof. Prince Gupta **All Authors**

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IV. Convolutional neural networks IN WASTE CLASSIFICATION

V. Dataset

Abstract:

Convolutional neural networks (CNNs) are being used in this paper to investigate waste classification. The study compared the categorization of three waste categories (plastic, paper, and metal) using a CNN and a Support Vector Machine (SVM). The results showed that while the SVM had an accuracy of 94.8%, the CNN's accuracy was lower at 83%. Another study divided waste into six categories and showed that the classification accuracy was 22% with a CNN, while the SVM had a test accuracy of 63%. The authors noted challenges in optimizing the hyperparameters, which prevented the CNN from being trained to its full potential. However, they concluded that the CNN should attain higher accuracy levels than the SVM once these challenges are overcome. The authors also used two popular CNN architectures, VGG16 and FastNet-34, in their proposed model for waste classification. The dataset used for the model was provided by Kaggle and consisted of 22564 waste photos divided into recyclable (R) and organic (O) categories. The results of the proposed model showed improved accuracy in waste classification compared to previous studies. The study highlights the potential for the use of CNNs in the field of waste management

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The Future Era of Computing: Automatic Computing

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2023 International Conference on Artificial Intelligence and Smart Communication (AISC) | 979-8-3503-2230-9/23/$31.00 ©2023 IEEE | DOI: 10.1109/AISC56616.2023.10085022

***Abstract*— The paper aim to describe the futuristic perspective of technology that will govern the aspects of our lives. The computers of today would soon start to become decapacitated as the needs, requirements and our dependency on technology continues to evolve. The study makes an attempt to look for the possible futuristic ideas that would aid this massive technological dependence. The ever-growing technology has proved beneficial to mankind however, we should have a glimpse of the next big thing. With the fall in Moore's law and the rise of quantum computing it has now become a necessity that the new options and opportunities must be examined. The term "quantum computing" refers to a sort of computing whose processes may exploit the processes of quantum physics, such as superposition, interference, and entanglement. Quantum computing is a relatively new field of research. Moore's Law is a model of technical economics that has enabled the information technology sector to roughly double the functionality and performance of digital devices every two years while retaining the same cost, power, and space. This paper is merely a small cog in this long chain of futuristic possibilities.**

Keywords— *Future computing, Quantum Computing, Technology Trends, Moore's Law*, Autonomic Computing

Introduction

The development of the first re-programmable machine laid the foundations for the computers that we know of and use on a daily basis. The mere idea of designing and actually producing such a machine was a fantasy back then something that no one ever thought was possible. Alan Turing's Bombe machine - an electro-mechanical device that was used by the Britishers under as a covert war operation was a remarkable invention. The idea of 'intelligent' machines however is even more ancient they used to exist even before the birth of computers. The obvious question is what makes a machine intelligent? The answer is utterly complex and dynamic as it keeps on changing with time. This is something that is several years old. Today, computers can do nearly everything however the answer to this question has changed in itself as well as it has severely affected. Moore's 1975 study showed yet another critical insight: integration complexity improves as silicon die size, feature size, and "device and circuit cleverness" increase. These discoveries have affected semiconductor investment during 1965 and 1975. The ability to predictably and cost-effectively scale computer performance is becoming more critical. This applies to consumer technology, "big data" and web servers (Google, Facebook, twitter etc.), scientific discoveries, and national security. Many other parts of the financial system and national economy are tied to these substantial gains in IT and computation, such as avionics systems for aviation, the automobile sector and smart grid technologies.

I. Current Era of Computing

The world began to realize the relevance of the term 'information' during the second world war. Thus, the notion of deciphering value from it also became prudent during that time alone. [1] The era of present computing has always been governed by Moore's Law which states that the computing power doubles after every 18 to 24 months [2] as the amount of information grew, the need to process also converged and it all comes with the advent of silicon chips dating from 1957 till present. The concept of using silicon processing chips revolves around making the chip denser by packing more and more transistors in close proximities. For instance, 1400 million transistors are packed in extremely close proximities to boost memory and computing speed in the popular Intel i5 and i7 processors. [3] Elements like Silica, black phosphorous, transition metal dichalcogenides are good conductors of electricity thus, they drastically reduce the power consumption.

However, the problem of heat and leakage haunts the designers and engineers also adversely affecting the computing speed and capabilities. Pollack's rule state that doubling the processor core's logic increases performance by 40 percent only. It has also been noticed that with the current practices the designers can't go beyond the speeds of 4Ghz or else the power begins to drop. The section below explains some of the most common problems with the current era of computer processors.

II. Problems with Silicon Chip

Below are some of the shortcomings of the popular silicon-based processor chips which is why it is believed to be inefficient in the future.

A. Speed & Density Tradeoff

The term 'speed' here refers to the computing speed in terms of processing speed. Computers till now have been achieving it through their transistors being packed in close proximity and also reducing the size of the chip itself as mentioned before, an Intel i5 chip for instance comprises of 1400 million transistors. But there is a limit to the shrinkage that can be brought. [5]

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Fraud Detection in Financial Domain using Machine Learning

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***Abstract*— Digital fraud has become a menace in every industry. It is critical for any firm to have a concentrated focus on detecting and preventing fraudulent activities. Security is a priority. The way we communicate has changed dramatically as a result of digitization. A simple click of a mouse, complete our day-to-day transactions. On the other hand, it has created concerns from swindlers who take advantage of absent protections in current financial systems and mimic real customers, undertake time-consuming transactions on their behalf that result in a profit causing financial setbacks to the organizations and customers. Organizations will need to pay attention as a result of this. Its brand value is also affected. Organizations have learned from their mistakes. To prevent fraud and keep ahead of the criminals, it is necessary to maintain a constant focus. It's critical to keep an eye on major trends. We might be able to tell the difference between a legitimate and a fraudulent transaction, obtaining customer data such as geolocation, authentication, and so on, it is possible to keep track of the device's IP address during the session. Machine Learning (ML) will assume a significant part in the future in identifying examples of such frauds consequently. We use algorithms like decision trees, XGBoost, K-NN and others to find an optimal solution for our concerning project.**

Keywords*— *Machine Learning, random forest classifier, feature extraction, heatmap, confusion matrix, predictive analysis

I. Introduction

When a message is sent across a communication channel, fraud attacks are a serious problem. The applications/tools that we use in this technical environment are always changing day by day. The shift from analogue to digital assisting resulted in the substantial improvement of all sectors. Simultaneously, we leave our digital footprints wherever and whenever we use technology. Users are more cautious about their credentials as a result of this. Users are looking for a safe environment to prevent fraud, we need to create an environment that is proactive in determining suspicious behaviours We will examine how to improve fraud protection and detection features in this paper.

Regrettably, con artists exist and when it comes to identifying loopholes, they don't appear to be lagging behind in breakthroughs. To protect the company, we need to make sure their security measures stay up with their innovative activities.

Let's talk about the bank sectors, for example, a large number of fraudulent transactions occur on a daily basis. If we're just looking at fraudulent credit card transactions, if a fraud occurs, it will be reported to the appropriate authorities, the bank is in charge of the urgent solution. As the immediate solution, prohibiting the user from using the card in near future and recommending them to reset and change his password. Then, the banks will investigate how the fraud occurred and what patterns devised by the fraudsters to breach the user's account. As soon as the pattern is discovered, the financial sectors will cooperate to close any loopholes and implement the required protective measures to cease the repeating deceptive practice indefinitely. Meanwhile, fraudsters are exploiting the same technique, would have carried out a number of fraudulent transactions. As a result, a significant quantity of money is lost.

II. Related Work

Following are the various researches conducted to help the victim organizations from frauds. According to Sudha and Nirmal Raj [1], several anomaly detections approaches have exploited the concept of nearest neighbour analysis. They have used OTP system to enhance security. In this proposal, Deepthi [2] suggested the use of ML methodologies to point out illegitimate transactions using credit card. The suggested model's performance is assessed using the metrics of sensitivity, specificity, precision and fallacy. When comparing different methods, it was discovered that random forest classifier outperformed logistic regression and decision tree algorithm.

According to Pradheepan Raghavan and Neamat El Gayar [3], SVMs maybe paired with CNNs for a more dependable performance, are the best approaches for detecting fraud with larger datasets, according to this article. For smaller datasets, ensemble techniques such as SVM, Random Forest, and KNNs can deliver significant improvements. Convolutional Neural Networks (CNN) outperform other deep learning approaches such as Autoencoders, RBM, and DBN in most cases. Taher [4] proposed that several issues make it difficult to identify solutions for fraud detection, one of which is the problem of class imbalance. A number of remedies have been presented to address this issue. They analysed the results of eight ML approaches to detect credit card fraud and identified their flaws and then compared the approaches to imbalanced classification and studies their efficiency in different outrageous scenarios. In this work, Jaiman [5] examined four different classifier models [5] were created. Validation and testing were carried out on 80% of the dataset. Performance was measured using precision, sensitivity, specificity, and accuracy. Logistic Regression was found to be the most efficient in pointing out credit card theft when evaluated under actual situations. Jaculine [6], proposed a worldwide paradigm that incorporates AI to allow a common scam prevention approach, a consolidate fraud management

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Two-element MIMO Antenna with High isolation based on Zigzag-shaped Slot on the ground for 5G and IOT applications

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I. Introduction
II. Design and analysis of Two-port antenna
III. Simulated Results Analysis
IV. Conclusion:
Authors
Figures
References
Keywords
Metrics
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Abstract:
This paper proposed the two port antenna with zigzag-shaped slot decoupling structure and high isolation for 5G and IoT applications. The microstrip-fed radiator is accomplished to design the two-port MIMO element antenna where the ground decoupling structure between antenna elements improves the ground length and matching of the antenna. The Zigzag-shaped slot is introduced on in the ground which improves the isolation and diminishes the surface current between antenna elements. The operating bandwidth achieved from 4 GHz to 5.1 GHz with $|S21| > 24$ dB isolation where the maximum isolation is obtained up to 37dB. The two-port MIMO antenna covers the radar altimeter (4.2 GHz to 4.4 GHz), 5G (n79 - 4.4 GHz to 5 GHz), and 5 GHz IOT/Wi-Fi applications.

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I. Introduction

Advances in technology and increasing internet demand have led to new requirements such as high channel capacity and data transmission speed and effective latency. Due to these demands, the use of the MIMO antenna in place of a traditional single-element antenna can prove useful in meeting these needs well so that the MIMO antenna can be used in IoT, 5G, biomedical, and wearable applications [1]. The MIMO antenna can use for multiple transmissions and reception of the EM waves where the effective MIMO antenna required good isolation so that the antenna works effectively without effect its characteristics by the adjacent antenna element. The distance between antennas can improve the isolation when the gap between antenna elements is more than the conventional distance and $\lambda/2$ but it increases the overall size of the antenna. The requirement of wearable, biomedical, and 5G wireless communication is the compact antenna which can be incorporated into any wireless device and consume low space therefore improving the isolation to fulfill the limited space of the antenna increases the challenge of design.

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Study of 2x2 MIMO Circular patch Antenna for WiFi-6 or WiFi-6e in IEEE 802.11ax Applications

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Abstract:
WLAN communication evolution can be analyzed from a variety of perspectives, but MIMO is crucial to that analysis because of its performance and assets. In multi-input, multi-output technology, higher data rates may be achieved depending on how transmitters and receivers interact, and precise results may be achieved. Using antenna arrays, we describe a firm 2×2 MIMO antenna structure where the S parameter is increased while the inter-element separation is 0.5 λ mm. The design of the antenna is done in such a way that it serves IEEE 801.11ax applications and that compromises of standards, which are Wi-Fi6 or Wi-Fi6e, whereas Wi-Fi6 operates at two different frequencies, i.e., 2.4 GHz and 5 GHz, and now if we look into the modified standard version, which is Wi-Fi6e, it provides a third extended frequency band of 6 GHz, so it operates at the above frequencies. The proposed structure has a circular-shaped patch that utilizes a substrate of material called FR4, which has a permittivity of 4.4, and the substrate is placed at a height of 1.6 mm from the ground. The analysis and design of the proposed antenna are done using ANYSIS HFSS software.

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Advances in Signal Processing, Embedded Systems and IoT pp 301–307

Dual Band Microstrip Patch Antenna with Annulated Circular Ring

Chirag Arora

Conference paper | First Online: 24 May 2023

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Abstract

In this article, authors have designed a slotted microstrip patch antenna comprising of a circular ring embedded in the center. Initially, the designed conventional patch antenna operates at 2.45 GHz. However, when two slots are etched on both ends of the patch, an additional resonant frequency band is obtained at 5.8 GHz, which reduces to 5 GHz when an annular ring is inserted between these two slots. The gain and bandwidth of the designed antenna are 4 dBi and 400 MHz at 5 GHz and 8 dBi and 270 MHz at 2.45 GHz. Thus, the proposed antenna can accommodate both IEEE 802.11a Wi-Fi bands operating at 2.45 and 5 GHz. This dual band antenna is designed on 1.48 mm thick FR-4 substrate with dielectric constant of 4.3 and loss tangent of 0.01. The designed structure is excited by a SMA coaxial connector of 50-Ω. High Frequency Structure Simulator software (HFSS) is used for designing and simulating this antenna. This commercially available software is based on finite element method.

Keywords

Microstrip patch antenna **Wi-Fi** **Dual band** **Finite element method**

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RESEARCH ARTICLE | DECEMBER 29 2022

Software defined networking: A view towards security challenges

Surendra Kumar Keshari ; Vikas Goel; Paramanand Sharma; Hunny

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AIP Conf. Proc. 2597, 030006 (2022)
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Software Defined Networking (SDN) is new paradigms type of networking that is a programmable network and overcomes the challenges like, network scalability and management of the traditional networks. While programmable network is growing, the security challenges are increasing for different applications. Software Defined Networking manages control planes and data planes separately, where the controller at control planes decides the path at run time and data plane forwards the packets based on controller's decisions. The applications of software are increasing day by day including in communication traffic in SDN, and therefore different applications of different industries and societies faces various challenges related to it. This paper examines the software defined programmable network and view the challenges due to security issues of programmable networking. Finally, this paper discussed with its security impacts and gives concluding remarks.

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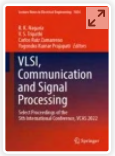
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FGMOS and QFGMOS-Based Super-Wilson Current Mirror and Its Application in Full-Wave Rectifier

Renuka Bhardwaj, Ashwni Kumar & Richa Srivastava

Conference paper | First Online: 02 July 2023

129 Accesses

Part of the Lecture Notes in Electrical Engineering book series (LNEE,volume 1024)

Abstract

A novel FGMOS and QFGMOS-based super-Wilson current mirror is proposed along with a comparative analysis has been done in this paper using FGMOS and QFGMOS-based technique. A super-Wilson current mirror is used to analyze FGMOS and QFGMOS technique to see the analysis of performance parameters like bandwidth, input, and output impedance and its current characteristics. The super-Wilson current mirror is simulated on PSpice Simulator using 180 nm technology file using \(\pm\) 0.3 V Voltage supply.

Keywords

Super-Wilson current mirror **Impedance** **Bandwidth** **Analog circuit** **Low voltage**

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Abstract:

India is a country that is going to become the most populated country in the world in the coming years. It has a large population of youth. Today’ s youth enjoy riding bikes and often disregard safety precautions such as wearing a helmet. Because of these, two-wheelers accidents are increasing day by day, which causes deaths and several types of serious injuries. Significant causes of death are head injuries, which can be prevented by wearing a helmet and taking proper safety precautions. One can also see that drinking and driving have also increased, leading to road accidents. Overspeeding is also one of the major factors. The increasing rate of road accidents made us develop a smart helmet using the internet of things, which reduces accidents and the risk of death. It has a feature where the bike starts only if the rider wears a helmet. If the rider is over-drunk or not wearing the helmet, the ignition will automatically switch off. If any accident occurs, the GSM modem and the GPS modem will send the message to the registered contact number by using a SIM card. In addition, if the bike or helmet is stolen, the owner can easily find out the exact location of the bike and the helmet using this device. This feature is necessary for a country like India, where bike theft cases are frequent and high.

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RESEARCH ARTICLE | DECEMBER 29 2022

Software defined networking: A view towards security challenges

Surendra Kumar Keshari ; Vikas Goel; Paramanand Sharma; Hunny

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Software Defined Networking (SDN) is new paradigms type of networking that is a programmable network and overcomes the challenges like, network scalability and management of the traditional networks. While programmable network is growing, the security challenges are increasing for different applications. Software Defined Networking manages control planes and data planes separately, where the controller at control planes decides the path at run time and data plane forwards the packets based on controller's decisions. The applications of software are increasing day by day including in communication traffic in SDN, and therefore different applications of different industries and societies faces various challenges related to it. This paper examines the software defined programmable network and view the challenges due to security issues of programmable networking. Finally, this paper discussed with its security impacts and gives concluding remarks.

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Four Element Pattern Diversity MIMO antenna with Parasitic Decoupling structure and SRR WLAN notch for UWB application

Publisher: IEEE

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Anubhav Kumar ; Navneet Sharma ; Divya Saxena ; Pankaj Jha ; Paramanand Sharma **All Authors**

Abstract

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I. Introduction

II. Four Element Uwb Antenna Design and Evolution Analysis

III. Simulation Analysis

IV. Performance Analysis

V. Conclusion

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Abstract:
A UWB 4-element antenna with SRR WLAN notch and four L-shaped parasitic decoupling is discussed. The proposed antennas impedance bandwidth of 10dB varies from 3.8 GHz to 11 GHz and is operated on 5G and UWB applications. The four L-shaped parasitic strip is used to enrich the isolation more than 20 dB. The highest gain of antenna is measured to be 4.5 dB. The SRR notch placed near to the feed is used to prevent the interference with WLAN frequencies and varies from 5.05 to 5.88 GHz.

Published in: 2022 10th International Conference on Reliability, Infocom Technologies and Optimization (Trends and Future Directions) (ICRITO)

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Load-Source Side Demagnetization Scheme in Forward Converter for Extended Duty Cycle

Sunil Kumar & Niraj Singh Mehta

Conference paper | First Online: 15 June 2023

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Abstract

In this paper, a scheme for realizing the switch duty cycle above a normal 0.5 by including the load side voltage in series with the supply voltage for the demagnetization of the transformer core, has been presented. A wide duty cycle is essential in many converters, especially, in a forward converter. The usefulness of the present scheme is that no extra circuitry is required for this purpose. Also, as the load voltage is stepped up, the duty cycle widens correspondingly. A 24 W, 24 V output converter is analyzed and presented, to validate the proposed idea through simulation results.

Keywords

Magnetization **Demagnetization** **Extended duty cycle** **Load-source side** **Forward converter** **Magnetizing inductance** **Output inductance**

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II. Proposed Methodology

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Keywords

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Conference Location: Greater Noida, India

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For a student, finding a job in their area of interest can be challenging, requiring much effort and dedication. Staying informed about the latest job opportunities in the market is crucial for students. Missing out on such opportunities can lead to regret during the placement period. Therefore, it is imperative to maintain a continuous track of the new job openings that match one's interests. This raises the need for an application that can make things easier for the students during their recruitment season. Thus, this makes way for a single interactive platform that assists students in their pursuit of getting placed and never miss an opportunity.

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Recognizing human movements through computer vision is an important field of research, which can be used in various applications such as patient monitoring, observation, and human-machine interface. The ability to perceive these movements requires extremely complex judgments. Generally, the above-mentioned applications need to automatically recognize information such as: a pair of easy movements of a man and a woman. If the action is well classified, then the proper information can be provided to the system. This paper addresses various machine learning algorithms such as logistic regression, RBF SVM, decision tree, random forest, linear SVM, gradient boosting DT by grouping different activities. This article classifies complex human behaviors by observing, comparing and evaluating the performance of algorithms by using large set of information.

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In recent years, scientists are becoming increasingly interested in the creation of nanosatellites. This interest is evident for a number of reasons, including safe development, extremely cheap cost, and small design, which reduces launch costs. Nanosatellites are made to carry out specific functions for researchers, such as satellite data collection or data from space, etc. Nanosatellites are simpler to construct than conventional large satellites. During various design phases, satellite developers face numerous difficulties. There are certain challenges in making nanosatellites. The creation of a communication link between the satellite and the ground station is another essential component; without it, spacecraft in Earth's orbit are useless objects. Designing uplink and downlink for nanosatellites is therefore one of the biggest problems. The most important phase in creating a connection between ground stations and nanosatellites is this one. An analytical assessment for the link budget computation with regard to the nanosatellite is provided in this publication.

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This paper focuses on the challenges encountered in designing uplink and downlink for nanosatellites using a proper link budget analysis. Nanosatellites are a category of satellites with a weight or mass between 1 and 10 kg. The

capabilities and implementations of constellations are also constrained by the physical design of satellites and the structure of ground stations. Opportunities are opening for researchers, application developers, and customers as nanosatellites become more affordable, straightforward, smaller, and easier to launch. In computing design, considering an accumulation of nanosatellites as a distributed computational system has various implications such as managing energy, distributing constellations, ensuring secure edge multi-occupancy, enabling spatially localized machine learning and inference, and facilitating distributed motion planning and computing. It brings up new research questions related to the role of actuation [1], [2].

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Text Views

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Document Sections
I. Introduction
II. Approach
III. Result
IV. Singularity
V. Conclusion
Authors
Figures
References
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Contents

I. Introduction

The COVID-19 pandemic has given students more opportunities to gain experience and improve their capabilities at their own pace [1], [2]. Teaching and learning are important pillars of the education system with the accomplishment of examinations to evaluate the capabilities of the learner. The proctorial process is the heart of any examination. The online examination is a challenge for this proctorial process, which is facing serious problems in the education system [3]. To obtain the solution to these challenges, a self-decisive proctorial system is devised to make the examination more transparent to all. Nowadays AI & ML is playing a dominant role in the decision- making of any smart systems. In this manuscript, a developed AI-based smart proctoring system is presented that uses facial recognition to verify candidates, while they are examined by this proposed online exam platform [4], [5]. This paper also presents review process between the existing AI vs Non-AI-based surveillance systems. The key four elements are considered for the AEPS (a)architectures of AEPS, (b)parameters for the designing of AEPS, (c) trends, and problems in AEPS, and (d) the future of AEPS. The proposed 3600-degree analysis of online surveillance systems shows security issues related to AI-based surveillance systems are increasing and causing legitimate concern. A proctored exam is a time-based exam taken by a candidate and proctored software monitors the desktop on a computer together with webcam video as well as audio. The online proctored exam is just like others physical mode exam, but with the online framework supporting all the activities involved. And most importantly, oversight to protect the sanctity of the trial. The AI-based AEPS uses an efficient algorithm that monitors the candidate to report any detected suspicious activity. The online surveillance system focuses on two main components. A webcam to record video of students arriving at the exam for later viewing by the examiner/proctor. The proctor/proctor may be able to see pranks that may or may not be cheating during the exam. The second component is the lock. They are forbidden from opening other tabs in their web- browser. Alternatively, This is called computer isolation or browser isolation.

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Dynamics and Control of a Mobile Kicking Robot

Publisher: IEEE

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I. Introduction

II. Literature Review

III. Mechanics, Design, and calculations

IV. Control for the Robot

V. Electronics Of The Robot

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Figures

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Abstract:

This paper contains the complete research and work required for the development of a 4-wheeled holonomic drive Kicking Robot for Omnidirectional movement, designed for achieving desired kicking range and right motion, using control and dynamics. We have used Kinematics and PID control algorithms to reach the desired limits. The integration of numerous sensors makes the robot more accurate and versatile for situations, and their working along with control has also been explained. In addition, the digital Alters for proper sensors data acquisition have been implemented. Furthermore, equations and dynamics of the traversal of the robot using mecanum wheels have been explained. We have also explained the developed Circuitry and Circuit Protection for the high reliability of the robot along with the workflow.

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Above is the figure of the originally developed kicking robot that the paper has aimed to explain.

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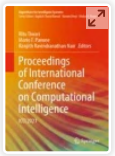
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Proceedings of International Conference on Computational Intelligence pp 359–370

Empirical Analysis of Novel Differential Evolution for Molecular Potential Energy Problem

Pawan Mishra, Pooja & Shubham Shukla

Conference paper | First Online: 04 October 2022

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Abstract

In bio-chemistry, molecular potential energy problem is a highly complex problem which is multi-model in nature as well. In the present study, a novel differential evolution algorithm (NDE) is applied to handle this problem and to efficiently minimize the molecular potential energy function. The NDE algorithm with its efficient nature provides enhanced search capability with reduced space and time complexities. This variant of DE made use of adaptive control parameter settings along with unit population structure which amplifies the execution of simple DE algorithm without compromising the standards of the solution. The performance of NDE is analysed on eight unconstrained benchmark functions and molecular potential energy function as well in terms of mean fitness and standard deviation. The numerical outcomes showed that NDE achieved good results for all the benchmark cases and maintained a trade-off between convergence rate and efficiency.

Keywords

Differential evolution **Control parameters** **Population structure**

Molecular potential energy problem

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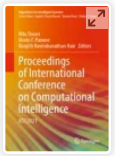
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Proceedings of International Conference on Computational Intelligence pp 41–55

Dynamics and Control of Quadrupedal Robot

Shashank Kumar, Shubham Shukla, Ishank Agarwal, Arjit Jaitely, Ketan Singh, Vishwaratna Srivastava & Vibhav Kumar Sachan

Conference paper | First Online: 04 October 2022

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Abstract

The paper holds the concept of dynamics and control of quadrupedal robot using proportional, integral and differential, control loop feedback algorithm. In this research paper, we discuss a four-legged lead screw walking mechanism robot with obstacle detecting and overcoming capabilities. This walking robot is capable of walking on straight, curl paths as well as tilted surfaces with the maximum tilt of up to 30°. We have used the PID algorithm and encoder sensors for path planning. Sensors like sharp IR, inductive proximity are present on the robot's feet. We worked on the PIXY camera module that helps to detect objects and track their position. This robot is fully autonomous, but in case of emergency, we can control the robot manually. Result: the robot follows straight paths with gait matrix strategy and curved paths with integrated movement sequences. Index Terms—Legged Robot, obstacle avoidance, PID controller, Quadrupedal, Robotics, Walking robot.

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In this research article Bit Error Rate for Different modulation techniques is analysed and compared for an AWGN channel with respect to Signal to Noise Ratio (SNR). The range for SNR which is applied for the calculation is from -4dB to 24 dB. In this research article, proposed structure of Radio over Fiber (RoF), is shown which maps the general components of the RoF system. We have also seen the deviation of Bit Error Rate by changing the Signal to Noise ratio Strength and we also prepared a mathematical model, using mostly utilized modulation schemes in the RoF system. In this research article, we compared the BER of mostly utilized modulation schemes like BPSK, QPSK, M-QAM and M-PSK with their associated SNR. The 4-QAM and the QPSK based RoF link has the lowest BER $10^{-28.855}$ and with highest SNR 18 dB and 32-PSK modulation schemes has the highest BER 10^{-} 0904 with lowest SNR 4 dB. A comparatively analysis is drawn with the help of MATLAB R2019B, to analyse the effectiveness of the used modulation schemes.

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Date of Conference: 10-12 February 2023

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Contents

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Radio Over Fiber (RoF) technology involve the use of optical fiber. RoF implementation is connected to the availability of installed optical fiber cables which will be used as medium or channel. RoF system uses the optical fiber which has low loss and provide ultra-wide bandwidth.Radio over fiber system just sends the radio signals over optical fiber but it is not as simple as it seems it require lot of network analysis and modulation work [1]. It has various advantages like low maintenance, lower power consumption, simple antennas, less loss by attenuation, provides wide bandwidth and less power dissipation. It is a rising technology to fulfil the increasing demands of wireless networks and user bandwidth demands [2]. The work of converting the optical signals to radio signals is done by the base station in RoF system. We use a easy to use modulated RoF link with uses bidirectional modulation setup in which modulation and the multiplexing and coding are done at the Central Unit. The receiver in this system made of PD to provide an RF power output equivalent to the square of the input optical power [2] –[6].

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Design and Investigation of PGP SELBOX FinFET with Uniform and Non-uniform Doping Profile at Sub-7 nm Technology Node



Satya Prakash Singh and Md. Waseem Akram

1 Introduction

In the ultra-small conventional transistors, it gets very challenging to fabricate ultra-high concentration slope at junctions. Junctionless transistors were introduced and continuously explored after 2009 [1–7]. Junctionless transistors keep high doping in all the regions. Charge carriers move away from channel, when device is off, and bulk conduction starts when device is on. Production of junctionless devices appears easier due to low thermal budget and absence of large concentration gradient. Surface scattering does not play major role due to bulk conduction [8–11]. Although there are various limitations of these devices, it is very tough to get uniform doping in the vertical direction due to technological limitations. Charge carriers are removed more from top of channel than bottom of channel when uniform doping is done. It increases the leakage current. SOI FinFET shows high on-current and minimal parasitic capacitances and enhanced control on short-channel effects. Sub-threshold leakage current flows in the lower part of the channel because lower portion of the channel gets depleted less effectively in SOI-JLT. Gate material must have higher value of gate work function for highly scaled n-channel device for the sake of nice turn-off and subthreshold characteristics [12]. Thus, the channel thickness must be reduced to lower value (10 nm<) to achieve the appropriate control on the channel through gate [13]. The value of on-current will be affected directly due to device channel thickness variation. Command of gate on channel diminishes with movement toward lower part

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BiFrost: A Blockchain-based Decentralized Messaging Application

Himanshu Pandey[1], Akhil Siraswal[1], Ekta Kaushik[1], Dilkeshwar Pandey[1], Sparsh Kapoor[2], and Hunny Pahuja[2]

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Abstract. BiFrost is a revolutionary solution for secure online communication and data storage. It addresses security concerns such as eavesdropping, man-in-the-middle attacks, and censorship by offering decentralization, immutability, and data security through the use of blockchain technology.
User-submitted data is added directly to the blockchain, creating a global copy in each node, and only authorized users can access the data using private keys. The system is fully decentralized, meaning there is no central authority, making it immune to censorship and government oppression. The technology used in BiFrost includes IPFS, smart contracts, Ethereum, INFURA, Solidity, and SPF.
BiFrost provides a secure and decentralized solution for online communication and data storage, eliminating the need for a trusted intermediary and ensuring the privacy and security of data.

Keywords: Eavesdropping, IPFS, Smart Contracts, Blockchain, INFURA, Solidity, SPF, and Ethereum.

1 Introduction

The concept of blockchain was developed to enhance transaction security by providing confidentiality, data integrity, authorization, and encryption-based tamper resistance [1]. It eliminates the need for third-party involvement in transactions, requiring network participants to reach a consensus for secure validation without altering previous records. Manipulating the blockchain would necessitate an extremely high cost and simultaneous access to all network computers, rendering it virtually impossible for external attackers to tamper with the database.

Blockchain-based communication and data storage technology offer several advantages. Data can be encrypted to prevent theft [14], and its distributed storage eliminates single-point errors. Communication can be end-to-end encrypted, ensuring resistance to spying. The decentralized nature of the system makes it more cost-effective

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Journal Paper

Paper Title :Design of Diagonally Slotted Microstrip Antenna for Wireless Applications

Author : Shipra Srivastava, Vibhav Kumar Sachan, Saptarshi Gupta, Satya Sai Srikant

Article Citation : Shipra Srivastava ,Vibhav Kumar Sachan ,Saptarshi Gupta ,Satya Sai Srikant , (202
" Design of Diagonally Slotted Microstrip Antenna for Wireless Applications " , *International Journa Electrical, Electronics and Data Communication (IJEEDC)* , pp. 1-3, Volume-10,Issue-11

Abstract : Abstract - It is well known that for every one wavelength and the polarization plane Antenna and Electromagnetic signal makes one complete circle in a corkscrew pattern. This pape presents about circular polarization of planar antenna, which has been designed with IE electromagnetic simulator. Four distinct geometries were designed with two diagonally etched slo microstrip patch antenna. This paper also demonstrates about the circular polarization with the hel four slots in the form of squares, circles, rings, and crosses were chosen. Also other parameters Axial Ratio performance plot, Reflection coefficient and Impedance plot were studied. This paper a discuss about one of the above mentioned antenna, which was fabricated and tested prope

Keywords - Diagonally Slotted Patch Antenna, Axial Ratio, VSWR, Circular Polarization, Gain

Type : Research paper

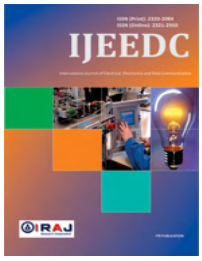
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Fuzzy Rule Based Collaborative Peer Learning Methodology for Gradual Learning Engineering Students

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Abstract:
In a centralized education system, end-semester university examinations conduct for all affiliating institutes together under a common umbrella of a state university. However, every institute conducts internal examinations on its own to assess students' performance from time to time. The student scoring low marks can be termed a gradual learner requiring extra attention. Institutes and departments develop different policies for helping such gradual learners. Subject teachers also give their best and restless efforts to such students so that they can score at least passing marks in end-semester university examinations. But, these students hesitate to interact with their subject teacher beyond regular classes due to their introverted and shy attitudes. Compared with teachers, students feel comfortable interacting with classmates and so, the average or good marks scoring students can help such gradual learners. This paper explains a case study done for gradual learning engineering students. The collaborative teaching pedagogy is used in which gradual learning category students can discuss their subject doubts with their peer students. The highlights of this proposed approach are; (i) to achieve zero carryover paper in the subject, (ii) to develop confidence in gradual learning category students, (iii) to prepare the students as a leader who can work with their team members, and (iv) to understand and bridge the gap in teaching pedagogy for several students' clusters based on their learning capabilities, (v) validation of the result using the fuzzy rule-based model.

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Renewable (Solar)Energy and Grid Integration

Dr. Surendra Tripathi, Shivam Juyal, Shubham Yadav, Utkarsh Goyal
KIET Group of Institutions

Abstract—This paper presents review/research on grid Integration and power quality issues associated with the integration of renewable energy systems in to grid. The aim of this research paper is to investigate the potential of solar grid integration in order to provide a comprehensive understanding of the current status and future perspectives of this technology. Solar grid integration has been identified as a key area of research in the field of renewable energy, due to its potential to significantly increase the share of solar PV in the global energy mix. Despite the considerable progress made in recent years, there are still many challenges that need to be addressed in order to make solar grid integration a reality. This research paper will provide an overview of the current state of solar grid integration research, as well as the challenges that need to be overcome in order to make it a viable option for the future.

Digital Sensor Based Temperature Control

Prashant Prakash, Viraj Kumar
Electrical & Electronics Engineering, KIET Group Of Institutions Ghaziabad

Abstract— Temperature beyond a certain limit can be dangerous and is totally the waste of energy so the main objective of this review paper is to basically control the temperature when it goes beyond a certain limit or to bring back the temperature to the desired level so that the wastage of energy can be reduced. It will also be helpful in monitoring the changes in the environment, in near future this can be used by the industries or in an electronic devices and also to assist people who are disabled and are unable to control the speed of the fan. Another objective of this review paper is to study and build an automatic system using microcontroller and its interfacing with other devices. Nowadays, in day to day life arduino is most common device used because of it's many advantages like it support many devices.

Energy Market, Value-Added Services (US-India Market Policies)

Shashwat Singh Maurya and Nitin Kumar Saxena
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Abstract: Power and Energy advancement is among the most critical part of foundation, vital for the financial development and government's (economical and welfare) assistance of countries. The presence and advancement of satisfactory framework is fundamental for supported development of the Indian economy. With the exponential growth in the power consumption in India, it becomes quite necessary to regulate the retail cost of power supply across the grids and opportunity to obtain Value Added Services (VAS). The role of Third-party providers comes into play under these opportunities, which will be evident in the latter part of the paper. Electric organization offers VAS which ought not be restricted to explicit population. In the event that the objective is to make a market where numerous VAS are accessible to numerous clients as it would be prudent (limiting the pool of market members isn't to the greatest advantage of clients). The goal is to make change the customers into 'Prosumers'.

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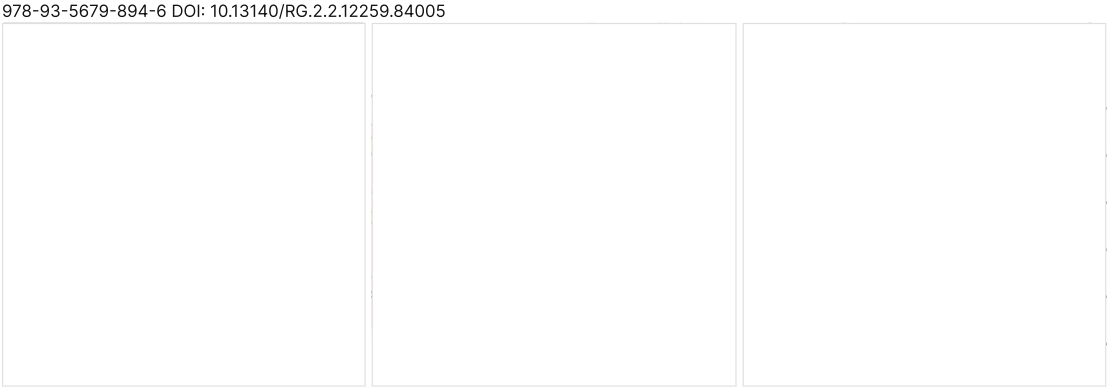


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Development of performance estimator for Li-ion Batteries using soft-computing

Shivam Sharma, Dr. Brijesh Singh, Tarun Kumar, Shubham Kumar, Anmol Gupta
Department of Electrical and Electronics Engineering K.I.E.T Group of Institutions Ghaziabad, India

Abstract— In the recent years, with the rapid advancements made in the technologies of electric and hybrid electric vehicles, selecting suitable batteries has become a major factor. Among the batteries currently used for these types of vehicles, the lithium-ion battery leads the race which is used to power various batterycovered machines as well as in powering electric vehicles. Selection of lithium-ion batteries for different purposes mainly depends on its normal and discharge parameters although normal parameters viz.: nominal Voltage(V), nominal capacity (Ah) is easily available for any battery, discharge parameters which includes fully charged voltage, nominal discharge current, capacity (ah) at nominal voltage, internal resistance, exponential zone and cut off voltage are hard to find. For analysis purpose rechargeable lithium-ion battery of various ratings are taken into consideration by influencing in MATAB and deviation in discharge parameters with respect to the batteries normal parameter is compared side by side. This research goal is to provide a software-based solution to find discharge parameters of lithium-ion battery regardless of its normal parameters. The paper offers several applications in battery selection without any requirements of other tools and further can be utilized for cell balancing and several charging applications.

Simulation for SOC estimation and performance analysis of batteries at FTP-72 Drive cycle

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Abstract – Battery technology has been a backbone in electric vehicles, renewable energy storage for later use, and hybrid electric vehicles (HEV), as batteries are used for a multitude of purposes in everyday life, ranging from providing the initial power needed to start vehicles' engines to acting as a power source in the event of a power outage. Lithium Ion (Li-ion), Lead acid are the most common batteries used in electric vehicles. An Electric Vehicle model is constructed using the software MATLAB Simulink for a full comparison of these batteries' base upon discharge of the battery (SOC DISCHARGE) for a specific range. For simulating the model, the FTP – 72 Drive cycle is used, and the Simulink model runs for a specific range. It is noticed how much battery is depleted that is, SOC degradation of different batteries, for the same range. The wind speed is set to 10 km/hr.

Dynamic Economic Load Dispatch for Thermal and Wind Generator with Ramp, Reserve Constraints

Arika Singh[1], Hemant Ahuja[2], Vaibhav Raj Singh[3,]Kirti Pal[4]

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Abstract. To generate the best result from the complicated optimization problem various power plants uses dynamic economic load dispatch (DELD). Without dynamic economic dispatch management of various power system functions cannot be done. Here GAMS (General Algebraic Modelling System) software is used to solve the various problem of dynamic economic dispatch. Although evolutionary algorithms can be used to solve this problem, their performance is dependent on numerous parameters, including the control parameter, population diversity, and constraint-handling technique. Here a set of algorithms are introduced to improve the performance of evolutionary ones by taking advantage of various constraints-handling mechanisms and a diversity mechanism in GAMS. The term "DELD"refers to a group of units being dispatched across a certain operating horizon of 24hrs with known on/off state of units. In this paper linear and non linear DELD with emission cost are discussed in detail. Different methods to reduce the fuel emission cost are also proposed.

Keywords: Dynamic economic load dispatch, GAMS, Constraint Handling, Wind Generator, emission cost.

1 Introduction

The significant expansion in the consumption of fossil fuels over the previous few decades causes global decline in the resources. As a result, the best way to use it in power generating has become a hot issue of research [1]. Because the overhead expenses of various generating units vary substantially, the power economic dispatch problem is difficult to solve stated by [2]. To get the optimal generation from various power plants and meeting the load demand at that specific time and that too at lowest cost is a complex task. Many evolutionary techniques are applied on optimal power flow to minimise the generating cost [3]. Unit commitment is another option used to assigning the entire required generation among the available generating units as explained in [4-6] to minimize the generating cost. In unit commitment ramp rate are also considered by many authors [7-10].

The majority of reported work is static economic dispatch, in which the system is set to fulfil a specific load level for an hour. This arrangement of hourly power

the batteries from damage. In this research work we are focusing on State of Charge Estimation of battery packs to protect the battery from deep discharging and increase the life of battery pack. This work includes MATLAB SIMULINK models that shows charging and discharging behavior of battery under constant load and dynamic load conditions. This work also includes a MATLAB SIMULINK model that demonstrates the charge discharge automation control that prevents battery pack from over charging and deep discharging.

BMS for PV Integrated System

Kaushikee Upadhyay, Shubham K. Patel, Pinki Verma, Varun Sharma
Department of Electrical and Electronics, KIET Group of Institutions, Delhi-NCR, Ghaziabad, India-201206

Abstract- Peak demand is major problem in electrical grid in running days. This problem can be solved by increasing generation capacity which is not good one. However, a good option is the load side demand electrical power management with integration of the renewable energy. Solar energy is reliable, clean, and most fundamental renewable resource.

Design of Hybrid Microgrid using Homer

Utkarsh Bajpai, Vishal Bajpai, Tej Prakash, Masood Rizvi
Dept. Electrical and Electronics, KIET Ghaziabad, India

Abstract: The aim of this research is to model a hybrid microgrid systems for a hospital, which is economically optimal and technically feasible. The system is modeled by integrating photovoltaics in the microgrid. Due to intermittent nature of solar energy the model also includes diesel generator and battery backup. Batteries allow generator-off operation for short outages, and allow the generators to run at more efficient load ratios for longer grid outages. Sensitivity analysis is done for PV investment prices, solar insulation, converter costs, and fuel price. The simulations are carried on the net present costs, cost of energy and renewable fraction of the given hybrid configuration. The result indicates that the PV/diesel/battery hybrid renewable system configuration is found to be optimum.

at the appropriate time remains a significant problem, especially when they are in a critical state. This study uses blockchain smart contracts to provide a governed response to the needs of patients, doctors, and the healthcare industry. To develop a smart e-health system, the suggested solution proposes to share health data over a blockchain platform. Also, the consumers and suppliers of healthcare services continue to place a high priority on the security and privacy of electronic health records (EHRs). Sensitive health information is exposed when a healthcare system is breached. Typically, this data is maintained in centralized databases, which introduces security flaws and encourages cyberattacks. With cryptographic hash algorithms, this system offers great security and integrity. The suggested Blockchain-based architecture is intended to improve the sturdiness of healthcare management systems and to get around known security flaws in existing systems for smart healthcare. The proposed system's superiority and solidity in terms of security and privacy requirements, key components of blockchainbased healthcare systems, and performance measures including various throughput and latency have been demonstrated by performance evaluation results from Hyperledger Caliper and proper evaluation.

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	Automatic Generation Control in Multi Area Power System		
29	SCADA and PLC based Smart Traffic Control System	3256	Avishek Kumar Mandal, Siddharth Pandey, Karan Singh, Abhishek Kumar, Rahat Ullah Khan, Ajeet Singh
30	Smart Village : A case Study	6227	Devishri Bassi, Aviral Anand, Dr Brijesh Singh
31	GSM basedDoor Access System	7628	Mayank Kumar Vimal
32	Design and Development of a Hybrid Tricycle	465	Anmol Gupta, KASHISH VERMA,PRAKHAR GUPTA, ARIKA SINGH
33	Human activity recognition using MediaPipe and Python	4118	Mukul Chauhan, MANSHI GUPTA, Dr. RAJEEV KUMAR
34	SMART GRID: Electric Vehicle as an Ancillary	3190	Ajeet Kumar Rai, Ayushi Sharma, Dr. Ramesh Singh
35	Improving efficiency of DC-DC Converter using Fuzzy Logic Controller	4644	Deepanshu Gupta, Aman Singh, Ayushmaan Saini, Kapil Gandhi
36	IoT Based Conditioning Monitoring Of Battery	7726	Varun Sharma, Atul Barthwal, Vaibhav Pathak, Nitin Kumar Saxena
37	Comparative Study of Solar Power Generation using boost converter and MPPT Technique	4365	Sanskriti Sharma, Samarth Shukla, Vaasu Gupta, Shruti Pandey
38	dentification of plants using deep learning for medicinal purposes	5066	AtulyaKairati, Avanish Maurya, Adarsh Kumar, Arun Kumar
39	Augmented Reality based GEO Tagging Task Management System	6866	Kritika Singh, Udit Agarwal
40	Development of performance estimator for li-ion batteries using soft-computing	3454	Shivam Sharma, Tarun Kumar, Shubham Kumar, Dr. Brijesh Singh, Proff. Anmol Gupta
41	Off-Grid Solar Powered House	3525	Sanskar Baliyan, Jyoti Srivastava, Shivang Misra
42	PMSG based wind energy conversion system	4761	Shubham Upadhyay, Shreya Tomar, Tanishka singh
43	A PESTLE analysis of Renewable Energy systems in India	7020	Manasvi Mittal, Dr. JAIMALA GAMBHIR
44	Designing and Analysis of an Electric Vehicle using MATLAB/Simulink.	7416	Shubh Srivastava, Rahul Kumar, Yash Rai, Surendra Kumar Tripathi, Ramesh Singh.
45	Rash Driving Detection System	4341	Varun Sengar, Vansham Chaudhary, Vidushi Singh
46	Design and Development of Smart Battery Management System	7434	Prateek Singh, Pritam Verma, Karan Kain, Anmol Gupta
47	BMS for PV Integrated System	1749	Kaushikee Upadhyay, Varun Sharma

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Dr. Surendra Tripathi, Shivam Juyal, Shubham Yadav, Utkarsh Goyal
KIET Group of Institutions

Abstract—This paper presents review/research on grid Integration and power quality issues associated with the integration of renewable energy systems in to grid. The aim of this research paper is to investigate the potential of solar grid integration in order to provide a comprehensive understanding of the current status and future perspectives of this technology. Solar grid integration has been identified as a key area of research in the field of renewable energy, due to its potential to significantly increase the share of solar PV in the global energy mix. Despite the considerable progress made in recent years, there are still many challenges that need to be addressed in order to make solar grid integration a reality. This research paper will provide an overview of the current state of solar grid integration research, as well as the challenges that need to be overcome in order to make it a viable option for the future.

Digital Sensor Based Temperature Control

Prashant Prakash, Viraj Kumar
Electrical & Electronics Engineering, KIET Group Of Institutions Ghaziabad

Abstract— Temperature beyond a certain limit can be dangerous and is totally the waste of energy so the main objective of this review paper is to basically control the temperature when it goes beyond a certain limit or to bring back the temperature to the desired level so that the wastage of energy can be reduced. It will also be helpful in monitoring the changes in the environment, in near future this can be used by the industries or in an electronic devices and also to assist people who are disabled and are unable to control the speed of the fan. Another objective of this review paper is to study and build an automatic system using microcontroller and its interfacing with other devices. Nowadays, in day to day life arduino is most common device used because of it's many advantages like it support many devices.

Energy Market, Value-Added Services (US-India Market Policies)

Shashwat Singh Maurya and Nitin Kumar Saxena
KIET Group of Institutions

Abstract: Power and Energy advancement is among the most critical part of foundation, vital for the financial development and government's (economical and welfare) assistance of countries. The presence and advancement of satisfactory framework is fundamental for supported development of the Indian economy. With the exponential growth in the power consumption in India, it becomes quite necessary to regulate the retail cost of power supply across the grids and opportunity to obtain Value Added Services (VAS). The role of Third-party providers comes into play under these opportunities, which will be evident in the latter part of the paper. Electric organization offers VAS which ought not be restricted to explicit population. In the event that the objective is to make a market where numerous VAS are accessible to numerous clients as it would be prudent (limiting the pool of market members isn't to the greatest advantage of clients). The goal is to make change the customers into 'Prosumers'.

Friday the 02:00PM IST on 4th November 2022

Room No. : D-046

Key Note Speaker

Professor Peter Han Joo Chong
Auckland University of Technology (AUT)
New Zealand
(Online Mode)

Topic:- Fuzzy Logic-based Resource Allocation Algorithm for 5G C-V2X Networks

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https://teams.microsoft.com/l/meetup-join/19%3ac1e41439ad8347f893465ed5e114eb70%40thread.tacv2/1667297148557?context=%7b%22Tid%22%3a%220c2c5eb2-7477-4593-ac08-f1de3be027d2%22%2c%22Oid%22%3a%2215f6f06c-062b-4635-9699-dd6d43f1f346%22%7d

Online Session Coordinator : Prof. Alok Kumar Pandey

Room No. : D-118

Session 3 :Project Presentation of IV Year Students

Session Chair-I	Session Chair-II	
Dr. Naveen Kr. Sharma [Mob.: +919882281525] Assistant Professor IKG-PTU, Kapurthala, India **(Offline Mode)**	**Dr. Jyoti Srivastava** [Mob.: +919899293208] Associate Professor KIET Ghaziabad	

S. No.	Paper Title	Paper ID	Name of the Authors
1	Green Room		**Dr.Jyoti Srivastava (Faculty Coordinator)** Aakash Poonia (P) Abhishek Sharma (P) Ayush Verma (P)
2	Controlling of moisture in the Soil		**Dr.Jyoti Srivastava (Faculty Coordinator)** Anubhav Joshi Parul (P) Unnati Srivastava (ECE) Utkarsh Pandey
3	Wireless Power Driven Car		**Dr.Jyoti Srivastava(Faculty Coordinator)** Aryan Kansal Atishay Jain (P) Udit Mittal
4	Wireless chargeable vehicle		**Dr.Ruchika Singh(Faculty Coordinator)** Ajay Dhama Ayush Singh
5	Water Irrigation System Using IOT		**Dr.Ruchika Singh(Faculty Coordinator)** Bindu Yadav Shristi Pandey (P)
6	Designing of controlling for VSWT	839	**Prof.Alok Kumar Pandey(Faculty Coordinator)** Ajay Singh (P)
7	Design of controller for UV		**Prof.Alok Kumar Pandey(Faculty Coordinator** Vivek Kumar (P)

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home automation system constructing a clever WiFi domestic device by the usage of Wi-Fi as a verbal exchange protocol. The Home Automation may be applied the usage of distinctive kinds of Wi-Fi verbal exchange strategies together with Bluetooth, GSM, ZigBee, Wi-Fi, etc. These present strategies have disadvantages as they have a limited range. To triumph over these disadvantages, we're going to put in force the challenge "IOT based Home Automation and Security System". The challenge makes a specialty of controlling lighting and security referred to as Home Automation and supplying Smart safety. This is useful for Elderly and handicapped people.

Development of performance estimator for Li-ion Batteries using soft-computing

Shivam Sharma, Dr. Brijesh Singh, Tarun Kumar, Shubham Kumar, Anmol Gupta
Department of Electrical and Electronics Engineering K.I.E.T Group of Institutions Ghaziabad, India

Abstract— In the recent years, with the rapid advancements made in the technologies of electric and hybrid electric vehicles, selecting suitable batteries has become a major factor. Among the batteries currently used for these types of vehicles, the lithium-ion battery leads the race which is used to power various batterycovered machines as well as in powering electric vehicles. Selection of lithium-ion batteries for different purposes mainly depends on its normal and discharge parameters although normal parameters viz.: nominal Voltage(V), nominal capacity (Ah) is easily available for any battery, discharge parameters which includes fully charged voltage, nominal discharge current, capacity (ah) at nominal voltage, internal resistance, exponential zone and cut off voltage are hard to find. For analysis purpose rechargeable lithium-ion battery of various ratings are taken into consideration by influencing in MATAB and deviation in discharge parameters with respect to the batteries normal parameter is compared side by side. This research goal is to provide a software-based solution to find discharge parameters of lithium-ion battery regardless of its normal parameters. The paper offers several applications in battery selection without any requirements of other tools and further can be utilized for cell balancing and several charging applications.

Feature extraction for motor imagery signals using the Fourier decomposition method to boost recognition performance

Neha Sharma, Dr.Manoj Sharma ECE Department Bennett University Greater Noida, India,
Dr. Amit Singhal ECE Department NSUT Delhi, India

Abstract- Brain-computer interface is a system that obtains brain signals, examines them, and turns them into instructions for an external machine. In the past two decades, researchers have shown their keen interest in BCI because of its vast range of biomedical applications. There are a few active challenges such as the unavailability of robust features, the need for a signal processing technique that can effectively work on motor imagery (MI) signals, low information transfer rate (ITR), etc. In this study, to overcome the issue of robust and optimal features, we have adapted a Fourier decomposition method (FDM) for the decomposition of EEG signal and efficient feature extraction. k-nearest neighbour is used as a classifier to get the state-of-the-art classification accuracy of MI-based EEG signals. We have used the IVa dataset from BCI competition III to validate the proposed method. With the proposed methodology, we have achieved a classification accuracy of 95.1% while every subject in the dataset has achieved a classification accuracy higher than 85%.

Comparative Performance Investigation of DC-DC Contoller in Electric Vehicles

Lakshay Gautam, Mohan, Prof.Ashish D Thombre, Pramod Maurya
Department of Electrical & Electronics KIET Group of Institutions, Ghaziabad, India

Abstract— This research paper evaluates the design and performance of different DC-DC Controller topologies for battery electric vehicles (BEV) and Plug in hybrid electric vehicles (PHEV), The two DC-DC Converter topologies are CBB-CIM (Cascaded Buck-Boost Converter Capacitor in the Middle) and CBB-IIM (Cascaded Buck-Boost Converter Inductor in the Middle) are presented, analyzed and compared in terms of converter topologies of interest, stability analysis , components of two Topologies, switching mechanism, rating & size of inductor and capacitor,

Room No. : D-047

Session 9: Computational Intelligences & application

Saturday the 10:00AM IST on 5th November 2022

Key Note Speaker

Dr. N R Pal

Indian Statistical Institute, Calcutta

Topic:- Will announce later

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S.No.	**Paper Title**	**Paper ID**	**Name of the Authors**
1	A review on various techniques for speed control of dc motor	4870	**Dr. Natwar Singh Rathore** **(Faculty Coordinator)** Abhinav Verma Aditya(P)
2	Renewables Forecasting Analysis for ANN, Deep Learning and Fuzzy Time Series Renewable forecasting for a more sustainable future	7569 2167	**Prof. D. Blandina Miracle** **(Faculty Coordinator)** Nandini Agarwal(P) Papil Verma(P) Rachit Chauhan(P)
3	Scalable renewable energy forecasting powered by AI		**Prof. D. Blandina Miracle** **(Faculty Coordinator)** Abhijeet Kumar Prashank Singh Keshav Gopal Rawat
4	Cattle Tractor with health monitoring		**Dr. Arvind Kumar Sharma** **(Faculty Coordinator)** Abhishek Mishra Shubh Agarwal Sonal Mishra(P)
5	Embedded system for hazardous gas detection	2343	**Prof. Vipin Verma** **(Faculty Coordinator)** Abhishek Panwar(P)
6	Pain Evaluation Instrument by Electrical Stimulation, Sensors and Pressure		**Dr. Yaduvir Singh** **(Faculty Coordinator)** Shubhangi(P)
7	Transmission line fault detection system		**Dr. Yaduvir Singh** **(Faculty Coordinator)** Om Chaturvedi(P) PriyanshManglik Shivang Pandey
8	A Systematic Literature Review on Task and Workflow Scheduling in Fog Computing	5864	**Gyan Singh** Amit K. Chaturvedi
9	A survey of brain signal acquisition techniques as applied in BCI	7584	**Vivek Dubey** Prakriti Trivedi Sanjay Singh
10	Various Techniques Used for Measuring Brain Activity in BCI: A Systematic Review	9651	**Sanjay Singh** Prakriti Trivedi Vivek Dubey

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Performance Analysis of Solar PV System Under Partial Shading Conditions

Yash Raj Bhardwaj, Vipin Yadav dept. Yash Pandey, Dr. Ramesh Singh
Dept. Electrical and Electronics KIET Ghaziabad Ghaziabad, India

Abstract—Around the world, shading has been identified as one of the major problems associated with the successful and efficient operation of photovoltaic systems. Shading may be caused by adjacent development, fog, falling or litter from feathered animals, etc., which will reduce the amount of electricity generated by the PV system. Generations under PV partial shading can be extended by suitably selecting PV array configurations and reconfiguration schemes. This paper provides a comprehensive survey of various PV arrays under working configuration and reconfiguration conditions.Efficiency in terms of maximum power output, shedding loss, fill factor and mismatch loss configurations, i.e. series-parallel (SP), cellular (HC), total cross-tide (TCT), bridge (BL) and reconfiguration IE; for four Evaluating OddEven (OE) Case Study in Different Shedding Situations The results are compared with 7 7 PV array configurations for the same shading cases. The investigation has been extended to identify the consequences of including bypass diodes in the power output of each module. Research also shows that the shading scenario determines the maximum instantaneous power output of the PV array.The results show that for all shaded case studies considered, OE reconfiguration provides superior performance in terms of maximum power output.

Feasibility Check Of Existing Power System On Expansion Through Etap

Shubham Gupta, Sudhir Kumar Singh, Nikhil Sharma, Sourabh Raja
Electrical & Electronics Engineering KIET Group Of Institutions Ghaziabad, India
Rajeev Saxena AGM-Elect Reliance Industries Limited Gujrat, India

Abstract—Short circuit levels are increasing at various substations over the design limit as a result of grid growth, increase of thermal and renewable production, and addition of transmission lines in the transmission network. These shortcircuit currents produce thermal as well as mechanical stress to the equipment, which might lead it to fail. Short circuit current must therefore be reduced and controlled. One approach is updating the protective equipment so that the predicted fault-current stays within the limits of the system. This usually entails the substation being completely rebuilt. It is an extremely costly option. Due to large quantity of items that must be replaced, redesigned, and tested; Upgrading the existing substations can be a time-consuming procedure. Short circuit levels can be reduced using a variety of techniques, including (1) Current Limiting Reactors, (2) High Impedance Transformers, (3) Is limiters, (4) Bus Bar Splitting techniques in substations, (5) Disconnection of some lines from the critical substation, (6) HVDC links, (7) Design of Higher Voltage transmission networks, and so on. The goals of this paper are to simulate a case study using up-rating circuit breakers and high-impedance transformer approaches, and to find the best ways for controlling and reducing EHV Substation short circuit levels.

Artificial Bee colony Based Controller Design for Automatic Generation Control in Multi Area Power System

Natwar Singh Rathore, Deepali Yadav, Bharat Dhama,
Department of Electrical and Electronics,KIET Group of Institutions,DelhiNCR,Ghaziabad,India-201206

Abstract- This paper presents an efficient and fast controller tuning method for automatic generation control (AGC) in multi area power system using artificial bee colony optimization (ABC) technique. Proportional integral and derivative (PID) controller with derivative filter is employed in the system to obtained minimized noise response in the input stage. The response of PIDN controller is obtained with the help of ABC optimization procedure. ABC algorithm proven its successful implementation in large scale nonlinear problems. In this procedure integral square error (ISE) is considered here as the performance measure. The multi area power system model is considered in the paper for the simulation purpose. The simulation studies are carried out in the MATLAB/ Simulink Software. The simulation results of the proposed ABC based controller is also compared with the wellknown Zeigler-Nichols (ZN) method of PIDN controller tuning method. The steady state responses are found satisfactory using proposed method of tuning for the multi area AGC system in terms of settling time, rise time, overshoot, and undershoot parameters.

11	To Design an Optimal Hybrid Energy System for Havelock Island in India	2780	Aishwary Gautam, Mohannad Shariz Ansari, Bhavishya Tomor, Madhuram Gautam
12	To design a PV/diesel/battery hybrid system for Agatti Island in India	9474	Aditya Singh, Mohammad Shariz Ansari, Aditya Srivastava, Adesh Gupta
13	STAND ALONE PV SYSTEM WITH BATTERY STORAGE	6431	Shoaib Akhtar, SACHIN SINGH, MAYANK SINGHAL, YADUVIR SINGH
14	Review Paper on Face Detection and Recognition Techniques	6518	Pragya, Akshay Rathi, Abhinav Chaurasia
15	Competition in Retail Electricity Market - India VS USA	8707	Sakshi Bhardwaj, Tanya Bajaj, Nitin Kumar Saxena, Vaishnavi Singh
16	Comparative study on brain tumour detection	8867	Anurag Gautam, Mr. Saurabh, Abhishek shankar, Mohd. Shahroon
17	F-Transform based Brain Tumour Detection using Classification Techniques	2881	Anurag Gautam, Mr. Saurabh, Abhishek shankar, Mohd. shahroon
18	Performance analysis of grid connected solar energy power conservation system under varying conditions	3892	Shirshak Shukla, Yogita, Vaibhav Singh
19	An efficient home automation system based on internet-of-things	3400	Varun Gupta, Afraz Khan, Shubham Sachan, Suboor Azhar, Pushpendra Singh, Abhas Kanungo, Salim, Sharad Gupta, Arvind Kumar Sharma
20	Development of performance estimator for Li-ion batteries using soft-computing	3454	Shivam Sharma, TARUN KUMAR, SHUBHAM KUMAR, DR. BRIJESH SINGH, PROFF. ANMOL GUPTA
21	Feature extraction for motor imagery signals using the Fourier decomposition method to boost recognition performance	7300	Neha Sharma, Dr. Manoj Sharma, Dr. Amit Singhal
22	comparative performance investigation of dc-dc controllers in electric vehicle	2347	Lakshay Gautam, MOHAN
23	Comparative Performance Analysis Of PV Fed Boost Converter	5864	Ayush Srivastava, Abhishek Gupta, Adtiya Srivastava, Shruti Pandey, Natwar Singh Rathore
24	Simulation for SOC Estimation and performance analysis of batteries at FTP-72 Drive cycle.	699	Smita Upadhyay, Shubhanshi, Shyamji Shukla, Brijesh Singh
25	Arc Flash Analysis Using Electrical Transient Analyzer Program (ETAP)	1479	Nikhil Chauhan, Himanshu Gautam, Manish Dev Vardhan Prof. Sudhir Singh, Rajeev Saxena
26	Performance Analysis of Solar PV System Under Partial Shading Conditions	9528	Yash Raj Bhardwaj , Vipin Yadav , Yash pandey
27	Feasibility check of existing power system on expansion through ETAP	5249	Shubham Gupta, Nikhil Sharma, Sourabh Raja, Sudhir Kumar Singh, Rajeev Saxena
28	Artificial Bee colony Based Controller Design for	2044	Deepali Yadav, Natwar Singh Rathore, Bharat Dhama

BCIPECH-22

48	Statistical Techniques for SFRA Diagnosis of Distribution Transformers	8543	Jay Kumar, Richa Kapoor
49	Design of Hybrid Microgrid using Homer	6814	Utkarsh Bajpai, Tej Prakash, Masood Rizvi
50	PID Controller Design For Three Tank System	9988	Arpita Bajpai, Akash Rana, Natwar Singh , Alok Pandey
51	FIR Management Portal	5095	Tarun Tyagi, Anubhav Trivedi, Udisha Agarwal
52	Novel Scheme to Minimize Speed Variation in DC Series Motor	370	Vipin Jain
53	Stock Price Prediction using Machine Learning	5284	Sameer Kumar, Ajay Agarwal, Rishabh Mudgal, Siddharth Gautam
54	Fake news detection by using Machine Learning	6713	Shivam Tripathi, AJAY AGARWAL, SHIVAM TAYAL
55	Solar power based reverse osmosis desalination system	8363	Ankit Yadav, Ankit Chauhan, Kamil Sheikh, Natwar Singh Rathore
56	Cost Optimisation of Microgrid using HOMER Software â€“ A case study of Botswana	9649	Ravi Shanker Yadav, Nikhil Kumar, Nitesh Kumar Yadav, Masood Rizvi
57	Cloud Service Providers Comparative Study and Analysis: AWS, Azure and GCP	2509	Ankit Chauhan, Arun Kumar
58	Solar based irrigation system	312	Nikhil Maurya, Ravish Maurya, Jyoti Srivastava, Ravi Kumar Shah
59	Online Voting Portal	8532	Mayank Mittal, Vineet Sharma
60	A Comprehensive Study on Cyber Security Threat Sources and Security	5371	Parth Sharma, Saksham Garg, Tushar Garg, Ravi Gupta, Shikha Jain, Dinesh Kumar
61	Reconfiguration strategies to extract maximum power from photovoltaicarray under partially shaded conditions.	179	Atul Yadav, Ashish Dwivedi, Abhinav Kushwah
62	AI-enabled Real Time Face Mask Detection	6860	Mudit Kalra, Pravish Srivastava, Raghav Singh, Naveen Kumar
63	Review and Analysis of Fast Charging of Lead-Acid Battery for e-Vehicles	8279	Rahat Ullah Khan, Harsh Singh, Harsh Mishra , Harsh Kushwaha

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Discrete cosine transform features matching-based forgery mask detection for copy-move forged images

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Abstract:
In this age of digital technology, it is relatively simple to manipulate images. It is quite difficult to recognize altered photographs with the human eye, and as a result, we are frequently fooled or misled on social media platforms as a result of altered images being shared. As a result, it is of the utmost need to create methods that are both quicker and lighter in order to categorize and pinpoint tampered or faked images. In this article, we demonstrated a methodology for detecting copy-move forging masks that uses a modified version of the discrete cosine transform (DCT) block level features extraction method. The altered photos have their feature information retrieved at the block level. a procedure in which blocks of the proper size are chosen experimentally. In addition, these block characteristics are compared by measuring the lexicographic distance between the feature vectors in order to find blocks that are similar to one another. The visual findings are offered for comparison between the real mask and the one that was anticipated. The detection accuracy of fake masks is around 95% on average.

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Contents

I. Introduction

We usually find many images available either on social media like whatsApp, facebook, or Twitter. We may interpret any of these images as original and can build perception according to the image content without even having a question in mind that the image may be tampered with or forged. Similarly, if a patient goes for a medical checkup and digital reports sent through e-mail are tampered with at source or on a network; it can lead to loss of life due to the wrong treatment of such patients. A tampered crime scene image presented in the court can lead to wrong judgments. So, there is a stringent need to address this issue.

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ADVANCED SEARCH

A Review of Deterministic and Non-deterministic Load Balancing Mechanisms in Software Defined Networks

Publisher: IEEE

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III. LOAD BALANCING

IV. [illegible] CHALLENGES

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Figures

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Keywords

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Abstract:

Managing conventional networks has become challenging due to rapid network growth and emergence of new technologies like big-data and cloud computing. To overcome such issues the new paradigm concept is suggested known as Software Defined Network (SDN). To comply with quality of services (QoS) of networks and maximize the reliability of network the load balancing must be considered. In a traditional network, load balance is predicated on the network's current data flow. On the other hand, SDN controllers can establish better load balance in wider perspective of network. This paper surveys the load balance strategies in SDN network based on deterministic and non-deterministic approaches. Furthermore, the major problems of some algorithms have been addressed so that investigators might use improved load balancing approaches in future.

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Contents

I. INTRODUCTION

The Software-Defined-Network (SDN) is a new paradigm of networking which offers separate control layer and data plane layer. The data forwarding layer is the network's supporting infrastructure, which includes switches and routers, while the control plane is the network's brain [1].

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2023 International Conference on Advances in Intelligent Computing and Applications (AICAPS)
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Distribution of Nanomachines over Nano-networks

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I. Introduction

II. RELATED WORK

III. SYSTEM MODEL

IV. PROPOSED CLOSED FORM EXPRESSION FOR

V. SIMULATION RESULTS

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Molecular Communication is a new vertical in the modern communication system in which molecules are used in exchange of information. As the information molecules travel from transmitter to receiver through the diffusion process, they undergo various impairments. However, molecular density or in turn total number of received molecules ensure faithful communication. On the other hand, the molecular density is a probabilistic quantity and given by probability density function (PDF). In literature, various PDFs are used to quantify the molecular density and number of received molecules. In sequence, this paper presents molecular density under different PDFs. It is noteworthy to mention that the Levy distribution is the most stable function to represent particles in the Brownian motion. Whereas IG distribution is generic in nature. In particular, we have considered Inverse Gaussian (IG) distribution and Levy distribution function to evaluate the molecular density under different scenarios. The simulation shows perfect agreement with the theoretical background.

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Molecular Communication (MC) is one of the latest research areas of interest. Molecular communication is a communication technique where chemical signals are used to carry the information for short-range communication inside the body. In conventional communication, data is encoded using binary, however in molecular communication, data is truly encoded on the molecule. It is a new paradigm for communication that uses patterns of molecules to carry information. Figure 1 depicts the molecular communication channel. The fundamental ideas behind molecular communication are based on developed concepts from physics, chemistry, biology, as well as pharmacology, microfluidics, and other fields. The concept of molecular communication is proposed as a new standard for engineered biological nanomachines communicating with natural biological nanomachines that comprise a biological system. Given that, biological systems saturate numerous contexts and applications, molecular communication has a great potential for contribution. Molecular Communication is also beneficial in a variety of ways. Nanomedicine applications of MC are basically of two types, diagnostic applications and advanced treatment. Diagnostic applications are expressed as disease detection, personalized diagnosis and imaging. The strategic goal of personalized diagnosis with MC is to define, design, implement, and test a non-invasive and completely new approach to determining the risk of various disorders in the body.

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III. Proposed Work

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At present, there is rapid growth in storing data online. Online data storage enables users to access their information anywhere and anytime. However, this can lead to some security issues, which can be handled today using Blockchain. Numerous researchers have worked on various blockchain application domains, including supply chain management, the medical industry, governance, etc. In addition to these applications, many issues still need research, such as security, privacy, performance, scalability, etc. As part of our research, we are focusing on a blockchain-based medical application field. The concept is based on the Internet of Things (IoT) and Blockchain, where we employ wearable devices to read user data like blood pressure, heartbeat, and temperature. However, anyone can wear this wearable device which comes up with the problem that it is optional that the data we are storing comes from a valid user. Secondly, we need fast access to data stored in Blockchain, but as the block creation takes 10-12 seconds, we suffer from some delay in response time. In our work, we proposed solutions to these two problems by using authentication while storing data and reduction in the Block creation time.

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Contents

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Blockchain technology is currently highly popular and is expected to be widely adopted worldwide in the future. Researchers have explored various applications of blockchain in fields such as supply chain management, healthcare, and governance [1]. Blockchain enables data to be stored in a decentralized and distributed manner [2] [3]. The first use case of blockchain technology was for Bitcoin, which is a public blockchain that allows anyone to join the network at any time. However, Ethereum blockchain is used for securing data beyond financial transactions. Ethereum is the world's first decentralized computing system, enabling the sharing of resources and computation efforts [4] [5]. It has its own digital currency, ether (ETH), which can be used for payments and to design new applications. To develop applications on Ethereum, smart contracts are used, which digital contracts containing code are written in a language called Solidity, similar to JavaScript [6]. Smart contracts are agreements stored in blockchain and are automatically executed when certain conditions are met, without requiring a third party. They can store agreements, payments, and transactions in digital form with a signature to prevent later denial.

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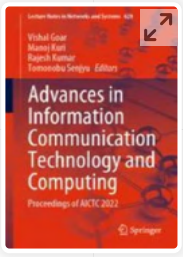
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Advances in Information Communication Technology and Computing
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Stock Market Forecasting Using Sentiment Analysis and Deep Learning

Veepin Kumar, Sanjay Singla, Shalika, Sandeep Kang & Raman Chadha

Conference paper | First Online: 30 May 2023

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Part of the Lecture Notes in Networks and Systems book series (LNNS,volume 628)

Abstract

Sentimental data processed from digital online communities can be used in different ways for market scrutiny. Sentiment Analysis is a way to extract opinion inclination (negative, neutral, positive) from a fragment of text cited for any institution or product. This word-of-mouth index can in turn be used to speculate the public mood

and its market that has an impact on stock prices. Quarrying news articles and predicting the movements of product prices based on the content of Reviews corpus becomes beneficial. This research paper used Sentiment Analysis on the most popular Dow Jones Industries news articles to take advantage of this fact. We then combined this information with market index data from the company during the same time period to create a combined model that offers more accurate results based on Sentiment Analysis and Neural Networks (NN) and will assist the stockholder to lower risk and receive better returns.

Keywords

Prediction **Neural network**

Sentiment analysis and stock market

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1 Introduction

The stock market means the collection of exchanges and markets where well-ordered activities of selling, buying of shares that are publicly held takes place along with their allocation. Stock markets offer a safe and highly structured environment where those who participate in the market negotiate and execute

transactions in shares and other eligible financial means with credibility with minimal execution menace [1]. The objective of stock market prediction is to determine the movement of stock value in the future of any financial exchange. Its accuracy in prediction can lead to greater profit for the investors. One of the most challenging issues is to predict the stock market trend due to various factors involved such as interest rates, economic growth, and politics that makes the market volatile and extremely hard to predict accurately [2].

In the modern economy, stock market information analysis and forecasting are crucial. Linear (ARIMA and MA) and non-linear models (ARCH and NN) can be used to categorize the many forecasting methods and algorithms [3]. There can be two major divisions of categories as to how the stock market can be predicted, these are namely technical and fundamental analysis. The first category of technical division aims at analyzing historical data of the stock prices for the prediction of future values, whereas the fundamental analysis depends on the examination of a collection of unstructured textual data, such as earning reports and financial news [4]. It is believed that technical analysis can predict the movement of the market but these research did not get high prediction results as they had a huge dependency on structured historical data not

considering a very important source of information that consists of social media sentiments and online financial news [5]. Nowadays a large amount of critical information is available on the web related to the stock market including BBC, Yahoo Finance and Bloomberg. It gets hard to manually extract useful information from these sources making text mining for the same significant to extract useful information for analysis [6]. Modern approach to stock market Analysis inculcates both quantitative analyses using historical record of the past behaviour of the organization or product as well as qualitative analysis making use of news feed highly affecting the market trend with the growing influence of social media on prevalent scenarios. Predicting the future of the market comprises a vast range of variables including historic models to psychic models. But as stated by the behavioural economic hypothesis, market stats are related to public mood [3]. Social networking websites can provide a sizable collection of user generated content that in turn can be used for sample aggregation of public opinion for predicting market behaviour. Simple statistical forecasting using historical data based on a company's past performance ignores the importance of customer opinion (social media, news etc.).

In this paper we perform mood detection using lexicon-based sentiment analysis of the scrapped

top news articles of the Dow Jones Industries and incorporate that intensity in a NN model that uses historical data to couple qualitative as well as quantitative analysis for our prediction of the stock market opening price for the next two months [7]. The forthcoming sections of this paper include the background of stock market and deep learning in Sect. 2, Sect. 3 explains the formulation of the problem and the suggested methodology. Section 4 describe the result analysis of our proposed solution and its effectiveness and at last, Sect. 5 concludes the research work and provide future directions.

2 Background

The study and analysis of literature is very essential since different researchers have utilised various datasets and approaches to forecast the stock movement trend through sentiment analysis. Huang et al. [1] test the Support Vector Machine's (SVM) capacity to predict the direction of financial movement by predicting the weekly movement direction of the NIKKEI 225 index and compare SVM's performance to that of linear discriminant analysis, quadratic discriminant analysis, and Elman backpropagation NNs in order to assess its predicting ability. The test outcomes show that SVM outperforms the other categorization methods. Khaidem et al. [2] made trials with a framework which anticipate whether stock prices will rise or fall with respect to the

price prevailing in the past. Random forest algorithms and gradient boosted decision trees were used to produce results achieving an accuracy of 64%. In order to predict the closing price of an organisation based on previous prices, Hiransha et al. [3] used a number of deep learning models, including Recurrent Neural Networks (RNN), Multilayer Perceptron (MLP), Convolutional Neural Network (CNN), and Long Short-Term Memory (LSTM). CNN outperformed out of all the methods applied in this paper. The results were compared to the linear Autoregressive Integrated Moving Average (ARIMA) model, and it was shown that the NNs performed better than ARIMA. Pathak et al. [4] effectively performs a merge of quantitative as well as qualitative analysis of Indian stock market trends using sentiment analysis and machine learning (ML) with a fuzzy logic module. Sun et al. [6] look into the possibility of forecasting the stock market using text from user-generated microblogs. The model employed in the author's study differs from models used in past studies in two key ways: (1) it employs market information obtained in high-volume social media data rather than news stories, and (2) it does not analyse sentiment. The bulk of the companies listed in the S&P 500 index's data from 2011 to 2015 were used to evaluate the model, and it outperformed a baseline regression.

Usmani and Adil [8] instinctive design combines

sentiment analysis results from historical data, news feeds, and twitter feeds. With remarkable accuracy, this strategy forecasts the direction of the stock market. To determine the direction of the market, it employs statistical time series models like ARIMA and SMA. In order to predict stock market trends, Yoo et al. [9] investigated ML models and event responsive algorithms like sentiment analysis. It also emphasises how factors like global and political events have an impact on market development and should be properly consideration. By analysing the text content of daily Twitter feeds using Opinion Finder, Bollen et al. [10] investigated the Dow Jones Industrial Average (DJIA) trend using emotional states from Twitter feeds. In order to investigate the prediction of changes in DJIA closing values by proposition of the public mood conditions measured by the Opinion Finder, a self-organizing fuzzy neural network is used. This network has an accuracy of 77.6 percent in predicting the daily up and down changes in the DJIA closing values. Table 1 list some of the research papers along with the technology used.

Table 1 Literature survey of different methods used for the problem

According to Porshnev et al. [13], the inclusion of twitter sentiment analysis does not improve the

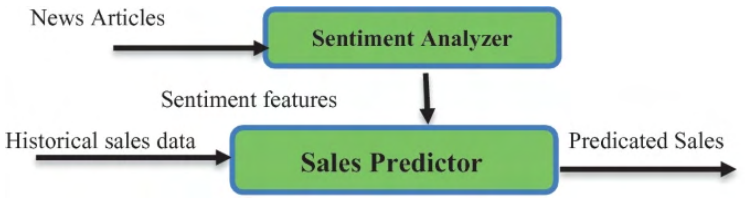
prediction model's accuracy and does not provide any useful information. As a result, this study uses news feeds rather than tweets to increase the validity of sentiment analysis. The study provides a lot of insight into how sentiment analysis should be used. They suggested expanding the collection (training data) when each test was conducted, making the training data more effective as tests were conducted more frequently. Lin et al. [18] use the MLP model taking the sentiment feature alone with last four quarters historical sales number as our input feature.

3 Problem Formulation and Research Methodology

Our problem focuses on improving the application of a combination of quantitative as well as qualitative analysis for market trend determination and prediction. Earlier, there have been applications where this approach has been followed with different methodology and techniques to determine the results, for instance using time series analysis using SARIMAX model or by using MLP technique. We will predict the upcoming opening prices of the Dow Jones industries for a couple of months while considering sentiment indexes calculated using sentiment Analysis in our time series model using an efficient technique different from what has been already applied in the field to produce greater accuracy and reduced root mean square

error. The overall architecture of the suggested problem is depicted in Fig. 1.

Fig. 1

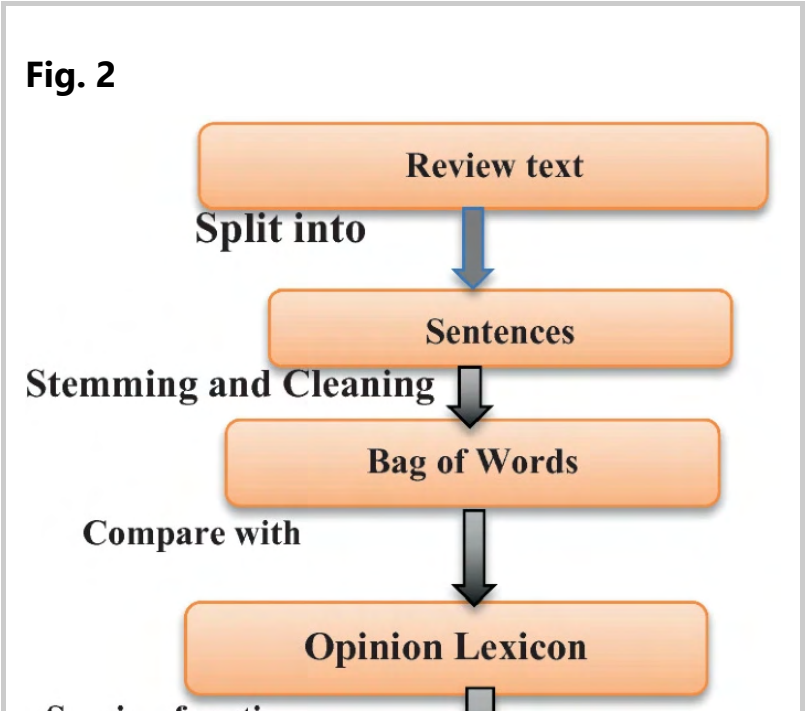


Overall architecture of the problem

In this research work, two datasets have been used for the application of final methodology. The first dataset consists of the top twenty-five news articles of the Dow Jones stock prices for each day for a span of 8 whole years. The other dataset consists of stock market data of Dow Jones Industries with attributes including opening price, closing price, high and low prices, adjusted close price and volume for each day over a span of eight years. The news articles data was cleaned by removing unnecessary symbols (@, #, $), spaces, tags and URLs and were further processed to be analysed for opinion mining using NLP techniques. We applied an approach to map the lexical features to sentiment scores within a specific range constituting the range from a negative to a positive polarity of opinion. The key advantage of the lexical method is that since we already have everything, we don't need to train a model on labelled data; instead, all that would be

left to do is evaluate the sentiment of sentences in the dictionary of emotions. The procedure for using lexical sentiment analysis is shown in Fig. 2. After processing both the datasets we merged the sentiment indexes and stock market data using matching dates. At the end of the pre-processing phase, the data frame contains attributes containing both stock price attributes and sentiment indexes for news articles computed for each matching day in the dataset. LSTM are well suited to classify, analyze, and predict time series with unpredictable time lags. Due to its relative gap length insensitivity, LSTM has an advantage over RNN, hidden Markov models, and other sequence learning techniques. Furthermore, LSTMs give us a variety of parameter choices, such as learning rates, input and output biases, and more. Consequently, there is no need for minor modifications. With LSTMs, updating each weight is now only O (1) in complexity.

Fig. 2

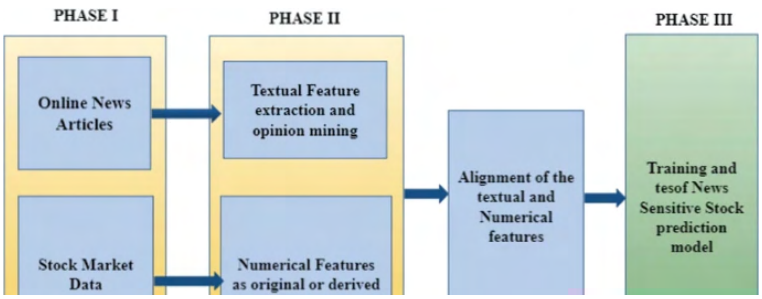




Working of lexical sentiment analysis

A neural network stops learning due to the vanishing gradient problem because of which the updates to the various weights become smaller and smaller within a given neural network. This issue is mitigated with LSTM which makes it ideal for the purpose of predicting stock opening prices for forthcoming days using the stock values of previous records over a period. Problems with multiple input variables can be coherently modelled using recurrent Neural Networks like LSTM. Traditional Linear methods can be hard to use with multiple input forecasting problems. Therefore, it can be a great benefit in time series forecasting. We use a multivariate LSTM Model and train it over different attributes governing Stock market movement to predict the faith of the market with its movement for the next two months. The solution of proposed problem is represented in Fig. 3.

Fig. 3



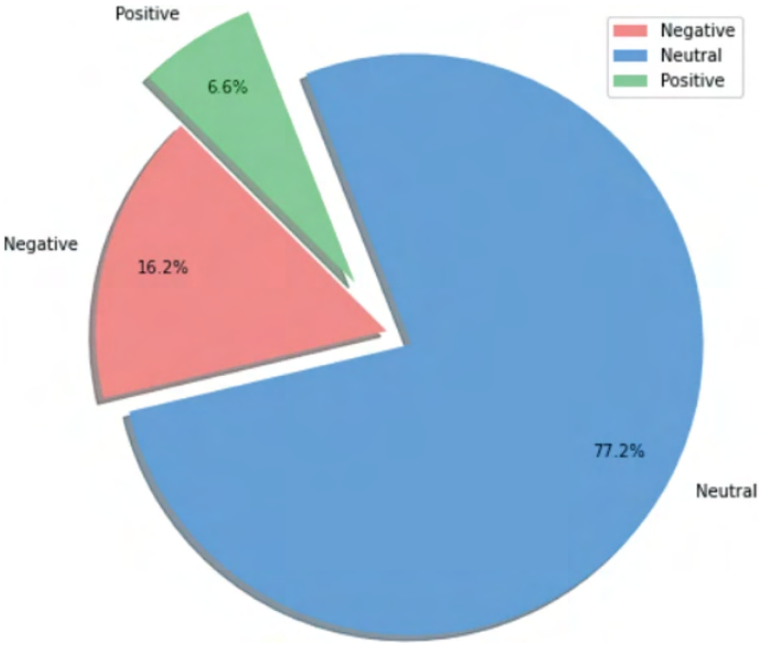


Overall architecture of solution

4 Result Analysis

Following results were obtained after performing sentiment analysis on the collection of news articles from the dataset, categorizing them into positive, neutral, and negative as shown in Fig. 4.

Fig. 4



Sentiment analysis of Dow Jones news headlines

The process of forecasting includes making future predictions based on recent and historical data. Networks are essential to assess patterns over time to comprehend the patterns in a long sequence of data. Recurrent networks, such as

LSTM, which are used to learn such data, were employed. They can comprehend long-term interconnections and temporal differences. For our research, we trained the model on LSTM units over the span of 30 iterations using the Adam optimizer and Mean Squared Loss function.

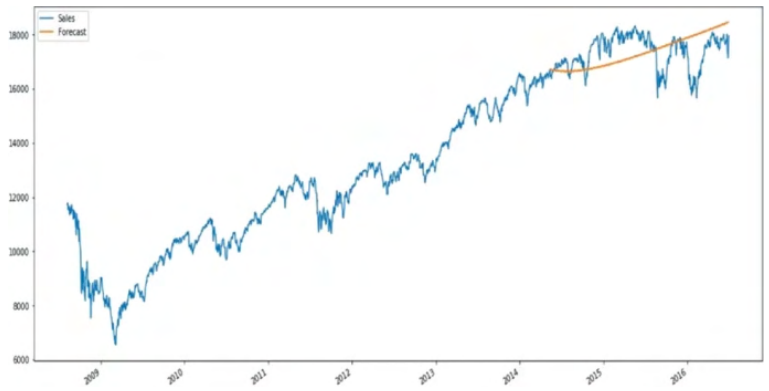
Various algorithms have been used to implement a similar structure for stock forecasting and it was observed that the LSTM model provides a much lesser root mean square error than the other methods applied for the same. Figure 5 shows the prediction of a simple time series ARIMA model applied on the historical data of the stocks of Dow Jones Industries. The forecasted value has a large amount of root mean square error upon application rather than a closed curve with much lesser root mean square that is observed while applying the model proposed in Fig. 6.

Fig. 5



Training predictions versus actual stock prices with predicted stock price

Fig. 6



Graph plot of predictions using ARIMA model

5 Conclusion and Future Scope

Micro Blogging has become highly popular in today's era because it offers characteristic features like accessibility and satisfaction which allows instant dispersion of information and negligible response time with limited or no restrictions at all on content and security. Before the foundation of behavioural finance was established, research on stock market prediction was entirely based on unpredictable walks along with numerical or quantitative prediction, but with its advent, people's beliefs that mood and emotions were also taken into account when predicting stock market movement. Therefore, we employed the concept of sentiment analysis of News Articles with Deep learning models to make it more effective. The results indicates that there is significant correlation linking the prevailing public emotions and etiquette of investment in the short

term nevertheless this correlation is not proved to be significant statistically. Evidence also shows cause and effect relation between prevailing public sentiment and the stock market trends with respect to relationship between public emotions and daily closing prices. As part of a future implementation, we can perform comparative analysis with extreme learning classifiers which do not need gradient based backpropagation to function and deep learning classifiers using attribute pruning on the basis of variables that may be used for forecasting of market.

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Supply Chain Management in Blockchain Using Hyperledger

Arun Kumar Kushwaha, Soumya Singh, Anshay Rastogi, Vipin Deval, Pravesh Singh & Vikas Goel

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A track of the products is kept from producer to consumer as a test of combining the digital and physical worlds. The final consumer has access to a comprehensive record of information and can be confident that the information is correct and precise. Because it employs a distributed public book of account, one of the emerging technologies, blockchain could be a useful approach in handling supply chain management. As a result, building supply chain on blockchain helps improve overall supply chain management as it eliminates counterfeit products, improves visibility and transparency as well in the supply chain. The following qualities of blockchain technology make it useful in the supply chain sector: it lowers errors, avoids product delays, eliminates fraudulent activities, improves management, promotes consumer/supplier confidence, and so on. As a result, we use blockchain to deploy supply chains to improve overall supply chain management. Blockchain records information on a wide range of products and/or service transactions, which are tracked in real time to address a lack of transparency.

Keywords

Supply chain **Blockchain** **Hyperledger fabric** **Hyperledger composer** **Hyperledger playground**

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IV. Proposed Work

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The term “cloud computing” refers to a relatively new technology that provides users with access to various computing services and resources, including software, data storage, and communication infrastructure. There are currently certain security concerns with cloud computing. An Intrusion Detection System (IDS) is a form of network security that monitors for malicious activity. In the cloud, an IDS might operate on individual hosts or over an entire network. DoS attacks, which aim to disrupt, disable, or otherwise harm a service, have become increasingly common against cloud applications and internet services. Due to the cloud's complexity and decentralized nature, it is difficult to detect attacks on its infrastructures. Moreover, by allowing a wide variety of smart devices to access cloud-based infrastructures, it raises both the difficulty and the complexity of assaults. A decision tree is a method of categorization used in data mining. It is recommended to utilize this method when developing a classification scheme from a reclassified data set. Classifiers such as the Classification and Regression Tree (CART), C4.5, and the Random Tree (RT) are proposed in this work. The utilized CART method has a tendency to generate additional trees on nodes, until no tree can be formed judging whether or not a node is terminal. Because of its adaptability, the CART technique can handle gaps in the data. The tree is pruned to make it smaller and more manageable in C4.5. A classifier's complexity is decreased while its prediction accuracy is improved. Decision trees were used to generate the chain of basic decisions used in RT's label assignment process.

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Computing resources (hardware and software) are pooled and made available through a network in the form of a service in cloud computing (the internet). Cloud computing is the practice of storing, processing, and retrieving data and applications over the Internet rather than on a local server. Users can avoid the hassle of maintaining on-premises gear and software by storing their data in the cloud and accessing it whenever they like using a top-notch cloud application [1].Hardware and software can be made available as "services" through cloud computing, where "service" refers to the provision of resources on demand for a fee based on how much of those resources are actually used. 1

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It makes very dynamic resource provisioning possible. It allows users instant access to hardware resources with no need for initial capital outlay, which helps many companies reduce their time to market.

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This has the potential to significantly lower the IT barrier to innovation, as evidenced by the proliferation of promising new businesses and the rise of social networking sites like Facebook that specialize in niche areas like MINT (managing finance).

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Cloud computing simplifies the process by which businesses can expand services that depend on ever-more-reliable data to meet fluctuating customer needs.

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As a new form of technology, blockchain has much to offer. The technology has a wide range of potential uses and advancements, depending on the field of application. However, further study is required to realise the potential of advanced technologies like Blockchain and smart contracts. There is a lot of potential for investigation because the technology is so new. This research looked at the origins of the Blockchain and analysed several different blockchain solutions. Ethereum was discovered to be the most often used platform for constructing distributed apps after being compared to other platforms. Therefore, a distributed smart energy microgrid application will be built on the Ethereum platform. There is a coin, or token, exclusive to each blockchain platform. Bitcoin's relationship to other cryptocurrencies was measured using the Karl Pearson correlation coefficient. The research concludes that ether's price is most sensitive to changes in the price of bitcoin. On a preferred Ethereum network, a distributed application for managing smart microgrids has been built. The smart contract constitutes the heart of this programme. As a result, we also take care of the smart contract's layout, coding, and optimization. In comparison to the original, less GAS is consumed by this smart contract. The entire distributed app has been built and thoroughly tested. Smart Energy Microgrid Distributed Application framework results demonstrate that the application functioned as expected.

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Conference Location: BHOPAL, India

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Contents

I. Introduction

Blockchain is a cutting-edge innovation with the potential to revolutionise many different markets. One frequent shorthand for this technology is that it "supports Bitcoin" (digital currency). The Blockchain provides answers to trust-based problems that have plagued humans for a long time. In the end, it does nothing more than create a foundation of mutual trust between previously unknown parties [1]. They also guarantee unchangeability, eliminating middlemen, and reducing prices. It's also worth noting that machine learning technology used in several fields, which is always developing. This study combines blockchain technology with machine learning in order to evaluate the accuracy of price forecasts for a wide variety of blockchain-based coins. Given the scale of the cryptocurrency market, accurate price predictions are crucial for investors.

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FECD:-Facial Expression Classification & Detection

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14
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Alerts

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Abstract
Document Sections
I. Introduction
II. Related Work
III. Methodology
IV. Results
V. Conclusion
Authors
Figures
References
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Abstract:
This paper primarily focuses on Facial Expression detection and classification and beating other SOTA [State-of-the-Art Models] in the space. When discussing face images, the term "facial expressions" is a common terminology. These expressions can sometimes be a blend of two or more human feelings that lead to wrong predictions. When taking about the systems it is commonly classified into four systems, Recognition, Extraction, Detection, and segmentation.

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Publisher: IEEE

Conference Location: London, United Kingdom

Contents

I. Introduction

In the quickly developing subject of facial expression recog-nition, emotions expressed by a person's facial expressions are recognized and analyzed utilizing technology. This technol-ogy is becoming more and more crucial in many different professional contexts, such as psychology, marketing, and security. Face expression recognition technology may be used in psychology to better understand how individuals are feeling and responding to various stimuli. For instance, it may be used to examine consumer reactions to various marketing formats or gauge the efficacy of various therapeutic modalities.

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I. Introduction

II. Problem Statement

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Abstract:

In today's world, the social-based online network systems are rapidly expanding, which results in large accumulation of data. When we try to examine this enormous amount of data that has been collected in these systems, we face new difficulties. The forecasting of user social relationships is one of the intensively researched topics. Link prediction locates broken links or forecasts the probability of new links. The problem of Link prediction is an extremely well-researched issue and has uses across a wide range of fields, some of which can frequently be observed in recommendation algorithms, like new connections (suggested friends/followers) on social networks or associated merchandise on online store. A lot of algorithms have already been presented in context for solving the link prediction problem. We selected three real-world social networks and seven most widely used link prediction algorithms. To the best of our knowledge, we conduct a survey of these Link Prediction approaches that are currently in use and compare them in this work.

Published in: 2023 International Conference on Artificial Intelligence and Smart Communication (AISC)

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With the rise of social media, almost everyone might be familiar with the concept of a social network. A cluster of people and different associations amid them make up a Social network. The connections here, any social connection that establishes a bond between two individuals. The Social networks can be visualized as graphs, where a vertex corresponds to an individual in some group and the edges represents some sort of association between the corresponding individuals. The connections are typically brought about by internal to a group mutual interests.. It is possible for new edges and nodes to appear in the network, indicating new network interactions. Thus, these social networks are highly dynamic in nature [1].

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There has been an increase in interest in digitizing and preserving old books and papers in the last few years. The quick advancement of data innovation and the Internet' s quick spread has also contributed to the enormous volume of image and video data. The texts that are included in the image and video assist us in analyzing them and are also utilized for indexing, archiving, and retrieval. Different noises, such as Gaussian noise, salt and pepper noise, speckle noise, etc., can readily damage an image. Several image filtering algorithms, including the Gaussian filter, mean filter, median filter, etc., are employed to eliminate these various noises from images. This article analyses the impact of several pre-processing approaches, such as thresholding, morphology, and blurring procedures, to maximise text extraction strategies. The experiment's findings demonstrate that pre-processing approaches unquestionably improve the document's structural and visual quality.

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The Internet's development resulted in a significant increase in the database of photographs and videos. The majority of the pictures and videos are made up of a lot of text-based data. Additionally, there has been a rise in interest in digitizing and preserving old books and records recently. However, it is a laborious task to extract text from these real photos, scanned documents, or movies. During picture acquisition, processing, transmission, and reproduction, noise frequently results in image distortion [1–3]. One of the primary goals of image processing is to restore the original image after the noise has been removed. Even though many algorithms have been developed in the past, there is still room for improvement in text extraction from photos and videos. Word orientation, font size, varied backgrounds, poor quality, varying text colours, noise interference, etc. are the key obstacles to text extraction from complex degraded pictures. Therefore, pre-processing techniques are essential for improving the caliber of text extraction [4–6]. In this study, we examine how basic pre-processing techniques impact image quality and, consequently, text extraction.

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Micro-Electronics and Telecommunication Engineering pp 645–654

An Intelligent Framework for Movie Recommendation Through Online Social Media

Gaurav Agarwal, Shail Kumar Dinkar & Ajay Agarwal

Conference paper | First Online: 02 June 2023

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Abstract

The production, promotion, and distribution of content in the electronic media and entertainment sector must adapt to new strategies. The reason for this is that current customers can search for and access content on any device, at any time, from anywhere. The world has entered a media-rich information period due to the proliferation of online services and flexible innovations. An efficient recommender system always makes sure to record the users' actual preferences and only makes recommendations for items that the user genuinely wants. Recommender systems have been used for two decades to re
Altho
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I. Introduction

Twitter has developed into a crucial tool for real-time communication in emergency situations. People are more interested in programmatically monitoring Twitter because smartphones are so common that they can proclaim an event they see in real-time. Twitter data also offers several distinctive characteristics, including real-world discussions, uniform length, abundant variation, and a real-world data feed.

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Social Media and Networking Applications in the Education Sector

Publisher: IEEE

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Tanushree Sanwal ; Sapna Yadav ; Sandhya Avasthi ; Ayushi Prakash ; Meenakshi Tyagi All Authors

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Document Sections

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II. Introduction

III. The link between Facebook and Youtube videos

media and networking for social learning : a theory based aspect

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Abstract:

The use of social media is a budding phenomenon that is having a bigger impact on both personal and business life. Social networks are used as tools to facilitate human interaction. Use of social networking sites (SN) complements and improves instruction in conventional classroom settings. For instance, there is a tonne of material available on YouTube, Facebook, wikis, and blogs on a variety of subjects. This study explores the necessity to modify the conventional methods of instruction and learning in light of social media innovation. Discovering the details why higher education students in Delhi-NCR use social media, recognizing the effects of social networking tools on learning and education generally, analyzing the challenges that students may encounter when using social media, and deciding whether traditional learning methods need to change in the age of social media technologies are the main goals of this study. The research technique would involve filling up an online questionnaire by the students at various universities, colleges, and other higher education institutions in Delhi-NCR to reach the study's objectives and investigate the potential effects of social networking platforms on teaching and learning methods. Both quantifiable and qualitative data were gathered. This study is based mostly on the student's viewpoint, examining how using social networking platforms affects students and how it alters conventional teaching and learning methods. To support the use of social networks in higher education, this study underlines the advantages of using them as instruments for creating a new style of learning as well as the drawbacks that may harm the learning process.

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Conference Location: Rajpura, India

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Contents

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The goal of this investigation is not just to study the change from "traditional" learning based on "blackboard" and "teacher-centered pedagogics" to "electronic-centered learning." But this essay is mostly about how social media and networking sites like Facebook and YouTube can be used to help people learn and teach in the 21st century. Due to changes in the social, economic, and educational environments, it is important to keep looking for new ways to teach to meet the requirements of the next generation of pupils who are motivated and interested in technology. The study aims to find out what kinds of problems educators and students may have had when in contact with social media and networking sites to teach and learn.

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Alerts

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Abstract

Document Sections

I. Introduction

II. Related Works

III. Problem Statement

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Figures

References

Keywords

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Abstract:
Reading massive amounts of user-generated text and pulling out the relevant aspects and opinions is a complicated process. Summaries, on the other hand, help busy people who only have a little bit of time to read get the gist of the information quickly. Text summarization is the process of taking the original text and making a shorter version of it that still has all of its informational value and main idea. Humans have a hard time summarizing long texts by hand. Different ways to summarize a text can be put into groups based on the more general techniques of extractive and abstractive summarization. The research paper discusses the need for generating aspect-based summaries and Sentiment analysis. A framework is proposed based on extracting coherent aspects from the reviews and applying the extractive summarization method to generate summaries. In addition, providing insights into the reviews of tourist attractions by using aspect-based sentiment analysis. The results are evaluated using crowdsourcing, Fairsumm, and Centroid method. The crowdsourcing method gives the best result on aspect-based summaries.

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Contents

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India’s tourism industry is flourishing and has a big influence on the country’s economic growth. It entails taking tours, enticing visitors, giving them lodging, and offering them entertainment. An important factor in a country’s GDP is the hospitality and tourism sector, one of the fastest-growing in the world. Millions of tourists visit different parts of the world every year, and many of them post reviews or blogs about their experiences, whether they were good or bad, on various online platforms. The variety of viewpoints presented in this article will help current and potential tourists, as well as local service providers, make better decisions [1]. Manually reading through each review and pulling out the pertinent data, however, is a major hassle. Furthermore, readers may have varying levels of information needs, which is not taken into account by the most recent state-of-the-art multi-document summarization techniques [2], [3], [4]. A traveller will eventually use Google or other tourist information web pages like Tripadviser.com, Expedia.com, or MakeMyTrip.com when he visits several places and wants to learn more about each one. These tourist information systems not only provide details of hotels, and airfare but also provides information about cities through tourist reviews. It will be challenging for him to study all of these in-depth facts on their extensive voyages, but he will find several online sites, documents, lengthy descriptive articles, etc., on the issue.

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Figures

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Intelligent Optimization Algorithm based Data Storage and Management: An Empirical Study

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Abstract

Document Sections

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Authors

Figures

References

Keywords

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Abstract:

Due to developments in digital world, security is developed into an inseparable problem but transferring images. Visual Cryptography (VC) is a present cryptographic approach that is utilized to confidential images shared safely and also its data kept with utmost secrecy. A sender transfers the confidential image that is separated into shares and it holds hidden data. If share is arranged and stacked together, it is inclined to represent the confidential image data to receiver. Previous VC method, the confidentiality of shares could not be retained because all other fake shares are easily modified or inserted remain that continuing challenges. This article develops an Intelligent Optimization Algorithm Based Data Storage and Management (IOA-DSAM) technique. The IOA-DSAM technique intends to securely and effectively store the data. To attain this, the IOA-DSAM technique splits the images into different shares. Next, the shares are encrypted using Homomorphic Encryption (HE) technique where the key generation process takes place via modified fruitfly optimization (MFFO) algorithm. Upon reception, the decryption of shares is performed followed by share reconstruction process. To exhibit the performance of the IOA-DSAM system, a widespread experimental study is performed. The resultant outcomes demonstrate the improvement of the IOA-DSAM technique over other models.

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Contents

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In recent times, owing to massive progression in digital world make it difficult hard to maintain them in sequence to be secret [1]. The secret letter must be quiet in the storage space of senders and in transmission medium. Numerous systems like cryptography, Steganography are used for data security [2]. Visual cryptography, in sequence lastly altered to worthless scheme, so that the deceiver cannot attain them. Visual Cryptography technique for encoding user-defined text using various methods of shares [3]. It is planted on the converting subversive picture delivered by the disseminated to clients through communication media. The receiver can return the novel image by loading all comprehensible shares on one another [4]. The most significant article of visual Cryptography is, it recovered secret images excluding any computation [5].

Fig. 1 Contrast Enhancement Reading

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EFFECT OF ONLINE EDUCATION ON MENTAL & PHYSICAL HEALTH OF SCHOOL CHILDREN

[1]Dr. Mani Tyagi, [2]Akansha, [3]Akanksha Choudhary, [4]Akansha Sharma, [5]Akash Shukla, [6]Akash Verma & [7]Akrati

[1,2,3,4,5,6&7]KIET Group of Institutions, Delhi NCR, Ghaziabad

Abstract: The COVID 19 pandemic harmed the overall health of the School children all over the world which include their mental and physical health issues. This will have a negative impact on the student achievement and their performance on the studies. According to the findings, implementing online learning during the pandemic was problematic and difficult for both families and children.

The study's findings revealed that the COVID 19 pandemic caused stress, which increased the students' levels of anxiety and depression. Due to change in their daily routine, children become clinger, attention seeker, and completely depending on their parents. When the School will reopen all the children will resist to go for the offline classes. All the mentors and parents will face the difficulties once the school reopen, after the lockdown. They also face challenges in following instructions, comprehending the complexities of the pandemic situation, and carrying out their own work independently. All children of all ages and from all countries are affected. This is a global crisis, with long-term consequences for some children.

Keywords: *Effect on studies, Changes in the pattern of studies, Online Classes, Challenges*

IMPACT OF COVID19 ON E-BANKING IN Delhi-NCR

[1]Vishal Chaudhary, [2]Vishal Tyagi, [3]Yatendar Sharma & [4]Vishal

[1,2,3&4]KIET Group of Institutions, Delhi-NCR, Ghaziabad

Abstract: The way banks and the financial industry function may alter as a result of internet technology. The most effective illustration of a method that has already change financial market is the invention and manufacture of ATM, mobile applications to provide financial services to users. Its believed that one of the initial technologies used the ATM was to create e-banking.

IMPACT OF DIET ON MENTAL & PHYSICAL HEALTH OF THE TEENAGERS

[1]Dr. Mani Tyagi, [2]Akshit Aggarwal, [3]Akshita, [4]Alok Tyagi, [5]Aman Verma, [6]Amit Maurya & [7]Anvi Jain

[1,2,3,4,5,6&7]KIET Group of Institutions, Delhi NCR, Ghaziabad

Abstract: Every single child has a dietary requirement of balanced food so that they remain healthy and so that they can get the nutrients. Children's ability to eat depends on their growth. When PG students consume diet food which they remain active which is very important for them. They are consumed fibre and essential vitamins and minerals which are needed for growth and development. This study was done for the change of habit of under nutrition methods. For this study we are conducted descriptive method. A self-questionnaire was circulated as Google form to collect data**.** With the help of data, we know that 46 Participated around the age of 18-24 consumed the breakfast and take the meals in a day and consume the milk by the students according to my questionnaire and around the take a diet that conations all the vital nutrients by the body and aware of the daily nutritional requirement of the PG students which gives insight to understand the problem and their solutions. During the lock down people observe their own weak immune system that's why people bring changes in the dietary habits to strong a immune system. Therefore, it is a way to strong the immunity system which will help to prevent us and in fighting all types of virus.

Keywords: *Balanced Diet, Nutritional Requirements, Immune System*

ELECTRIC VEHICLES VS INTERNAL COMBUSTION ENGINE

[1]Shivani Agarwal, [2]Kshitij Dubey, [3]Lovepreet Singh, [4]Kuldeep Pal, [5]Mansi Singh, [6]Mansi Ratogi & [7]Monika Kumari

[1,2,3,4,5,6&7]KIET Group of Institutions, Delhi NCR, Ghaziabad

Abstract: Data shows, how electric vehicles could be beneficial for future for the entire world in concern with the environment, pocket friendly for individuals as well as for the Government. The data we collected throughout our entire research is the source of primary data which we collected from students, working professionals and drivers also with the help of Google form.

The question is in our survey is related to the infrastructure availability in metro city and rural region, tariffs, government schemes to promote EVs and durability of EVs while comparing to the IECs. In whole research we set out the 18 parameters to compare the EVs and ICEs some of which are Emission, gear system, maintenance cost etc.

Keywords: *Electric Vehicles, Internal Combustion Engine*

ICRMAT 2022
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Creating awareness and implementing Blooms Taxonomy in teaching pedagogy—with special reference to Higher Education

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Vijender Kumar Solanki
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Hyderabad, India, IEEE Senior Member
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***Abstract*—The main objective of this study is to design a questionnaire which helps to measure the constructive alignment of Blooms taxonomy as per the six level of cognition. To achieve the objective, questionnaire was designed. This questionnaire will be helpful in ascertaining the present level of respondent as per the blooms taxonomy so that corrective actions could be taken to optimize learning outcomes. In Indian higher education, especially in Tier 2 and Tier 3 colleges are more heavily biased towards lower order thinking skills. With this questionnaire, current standing of the respondent can be measured and progression to higher order thinking skills can be facilitated at the end of the trainer/educator, hence bridging the gap between academia and industry.**

***Index Terms*—Blooms taxonomy, Higher Education, Learning, Constructive Alignment.**

I. Introduction

The future of any individual, society and country is solely depends on the level of education. The level of education does not mean to have higher and higher degrees but in current scenario, the actual meaning of education is to "know how to apply the existing knowledge to solve and create an innovative solution".

As learning progresses it becomes more complex. A mere understanding of any concept becomes increasingly insufficient with the progression in learning complexity. Several models have been proposed to measure the level of cognition of the learner. One such widely accepted and acclaimed model is Blooms Taxonomy.

Although named after Bloom, the taxonomy is based on series of conferences from 1949-53 which were designed to improve existing curricula. It has three domains namely: Cognitive, Affective and Psycho motor which is shown in figure 1.

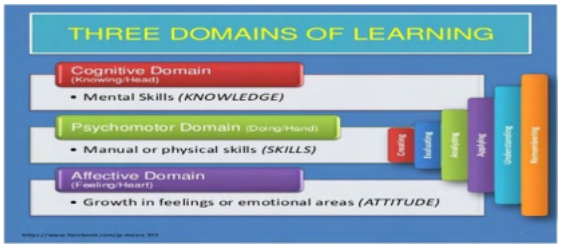


Figure 1: Three Domains of Learning

II. Need of Study

The present Proposal is based on the most widely used domain, i.e. the cognitive domain. The main reason behind the choice is, at the level of higher education, a student predominately uses this domain. There is no doubt that Bloom's Taxonomy of Educational Objectives for the cognitive domain [3] has had a considerable impact on educational thought and practice all over the world [5]. The original taxonomy is a six-level classification system that uses observed student behavior to infer the level of cognitive achievement. These are: Knowledge, Comprehension, Application, Analysis, Synthesis, and Evaluation were shown in Figure 2.



Figure 2: Six Levels of Cognitive Domains

A. Research Motive

These six levels can be categorized into two thinking orders according to the cognitive thinking required at each level. These two thinking orders are Lower Order Thinking Skills (LOTS) and Higher Order Thinking Skills (HOTS) which is represented in Figure 3.



Figure 3: Lower Order Thinking Skills (LOTS) and Higher Order Thinking Skills (HOTS)

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The affective domain is generally shaped during the formative years of the life of the student and family and early schooling has a major impact on expression of this domain.

Psycho motor domain caters to hand-eye coordination and hands on training. Higher education is more inclined towards classroom learning and control experiments rather than giving hands on experiences. So, as far as the scope of the present proposal goes, we are limiting ourselves to only **cognitive domain**.

B. *Research Gaps*

Research study [6] mentioned that huge gap has existed in education system. Moreover, the level of understanding, knowing and creating new solutions in the minds of students is also missing [7] which can be fulfilled with the help of blooms taxanomy.

III. Methods

A. *Sample*

The current study works on measuring the level of awareness of implementing blooms taxonomy in teaching pedagogy in higher education. Data were collected through a questionnaire designed by the investigators and pilot testing was done to validate the questionnaire designed after extensive literature review. The items of questionnaire were generated based on guiding theoretical principles that each level of bloom taxonomy. The study was conducted on a sample of 190 educators (21 Professors, 39 Associate Professors, 130 Assistant Professors responded) working in different academic organizations in NCR region, India. Convenient purposive sampling procedures were used to collect data from educators/trainers. The questionnaire also sought personal information such as name, age, gender, educational qualification, occupation, marital status, designation, and work experience. Descriptive statistics of the demographic variables (gender and marital status, educational qualification, and work experience) were shown in Table 1.

Demographic n = 190		**No. of respondents**	**Percentage (%)**
Age (in years)	Young (27-37)	120	63.15
	Middle age (38-47)	50	26.31
	Old Age(48-57)	20	10.52
Gender	Male	90	47.36
	Female	100	52.64
Education	Post-Graduation	107	56.31
	PhD	83	43.69
Designation	Assistant Professor	130	68.42
	Associate Professor	39	20.53
	Professor	21	11.05

B. *Objectives and Relevance of the Study*

The main objective of this study is to design a questionnaire which helps to measure the constructive alignment of Blooms taxonomy as per the six level of cognition. To achieve the objective, questionnaire was designed. This questionnaire will be helpful in ascertaining the present level of respondent as per the blooms taxonomy so that corrective actions could be taken to optimize learning outcomes. In Indian higher education, especially in Tier 2 and Tier 3 colleges are more heavily biased towards lower order thinking skills. With this questionnaire, current standing of the respondent can be measured and progression to higher order thinking skills can be facilitated at the end of the trainer/educator, hence bridging the gap between academia and industry.

IV. Discussion

The findings of the data were represented in the form of bar graph and pie charts for easily understanding to the large number of audiences. To check the awareness of blooms taxonomy in higher education, question was asked that "Are you aware of educational learning objective models called Bloom's Taxonomy?". The **first finding** of the result was shown in figure 4. A majority of 73.8% (140) respondents confirm that they are aware of educational learning objective models called Bloom's Taxonomy and the remaining 26.2% (50) respondents do not know (not aware) about educational learning objective models called Bloom's Taxonomy.

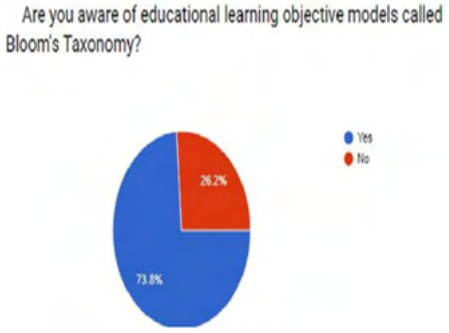


Figure 4: Awareness about Bloom's Taxonomy

Second finding represented in figure 5. Out of 140 respondents, 52.8% have applied it in their classroom teaching methodology and the remaining 47.2% have not yet applied in their classroom teaching methodology

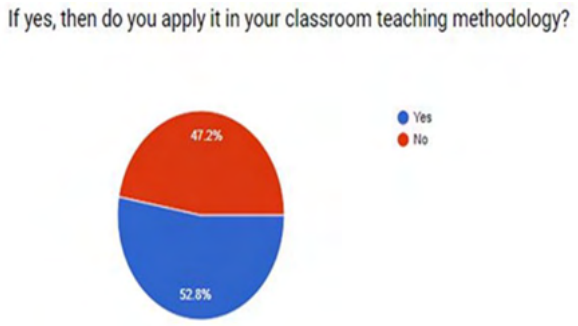


Figure 5: Classroom teaching methodology



Figure 6: Applied taxonomy model in their lassroom teaching if appropriate training would be given

Third finding represented in figure 6. Out of 190 respondents, 68.6 % respondents can incorporate the taxonomy model in their classroom teaching if appropriate training would be given. 30.2% respondents mentioned that they may incorporate the taxonomy model in their classroom teaching if appropriate training would be given. For a surprise of the researchers, 1.2% (2) respondents were not able to incorporate the taxonomy model in their classroom teaching if appropriate training would be given.

Fourth finding represented in figure 7. Out of 190 respondents, 73.7 % respondents can incorporate any innovative teaching methodology in the classroom. 26.3% respondents cannot incorporate any innovative teaching methodology in the classroom.

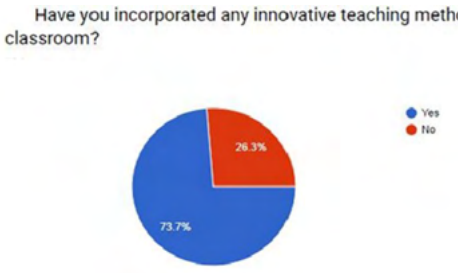


Figure 7. Able to incorporate any innovative teaching methodology in the classroom

Fifth finding represented in figure 8. Out of 190 respondents, 52.6% (102) respondents using most of the techniques in the classroom viz, giving notes to students, using charts/models/diagrams to teach concepts or theories, video lectures, animations. 35.6% (69) respondents using all the techniques in the classroom viz, giving notes to students, using charts/models/diagrams to teach concepts or theories, video lectures, animations. 11.3% (22) respondents using some of the techniques in some time in the classroom viz, giving notes to students, using charts/models/diagrams to teach concepts or theories, video lectures, animations. 0.5% (1) respondents using all or some of these techniques very rarely in the classroom viz, giving notes to students, using charts/models/diagrams to teach concepts or theories, video lectures, animations.

Sixth finding represented in figure 9. Out of 190 respondents, 51% (99) respondents using most of the techniques in the classroom viz, Quiz, conceptual assignments, asking students questions based on the concept taught in the previous class, reinforcement by reiteration in the next class. 41.2% (80) respondents using all the techniques in the classroom viz, Quiz, conceptual assignments, asking students questions

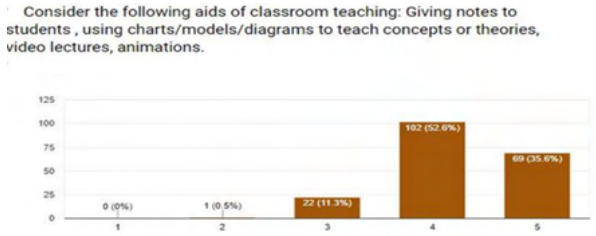


Figure 8: Cognition Level 1- Remembering

based on the concept taught in the previous class, reinforcement by reiteration in the next class. 7.2% (14) respondents using some of the techniques in some time in the classroom viz, Quiz, conceptual assignments, asking students questions based on the concept taught in the previous class, reinforcement by reiteration in the next class. 0.5% (1) respondents using all or some of these techniques very rarely in the classroom viz, Quiz, conceptual assignments, asking students questions based on the concept taught in the previous class, reinforcement by reiteration in the next class.

Seventh finding represented in figure 10. Out of 190 respondents, 55.2% (107) respondents using most of the techniques in the classroom viz, Presentations by students, simulation exercises, creation of working models by students, giving problems of varying difficulty level to students for solving, explaining practical applications of theoretical concepts. 11.9% (23) respondents using all the techniques in the classroom viz, Presentations by students, simulation exercises, creation of working models by students, giving problems of varying difficulty level to students for solving, explaining practical applications of theoretical concepts. 28.9% (56) respondents using some of the techniques in some time in the classroom viz, Presentations by students, simulation exercises, creation of working models by students, giving problems of varying difficulty level to students for solving, explaining practical applications of theoretical concepts. 4.1% (8) respondents using all or some of these techniques very rarely in the classroom viz, Presentations by students, simulation exercises, creation of working models by students, giving problems of varying difficulty level to students for solving, explaining practical applications of theoretical concepts.

Eighth finding represented in figure 11. Out of 190 respondents, 45.9% (89) respondents using most of the techniques in the classroom viz, Comparative analysis, debugging, giving proofs and evidences to prove a theory/concept, discussions, role plays. 24.2% (47) respondents using all the

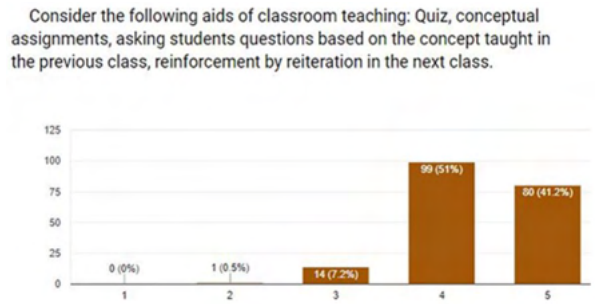


Figure 9: Cognition Level 2- Understanding

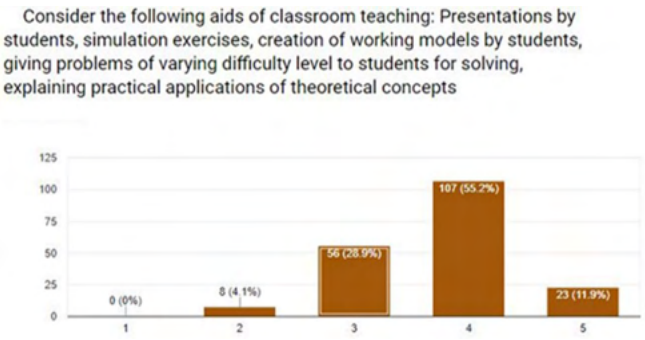


Figure 10: Cognition Level 3- Applying

techniques in the classroom viz, Comparative analysis, debugging, giving proofs and evidences to prove a theory/concept, discussions, role plays. 24.7% (48) respondents using some of the techniques in some time in the classroom viz, Comparative analysis, debugging, giving proofs and evidences to prove a theory/concept, discussions, role plays. 4.6% (9) respondents using all or some of these techniques very rarely in the classroom viz, Comparative analysis, debugging, giving proofs and evidences to prove a theory/concept, discussions, role plays. 0.5% (1) respondents do not use any of the above techniques in the classroom viz, Comparative analysis, debugging, giving proofs and evidences to prove a theory/concept, discussions, role plays.

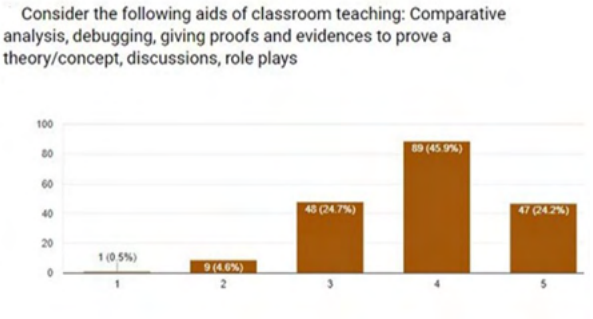


Figure 11: Cognition Level 4- Analyzing

Ninth finding represented in figure 12. Out of 190 respondents, 39.2% (76) respondents using most of the techniques in the classroom viz, Encouraging students to ask challenging questions which are related not only to subject but also to larger context of human values and professional ethics, encouraging students to think out of the box for problem solving, encouraging student to go beyond syllabus and study new developments in the subject. 41.2% (80) respondents using all the techniques in the classroom viz, Encouraging students to ask challenging questions which are related not only to subject but also to larger context of human values and professional ethics, encouraging students to think out of the box for problem solving, encouraging student to go beyond syllabus and study new developments in the subject. 18% (35) respondents using some of the techniques in some time in the classroom viz, Encouraging students to ask challenging questions which are related not only to subject but also to larger context of human values and professional ethics, encouraging students to think out of the box for problem solving, encouraging student to go beyond syllabus and study new developments in the subject. 1% (2) respondents

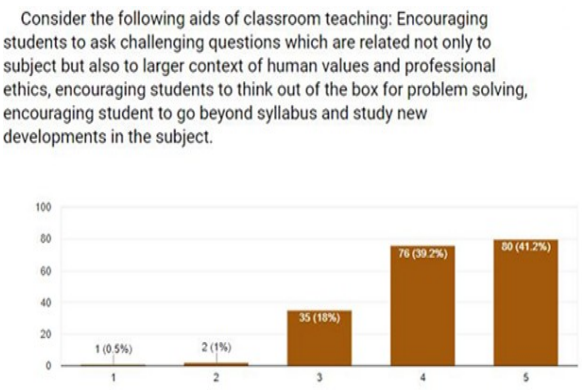


Figure 12: Cognition Level 5- Evaluating

using all or some of these techniques very rarely in the classroom viz, Encouraging students to ask challenging questions which are related not only to subject but also to larger context of human values and professional ethics, encouraging students to think out of the box for problem solving, encouraging student to go beyond syllabus and study new developments in the subject. 0.5% (1) respondents don't use any of the above techniques in the classroom viz, Encouraging students to ask challenging questions which are related not only to subject but also to larger context of human values and professional ethics, encouraging students to think out of the box for problem solving, encouraging student to go beyond syllabus and study new developments in the subject.

Ninth finding represented in figure 13. Out of 190 respondents, 43% (83) respondents using most of the techniques in the classroom viz, give assignment/projects to students which promote learning by doing, encourage students to take up unique/novel projects. 39.2% (76) respondents using all the techniques in the classroom viz, give assignment/projects to students which promote learning by doing, encourage students to take up unique/novel projects. 18% (35) respondents using some of the techniques in some time in the classroom viz, give assignment/projects to students which promote learning by doing, encourage students to take up unique/novel projects. 1% (2) respondents using all or some of these techniques very rarely in the classroom viz, give assignment/projects to students which promote learning by doing, encourage students to take up unique/novel projects. 0.5% (1) respondents don't use any of the above techniques in the classroom viz, give assignment/

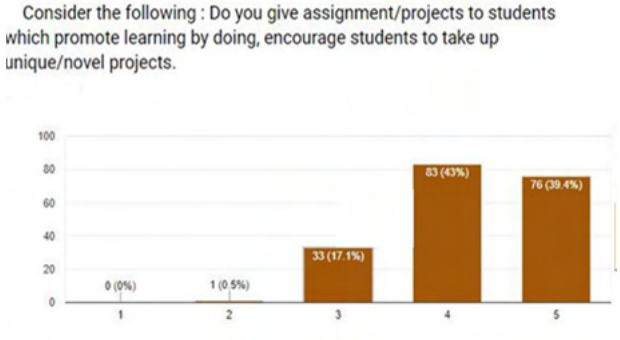


Figure 13: Cognition Level 6- Creating

projects to students which promote learning by doing, encourage students to take up unique/novel projects.

V. Conclusion

The present study reports that majority of faculty members made extensive use of LOTS techniques. An average of 77.6% faculty members used at least one of the HOTS techniques in their classroom. 73.8% faculty members mentioned that they are aware of Bloom's Taxonomy. Surprisingly, only 52.8% admitted to making its use in classroom teaching, **indicating a state of being unconsciously unaware**. These ~42% faculty members do not know that they do not know the concept of Bloom's Taxonomy. The **unconsciously unaware** state can be rectified with proper training and workshops. So, the academicians are suggested to incorporate the blooms taxonomy model in their classroom teachings for the better results and learning among students.

VI. Recommendation and Implications

To make sure that students in management and education can apply what they learn, teachers are recommended to implement the following:

• Provide opportunities for the student to use ideas, theories, or problem-solving techniques and apply them to new situations.

• Review the student's work to ensure that he/she is using problem-solving techniques independently.

• Provide questions that require the student to define and solve problems.

• Ensure that assignments given cater to HOTS

• Question papers should be an optimum mix of LOTS and HOTS.

• An ongoing project/assignment/group task that gradually increases in complexity can be implemented

• This mix should gradually move towards achieving higher ratio of HOTS questions during the semester

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A study on social media usage and fear of missing out (FOMO) among youngsters

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Abstract
The rapid growth of social media platform has led to evolve communal distress regarding the way in teenagers and young adults have engaged themselves in the verge of destruction. To understand there rise in population getting engage in social media the social psychologist answers this problem with an affair called fear of missing out popularly known as FOMO. FOMO is an example of social psychological process which has been associated with excessive usage of social media platform. The present study is an attempt to highlight the understanding of social media usage and FOMO among youngsters (adolescents and young adults) a comparative analysis was attempted on social media usage and FOMO among youngsters. This was accomplished by finding the difference between youngsters on usage of social media and level of FOMO. Data was collected from 100 participants 50 of them were adolescents and other 50 were young adults. Quantitative method was used during the process of data collection and was analyzed using t-test method. The findings of this analysis determined the degree of FOMO and social media addiction among youngsters. The study also revealed that there is significant difference between youngsters on social media usage as well as on FOMO.

Keywords: social media addiction, adolescents, young adults, social media usage, youngsters and FOMO

Introduction

Any sought of Compulsive behavior is usually termed as 'addiction' which has its adverse effect on our physiological, psychological, emotional and social health. Usually, in the state of addiction person feel necessary to attempt any task or activity frequently without thinking about its harmful consequences which sooner or later disturbs our other important activities of life. For instance, relationships, studies, work and so on. In that context social media addict could be referred as an individual who excessively and compulsively uses any social media platform to an extent where that person gets aloof from the real world and this leads to ample amount of issues in his/her life. Moreover, it becomes difficult to diagnose that when a fondness for an activity turns into addiction for the same.

With this come some major drawbacks of social media for the society (Ahmad, 2016) cyber bullying or cybercrimes, hacking, addiction, fraud and scams, security issues, reputation, cheating and relationship issues, health issues, social media cause dying and glamourizing drugs and alcohol. However, Ahmad et al, (2016) also discusses the merits of using social media as it brings connectivity, promotes education, helps in information and updates, helps in promotion of noble cause, spreads awareness to public and assist government agencies to fight against crime and provide assistance in building communities.

Pros and cons of using internet also describe Internet addiction disorder, which means, if you are continuously and excessively playing games on internet, if you are compulsively shopping online, cannot resist from checking notifications from Facebook, Instagram or Whatsapp, and if your daily habit of excessively sitting in front of computer screen is deteriorating your health, relationships, work and studies. If any of the above-mentioned things are hampering with you then it's an indication that you might be undergoing through this addiction. FOMO is a psychological phenomenon (Classen, 2018) with a pristine mental health syndrome with a refreshing acronym 'FOMO'.

FOMO doesn't simply relate to a casual night party or that next hot igniter date. In economic science, and call theory, the scientific discipline behind FOMO is partly explained by loss aversion. FOMO can be described as when an individual feel augmented anxious or stressed from missing out on social events or not having been invited to attend within the 1st place. FOMO feelings are sometimes reinforced for frequent guests of social networking sites like Facebook, Instagram, Whatsapp, tinder, snapchat so on and so forth. Every time users see a continuous stream of pictures, video clips and reviews about celebrations, events, occasions, functions or alternative life activities in which due to some reasons they couldn't attend or were not asking to join.

As per the twenty first century FOMO frequently demonstrates, that both the young and mature adults have poor emotions stability and depression from FOMO and this may be amplified whilst the consistent and busy networks of social media content which displays a lot of people having (or look like keeping) interesting reviews or accomplishing milepost deeds, particularly if the individual seeing them feels not able to maintain up or grapple with their peers. In one article it was suggested that, FOMO has esteemed so gracefully that a few intellectual or mental health specialists have label it a deadly disease among teenagers and an endemic mental health syndrome for all age group. Blum (2016) gave confirmed evidence that the teens that cared too much about social media had low self-esteem, low sleep quality or even melancholy or depression.

McMullen (2012) claims that today's young generation has been marked as a "virtual generation" and "digital native" because they start using computers and internet since their childhood.

In another study, Reyes (2018) explored the bond between "FOMO and SMU and problematic internet usage among Filipinos. Overall one thousand and sixty Filipinos did an experiment composed of three tests for measuring FOMO scale, Social Networking Time Use Scale (SONTUS), and Internet Addiction Test (IAT) and result showed that social media usage and problematic internet usage both are particularly related to FOMO, and it is capable to previse both social media and problematic Internet abuse."

Jelenchick et.al., (2016) described FOMO & Social media use as "utilization of Internet is unsecure, imprudent, or hasty in the living world that escort to unfavorable life outcomes, mainly tangible, psychologically, civil or practical disability". However, Bozoglan et.al., (2013) found in one of their tests that solitude is the most significant fluid related with unrestricted usage of the Internet. On the other hand,
(Przybylski et.al., 2013) identified FOMO as a phenomenal mediating network in individual's social media and Internet usage. They theorized it as a "Prevalent understanding that people might be having satisfying experiences from which one is missing".

Kim (2013) gave an account of the one point six three percent million Korean youngsters, seventeen-point nine percent constitute those with smartphone craving explained that a few observers could be peculiar with the concept of "internet addiction" or "smartphone addiction". A study done by Ahn in year 2007 (Ahn, 2007) found that, there are 24% of children analyzed with internet craving were debilitated. To find the association between personality traits and technological addiction, if any, Hussain & Pontes (Hussain & Pontes, 2018) identified that "more the usage of technology addiction to technology will lead to explicit personality trait disorders, and characteristics as it is psychologically correlated with personality disorders".

The differences in person, each FOMO and PIU (problematic internet usage) have pessimistic impact on personalized welfare (Stead & Bibby, 2017). The Problematic Internet utilization (PIU) also referred as Internet addiction (IA) is termed as the delinquent utilization of the Internet, which is a cause to consequential psychosocial and functional wreckage and this pattern of avail is unaccounted for by a primary psychiatric disorder such as mania or psychological effect of a substance (Liu & Potenza, 2007).

FOMO is a socio-psychological syndrome which is at a great deal of vulnerability for Internet utilization and may lead to internet dependency (Naren et.al.,2016). FOMO according to Salimet.al., (2017) suggested that "FOMO is a consequential factor in effecting the self-introspection and self-regard of Instagram users." Abel et.al., (2016) argued that nowadays in society the usage of social media has become increasingly popular, the want to apprehend the connection between FOMO and social media usage continues.

Giagkou et.al., in year 2018 (Giagkou et.al., 2018) examined the tactics individuals apply to integrate friends or connection on Facebook and if their culls and drives change over period. In the year 2011-2012, data was accumulated from seven European countries, sanctioned to estimate that about 12.7% puerile Internet users are relegated as having symptoms of Internet addiction (Tsitsika et.al., 2014). FOMO shows incipient mechanisms of information exchange processes among teens or adolescents (Chotpitayasunondh & Douglas, 2016). "the social selection hypothesis suggests that problems related to low emotional stability negatively affect individuals' social media usage or factors associated with one's social media status, including stressful life events" (Hurst, 2007).

The most highly ranked preferences for smartphone-predicated applications were communication, social media, and information (Csibi et.al.,2017). The students with different personality and individual characteristics showed different calibers of addiction to Instagram." (Kircaburun & Griffiths, 2018).It was evident that 4 in 10 adults reported that they have experienced FOMO sometimes or often at some point of time in their life (Thompson, 2012).

The current study has a great significance as it will fill the gap of knowledge about any association between 'fears of missing out' and 'social media usage' and what impact does they have on adolescence and young adults which was not found in many other related studies. The findings may benefit the educators, parents, peers, students and to the public; to the educators: the study is of relevant use as it will aid them to understand the sensitivity of this topic to motivate their scholars to an extent that they won't suffer from its adverse consequences in later life.

To the parents & peers the study is significant because this study will provide them with the insight on how much time and energy, they really need to devote on social media usage and if exceeded can lead to the severe consequences of FOMO. To the students this study is equally beneficial as it will suggest the facts and figures that can impact their mental, emotional, social and physical health. In addition to the public in general it is profitable for them as it will reinforce them to have adequate knowledge and expertise about social media addiction and FOMO which will make them insightful of making the youth aware of emerging issues, so that awareness is not only limited to a city, state or nation but globally.

Research objectives

This study aims at investigating the impact of (SMU) social media usage and Fear of missing out (FOMO) among youngsters. In view of this, the objectives to achieve the above-mentioned aim are to assess the:

1. difference among youngsters (adolescents & young adults) in relation to the usage of social media and FOMO.
2. effect of social media usage among adolescents.
3. effect of social media usage among young adults.
4. effect of FOMO among adolescents.
5. effect of FOMO among young adults.

Hypotheses

Following are the hypothesis of this study:
H01: There will be a significant level of difference between youngsters on FOMO.
H02: There will be a significant level of difference between youngsters on usage of social media.

Methodology

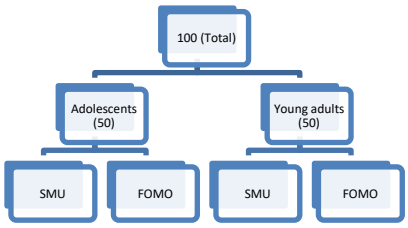
Anything that has some quantity or quality which varies is known as a variable. In research experiment we have two variables namely 'Dependent variable' and 'Independent variable'. Dependent variable is

the one of those variables which gets tested and measured in any empirical study or scientific experiment. Independent variable is the variable that is changed or controlled in a scientific experiment to test the effects on the dependent variable. In the current study the three variables we have taken are: Social media, FOMO, and age group. Out of which the 2 Dependent variables are: FOMO (FOMO) and Social media usage. And the Independent variable is: age group of youngsters (age of adolescents and age of young adults.)

Independent Variable includes Age group adolescents (13 to 17 years) and young adults (18 to early 25 years) whereas the Dependent Variables are FOMO (FOMO) and Social Media Usage (SMU).

Research Design

To fulfil the objective of the study following design was used:



The above design was made to study the independent variable i.e. age group (i) adolescents (ii) young adults upon dependent variables i.e. (i) social media usage (SMU) and (ii) FOMO (FOMO). A total sample of 100 students from different period of age groups was taken such that 50 students of age group (13 to 17 years) and 50 students of age group (18 to 25 years). To study the difference in social media usage and FOMO on adolescents of age group (13 to 17 years) was taken in a sample of 50 school going students. To study the difference in social media usage and FOMO on young adults of age group (18 to 25 years) was taken in a sample of 50 college going students.

Sample

The sample of the study consisted of 100 people out of which 50 were adolescents or school going students and 50 were young adults or college going students which were collected for data collection. Adolescents were between the age range of 13-17 years and one phase of the study was conducted at school level on IX to XII standard students of Raja Ram Mohan Roy Academy school. Young adults were between the age range of 18-25 years and the other phase of the study was conducted at undergraduate and postgraduate level in Deemed to be University of Graphic Era. Both male and female subjects were selected through purposive sampling technique. All the participants were assisted using FOMO tool developed by Przybylski et.al., (2013) and social media usage was identified using two open ended questions which were i) Everyday time spent via web-based networking media locales (in hours) and ii) Day by day recurrence of visiting internet based life profiles (no of times). All the participants were from Dehradun, Uttarakhand, India.

Data Collection Tools

The following tools were used:

1. FOMO developed by Przybylski et.al., in year 2013 (Przybylski et.al., 2013).
2. Social Media Usage; two questions were used. The questions were as follows; i) Everyday time spent via web-based networking media locales (in hours) and ii) Day by day recurrence of visiting internet-based life profiles (no of times).

Description of the Tool

For this study tool used is FOMO scale: FOMOs Which has been developed by Przybylski et.al., (2013). This tool has 10 items, and they were scored on five-point Likert scale ranging from '(5) extremely true of me' to '(1) Not at all true of me'. Basic information of the participants such as name, age, gender, education qualification was asked to be filled in the FOMO questionnaire instructions were given to the participants in detail before making them fill the questionnaires. Individual raw scores were calculated

by averaging the participants responses of all ten items and reliability was found to be α=0.87 to 0.90. From the raw scores the degree of FOMO was interpreted. Further, 2 questions of social media usage were also added to identify the level of social media addiction among youngsters. The questions were as follows; i) Everyday time spent via web-based networking media locales (in hours) and ii) Day by day recurrence of visiting internet-based life profiles (times). At last strict care was taken while maintaining the confidentiality clause of all the participant responses.

Procedure

The nature of the current study is quantitative explanation and narration of the given data while focusing on the impact of social media usage and FOMO among youngsters. The study was therefore conducted at both school and university level. School selected was Raja Ram Mohan Roy Academy whereas university selected was Graphic Era Deemed to be University in Dehradun, Uttarakhand, India. The sample of the study consisted of 100 people out of which 50 were adolescents or school going students and 50 were young adults or college going students which were selected for data collection. Adolescents were between the age range of 13-17 years and one phase of the study was conducted at school level on IX to XII standard students of Raja Ram Mohan Roy Academy school.

Young adults were between the age range of 18-25 years and the other phase of the study was conducted at undergraduate and postgraduate level in Deemed to be University of Graphic Era. Both male and female subjects were selected through purposive sampling technique.

All the participants were selected using FOMO tool developed by Przybylski et.al., in the year 2013 (Przybylski et.al., 2013)., and social media usage was identified using two questions which were i) Everyday time spent via web-based networking media locales (in hours) and ii) Day by day recurrence of visiting internet based life profiles (times).

Few questions were also asked from the participants such as "Are you on more than two social networking sites?" on which they replied Yes, "Usually you use social media for professional, educational or business purpose?" on which more than 90% of the participants answered as No, "Which one is more satisfying either playing games online like PubG or preferring to play outdoor games?", More than 85% of the participants from both the age period answered that they spent hours and hours on playing games online like PubG, CS go, Freefire, clash of clans so on which they prefer more over any other outdoor game.

Data Analysis

Statistical techniques were employed to organize and interpret data. Mean, SDs & t-test were utilized to analyze the data obtained statistical values are presented in tables and graphs.

Results

The current study was an attempt to know about the effect of social media usage and FOMO among youngsters. A sample of 100 respondents was selected residing in Dehradun city. On this typical sample, a survey was carried out to find out the degree of FOMO and social media addiction faced by youngsters. Questionnaire and interview plan were used to collect data for the study. It comprised of 10 close ended questions related to FOMOs and 2 questions related to social media usage, few general questions related to both the variables were also asked for the interview schedule.

Age-wise distribution

The sample for the study was divided into two categories according to their age group. Table - 1 shows the percentage distribution for the same.

Table 1

Distribution of Sample according to their age.

Age (years)	n	%
Adolescents 13-17	50	100%
Young Adults 18-25	50	100%

The results obtained were put through statistical analysis and are presented below. For the better understanding the results were divided and presented under following two heads.

1. FOMO
2. Social Media usage

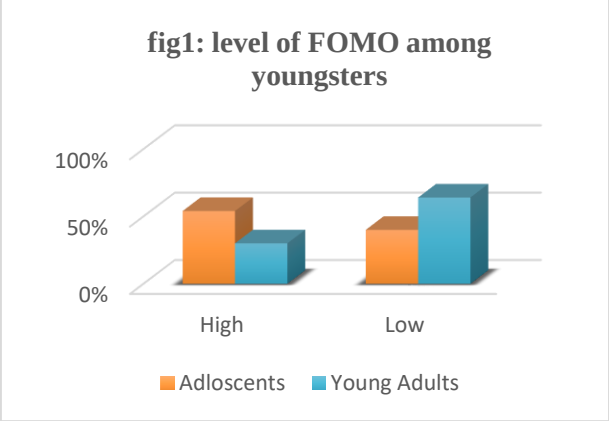
FOMO

Table 2

Level of FOMO among youngsters

Age Group	High level	Low level
Adolescents	54%	40%
Young Adults	30%	64%

Table no. 2 depicts the level of FOMO in both the sample groups. 54% of adolescents were found to experience high level of FOMO. 40% of adolescents were found to experience low level of FOMO. While 30% of young adults were found to experience high-level of FOMO whereas 64% of adolescents experienced low level of FOMO. Therefore, it was proved that there is high level of FOMO among adolescents as compare to young adults.



The fig 1 shows the results of FOMO which depict the sample of adolescents were found to have high degree of FOMO as compare to young adults. Possibly it could be due to the age period they are going through. The adolescence phase is quite challenging for the teenagers in terms of physical, mental, emotional and social health. Adolescents are immature to understand that if not being invited or not being present at any event or activity doesn't bother if you're happy in living in present. Failing to understand this aspect of life make them feel the FOMO more than young adults. For the first section, quantitative data was collected via FOMOs questionnaires consisting of ten items. The information collected in this section was scored and was further put to a statistical analysis of t-test. The results obtained are presented here in the form of table number 3.

Table 3

Mean, SD and t-value on the level of FOMO among youngsters

Groups	N	M	S.D.	S. ED	df	t
Adolescents	50	M_1= 3.33	SD_1= 0.97	0.0172	98	p<01
Young Adults	50	M_2= 2.54	SD_2= 0.70			p<05

Both the adolescents and young adult participants were equal in number i.e. 50, the total sample size selected for this study was therefore 100. M_1 =3.33 i.e. the mean of adolescent scores, M_2= 2.54 i.e. the of young adults scores. Standard deviation came out to be S. D_1=0.97, & S. D_2= 0.70 similarly standard error was to be S. ED=0.0172. Degree of freedom was equal to 98. At last t test was put and value of t came out to be 6.79. this value of "t" was found to be significant at both the level. From the results it was also found that adolescents scored high on FOMOs as compare to young adults. It can be clearly mapped from the table no. 2 mean scores of both the groups. Adolescents sample obtained a mean of 3.33 while young adults sample obtained a mean of 2.54. Therefore, a significant difference was found among youngsters on FOMO scale.

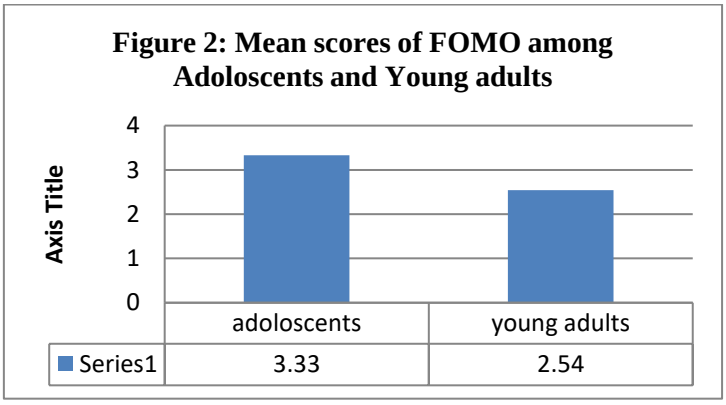


Fig no. 2 shows the difference in the mean scores on the level of FOMO among youngsters scores. Adolescents obtained a mean score of 3.33 and young adults obtained mean score of 2.54 on FOMO. Indicating that the adolescents scored high on the level of FOMO as compare to young adults.

Social Media Usage

For a detailed result of youngsters on social media usage table no. 4, was created the raw scores were converted into percentage form to get a clear picture of participants responses on everyday time spent via web-based networking media locales (in hours) and Day by day recurrence of visiting internet based life profiles (in times).

Table 4

Responses of the target group

Everyday time spent via web-based networking media locales (hours)	1-3hrs	4-6hrs	7hrs & more	Day by day recurrence of visiting internet based life profiles (in times).	1-3times	6-10times	11-20times
Adolescents (%)	32%	34%	34%	Adolescents (%)	26%	16%	58%
Young adults (%)	32%	60%	8%	Young adults (%)	36%	36%	28%

From table no.4, it was found that *everyday time spent via web-based networking media locales (in hours)*was different for adolescents from that of young adults. 32% adolescents spent daily 1-3hrs, 34% of them spent 4-6hrs and, again 34% of them spent 7hrs and more on social media sites on daily basis. Whereas 32% of the young adult participants responded the same for 1-3hrs, 60% for 4-6hrs and only 8% of them said that they spent more than 7hrs of their time on social media sites on daily basis. On

responding for the question *day by day recurrence of visiting internet based life profiles (in times)*; adolescents responded that 26% of them visit social media profiles for 3-5times per day, 16% for 6-10times and, 58% of them visit social media profiles for 11-20times a day. While young adult percentage differed from that of adolescents in terms of daily frequency of visiting social media profiles. As 36% of them responded that they visit their social media sites 3-5times a day, again 36% of them responded the same for 6-10times a day and, only 28% responded that they visit social media profiles 11-20times a day. This shows that adolescents are more dependent or addicted towards social media usage.

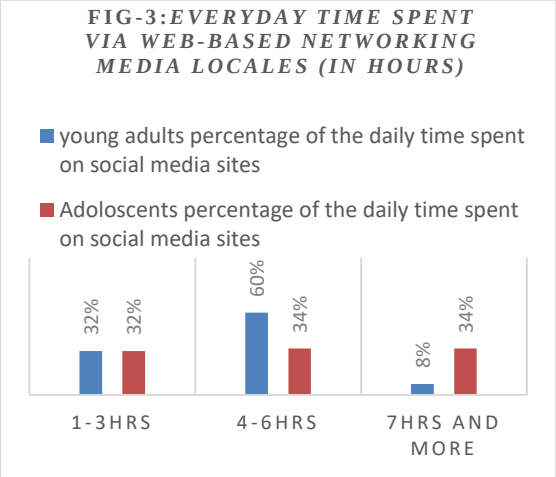


FIG-3:*EVERYDAY TIME SPENT VIA WEB-BASED NETWORKING MEDIA LOCALES (IN HOURS)*

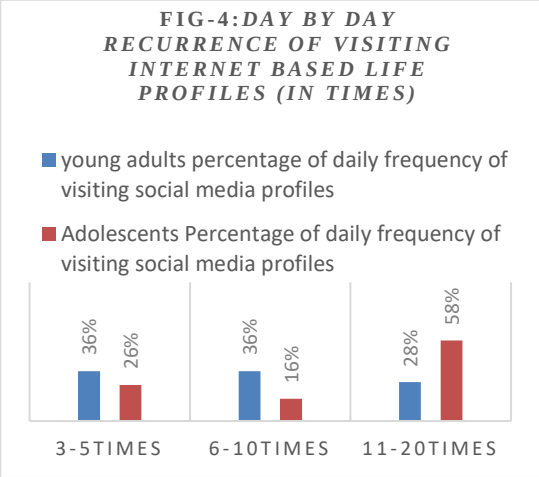


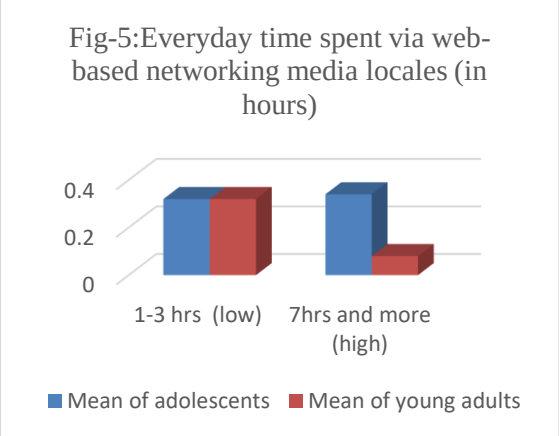
FIG-4:*DAY BY DAY RECURRENCE OF VISITING INTERNET BASED LIFE PROFILES (IN TIMES)*

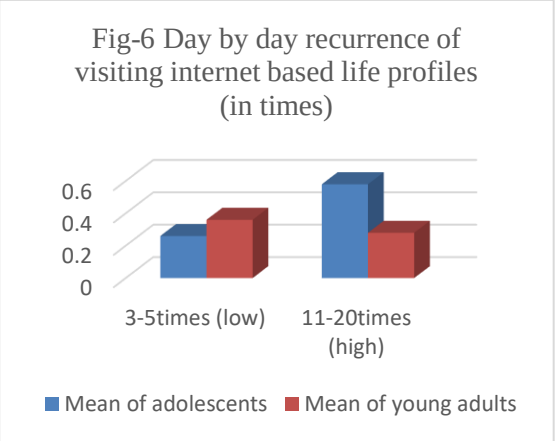
Table 5

Levels of Social Media Usage mean scores for youngsters

Everyday time spent via web-based networking media locales (in hours)	1-3hrs (Low)	7hrs and more (High)	Day by day recurrence of visiting internet based life profiles (in times)	3-5times (Low)	11-20times (High)
Mean of adolescents	0.32	0.34	Mean of adolescents	0.26	0.58
Mean of young adults	0.32	0.08	Mean of young adults	0.36	0.28

Mean scores were also obtained for the same group of participants in the form levels of social media usage as presented in table no.5.





The results for everyday time spent via web-based networking media locales (in hours) range i.e. 1-3 hours stating low degree of level to 7 hours and more stating high degree of level. For day by day recurrence of visiting internet-based life profiles (in times) ranging from 3-5 times depicting low level to 11-20times depicting high level. This shows that adolescents are more dependent or addicted towards social media usage. From table no.5, it is clearly visible that mean of adolescents (0.34) is more than the mean of young adults (0.08) for the range 7hrs and more and this is for daily time spent on social media sites. While mean of adolescents (0.58) is again higher than the mean of young adults (0.28) for the range 11-20times for daily frequency of visiting social media profiles. The same distribution is represented in fig no.5 and 6. Therefore, it has been proved that there is a high level of social media usage among adolescents as compare to young adults.

To find out the social media dependency between the two sample groups of youngsters two questions were used i) everyday time spent via web-based networking media locales (in hours) & ii) For day by day recurrence of visiting internet based life profiles (in times). The information collected in this section was scored and was further put to a statistical analysis of t-test. The results obtained are presented here in the form of table number 6.

Table 6

Mean, SD and t-value on social media use among youngsters.

Groups	N	M	S.D.	S. ED	df	t
Adolescents	50	M_1 =0.33	$S.D_1$=0.1931	0.00394	98	2.53
Young Adults	50	M_2= 0.32	$S.D_2$=0.1939			p<.05

Both the adolescents and young adult participants were equally divided in the ratio of 50-50, the total sample size selected for this study was therefore 100. M_1 =0.33 i.e. the mean of adolescent scores, M_2= 0.32 i.e. the of young adults score. Standard deviation came out to be S. D_1 =0.1931, S. D_2= 0.1939. Similarly standard error was to be S. ED=0.00394. Degree of freedom was equal to 98. At last to test was put and value of t came out to be 2.53. this value of "t" was found to be significant at 0.05 level of significance. From the results it was also found that adolescents scored high on Social Media Usage as compare to young adults. It can be clearly mapped from the table no. 4 mean scores of both the groups. Adolescents sample obtained a mean of 0.33 while young adults sample obtained a mean of 0.32. Therefore, a significant difference was found among youngsters on social media usage.

Discussion

The first hypothesis of the study was ***"****There will be significant level of difference between FOMO of youngsters".* To test the above hypothesis**,** mean, SDs and t value were calculated for the level of FOMO of youngsters. The obtained t-value for youngsters was found to be significant at 0.01 and 0.05 level of significance (t-value), indicating that youngsters differ significantly on the level of FOMO. This shows that both the groups possess significantly different scores on the level of FOMO. Observation on mean values on the level of FOMO, shown in (Table no. 3) mean value of adolescents was found to be higher than the mean value of young adults and this difference in mean values emerged to be statistically significant. Therefore, it can be said that the difference in mean values is not a matter of chance and both the groups have significantly different levels of FOMO. This difference on the levels of FOMO between youngsters is also shown graphically in fig no. 1 based on above findings, the proposed hypothesis "there will be significant level of difference between FOMO of youngsters" is accepted and it can be inferred that age has significant impact on the level of FOMO.

The obtained finding stands in support of the findings of relevant review of literature: Gordon (2018) suggested that advent of social media, FOMO has turn out to be more problematic topic for youngsters, who always want to remain engaged and updated for which they've been seen way too much online. Therefore, when teens and young adults miss a family gathering, reunion with pals, or do not attend any school or university event, they feel disturbed from those who were present at that moment and posted photos, videos online. Meanwhile it has also been suggested that adolescents who experiences FOMO are more likely to value social media whereas young adults who experiences FOMO are less likely to adhere the norms and value social media. Andrew Przybylski and his colleagues

suggested that, "adolescents seem to grapple with high level of FOMO that the general population, majorly teenage males, and those who struggle with higher degree of FOMO are more likely to experience depression and anxiety" Przybylski et. al(2013).

The second hypothesis of the study was ***"****There will be a significant difference between youngsters on usage of social media".* To test the above hypothesis**,** mean, SDs and t value were calculated for the level of social media usage and its addiction among youngsters. The obtained t-value for youngsters was found to be significant at 0.05 level of significance (t-value), indicating that youngsters differ significantly on the level of social media usage. This shows that both the groups possess significantly different scores on the level of social media usage. Observation on mean values on the level of social media usage, shown in (Table no. 6) mean value of adolescents was found to be higher than the mean value of young adults and this difference in mean values emerged to be statistically significant. Therefore, it can be said that the difference in mean values is not a matter of chance and both the groups have significantly different levels of social media usage. This difference on the levels of social media usage between youngsters is also shown graphically in fig no. 5 and 6. Based on above findings, the proposed hypothesis "there will be significant difference between youngsters on social media usage" is accepted and it can be inferred that age has significant impact on the level of FOMO.

The obtained finding stands in support of the findings of relevant review of literature Anderson & Jiang (2018) suggested that "YouTube, Instagram and snapchat are the most popular online platforms among youngsters. 95% of them have access to a smartphone, and 45% are constantly online". Another study conducted in Iran by Ghasemi (2017) suggested that "90.3%youngsters have internet equipped smartphones connected to internet through wireless networks like Wi-Fi, MTNL, SIM cards. The average daily usage of the internet is 30 mins in each connection. Only, when the use of internet is less than 19 hours per week, then only they say that a person has normally used it". Raja (2019) determined that adolescents are found to be more addicted to social media usage as compare to young adults may be because of the feeling of being submerged, alienated, bored, peculiar, stressed, depressed or anxious regarding something which triggers them to surf online anything and everything to kill time and energy. Thus, all the hypotheses were tested and were found significant also the results were discussed and stated here in this section.

Conclusion

The initially stated objective of this study was to identify social media usage SMU and FOMOFOMO among youngsters. Accepting the limitations of our study, we believe we have achieved this to quite an extent. Hypotheses were developed and tested results of the findings were stated and proved explicitly. This study identifies the significant relationship between the two variables; social media usage and FOMO and how they both effect on life of youngsters. It also identifies which group of variables is more prone to get victimized of 'social media usage' and 'FOMO'. The outcomes of the study in future will lead to improve the quality of research in the field of social media usage and FOMO that works particularly for two different age groups. Not only this, but researchers, education planners, teachers, parents, peers, students and public in general will also be benefitted from this study as they can gain knowledge about the effect of FOMO in today's generation and how this can turn to be harmful for an individual health, career, relationships and life. Further to this, it has also been evident that FOMO predicts issues related to the usage of social networking sites which has been linked with social media addiction. On the other hand, young adults are more mature and sensible enough to differentiate between pros and cons. Their results gave evidence that even if they are using social media for any purpose they aren't addicted to it and understand the fact that too much of anything is good for nothing, which is why their scores on FOMOs also came out to be lesser than that of adolescents. At last this study concludes by proving that there is a significant difference between youngsters on social media usage as well as on FOMO.

Limitations

• Sample size- the sample size for this study was small consisting of only 100 participants. Thus, it was little difficult to find significant relationships from the data. Larger sample size had been collected than better outcomes would have been achieved.

• Measure used to collect the data- gender specific data was mistakenly excluded, and this was found after the completion and interpretation of the findings. Inclusion of gender specific data during the survey in retrospect, could have resolved issues that emerged later in the study, also could have made the study heavier and more influential.
• Lack of prior research studies on the topic- limited research studies were found while citing references and forming the basis of literature review.
• Indifferences in the age range- For this we selected adolescents from school between age range 13 to 17 years and for young adult sample students from university were selected between the age range of 18 to 25 years. We recognize that in selecting sample from both the age group we missed to stretch our adolescent sample from 13-17 which ideally should have been 10 to 19 years and for young adults it should have been ranged between 18 to early 30s; in principle we would have like to include the ideal age range for our study.
• Restricted zone of area- We did this study only on a small portion of Dehradun, study could have been more influential if we would have collected sample from various state population which is why our study is also lacking in cultural variations.

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Research Article

Working women and financial literacy: A study in Ghaziabad

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Subject Classification : G0.

Abstract

Individuals are more concerned about education today, as we know, but literacy alone is insufficient. Financial literacy is extremely important because it enables people to make sound financial decisions, explore the financial world, & reduce their chances of being duped. Women, in particular, must be educated on this subject because they make the majority of household decisions. FL is a set of behaviors, skills, knowledge, and attitudes that enable people to make sound financial decisions. Women's financial health can suffer due to a lack of financial literacy. The primary goal of this paper is to investigate working women's knowledge of investment avenues, how they invest, where they invest, and for whom they invest, as well as to analyze their investment decisions regarding saving in Ghaziabad.

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SOLID WASTE MANAGEMENT IN INDIA'S CLEANEST CITY-INDORE: A CASE STUDY ON BEST SCIENTIFIC OPERATIONS AND SUPPLY CHAIN MANAGEMENT PRACTICES

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Abstract: Indore is a city located in the central part of India, in the state of Madhya Pradesh. It has been ranked as the cleanest city in India six years in a row since the rankings started in 2016. It has maintained such cleanliness by adopting a variety of unique operations and supply chain management practices like education among masses for waste segregation at source, door to door collection, closed vehicle transportation through specially designated routes, scientific disposal of the solid waste as per its properties, making the city open defecation free by building individual and public toilets, etc. This research paper tries to study these practices and put forward an outline to evolve a model for other cities to follow. The methodology adopted here is a critical review of the measures adopted by the city of Indore in solid waste management practices and based upon these, recommendations for a model has been proposed for ideal solid waste management system. It is expected that this research will provide a holistic and long-term solution in curbing the problem of solid waste management in various cities of India and bridge the gap between the politics, economics and science of solid waste management.

Keywords: *Incineration; Landfills; Open defecation free; Recycling; Solid waste management; Supply chain management*

DIGITAL MARKETING MANAGEMENT IN FINANCIAL SERVICES FOR SUSCEPTIBLE CLIENTS IN THE ERA OF AI.

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Abstract: Digital marketing practices have undergone a radical transformation as a result of artificial intelligence (AI). Research on AI deployments that aggravate problems for financially susceptible patrons is scarce in the literature, despite extensive coverage of applications that usually promote businesses and patrons. Financial systems, services, and technologies are not readily available to these customers. The purpose of this paper is to fill part of the research gap by describing the challenges facing businesses trying to incorporate artificial intelligence into the field of digital marketing of their financial services. The algorithms and data collected that is used to analyze AI-enabled digital marketing are not sufficient to help businesses target their customers more effectively as the technology may not always improve their results. As part of this paper, we explore the relationship between artificial intelligence with digital marketing, and financial services related to vulnerable patrons, highlighting the key implications in information collection, processing, and delivery, as well as highlighting the power of human connection for ensuring optimal customer engagement and experience. For the successful use of AI, we need to understand both the ethical implications and the data challenges. This theoretical framework is provided to improve understanding of vulnerable customers and identify ways to better reach them. It applies to financial services providers, artificial intelligence developers, marketers, policymakers, and academics.

Keywords: *Digital Marketing, Artificial Intelligence, Financial Services, Customers, Technology*

IMPACT OF COVID-19 ON THE MENTAL HEALTH OF HIGHER EDUCATION TEACHERS OF DELHI NCR REGION TEACHERS

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Abstract: Covid-19 spread started from Wuhan, China where it was first detected in December 2019. Since then its outbreak took place globally. It managed to reach each and every country affecting the personal and professional lives of people in all possible ways. Majority of the countries used an outright lockdown as a preventive measure to handle the outbreak of the virus. Due to such lockdowns, people regardless of their profession had to suffer a lot. Many people lost their jobs and a lot of companies got bankrupt. When it comes to the relation of outbreak of this virus and economic conditions there were a lot of discussions that transpired and still take place, nonetheless there is a little research when it comes to the mental impacts that Covid-19 caused to the people. This research article would focus on the impacts of Covid-19 specifically to the mental health of the teachers in India in a master degree course.

This research is going to focus on the mental health of the teachers during the Covid-19 specifically on two facets of mental health- Stress and depression. Almost all kind of qualitative aspects would be discussed and researched on this article so as to make it more authentic and the second goal of the study was to determine whether the teachers were in use of meditative techniques to overcome the stress and depression that was begot by the Covid-19 and lockdown because of it.

FACTORS AFFECTING EMPLOYEE RETENTION IN DELHI NCR HIGHER EDUCATION INSTITUTIONS

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[1,2,3,4&5]KIET School of Management, KIET Group of Institutions, Delhi-NCR

Abstract: Employee retention has emerged as a significant issue in today's working environment as firms start to appreciate the value of the people that make up the organization. The objective of this paper is to understand diverse factors that affect the employee retention in higher education sector in Delhi NCR region. So this study focuses on employee retention through monetary and non-monetary factors that plays a very important role for employees to be in any organization. Target population of the study included all the educational institutions and colleges that came under Delhi NCR region.

The type of this study is descriptive, and the number of participants in the sample is greater than 100. The data was collected through survey method, self-structured questionnaire was prepared to take opinion from respondents and secondary data was collected through published as well as unpublished secondary source. It is concluded that employee's retention is influenced by financial rewards, motivation, job security, training, working environment, etc. This study recommends that above mentioned factors should be considered as most important factors in any organizations.

Keywords: *Employee retention, 3 R's of Retention, Strategies of employee retention, Factors of Employee Retention*

IMPACT OF COVID-19 ON THE MENTAL HEALTH OF HIGHER EDUCATION TEACHERS OF DELHI NCR REGION TEACHERS

[1]Ankita Sharma, [2]Habiba Ansari, [3]Harsh Saini, [4]Gaurav Verma, [5]Harshit Kumar, [6]Himanshu Verma & [7]Harshit Gupta

[1,2,3,4,5,6&7]KIET Group of Institutions Delhi-NCR, Ghaziabad

Abstract: Covid-19 spread started from Wuhan, China where it was first detected in December 2019. Since then its outbreak took place globally. It managed to reach each and every country affecting the personal and professional lives of people in all possible ways. Majority of the countries used an outright lockdown as a preventive measure to handle the outbreak of the virus. Due to such lockdowns, people regardless of their profession had to suffer a lot. Many people lost their jobs and a lot of companies got bankrupt. When it comes to the relation of outbreak of this virus and economic conditions there were a lot of discussions that transpired and still take place, nonetheless there is a little research when it comes to the mental impacts that Covid-19 caused to the people. This research article would focus on the impacts of Covid-19 specifically to the mental health of the teachers in India in a master degree course.

This research is going to focus on the mental health of the teachers during the Covid-19 specifically on two facets of mental health- Stress and depression. Almost all kind of qualitative aspects would be discussed and researched on this article so as to make it more authentic and the second goal of the study was to determine whether the teachers were in use of meditative techniques to overcome the stress and depression that was begot by the Covid-19 and lockdown because of it.

FACTORS AFFECTING EMPLOYEE RETENTION IN DELHI NCR HIGHER EDUCATION INSTITUTIONS

[1]Ms. Ankita Sharma, [2]Devanshi Pal, [3]Divya, [4]Deepali Tyagi, [5]Deepanshu Tyagi

[1,2,3,4&5]KIET School of Management, KIET Group of Institutions, Delhi-NCR

Abstract: Employee retention has emerged as a significant issue in today's working environment as firms start to appreciate the value of the people that make up the organization. The objective of this paper is to understand diverse factors that affect the employee retention in higher education sector in Delhi NCR region. So this study focuses on employee retention through monetary and non-monetary factors that plays a very important role for employees to be in any organization. Target population of the study included all the educational institutions and colleges that came under Delhi NCR region.

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Keywords: *Employee retention, 3 R's of Retention, Strategies of employee retention, Factors of Employee Retention*

A STUDY ON CAUSAL RELATIONSHIP OF FDI AND ECONOMIC GROWTH IN INDIA: AN AUTO REGRESSIVE LAG APPROACH

[1]Nikhil Kumar Kanodia, [2]Dr. Dipti Ranjan Mohapatra & [3]Dr. Pratap Ranjan Jena

[1]ABS, Amity University, UP, Noida

[2]ACCF, Amity University, UP, Noida &

[3]NIPF&P, New Delhi

Introduction- The importance of foreign direct investment (FDI) for the growth and development of emerging economies like India has long been recognised in the literature. The literature on the variables affecting FDI inflows is developing, nonetheless. In this study, the long- and short-term relationships between FDI inflows and market size, inflation rate, level of infrastructure development, domestic investment and openness to trade in India are investigated.

Methodology: The study involves use of time series dataset over a period of 2000-2021 employing Autoregressive Distributive Lag (ARDL) bounds testing approach and Error Correction Model to reveal the relationship between variables under study. CUSUM and CUSUMQ have been employed for analysing the stability of the model. The estimated model's normal distribution, serial correlation, heteroscedasticity, specification form, and other factors are also tested in the study.

Result: The empirical results of the study show that FDI and domestic investment, inflation, infrastructure, and trade openness have both long- and short-term relationships. However, market size is observed to be insignificant in influencing flow of foreign investments. As expected, inflation rate is observed to have an inverse and significant association with FDI inflows. Domestic investment, infrastructure and openness to trade are observed to have a positive and significant influence in attracting FDI to India.

Discussion: The study's conclusions are consistent with most of the past studies on developing economies conducted by other researchers. The study recommends that although, market size proxied by gross domestic product is observed to be insignificant, there needs to be improvement in various economic performance indexes which can lead to enhanced GDP and positive influence on FDI.

Keywords: *Foreign Direct Investment; ARDL; Error correction model; Market size; Infrastructure; Inflation; Domestic investment, Trade Openness*

IS SOCIAL MEDIA AN EFFECTIVE WAY FOR RECRUITMENT?

[1]Upasna Chauhan, [2]Tanushree Sanwal & [3]Ankita Sharma

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Abstract: Recruitment through Social Media seeks a lot of hard work as well as smart work because it always needs an intelligent mind besides quick responsive mind for selecting an irregular employees. It directly follows the famous saying 'Slow and steady wins the race'. This is why it has to be inevitable requirement of the organisation to hire an absolute man. Recruitment by Social Media makes an HR constant and extra ordinary just because the various availability of employees. It can be done by many methods but social media recruitment is one of the most liked methods that is followed by the organization. The main goal of this research paper is to analyse that the use of social media for recruitment is an effective or not? If yes then how is it effective and if no then why it is not effective method for recruitment? Social Media is considered as a place of various people. It is full of energetic, diligent never give up and organised personalities who are found dynamic and excellent on their work performance. It's always a hard job to an HR to hire an honest and dedicated employee who truly contributes something to the organisation. Social Media as a recruiting place can be seen in both as Merit and Demerit.

Keywords: *Recruitment, Social Media, Effective, Organisation, Hire*

GENDER DISCRIMINATION IN WORKPLACE

[1]Dr Tanushree Sanwal, [2]Vanshika Garg & [3]Vanshika Tyagi

[1,2&3]Kiet Group of Institutions, Ghaziabad

Abstract: The rising body of research on gender prejudice in management is examined in this study, with a particular emphasis on women in executive roles across several industries. Stereotyping, attribution, and equity are three examples of cognitive processes that don't conflict with one another. Instead, they collaborate to identify how bias against women manifests itself, whether it be formal or informal, overt or hidden, etc. As a result, women are either overrepresented in hazardous managerial posts or underrepresented in upper management (in periods of organizational crisis or downturn). Men are more likely to be promoted when their mentors are of the same gender and provide them with formal or informal support, even in the rare industries where women make up more than half of the workforce (such as nursing, elementary education, or social services). Statistical and experimental data in the present study indicate that there is still a long way to go before the number of women in management roles matches the number of men in leadership roles.

SUSTAINABILITY REPORTING QUALITY OF INDIAN FIRMS? PRE- AND POST-SEBI AMENDMENT

[1]Divya Gogia, [2]Sandeep Kumar Gupta & [3]Priya Rathi

[1,2&3]Shiv Nadar University, Greater Noida

Abstract: Following the amendment of company listing agreements in 2012, which require the top 100 listed companies to submit annual sustainability reports, this study purposes to compare the quality of sustainability reporting before (2011) and after (2021) using the Global reporting initiative (GRI) sustainability reporting elements. For both years, we employed content analysis of 51 environmentally sensitive firms' annual, integrated, and sustainability reports. The findings show a substantial upsurge in the sustainability reporting quality (SRQ) from 2011 to 2021. The quality of SR improvement suggests that businesses are dedicated to reducing, if not eradicating, environmental deterioration and social well-being.

Keywords: *Content Analysis, Global Reporting Initiatives (GRI), Sustainability Reporting Quality (SRQ), Sustainability Reporting Elements, SEBI agreement*

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Hybrid Technology Based Smart Hostel Management System Using Artificial Intelligence and Internet of Things

Publisher: IEEE

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Abstract:

Notably in the last ten years, the number of learning organizations throughout the globe has grown at an unmatched pace. Teaching has now reached homesteads thanks to the growth. As a consequence, worldwide literacy levels have increased significantly in recent decades. As per reports, just 12% of the populace knew comprehend and write in 1820; nevertheless, data currently show a dramatic shift in or reversal of this trend: Figures prove that amongst 1820 and 2016, the high school graduation rate rose by 72%. If the pace of growth is considered, it is around 4% per five years, rising from 42percentage points in 1970 to 86% in 2015. Proper training has benefited in the development of intelligent people who can easily embrace and establish regulations for a civilized country, improving it and making an important contribution. However, the majority of recently built academic system, particularly dormitory amenities, still manage their possessions and property using outdated traditional methods. After the dotcom boom, digital services and products have advanced significantly. The cost of using the net is also decreasing, and its growth has been facilitated by faster internet. It is simple to assert that contemporary civilization now includes this digital age. The need for a growing percentage of world wide web gadgets has grown due to this change in social cognition from citizenry to bloggers. The popularity of smart homes or other Cellular solutions is rising. Nowadays, using the Internet as a resource to address problems is common. We've been staying in hostels nearly five years, we've discovered a number of major issues that impact every person with the help of the survey and our own findings. We've developed a solid and intelligent conceptual model as part of the technological study that promises to solve these problems by leveraging snipping innovations, notably AI (Artificial Intelligence) and IOT (Internet of Things), with sufficient evidence and verification. We...

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Contents

I. Introduction

As per important macroeconomic concepts, an institution's effectiveness is based on how well it is set up to optimise and harness each item of the assemble in order to fulfil its organisational objectives. We are claiming that understanding is the cognitive tool, capital ability occurs in the form of currency, material assets come in the form or ownership, labor/machinery, financial means, and businesses. No regardless of how much is put into a venture, if funds and activities are not effectively coordinated, the whole capital will indeed be lost, and the country's, women's, dreams, and objectives won't be achieved. Governance is thus of the most crucial elements in determining an institution's efficiency and formulating a plan to achieve its company goals. Additionally, studies have shown that what counts is the degree of a managerial endeavour. During the course of the process, we can come across frameworks, assumptions, and study findings. Numerous pupils from across the globe move of one place to the next each year to complete her study. As a consequence, their first priority is to choose an area that's also affordable and provides all the essentials for adequate housing, including potable water, nutritious meals, open rooms, transportation amenities, sanitary and washrooms, and some other important services, with the least amount of work [1]–[5]. As a consequence, dormitories have emerged as among the most successful businesses in existence at the time, especially in areas with a large content of academic system. The goal of this paper is to identify the issues that affect pupils, employees, dormitory governance, and landlords through a thorough analysis of real-time survey data. It also proposes a modern framework for the student housing ecosphere that will meet the needs of stockholders, employees, pupils, and gatekeepers and enable them to supervise the homestays' daily operations more speedily and spontaneously, saving them precious resources (time, money, and labour. All the facts that ought to be kept and utilised are now in sheets or financial records, since the great majority of hostels continue to use the antiquated manual architecture to maintain their information and data. This data or records are readily lost, and human involvement increases the likelihood of errors [3]. Additionally, it requires a lot of work to constantly update data, add new data, delete old data, and look for unambiguous information in the books. Improving the dormitories' administrative effectiveness results in increased experience. According to the article "Designing the correlation between perceived value, customers' satisfaction, and brand loyalty with Cheap Hotels: an actual study done in 2019," high levels of pleasure are closely related to high levels of devotion.

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Privacy Preserving Based Personal Health Records Sharing Using Rail Fence Data Encryption (RFDE) for Secure Cloud Environment

Publisher: IEEE

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Shashank Bhardwaj ; S. Baskar ; Vijaya Marakala ; Prasannan. D ; Durgaprasad Gangodkar ; Sumedh Vithalrao Dhole All Authors

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1. Introduction
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Figures
References
Keywords
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Abstract: The development of cloud technology is a fundamental idea for offering unfettered access to many different sources in the planning of the networking, memory, infrastructure, and software. Computers are becoming more and more widespread across a wide range of industries due to their numerous advantages, notably in the healthcare industry. Typically, it is essential to the interchange of health information. In light of the ongoing issues with password security, sending private medical information via the internet still raises serious privacy concerns. Whether or whether they have complete permission, patients are not forced to divulge any of their private or personal information. This article examines several noteworthy recent studies that address the problems of password security and data privacy for cloud-based health services. These compare the benefits and drawbacks of different physical access preservation techniques. The paper also proposes a combined authentication procedure based on RFDE models. Cloud security is usually greatly hampered by the necessity for information privacy in an effort to protect sensitive and non-sensitive data for decision-making and to solve the problem of information leakage. One of the most challenging parts of the transfer of personal health records (PHRs) to the cloud is the reuse and exchange of accurate, complete medical evidence. When PHRs are outsourced to third-party businesses, such as cloud services, they are often used as patient-centered, private ways of exchanging health information. Data about a particular PHR doctor is coded for protection before being sent to the cloud. However, there are still substantial barriers due to issues with security, things that can be improved, lawful consumer privacy portfolio management, efficiency, and regulation over sensitive and non-sensitive data kept in the cloud. The PHR file may be encrypted using the Rail Fence Data Encryption (RFDE) technique to provide strong confidentiality rul...

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Contents

1. Introduction

The need for information privacy to protect sensitive and non-sensitive data during choice and to solve concerns with unauthorized disclosure usually presents substantial challenges for cloud computing security. One of its single most challenging parts of the transfer of personal health records (PHRs) to the web is the reuse [1] and exchange of accurate and complete medical evidence. When contracted to third - party service businesses, such as cloud storage, PHRs have been used as patient-centered, private ways of exchanging health information. Data about such a particular PHR practitioner is encrypted before being sent to cloud.

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Abstract:
The provision of customized treatments is one of the key uses of machine learning in the healthcare industry. It enables healthcare providers to offer personalised patient care by looking into people's medical histories, symptoms, and test results. Doctors can create specialized treatments and administer medications that target ailments in individual people by using ML in medicine and healthcare. Healthcare companies can now get analyses based on patient electronic health information thanks to machine learning (ML). This enables physicians to decide on the appropriate course of treatment for the patient more quickly. In healthcare, machine learning can also assist clinicians in assessing whether a patient is prepared for necessary medication changes. This encourages starting a treatment plan properly. In this research paper, we have used classification models for forecasting the chances of heart disease.

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Contents

I. Introduction

Around the world, machine learning is applied in many different fields. The health sector is not an exception. Machine learning can be very beneficial in predicting the presence or absence of illnesses such as heart issues, mobility problems, and other conditions. Such information can provide crucial insights to clinicians if anticipated well in advance, allowing them to better tailor their diagnosis and course of care for each patient. [1], [2], [3], [4], [5]. Figure 1.

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Swasthya Mitra: Smart contract enabled patient's electronic health records sharing (EHR) system

Arun Kumar Tripathi ; Apoorv Jain; Kajal Punia; Niharika Baliyan

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AIP Conf. Proc. 2782, 020006 (2023)
https://doi.org/10.1063/5.0154167

Electronic Health Records (EHRs) are very crucial and personal assets of a person and should be shared with medical practitioners for monitoring the health of a person based on the previous history for efficient diagnosis and proper treatment of the disease. Blockchain opens the new horizons sharing of EHRs among medical practitioners with the assurance of security and privacy. It is a decentralized, immutable, and secure architecture without the involvement of a third party in the transaction. The basic aim of the research paper is to propose a fast, temper poof, reliable and transparent EHR approach for sharing medical records on the Ethereum blockchain platform using smart contract without involving a third party. The encrypted medical records can be shared directly between the doctor and the patient. Moreover, medical laboratories can also share the patient test reports with the patient in secure fashion using blockchain. The proposed system will increase confidence in collaborating and sharing EHR with medical practitioners.

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Advances in Modelling and Optimization of Manufacturing and Industrial Systems pp 175–182

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Krishna Vijay, Utkarsh Mishra & Subodh Kumar Sharma

Conference paper | First Online: 24 February 2023

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Abstract

Atomization casting provides the low-cost casting process with better attributes and performance. It acts as a major competitor for existing technologies, such as normal casting and powder casting route. The economy benefit in this process is derived from a step integrated operation of converting superheated molten alloy directly into a semi-finished product. Atomization casting converts a molten stream into a spray of droplets by high pressure gas atomization. The grain refinement is occurred in Al-6%Si and Al-12%Si atomization cast alloys.

Keywords

Atomization casting **Mechanical property** **Convergent divergent nozzle**

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This is to certify that **Mr. Subodh Kr. Sharma** has presented a paper entitled **Experimental investigation on emission characteristics of diesel-neem oil biodiesel blended with nanoparticles in the diesel-powered engine** co-authored with **Mr. Arunesh Chandra and Mr. K.V. Ojha**

International Conference on **Frontiers in Desalination, Energy, Environment and Material Sciences for Sustainable Development (FEEMSSD-2023)** & **Annual Congress of InDA (InDACON-2023)** organized by **Madan Mohan Malaviya University of Technology Gorakhpur (U.P.), KIPM-College of Engineering & Technology GIDA, Gorakhpur(U.P)** and **Indian Desalination Association (InDA)** during March 16th-17th, 2023.

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This is to certify that Mr./Ms./Dr. Subodh Kumar Sharma

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Comparative experimental investigation of infill pattern and infill density on modelling process characteristics and mechanical properties of Polylactic Acid (PLA) material in Fused Deposition Modelling (FDM)

Rupesh Chalisgaonkar[1*], Sachin Rathore[1], K.L.A. Khan[1]

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Abstract: Additive manufacturing is potential and emerging technology widely being used to produce quality products with complicated profiles and customized features. Fused Deposition Modelling (FDM) process, a type of additive manufacturing technology using filament made of thermoplastic which is melted and subsequently extruded through nozzle. The main input process parameters of FDM are wall thickness, infill density, layer height, bed temperature, layer thickness, infill pattern, nozzle temperature etc. In this experimental work, a cube was 3-D printed by Ultimaker 2+ FDM printer using PLA (polylactic acid) material. The parameters selected for this experimental study are infill density (20%, 40%, and 60% for compressive strength and 100%, 80% and 60% for tensile strength respectively) and infill pattern (Grid and Tri Hexagon shape). The output parameters considered in this research work are printing time, weight of printed material, filament length consumed, volumetric accuracy after 3 D printing. It was found that printing time, weight of printed material and filament length consumption increases if infill density is increased while varying the infill pattern is insignificant for above process characteristics. It was also revealed that volumetric inaccuracy increases after increasing the infill density and shifting the infill pattern from tri-hexagon to grid type of pattern. The effect of infill density and infill pattern were also studied on the compressive strength, tensile strength, and yield strength of PLA material.

Advanced medicine reminder system

Amit Kumar Singh[1], R. Deepika[1], P. Savitha[1], P. S. Keerthana[1], B. Snega[1], Shiva Sharma[2]

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Abstract: This paper discusses the challenges faced by the world in addressing public health issues, particularly non-communicable diseases (NCDs) affecting more than 20% of the population. One of the significant challenges in managing chronic illnesses is medication non-adherence, with almost half of the patients not taking their medication as prescribed. This article emphasizes the importance of medication adherence and highlights the potential of medicine reminder systems (MRS) to address this issue. The existing MRS, using electronic components and a mobile app, is described in detail. The existing system offers sophisticated reminders to detect missed doses, track medication adherence, and display reminders on a user's mobile device. The developed system was tested and compared with the MRS based

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Advances in Modelling and Optimization of Manufacturing and Industrial Systems pp 125–133

Reliability Prediction and Its Simulation for a Friction Stir Processing Tool

Smriti Mishra, Prashant Bhardwaj, Neha Bhadauria & Prashant Vashishtha

Conference paper | First Online: 24 February 2023

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Abstract

Reliability estimation plays an important role in planning and implementation of condition-based proactive maintenance program and proposed the method which would help to reduce the losses in productivity. Approximate reliability of any system can be estimated easily with the help of trend exploration method. In this paper, stochastic Markov technique is used to evaluate the reliability of a high-speed steel tool which was used in friction stir processing of an aluminum alloy. This tool was used on the vertical machining center for the friction stir processing at high rotational speed. The probe wear of the tool after every pass over the workpiece was recorded for constant feed, speed, and depth of cut till the failure of the tool. Differential equations are generated based on Markov model for various failure stages and solved using Runge–Kutta method on MATLAB. This result is verified by Monte-Carlo simulation technique.

Keywords

Reliability **Markov model** **Monte-Carlo simulation**

Friction stir processing tool **Vertical machining center** **Runge–Kutta method**

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Recent Trends in Mechanical Engineering, pp 883–893

A Detailed Review of Friction Stir Processing

Sachendra, Shailesh Mani Pandey, Satyajeet Kumar, Shailesh Kumar Singh & Kuldeep Singh

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Abstract

Friction stir processing (FSP) is a surface modification technique which has widely grabbed the attention by significantly contributing in the development of functionally graded materials with improved surface structure and enhanced mechanical properties. By using FSP, the modified alloys and composites have ultrafine-grained structure with surface hardened with or without using reinforcement particles. In this paper, the review of latest achievement in FSP on aluminum alloys, with surface treatment and with particle reinforcement, is done. It can be seen that by varying the various process parameters along with particle reinforcement, the mechanical properties such as tensile strength, hardness, wear resistance, corrosion resistance, impact toughness have improved significantly.

Keywords

Friction stir processing **Al alloys** **Mechanical properties** **Microstructure**

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In Press, Corrected Proof What's this?

Study on wear behaviour of aluminium-based piston alloy using different coatings

Bibeka Nand Pathak [a], Arunesh Chandra [b], Ashok Kumar Mishra [c], Abhishek Saxena [a], Bhaskar Kandpal [a]

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Abstract

The wear rate of a piston in an engine determines how long it can run and how much power it can produce. The wear rate of lightweight piston materials used in medium cars was examined. The piston itself was used to cut the plates after it had been formed in an aluminium alloy. It was then successfully prepared for coating with hard anodizing and tin coating after being trimmed to a diameter of 90mm. There are a number of wear tests, including the pin on the disc test, slurry abrasion test, scratch test, and erosion test to analyse the wear rate. The coating's substance and intended applications determine which wear test is used. Slurry erosion and corrosion tests for the coating are favoured for usage on automobiles. But the pin on disc and scratch tests are frequently carried out in cases where the coating is applied dry. In the current investigation, only one variable load (30N, 40N, and 50N) and sliding speed (500rpm) was chosen for the wear test. Sliding distance (1200m) was treated as a constant. Under dry conditions, a pin-on-disc machine was used to test the wear of the coatings and soft materials. SEM analysis was used to examine the surface morphology of the coating's worn surfaces. It was discovered that as the load grew, the coating's wear rate also did. It was discovered that as the load was raised, the coating's co-efficient of friction decreased. With the aid of an optical telescope, the microstructure of the coating's worn surfaces was also inspected, although no evidence of a change in the microstructure owing to frictional heat was discovered. It was discovered that the coating's micro hardness decreased away from the wear track at the coating's cross section. Using a SEM, adhesion, deformation, and microcutting were the main wear mechanisms seen.

Introduction

Wear is a significant issue in industry, and it is estimated that its direct costs range from 1 to 4% of the GDP [1]. As a result, great attempt have been made to develop more durable materials and methods in order to lessen the wear on engineering tools and components. These include altering the materials' bulk qualities, treating their surfaces, applying coatings, etc. Understanding the behaviour of surfaces in sliding contact and the process that causes wear has also received a lot of attention in recent years. The potential for outstanding castability, good weldability, strong thermal conductivity, high strength at high temperatures, and excellent corrosion resistance exists in aluminum–silicon alloys. As a result, they are excellent choices for applications in the automotive industry, military applications, etc. The term

“piston alloy” refers to the low expansion class of aluminum–silicon eutectic or nearly eutectic alloys, which offer the best overall balance of qualities.

In order to make specific recommendations about the tribological use of this alloy for regional auto parts producers, the overall goal of the the experiment was to investigate the structure and wear behaviour of the aluminum-based piston alloy in the as cast and modified condition.

Section snippets

Charge materials

The powder of the entire required constituent is used for melting then cast in the shape of piston. For the experimental purpose a sectioned disc is taken out from the top side of the piston.…

Melting and casting

The melting operation is carried out in an induction furnace for the uniform melting of the charge material. With the aid of a digital chromel-aluminum thermocouple, the temperature was measured. The melt was super-heated in an electric arc furnace to a temperature more than 750°C and was final poured in…

Wear rate with mild steel pin of anodized plate:

The coating's wear rate was calculated in terms of mass loss over a 1200m sliding distance. To determine the coating's wear rate the one variable was chosen as already described that are load. The load was chosen as 29.9, 39.24N. The coating's hard particles could produce noise. The Fig. 1 shows the Mass loss of anodized coating with mild steel pin at various loading at 80mm track diameter.

Fig. 2 depicts the variance in the coating's wear rate under various loads. The wear rate of the…

Conclusions

The wear rate of an aluminium alloy coating can be determined utilizing a pin on disc test under dry sliding circumstances.

The load determined the wear rate. When the load increased, the wear rate increased as well. It was also found that the pin material affected the wear rate, with tungsten carbide pins wearing out more quickly than high carbon steel and mild steel pins.

The coefficient of friction was found to be high under high loads. Result has shown by increasing load coefficient of…

CRediT authorship contribution statement

BibekaNand Pathak: Conceptualization, Methodology, Writing – original draft, Writing – review & editing, Investigation. **Arunesh Chandra:** Supervision, Visualization. **Ashok Kumar Mishra:** Supervision, Visualization. **Abhishek Saxena:** Data curation, Writing – review & editing. **Bhaskar Kandpal:** Validation.…

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Ergonomic Assessment of Tractor Seat for Anthropometric Dimensions of Indian Population

Arunesh Chandra, Bibekanad Pathak, Subodh Sharma, Pawan Arora & Harish Kumar

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Abstract

Industrial design, apparel design, tool design, and workplace design all heavily rely on anthropometry. For farmers, a tractor is their primary form of power. The design of a contemporary tractor seat must therefore take these human issues into account. When anthropometric dimensions are appropriately considered in the design of seat, these variables enable the operator to carry out a variety of different activities with maximum effectiveness, safety and minimum fatigue. For drivers to have a better driving experience and comfort, the tractor seat's design is crucial. In present study Rapid Upper Limb Assessment (RULA) was used for assessment existing and proposed the design of the tractor seat where it was observed that RULA score (risk factor) was reduced from 5 to 2 when the tractor seat was modified taking into consideration of anthropometric dimensions.

Keywords

Anthropometry **Ergonomics** **Tractor seat** **RULA** **Working posture**

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Comparative experimental investigation of infill pattern and infill density on modelling process characteristics and mechanical properties of Polylactic Acid (PLA) material in Fused Deposition Modelling (FDM)

Rupesh Chalisgaonkar[1*], Sachin Rathore[1], K.L.A. Khan[1]

[1]KIET Group of Institutions, Delhi-NCR, Ghaziabad-201206, India

Abstract: Additive manufacturing is potential and emerging technology widely being used to produce quality products with complicated profiles and customized features. Fused Deposition Modelling (FDM) process, a type of additive manufacturing technology using filament made of thermoplastic which is melted and subsequently extruded through nozzle. The main input process parameters of FDM are wall thickness, infill density, layer height, bed temperature, layer thickness, infill pattern, nozzle temperature etc. In this experimental work, a cube was 3-D printed by Ultimaker 2+ FDM printer using PLA (polylactic acid) material. The parameters selected for this experimental study are infill density (20%, 40%, and 60% for compressive strength and 100%, 80% and 60% for tensile strength respectively) and infill pattern (Grid and Tri Hexagon shape). The output parameters considered in this research work are printing time, weight of printed material, filament length consumed, volumetric accuracy after 3 D printing. It was found that printing time, weight of printed material and filament length consumption increases if infill density is increased while varying the infill pattern is insignificant for above process characteristics. It was also revealed that volumetric inaccuracy increases after increasing the infill density and shifting the infill pattern from tri-hexagon to grid type of pattern. The effect of infill density and infill pattern were also studied on the compressive strength, tensile strength, and yield strength of PLA material.

Advanced medicine reminder system

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Abstract: This paper discusses the challenges faced by the world in addressing public health issues, particularly non-communicable diseases (NCDs) affecting more than 20% of the population. One of the significant challenges in managing chronic illnesses is medication non-adherence, with almost half of the patients not taking their medication as prescribed. This article emphasizes the importance of medication adherence and highlights the potential of medicine reminder systems (MRS) to address this issue. The existing MRS, using electronic components and a mobile app, is described in detail. The existing system offers sophisticated reminders to detect missed doses, track medication adherence, and display reminders on a user's mobile device. The developed system was tested and compared with the MRS based



Chapter

Biological potential of lycorine: A summary update

By Deepti Katiyar, Robin Singh, Surya Prakash, Abhay Bhardwaj, Kandasamy Nagarajan

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By Deepti Katiyar, Robin Singh, Surya Prakash, Abhay Bhardwaj, Kandasamy Nagarajan

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Abstract

RESEARCH ARTICLE | DECEMBER 29 2022

Evolving pharmaceutical therapies for confronting COVID-19: An overview

Roma Ghai; Kandasamy Nagarajan; Tejesvi Mishra; Srishti Vats; Abhimanyu Kaushik

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December 2019 was marked by the arrival of the novel coronavirus, which has now reportedly resulted in 4,200,412 deaths (as ofJuly 30, 2021) world-wide. Although the casualty rate of SARS-CoV-2 is lower than other viral infections, yet its uncertainty poses a global threat. The virus that causes Covid-19 diseases is spreading among people, and more people are becoming infected. According to clinical studies, SARS-CoV-2 develops and migrates through the respiratory tract along the conducting airways, eliciting a robust innate immune response that leads to severe clinical manifestations such as cytokine storms, the release of chemical mediators including IL-2 and IL-6 at vital organs, and worsens in patients with co-morbidities. The treatment is largely focused on the assessment of patients since the studies are evaluating a wide array of medications for possible outcomes during this emergency period of the Covid 19 epidemic. On the contrary, few conventional drugs have been disapproved, such as hydroxychloroquine while others like ribavirin and lopinavir, are effective in combination therapies as per the studies. Monoclonal antibodies, kinase inhibitors, and basic febrifuges, along with anti-tussive syrups, have become a growing therapy for coronavirus patients. Although this virus seems to have a specific treatment due to the effects of viral variation and mutation, it's causing a leading global challenge for researchers. This article aggregates the conventional and new breakthrough therapeutics for tackling Covid 19 and its emerging therapeutic rationale reviewed by WHO, ICMR, FDA, PubMed, Google scholar, and the Covid update newsletter.

Topics
Pharmaceuticals, Diseases and conditions, Coronaviruses, Antibody, Immune response, Therapeutics, News and events, Scientific society and organization, Review

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Applications of some biopolymeric materials as medical implants: An overview

Priya Bansal [a], Deepti Katiyar [b], Surya Prakash [c], N.G. Raghavendra Rao [d], Vidhu Saxena [a], Vinay Kumar [a], Abhishek Kumar [a]

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Abstract

Biodegradable materials derived from natural sources are able to substitute synthetic polymer from the biomedical field as well as from other applications due to their advantages in degradability, renewability, lower density, biocompatibility, stability, radiolucent property, etc. As the demand for biomaterial increases, various research has been done to prove their acceptability for implementation in tissue engineering, wound-healing, bone regeneration, and drug delivery rows and medical implants, etc. Implants are the medical devices that are similar in structure of body and able to replace or repair the damaged organ for maintaining the normal body functions. Materials (metals, ceramics, and polymers) used for preparing medical implants have certain disadvantages like immunological rejection by the body, high cost, etc. The focus of the review is to mainly highlight the important properties of biopolymer and their application in medical implants. Although there are various biopolymers that are being utilized in health care system for various reason, but here, the authors mainly discuss few polymers (collagen, gelatin and PLA (Poly Lactic acid) in detail with their approach in various medical devices used in different medical fields like orthopaedics, ophthalmology, cardiology, otolaryngology, dermatology, etc.

Introduction

Implants are medical devices, mainly a polymeric structure that look alike a body part and mainly utilized for the replacement of an injured body part [1], [2]. These medical devices are helpful in restoring the normal body function by repairing and restoring the injured body part or by providing the medication to that damaged region of body [3]. Body parts which mainly uses medical implants for normal functioning mainly include heart, bones, eyes, ears, knees, breasts, hips, etc. Certain implants can be placed temporarily i.e., they can be removed when there is no need like chemotherapy ports and screws that is used to reconstruct damaged bone. Permanent implants (can't remove from the body after implementation) like stents or hip implants. Biomaterials, an alternative to biological tissue is mainly found in nature, produced by living organisms as well as can be procured form microbes and plants [4], [5], [6]. For various health care fields, it is the best alternative in place of biocompatible and non-biodegradable polymers [7]. They are more beneficial than synthetic polymer in terms of degradability, renewability, lower density, biocompatibility, stability, radiolucent property, etc. and also preferred for production of implants over traditional material like metals,

ceramics and synthetic polymer [8], [9]. Immunological rejection and degradation products of synthetic polymers are the major concern while using these traditional polymers in medical devices.

Now a days, biopolymers are produced in various forms so that it can be used as absorbents, additives for food industry, chemicals for water treatment, packaging, medical, fabrics for clothes, biosensors, etc. [10]. They are mostly selected for evolution of various medical devices like temporary prostheses (an artificial device mainly used for missing organs like limb, tooth, etc.), scaffolds (a three-dimensional porous structures) primarily used in tissue engineering and controlled/sustained release drug delivery vehicles, etc. As compared to synthetic polymer, biopolymers are quite similar to biological macromolecules and stimulate exceptional growth and cell adhesion. Due to biodegradable nature, implants prepared with biopolymer can be replaced with extracellular matrix by host cells without any harmful immune reactions [11], [12]. Generally, biopolymers are categorized into three major groups named as polysaccharides, proteins and polyesters (Fig. 1).

Among various biopolymers, only few of them can be used for development of implants. In this review we mainly tried to highlight the evolution of implants made up from three specific biopolymers named as polylactic acid (PLA), collagen and gelatin.

Section snippets

Polylactic acid (PLA)

A very encouraging, common and recyclable biopolymer mainly obtained from natural sources like corn, starch rice, potatoes, etc. is widely used in healthcare system due to its bioresorbable & biocompatibility properties [13]. By using different (physical, chemical, plasma and radiation induced method) abatement techniques, PLA with desirable surface properties have been produced to use in various areas like tissue engineering, drug delivery, biomedical implants, etc. [14]. Braided corrugated…

Conclusion

Biopolymers gained interest over synthetic polymeric materials in the field of medical equipment, medicines, biocompatible implants & prosthetics, etc. in last few decades. These materials like gelatin, PLA, Collagen, are extensively studied in recent years for their compatibility with living system. The specific properties of different biopolymers promote their utility as implant materials in healthcare. Various favourable properties like biodegradability, biocompatibility, stability, etc.…

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.…

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FORMULATION, EVALUATION AND CHARACTERISATION OF A FAST DISSOLVING SUBLINGUAL TABLET OF A FREE RADICAL SCAVENGER EDARAVONE BY DIRECT COMPRESSION METHOD

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ABSTRACT

Edaravone acts as a free radical scavenger as it scavenges free hydroxyl radicals and also peroxynitrite radicals that are highly interconnected with neuronal damage and lead to many cerebral vascular disorders such as ischemic strokes and fatal degenerative neurological disorders such as ALS (Amyotrophic Lateral Sclerosis). It exerts a neuroprotective and antioxidant effect and hence, prevents disease progression by limiting the extent of lipid peroxidation through free radical generation and also cell membrane damage from oxidative stress. Sublingual tablet formation technique is highly efficient as it enhances the dissolution as well as the absorption rate and within the interval of 30- 35 seconds the drug would get 80-90% released. As a result, Edaravone sublingual tablets are successfully produced as, this needs to be given in the severe conditions where immediate action is required, also the dissolution profile also supported the decision by marking it more efficient. The Rheological study, solubility study, assay was performed for the drug. Disintegration test was also done, and the study exposed that the formulation got disintegrated within 20-25 seconds. Formulated Edaravone Sublingual Tablet batch T9 showed the maximum release of the drug and also showed other characteristics which made this to be the optimum formulation amongst of all the other batches. The dissolution data of the F9 batch revealed that the above formulated batch (F9), was the most auspicious formulation in terms of dissolution study profile and drug release profiles.

KEYWORDS: Scavenger, Antioxidant, Neuroprotective, Amyotropic Lateral Sclerosis, Optimum formulation.

NOVEL APPROACHES FOR COLON SITE-SPECIFIC DRUG DELIVERY: AN OVERVIEW OF RECENT ADVANCEMENT

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ABSTRACT:

Nowadays, various routes of administration have been explored for the effective delivery of the drug to the target site. The oral route is considered to be the most convenient for the administration of drugs to patients. But it has a serious drawback in conditions where localized delivery of the

drug in the colon is required. The colon-targeted drug delivery system (CDDS) is a potential approach for systemic and topical drug delivery in treating inflammatory bowel diseases such as ulcerative colitis, Crohn's disease, colon cancer, and amoebiasis. CDDS would provide direct treatment at the site of the disease, reduced dose, and reduced systemic adverse effects. CDDS should be able to release the drug into the colon, indicating that neither drug release nor absorption should take place in the stomach or small intestine, nor should the bioactive agent be degraded there. Instead, the drug should only be released and absorbed when it reaches the colon. The colon is a site for both local and systemic drug delivery. This review mainly compares the primary approaches for CDDS (Colon Specific Drug Delivery) namely prodrugs, pH and time-dependent systems, and microbially triggered systems, which achieved limited success and had limitations as compared with newer CDDS namely pressure-controlled colonic delivery capsules, CODESTM, and osmotic controlled drug delivery systems. The review is also focused on the possible benefits and issues associated with the novel colon-targeted drug delivery system. Recent advancements in various approaches for designing colon-targeted drug delivery systems and their pharmaceutical applications are covered with a particular emphasis on formulation technologies.

KEYWORDS: colon; non-invasive drug delivery; inflammatory bowel diseases; colorectal cancer; protein drugs, Review Drug delivery system.

REGULATORY ASPECTS OF COMBINATION PRODUCTS IN DIFFERENT COUNTRIES

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ABSTRACT

Combination products refer to the combination of two or more regulated components of drugs, medical devices, or biological products. In 1991, combination products were firstly defined in Code of Federal Regulations Title *21 3.2(e) (*21 CFR *3.2(e)*. While searching for the same in other countries, definition varies from country to country. Whereas, European Union doesn't have a

universal definition of combination products, and also it classifies pharmaceutical combination products into a unit category. So, the biggest difference in the definition of combination products among all countries is the regulatory scope of combination products. Whereas, the definition of combination products in japan is similar as that of the United State. The assign definition of combination products says that how the combination products should be regulated. Major issue of regulatory review is how to evaluate the safety and efficacy of combination products. Safety is *"*Freedom from unacceptable risk*"*, and efficacy is "the ability of a medical device*"*. *Whereas* interactions of different components must be considered first in combination products. For combination products, biological evaluation of final product shall reference to the series of ISO 10993 standards. China, NMPA has launched its Regulatory Science Action Plan (RSAP) in April 2019 and Combination Products was the first batch of nine key regulatory science projects initiated by NMPA. Some of new tools and technologies for research and development such as CM&S, AI/ML and Organ on-chips as well as efficacy and safety evaluation of combination products. Nations all over the world pay close considerations to inventive combination products, and have given various approaches and guidelines to energize innovation product and in its development.

ARTIFICIAL INTELLIGENCE IS A TOOL THAT IMPROVES THE APPLICABILITY OF PERSONALIZED MEDICINES

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ABSTRACT:

In today's fast growing world artificial intelligence is day by day penetrating our life, one of its breakthrough applications is its use in the field of personalized medicines, advancement in the field of artificial intelligence makes the field of personalized medicine more precised and accurate in disease detection, prevention, diagnosis and treatment of the disease. Artificial intelligence uses different algorithms such as artificial neural network (ANN), support vector machines (SVM), Naïve Bayes, and fuzzy logic to analyse different groups of data sets to identify a relationship

between them which leads to form a more accurate way of treatment. In recent times much of the use of AI in the development of personalized medicines has focused on the treatment of individuals with clinically obvious disease: identifying the underlying pathology, determining which interventions might make most sense to provide given what is known about that pathology and the mechanisms of action of interventions, and testing to see if a chosen intervention works also future trends of the personalized medicines & artificial intelligence are very fascinating where we could imagine a wending machine analysing your genetic code and advising you over food preferences so you could skip diseases tomorrow or a fist size robot conducting surgery over humans over different locations such as in deep space missions or in between a Warfield.

KEYWORDS: Artificial intelligence, Personalized Medicine, Genetic code.

ICBHE- OP0110

DEVELOPMENT APPROACH AND APPLICATION OF MAGNETIC NANOPARTICLES AND ENCAPSULATION METHOD

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ABSTRACT

Today's varied and developing field is nanotechnology. Nanoparticles' importance achieves the highest levels in pharmaceuticals, medicine, or diagnostics for medication delivery. Out of all the magnetic nanoparticles, which are new, simple to make, and have a variety of applications in biomedicine. Magnetic nanoparticles' distinctive properties display a variety of uses, including cancer treatment, customised drug administration, and illness diagnostics. An overview of this subject covers its background, benefits, and drawbacks. Magnetic nanoparticle preparation techniques and biological applications As well concentrates on the broad facts about magnetic nanoparticles and their potential. Engineered inorganic nanoparticles have been intensively examined, explored, and implemented in the biomedical area during the past few years because the platforms that have emerged from this work expand the use of the nanoparticles for specific theranostic applications. Nanosystems have the potential to create a theranostic mode that combines imaging, targeting, and therapy in a way that can deliver

individualised and tailored medicine while also integrating illness detection and treatment into a specific system. Due to their unique abilities in magnetic targeting, magnetic resonance imaging, chemotherapy, hyperthermia, bioseparation, gene therapy, enzyme immobilisation, and controlled drug release, the manipulation of magnetic nanoparticles (MNPs) as therapeutic agents has attracted growing consideration in material science. MNPs have been decorated to increase their therapeutic and diagnostic effectiveness.

KEYWORDS: Nanotechnology, magnetic nanoparticles, biomedicine, hyperthermia.

ICBHE- OP0111

STABILITY ASPECTS AND UTILIZATION OF BIOPOLYMER IN FORMULATION DEVELOPMENT

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ABSTRACT

Biopolymers have their distinct role in formulations development because of its low toxicity, stability, renewable nature, and biodegradability. The term biopolymer is assigned for materials that arise somewhere or altogether from biodegradable sources like microorganisms, plants or trees. Biopolymers have the capacity to form the hydrogels that can stimulate and supports the tissues and it also resemble the extracellular matrix and stabilize bio-components like DNA, RNA and proteins. These polymers are used in hydrogels which further utilize in biochemical processes. Addition of functional groups will provide the specific coupling which improves the process. Comparatively biopolymers contribute more biodegradability, recyclability and reduced process energy requirements. Biopolymers have appealing properties like biocompatibility and selective permeability. Biopolymers are available in broad ranges and used to apply in modern applications of different structures. Biopolymers such as xanthan are being used oilfield operations successfully, where the stability of the biopolymer is a main issue. Several known biopolymers are being utilized in pharmaceutical applications as synthetic polymers like poly-lactides (PLA), polyhydroxyal kanoates (PHAs) and poly-glycolides (PGA) and polylactide-co-glycolide co polymers (PLGA). These biopolymers are very promising and compatible with human

body. Traditionally biopolymers were also used as excipients for a long period and played a role of safeguard for formulations from its decay. Now a days Lignin based biopolymers going used in valorization and sustainable development. Biopolymers are examined and used in pharmaceutical formulation development in last decades and also used for drug delivery system.

KEYWORDS: Biodegradability, Extracellular Matrix, Coupling, Biocompatibility, Selective Permeability

ICBHE- OP0113

SOLUBILITY ENHANCEMENT TECHNIQUES FOR POORLY SOLUBLE DRUGS

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ABSTRACT

Solubility is amount of solute that can be dissolved in water at a specific temperature to form solution. Solubility is an important property that affects the drug product. Majority of new molecules discovered today are hydrophobic in nature because of combinatorial chemistry and high throughput screening that is used in discovery phase of molecule hence resulting in reduced bioavailability of drug and thus making a challenging problem in formulation development and acts as a major limiting step in launch of drug despite their good pharmacokinetic properties. According to BCS classification of drug class II and class IV are poorly soluble and hence by increasing the dissolution rate and release of the drug from dosage form can enhance its solubility

leading to increased bioavailability of drug. There are a variety of methods used to increase the solubility of the drug such as reducing the particle size by milling, micronization, nanomilling, nanocrystals formation methods. Another method is by using lipid based system such as self-emulsifying system, self-micro-emulsifying system, solid lipid nanoparticles. By using buffers, altering pH and crystallisation are methods based on chemical characteristics of drug that can be used. There are various other methods such as supercritical fluid process, spray drying, freeze spray drying, kneading method that can also be used to enhance the solubility of drug. The type of dosage form to be made, the physical and chemical properties of the active ingredient and excipients used, as well as various regulatory requirements, all play a role in choosing the right technique. The application of these methods, either singly or in combination, aids in the improvement of drug solubility, which leads to the formulation of a medication with better patient acceptance and low production costs.

FORMULATION AND OPTIMIZATION OF BIOADHESIVE TYPE GASTRORETENTIVE DOSAGE FORM OF AN ANTI-PSYCHOTIC AGENT (QUETIAPINE FUMARATE)

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ABSTRACT

Schizophrenia is a chronic, debilitating illness characterised by disruptions in cognition, affect, and behaviour, all of which have a bizarre aspect. Delusions, which are also generally bizarre, and hallucinations, which are generally auditory in nature, are also common. As the drug Quetiapine fumarate having pKa value of 3.3, so it is largely present in a unionized form and as well better absorb from the acidic pH of stomach than the basic pH condition of intestine. This drug also has a plasma half-life of 6 hours and a low oral bioavailability (9%) due to extensive first-pass metabolism, which is why Quetiapine fumarate was chosen for the current study. The study's goal was to prepare and test in vitro Quetiapine Fumarate muco-adhesive tablets. Various trials with different polymers (HPMC K100, Carbapol 934, Guar gum) were conducted during the formulation development process to improve the muco-adhesion of Quetiapine Fumarate. Increasing gastric residence time. The tablets were made using the direct compression method. The effect of HPMC polymer concentration and viscosity grades on drug release profile was investigated. According to the results of the in vitro release profile, formulation (F10) was the most promising formulation because the extent of drug release from this formulation was greater than that of other formulations suitable for once-a-day medication. Result of in-vitro muco-adhesive study and the swelling study indicate that the formulation (F10) was having considerable muco-adhesion strength and desirable swelling index.

KEYWORDS: Schizophrenia, Quetiapine fumarate, pKa, Muco-adhesive, Residence Time

ICBHE- OP0401

EXTRUSION SPHERONIZATION PELLETIZATION TECHNIQUE AND WURSTER COATING (BOTTOM SPARY) : A REVIEW

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ABSTRACT:

This review article covers a range of topics related to the extrusion-spheronization method. The first section covers several pellet production steps like granulation, extrusion, spheronization, and drying. In the second section, it is discussed how various factors, such as equipment (mixer, extruder, friction plate, and extrusion screen), formulation (moisture content, granulating liquid, excipients, and medications), and procedure (spheronizer load, spheronization time, spheronization speed, and drying method), can affect the quality of pellets. The final section

explains the many ways for characterising the pellets, including their particle size distribution, surface area, shape and sphericity, porosity, density, hardness and friability, flow characteristics, disintegration, and dissolution. Wurster coating, utilizing bottom-spray fluid-bed advance technologies, is usually used them to manufacture controlled with spraying the fixed amount of coating factor with the substrate.

KEYWORDS: Extrusion, spheronization, pelletization, granulation.

MICROEMULSION AS PROMISING DRUG DELIVERY: A REVIEW

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ABSTRACT:

The colloidal systems known as microemulsions were developed by Jack H. Shulman and they have made significant advancements in the use of micro emulsion systems in numerous scientific and industrial activities. Traditional dosage forms, including lotions and ointments, have flaws like instability issues, stickiness, poor absorption, and penetration, especially when it comes to big molecules. To combat this, the development of emulgel, which primarily focuses on the delivery of hydrophobic medicines, occurred. Emulsion has been a widely used system for many years. A family of thermodynamically stable colloidal systems known as microemulsions are made up of the dispersions of two or more immiscible liquids, one of which is continuous phase and the other is dispersed phase. The three main components of the formulation of a micro emulsion are the oil phase, the aqueous phase, and Smix (surfactant + co surfactant). The transparency, low viscosity, and thermodynamic stability of microemulsions make them easily distinguishable from regular emulsions. Due to the internal phase's high surface area, topical micro emulsions enable quick penetration of active molecules, and their constituents lessen the stratum corneum barrier function. Due to their potential for transdermal drug delivery, microemulsions thereby improve cutaneous absorption when compared to traditional formulations and are a promising carrier. Microemulsions are special drug delivery methods for medicines because of their clarity, high stability, and simplicity of manufacture. Until now, it has been demonstrated that micro emulsions can protect

labile drugs, regulate drug release, increase drug solubility, boost bioavailability, and decrease patient variability.

KEYWORDS: Micro emulsion, Colloidal system, Surfactant, transdermal drug delivery, *stratum corneum*

ICBHE- OP0409

FORMULATION AND EVALUATION OF CARBAMAZEPINE TABLETS USING BIOSURFACTANT IN TERNARY SOLID DISPERSION SYSTEM

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ABSTRACT

Carbamazepine is on the World Health Organisation's list of essential medicines. It is an anti convulsant drug used to treat epilepsy and neuropathic pain by blocking the sodium channel. Its use also lies in the treatment of bipolar disorder. According to biopharmaceutical classification system it belongs to class II as it has low solubility and high permeability. Low solubility of a drug also leads to decrease in dissolution rate which also limits the bioavailability of the drug after oral administration. In order to increase the dissolution and oral bioavailability of carbamazepine tablet ternary solid dispersion system technique using a biosurfactant has been used. Ternary solid dispersion system is dispersion of one or more active pharmaceutical ingredients in two different components at solid state. In this method drugs with low aqueous solubility like carbamazepine are molecularly dispersed in hydrophilic polymers such as polyvinyl pyrolidine, hydroxyl propyl methyl cellulose, polyethylene glycol along with the addition of biosurfactant and poloxamer 407 to improve their dissolution profile. Biosurfactants are surfactant of natural origin generally produced by microorganisms and these have good biodegradability and low critical micelle concentration. Rhamnolipids can be used as biosurfactant in ternary solid dispersion of carbamazepine. Carbamazepine ternary solid dispersion is prepared by solvent evaporation technique and then tablet preparation is done by direct compression and then tablet is evaluated to determine the enhancement in dissolution rate and bioavailability.

NOVEL APPROACHES FOR COLON SITE-SPECIFIC DRUG DELIVERY: AN OVERVIEW OF RECENT ADVANCEMENT

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ABSTRACT:

Nowadays, various routes of administration have been explored for the effective delivery of the drug to the target site. The oral route is considered to be the most convenient for the administration of drugs to patients. But it has a serious drawback in conditions where localized delivery of the

drug in the colon is required. The colon-targeted drug delivery system (CDDS) is a potential approach for systemic and topical drug delivery in treating inflammatory bowel diseases such as ulcerative colitis, Crohn's disease, colon cancer, and amoebiasis. CDDS would provide direct treatment at the site of the disease, reduced dose, and reduced systemic adverse effects. CDDS should be able to release the drug into the colon, indicating that neither drug release nor absorption should take place in the stomach or small intestine, nor should the bioactive agent be degraded there. Instead, the drug should only be released and absorbed when it reaches the colon. The colon is a site for both local and systemic drug delivery. This review mainly compares the primary approaches for CDDS (Colon Specific Drug Delivery) namely prodrugs, pH and time-dependent systems, and microbially triggered systems, which achieved limited success and had limitations as compared with newer CDDS namely pressure-controlled colonic delivery capsules, CODESTM, and osmotic controlled drug delivery systems. The review is also focused on the possible benefits and issues associated with the novel colon-targeted drug delivery system. Recent advancements in various approaches for designing colon-targeted drug delivery systems and their pharmaceutical applications are covered with a particular emphasis on formulation technologies.

KEYWORDS: colon; non-invasive drug delivery; inflammatory bowel diseases; colorectal cancer; protein drugs, Review Drug delivery system.

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ABSTRACT

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ABSTRACT:

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KEYWORDS: Artificial intelligence, Personalized Medicine, Genetic code.

ICBHE- OP0110

DEVELOPMENT APPROACH AND APPLICATION OF MAGNETIC NANOPARTICLES AND ENCAPSULATION METHOD

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ABSTRACT

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KEYWORDS: Nanotechnology, magnetic nanoparticles, biomedicine, hyperthermia.

ICBHE- OP0111

STABILITY ASPECTS AND UTILIZATION OF BIOPOLYMER IN FORMULATION DEVELOPMENT

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ABSTRACT

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ICBHE- OP0113

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ABSTRACT

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ICBHE- OP0401

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ABSTRACT:

This review article covers a range of topics related to the extrusion-spheronization method. The first section covers several pellet production steps like granulation, extrusion, spheronization, and drying. In the second section, it is discussed how various factors, such as equipment (mixer, extruder, friction plate, and extrusion screen), formulation (moisture content, granulating liquid, excipients, and medications), and procedure (spheronizer load, spheronization time, spheronization speed, and drying method), can affect the quality of pellets. The final section

explains the many ways for characterising the pellets, including their particle size distribution, surface area, shape and sphericity, porosity, density, hardness and friability, flow characteristics, disintegration, and dissolution. Wurster coating, utilizing bottom-spray fluid-bed advance technologies, is usually used them to manufacture controlled with spraying the fixed amount of coating factor with the substrate.

KEYWORDS: Extrusion, spheronization, pelletization, granulation.

MICROEMULSION AS PROMISING DRUG DELIVERY: A REVIEW

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ABSTRACT:

The colloidal systems known as microemulsions were developed by Jack H. Shulman and they have made significant advancements in the use of micro emulsion systems in numerous scientific and industrial activities. Traditional dosage forms, including lotions and ointments, have flaws like instability issues, stickiness, poor absorption, and penetration, especially when it comes to big molecules. To combat this, the development of emulgel, which primarily focuses on the delivery of hydrophobic medicines, occurred. Emulsion has been a widely used system for many years. A family of thermodynamically stable colloidal systems known as microemulsions are made up of the dispersions of two or more immiscible liquids, one of which is continuous phase and the other is dispersed phase. The three main components of the formulation of a micro emulsion are the oil phase, the aqueous phase, and Smix (surfactant + co surfactant). The transparency, low viscosity, and thermodynamic stability of microemulsions make them easily distinguishable from regular emulsions. Due to the internal phase's high surface area, topical micro emulsions enable quick penetration of active molecules, and their constituents lessen the stratum corneum barrier function. Due to their potential for transdermal drug delivery, microemulsions thereby improve cutaneous absorption when compared to traditional formulations and are a promising carrier. Microemulsions are special drug delivery methods for medicines because of their clarity, high stability, and simplicity of manufacture. Until now, it has been demonstrated that micro emulsions can protect

labile drugs, regulate drug release, increase drug solubility, boost bioavailability, and decrease patient variability.

KEYWORDS: Micro emulsion, Colloidal system, Surfactant, transdermal drug delivery, *stratum corneum*

ICBHE- OP0409

FORMULATION AND EVALUATION OF CARBAMAZEPINE TABLETS USING BIOSURFACTANT IN TERNARY SOLID DISPERSION SYSTEM

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ABSTRACT

Carbamazepine is on the World Health Organisation's list of essential medicines. It is an anti convulsant drug used to treat epilepsy and neuropathic pain by blocking the sodium channel. Its use also lies in the treatment of bipolar disorder. According to biopharmaceutical classification system it belongs to class II as it has low solubility and high permeability. Low solubility of a drug also leads to decrease in dissolution rate which also limits the bioavailability of the drug after oral administration. In order to increase the dissolution and oral bioavailability of carbamazepine tablet ternary solid dispersion system technique using a biosurfactant has been used. Ternary solid dispersion system is dispersion of one or more active pharmaceutical ingredients in two different components at solid state. In this method drugs with low aqueous solubility like carbamazepine are molecularly dispersed in hydrophilic polymers such as polyvinyl pyrolidine, hydroxyl propyl methyl cellulose, polyethylene glycol along with the addition of biosurfactant and poloxamer 407 to improve their dissolution profile. Biosurfactants are surfactant of natural origin generally produced by microorganisms and these have good biodegradability and low critical micelle concentration. Rhamnolipids can be used as biosurfactant in ternary solid dispersion of carbamazepine. Carbamazepine ternary solid dispersion is prepared by solvent evaporation technique and then tablet preparation is done by direct compression and then tablet is evaluated to determine the enhancement in dissolution rate and bioavailability.

ARTIFICIAL INTELLIGENCE IS A TOOL THAT IMPROVES THE APPLICABILITY OF PERSONALIZED MEDICINES

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ABSTRACT:

In today's fast growing world artificial intelligence is day by day penetrating our life, one of its breakthrough applications is its use in the field of personalized medicines, advancement in the field of artificial intelligence makes the field of personalized medicine more precised and accurate in disease detection, prevention, diagnosis and treatment of the disease. Artificial intelligence uses different algorithms such as artificial neural network (ANN), support vector machines (SVM), Naïve Bayes, and fuzzy logic to analyse different groups of data sets to identify a relationship

between them which leads to form a more accurate way of treatment. In recent times much of the use of AI in the development of personalized medicines has focused on the treatment of individuals with clinically obvious disease: identifying the underlying pathology, determining which interventions might make most sense to provide given what is known about that pathology and the mechanisms of action of interventions, and testing to see if a chosen intervention works also future trends of the personalized medicines & artificial intelligence are very fascinating where we could imagine a wending machine analysing your genetic code and advising you over food preferences so you could skip diseases tomorrow or a fist size robot conducting surgery over humans over different locations such as in deep space missions or in between a Warfield.

KEYWORDS: Artificial intelligence, Personalized Medicine, Genetic code.

ICBHE- OP0110

DEVELOPMENT APPROACH AND APPLICATION OF MAGNETIC NANOPARTICLES AND ENCAPSULATION METHOD

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ABSTRACT

Today's varied and developing field is nanotechnology. Nanoparticles' importance achieves the highest levels in pharmaceuticals, medicine, or diagnostics for medication delivery. Out of all the magnetic nanoparticles, which are new, simple to make, and have a variety of applications in biomedicine. Magnetic nanoparticles' distinctive properties display a variety of uses, including cancer treatment, customised drug administration, and illness diagnostics. An overview of this subject covers its background, benefits, and drawbacks. Magnetic nanoparticle preparation techniques and biological applications As well concentrates on the broad facts about magnetic nanoparticles and their potential. Engineered inorganic nanoparticles have been intensively examined, explored, and implemented in the biomedical area during the past few years because the platforms that have emerged from this work expand the use of the nanoparticles for specific theranostic applications. Nanosystems have the potential to create a theranostic mode that combines imaging, targeting, and therapy in a way that can deliver

individualised and tailored medicine while also integrating illness detection and treatment into a specific system. Due to their unique abilities in magnetic targeting, magnetic resonance imaging, chemotherapy, hyperthermia, bioseparation, gene therapy, enzyme immobilisation, and controlled drug release, the manipulation of magnetic nanoparticles (MNPs) as therapeutic agents has attracted growing consideration in material science. MNPs have been decorated to increase their therapeutic and diagnostic effectiveness.

KEYWORDS: Nanotechnology, magnetic nanoparticles, biomedicine, hyperthermia.

ICBHE- OP0111

STABILITY ASPECTS AND UTILIZATION OF BIOPOLYMER IN FORMULATION DEVELOPMENT

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ABSTRACT

Biopolymers have their distinct role in formulations development because of its low toxicity, stability, renewable nature, and biodegradability. The term biopolymer is assigned for materials that arise somewhere or altogether from biodegradable sources like microorganisms, plants or trees. Biopolymers have the capacity to form the hydrogels that can stimulate and supports the tissues and it also resemble the extracellular matrix and stabilize bio-components like DNA, RNA and proteins. These polymers are used in hydrogels which further utilize in biochemical processes. Addition of functional groups will provide the specific coupling which improves the process. Comparatively biopolymers contribute more biodegradability, recyclability and reduced process energy requirements. Biopolymers have appealing properties like biocompatibility and selective permeability. Biopolymers are available in broad ranges and used to apply in modern applications of different structures. Biopolymers such as xanthan are being used oilfield operations successfully, where the stability of the biopolymer is a main issue. Several known biopolymers are being utilized in pharmaceutical applications as synthetic polymers like poly-lactides (PLA), polyhydroxyal kanoates (PHAs) and poly-glycolides (PGA) and polylactide-co-glycolide co polymers (PLGA). These biopolymers are very promising and compatible with human

body. Traditionally biopolymers were also used as excipients for a long period and played a role of safeguard for formulations from its decay. Now a days Lignin based biopolymers going used in valorization and sustainable development. Biopolymers are examined and used in pharmaceutical formulation development in last decades and also used for drug delivery system.

KEYWORDS: Biodegradability, Extracellular Matrix, Coupling, Biocompatibility, Selective Permeability

ICBHE- OP0113

SOLUBILITY ENHANCEMENT TECHNIQUES FOR POORLY SOLUBLE DRUGS

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ABSTRACT

Solubility is amount of solute that can be dissolved in water at a specific temperature to form solution. Solubility is an important property that affects the drug product. Majority of new molecules discovered today are hydrophobic in nature because of combinatorial chemistry and high throughput screening that is used in discovery phase of molecule hence resulting in reduced bioavailability of drug and thus making a challenging problem in formulation development and acts as a major limiting step in launch of drug despite their good pharmacokinetic properties. According to BCS classification of drug class II and class IV are poorly soluble and hence by increasing the dissolution rate and release of the drug from dosage form can enhance its solubility

leading to increased bioavailability of drug. There are a variety of methods used to increase the solubility of the drug such as reducing the particle size by milling, micronization, nanomilling, nanocrystals formation methods. Another method is by using lipid based system such as self-emulsifying system, self-micro-emulsifying system, solid lipid nanoparticles. By using buffers, altering pH and crystallisation are methods based on chemical characteristics of drug that can be used. There are various other methods such as supercritical fluid process, spray drying, freeze spray drying, kneading method that can also be used to enhance the solubility of drug. The type of dosage form to be made, the physical and chemical properties of the active ingredient and excipients used, as well as various regulatory requirements, all play a role in choosing the right technique. The application of these methods, either singly or in combination, aids in the improvement of drug solubility, which leads to the formulation of a medication with better patient acceptance and low production costs.

FORMULATION AND OPTIMIZATION OF BIOADHESIVE TYPE GASTRORETENTIVE DOSAGE FORM OF AN ANTI-PSYCHOTIC AGENT (QUETIAPINE FUMARATE)

Shashikant Goswami[1*], Anuj Pathak[2], Mayank Tyagi[3], Dr N G Raghavendra Rao[4], Prashant Sharma[5]

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ABSTRACT

Schizophrenia is a chronic, debilitating illness characterised by disruptions in cognition, affect, and behaviour, all of which have a bizarre aspect. Delusions, which are also generally bizarre, and hallucinations, which are generally auditory in nature, are also common. As the drug Quetiapine fumarate having pKa value of 3.3, so it is largely present in a unionized form and as well better absorb from the acidic pH of stomach than the basic pH condition of intestine. This drug also has a plasma half-life of 6 hours and a low oral bioavailability (9%) due to extensive first-pass metabolism, which is why Quetiapine fumarate was chosen for the current study. The study's goal was to prepare and test in vitro Quetiapine Fumarate muco-adhesive tablets. Various trials with different polymers (HPMC K100, Carbapol 934, Guar gum) were conducted during the formulation development process to improve the muco-adhesion of Quetiapine Fumarate. Increasing gastric residence time. The tablets were made using the direct compression method. The effect of HPMC polymer concentration and viscosity grades on drug release profile was investigated. According to the results of the in vitro release profile, formulation (F10) was the most promising formulation because the extent of drug release from this formulation was greater than that of other formulations suitable for once-a-day medication. Result of in-vitro muco-adhesive study and the swelling study indicate that the formulation (F10) was having considerable muco-adhesion strength and desirable swelling index.

KEYWORDS: Schizophrenia, Quetiapine fumarate, pKa, Muco-adhesive, Residence Time

ICBHE- OP0401

EXTRUSION SPHERONIZATION PELLETIZATION TECHNIQUE AND WURSTER COATING (BOTTOM SPARY) : A REVIEW

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This review article covers a range of topics related to the extrusion-spheronization method. The first section covers several pellet production steps like granulation, extrusion, spheronization, and drying. In the second section, it is discussed how various factors, such as equipment (mixer, extruder, friction plate, and extrusion screen), formulation (moisture content, granulating liquid, excipients, and medications), and procedure (spheronizer load, spheronization time, spheronization speed, and drying method), can affect the quality of pellets. The final section

explains the many ways for characterising the pellets, including their particle size distribution, surface area, shape and sphericity, porosity, density, hardness and friability, flow characteristics, disintegration, and dissolution. Wurster coating, utilizing bottom-spray fluid-bed advance technologies, is usually used them to manufacture controlled with spraying the fixed amount of coating factor with the substrate.

KEYWORDS: Extrusion, spheronization, pelletization, granulation.

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Neeshu Tevetia[1]*

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ICBHE- OP0110

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Keshav Sharma[1], Anuj Pathak[2] , Aryan p. Rawat[3], Garima Katyal[4]

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ABSTRACT

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KEYWORDS: Nanotechnology, magnetic nanoparticles, biomedicine, hyperthermia.

ICBHE- OP0111

STABILITY ASPECTS AND UTILIZATION OF BIOPOLYMER IN FORMULATION DEVELOPMENT

Anshika Malik[1], Anuj Pathak[2] , Sanjay Singh[3],Garima katyal[4]

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ABSTRACT

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KEYWORDS: Biodegradability, Extracellular Matrix, Coupling, Biocompatibility, Selective Permeability

ICBHE- OP0113

SOLUBILITY ENHANCEMENT TECHNIQUES FOR POORLY SOLUBLE DRUGS

Anuj Pathak, Nikhil kumar Singh, Rohit Tomar, Vaibhav Sharma

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ABSTRACT

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ICBHE- OP0401

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ABSTRACT:

In today's fast growing world artificial intelligence is day by day penetrating our life, one of its breakthrough applications is its use in the field of personalized medicines, advancement in the field of artificial intelligence makes the field of personalized medicine more precised and accurate in disease detection, prevention, diagnosis and treatment of the disease. Artificial intelligence uses different algorithms such as artificial neural network (ANN), support vector machines (SVM), Naïve Bayes, and fuzzy logic to analyse different groups of data sets to identify a relationship

between them which leads to form a more accurate way of treatment. In recent times much of the use of AI in the development of personalized medicines has focused on the treatment of individuals with clinically obvious disease: identifying the underlying pathology, determining which interventions might make most sense to provide given what is known about that pathology and the mechanisms of action of interventions, and testing to see if a chosen intervention works also future trends of the personalized medicines & artificial intelligence are very fascinating where we could imagine a wending machine analysing your genetic code and advising you over food preferences so you could skip diseases tomorrow or a fist size robot conducting surgery over humans over different locations such as in deep space missions or in between a Warfield.

KEYWORDS: Artificial intelligence, Personalized Medicine, Genetic code.

ICBHE- OP0110

DEVELOPMENT APPROACH AND APPLICATION OF MAGNETIC NANOPARTICLES AND ENCAPSULATION METHOD

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ABSTRACT

Today's varied and developing field is nanotechnology. Nanoparticles' importance achieves the highest levels in pharmaceuticals, medicine, or diagnostics for medication delivery. Out of all the magnetic nanoparticles, which are new, simple to make, and have a variety of applications in biomedicine. Magnetic nanoparticles' distinctive properties display a variety of uses, including cancer treatment, customised drug administration, and illness diagnostics. An overview of this subject covers its background, benefits, and drawbacks. Magnetic nanoparticle preparation techniques and biological applications As well concentrates on the broad facts about magnetic nanoparticles and their potential. Engineered inorganic nanoparticles have been intensively examined, explored, and implemented in the biomedical area during the past few years because the platforms that have emerged from this work expand the use of the nanoparticles for specific theranostic applications. Nanosystems have the potential to create a theranostic mode that combines imaging, targeting, and therapy in a way that can deliver

individualised and tailored medicine while also integrating illness detection and treatment into a specific system. Due to their unique abilities in magnetic targeting, magnetic resonance imaging, chemotherapy, hyperthermia, bioseparation, gene therapy, enzyme immobilisation, and controlled drug release, the manipulation of magnetic nanoparticles (MNPs) as therapeutic agents has attracted growing consideration in material science. MNPs have been decorated to increase their therapeutic and diagnostic effectiveness.

KEYWORDS: Nanotechnology, magnetic nanoparticles, biomedicine, hyperthermia.

ICBHE- OP0111

STABILITY ASPECTS AND UTILIZATION OF BIOPOLYMER IN FORMULATION DEVELOPMENT

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ABSTRACT

Biopolymers have their distinct role in formulations development because of its low toxicity, stability, renewable nature, and biodegradability. The term biopolymer is assigned for materials that arise somewhere or altogether from biodegradable sources like microorganisms, plants or trees. Biopolymers have the capacity to form the hydrogels that can stimulate and supports the tissues and it also resemble the extracellular matrix and stabilize bio-components like DNA, RNA and proteins. These polymers are used in hydrogels which further utilize in biochemical processes. Addition of functional groups will provide the specific coupling which improves the process. Comparatively biopolymers contribute more biodegradability, recyclability and reduced process energy requirements. Biopolymers have appealing properties like biocompatibility and selective permeability. Biopolymers are available in broad ranges and used to apply in modern applications of different structures. Biopolymers such as xanthan are being used oilfield operations successfully, where the stability of the biopolymer is a main issue. Several known biopolymers are being utilized in pharmaceutical applications as synthetic polymers like poly-lactides (PLA), polyhydroxyal kanoates (PHAs) and poly-glycolides (PGA) and polylactide-co-glycolide co polymers (PLGA). These biopolymers are very promising and compatible with human

body. Traditionally biopolymers were also used as excipients for a long period and played a role of safeguard for formulations from its decay. Now a days Lignin based biopolymers going used in valorization and sustainable development. Biopolymers are examined and used in pharmaceutical formulation development in last decades and also used for drug delivery system.

KEYWORDS: Biodegradability, Extracellular Matrix, Coupling, Biocompatibility, Selective Permeability

ICBHE- OP0113

SOLUBILITY ENHANCEMENT TECHNIQUES FOR POORLY SOLUBLE DRUGS

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ABSTRACT

Solubility is amount of solute that can be dissolved in water at a specific temperature to form solution. Solubility is an important property that affects the drug product. Majority of new molecules discovered today are hydrophobic in nature because of combinatorial chemistry and high throughput screening that is used in discovery phase of molecule hence resulting in reduced bioavailability of drug and thus making a challenging problem in formulation development and acts as a major limiting step in launch of drug despite their good pharmacokinetic properties. According to BCS classification of drug class II and class IV are poorly soluble and hence by increasing the dissolution rate and release of the drug from dosage form can enhance its solubility

leading to increased bioavailability of drug. There are a variety of methods used to increase the solubility of the drug such as reducing the particle size by milling, micronization, nanomilling, nanocrystals formation methods. Another method is by using lipid based system such as self-emulsifying system, self-micro-emulsifying system, solid lipid nanoparticles. By using buffers, altering pH and crystallisation are methods based on chemical characteristics of drug that can be used. There are various other methods such as supercritical fluid process, spray drying, freeze spray drying, kneading method that can also be used to enhance the solubility of drug. The type of dosage form to be made, the physical and chemical properties of the active ingredient and excipients used, as well as various regulatory requirements, all play a role in choosing the right technique. The application of these methods, either singly or in combination, aids in the improvement of drug solubility, which leads to the formulation of a medication with better patient acceptance and low production costs.

FORMULATION AND OPTIMIZATION OF BIOADHESIVE TYPE GASTRORETENTIVE DOSAGE FORM OF AN ANTI-PSYCHOTIC AGENT (QUETIAPINE FUMARATE)

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ABSTRACT

Schizophrenia is a chronic, debilitating illness characterised by disruptions in cognition, affect, and behaviour, all of which have a bizarre aspect. Delusions, which are also generally bizarre, and hallucinations, which are generally auditory in nature, are also common. As the drug Quetiapine fumarate having pKa value of 3.3, so it is largely present in a unionized form and as well better absorb from the acidic pH of stomach than the basic pH condition of intestine. This drug also has a plasma half-life of 6 hours and a low oral bioavailability (9%) due to extensive first-pass metabolism, which is why Quetiapine fumarate was chosen for the current study. The study's goal was to prepare and test in vitro Quetiapine Fumarate muco-adhesive tablets. Various trials with different polymers (HPMC K100, Carbapol 934, Guar gum) were conducted during the formulation development process to improve the muco-adhesion of Quetiapine Fumarate. Increasing gastric residence time. The tablets were made using the direct compression method. The effect of HPMC polymer concentration and viscosity grades on drug release profile was investigated. According to the results of the in vitro release profile, formulation (F10) was the most promising formulation because the extent of drug release from this formulation was greater than that of other formulations suitable for once-a-day medication. Result of in-vitro muco-adhesive study and the swelling study indicate that the formulation (F10) was having considerable muco-adhesion strength and desirable swelling index.

KEYWORDS: Schizophrenia, Quetiapine fumarate, pKa, Muco-adhesive, Residence Time

ICBHE- OP0401

EXTRUSION SPHERONIZATION PELLETIZATION TECHNIQUE AND WURSTER COATING (BOTTOM SPARY) : A REVIEW

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ABSTRACT:

This review article covers a range of topics related to the extrusion-spheronization method. The first section covers several pellet production steps like granulation, extrusion, spheronization, and drying. In the second section, it is discussed how various factors, such as equipment (mixer, extruder, friction plate, and extrusion screen), formulation (moisture content, granulating liquid, excipients, and medications), and procedure (spheronizer load, spheronization time, spheronization speed, and drying method), can affect the quality of pellets. The final section

explains the many ways for characterising the pellets, including their particle size distribution, surface area, shape and sphericity, porosity, density, hardness and friability, flow characteristics, disintegration, and dissolution. Wurster coating, utilizing bottom-spray fluid-bed advance technologies, is usually used them to manufacture controlled with spraying the fixed amount of coating factor with the substrate.

KEYWORDS: Extrusion, spheronization, pelletization, granulation.

MICROEMULSION AS PROMISING DRUG DELIVERY: A REVIEW

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ABSTRACT:

The colloidal systems known as microemulsions were developed by Jack H. Shulman and they have made significant advancements in the use of micro emulsion systems in numerous scientific and industrial activities. Traditional dosage forms, including lotions and ointments, have flaws like instability issues, stickiness, poor absorption, and penetration, especially when it comes to big molecules. To combat this, the development of emulgel, which primarily focuses on the delivery of hydrophobic medicines, occurred. Emulsion has been a widely used system for many years. A family of thermodynamically stable colloidal systems known as microemulsions are made up of the dispersions of two or more immiscible liquids, one of which is continuous phase and the other is dispersed phase. The three main components of the formulation of a micro emulsion are the oil phase, the aqueous phase, and Smix (surfactant + co surfactant). The transparency, low viscosity, and thermodynamic stability of microemulsions make them easily distinguishable from regular emulsions. Due to the internal phase's high surface area, topical micro emulsions enable quick penetration of active molecules, and their constituents lessen the stratum corneum barrier function. Due to their potential for transdermal drug delivery, microemulsions thereby improve cutaneous absorption when compared to traditional formulations and are a promising carrier. Microemulsions are special drug delivery methods for medicines because of their clarity, high stability, and simplicity of manufacture. Until now, it has been demonstrated that micro emulsions can protect

labile drugs, regulate drug release, increase drug solubility, boost bioavailability, and decrease patient variability.

KEYWORDS: Micro emulsion, Colloidal system, Surfactant, transdermal drug delivery, *stratum corneum*

ICBHE- OP0409

FORMULATION AND EVALUATION OF CARBAMAZEPINE TABLETS USING BIOSURFACTANT IN TERNARY SOLID DISPERSION SYSTEM

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ABSTRACT

Carbamazepine is on the World Health Organisation's list of essential medicines. It is an anti convulsant drug used to treat epilepsy and neuropathic pain by blocking the sodium channel. Its use also lies in the treatment of bipolar disorder. According to biopharmaceutical classification system it belongs to class II as it has low solubility and high permeability. Low solubility of a drug also leads to decrease in dissolution rate which also limits the bioavailability of the drug after oral administration. In order to increase the dissolution and oral bioavailability of carbamazepine tablet ternary solid dispersion system technique using a biosurfactant has been used. Ternary solid dispersion system is dispersion of one or more active pharmaceutical ingredients in two different components at solid state. In this method drugs with low aqueous solubility like carbamazepine are molecularly dispersed in hydrophilic polymers such as polyvinyl pyrolidine, hydroxyl propyl methyl cellulose, polyethylene glycol along with the addition of biosurfactant and poloxamer 407 to improve their dissolution profile. Biosurfactants are surfactant of natural origin generally produced by microorganisms and these have good biodegradability and low critical micelle concentration. Rhamnolipids can be used as biosurfactant in ternary solid dispersion of carbamazepine. Carbamazepine ternary solid dispersion is prepared by solvent evaporation technique and then tablet preparation is done by direct compression and then tablet is evaluated to determine the enhancement in dissolution rate and bioavailability.

ARTIFICIAL INTELLIGENCE IS A TOOL THAT IMPROVES THE APPLICABILITY OF PERSONALIZED MEDICINES

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ABSTRACT:

In today's fast growing world artificial intelligence is day by day penetrating our life, one of its breakthrough applications is its use in the field of personalized medicines, advancement in the field of artificial intelligence makes the field of personalized medicine more precised and accurate in disease detection, prevention, diagnosis and treatment of the disease. Artificial intelligence uses different algorithms such as artificial neural network (ANN), support vector machines (SVM), Naïve Bayes, and fuzzy logic to analyse different groups of data sets to identify a relationship

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ICBHE- OP0110

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ABSTRACT

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KEYWORDS: Nanotechnology, magnetic nanoparticles, biomedicine, hyperthermia.

ICBHE- OP0111

STABILITY ASPECTS AND UTILIZATION OF BIOPOLYMER IN FORMULATION DEVELOPMENT

Anshika Malik[1], Anuj Pathak[2] , Sanjay Singh[3],Garima katyal[4]

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ABSTRACT

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body. Traditionally biopolymers were also used as excipients for a long period and played a role of safeguard for formulations from its decay. Now a days Lignin based biopolymers going used in valorization and sustainable development. Biopolymers are examined and used in pharmaceutical formulation development in last decades and also used for drug delivery system.

KEYWORDS: Biodegradability, Extracellular Matrix, Coupling, Biocompatibility, Selective Permeability

ICBHE- OP0113

SOLUBILITY ENHANCEMENT TECHNIQUES FOR POORLY SOLUBLE DRUGS

Anuj Pathak, Nikhil kumar Singh, Rohit Tomar, Vaibhav Sharma

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ABSTRACT

Solubility is amount of solute that can be dissolved in water at a specific temperature to form solution. Solubility is an important property that affects the drug product. Majority of new molecules discovered today are hydrophobic in nature because of combinatorial chemistry and high throughput screening that is used in discovery phase of molecule hence resulting in reduced bioavailability of drug and thus making a challenging problem in formulation development and acts as a major limiting step in launch of drug despite their good pharmacokinetic properties. According to BCS classification of drug class II and class IV are poorly soluble and hence by increasing the dissolution rate and release of the drug from dosage form can enhance its solubility

leading to increased bioavailability of drug. There are a variety of methods used to increase the solubility of the drug such as reducing the particle size by milling, micronization, nanomilling, nanocrystals formation methods. Another method is by using lipid based system such as self-emulsifying system, self-micro-emulsifying system, solid lipid nanoparticles. By using buffers, altering pH and crystallisation are methods based on chemical characteristics of drug that can be used. There are various other methods such as supercritical fluid process, spray drying, freeze spray drying, kneading method that can also be used to enhance the solubility of drug. The type of dosage form to be made, the physical and chemical properties of the active ingredient and excipients used, as well as various regulatory requirements, all play a role in choosing the right technique. The application of these methods, either singly or in combination, aids in the improvement of drug solubility, which leads to the formulation of a medication with better patient acceptance and low production costs.

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Shashikant Goswami[1*], Anuj Pathak[2], Mayank Tyagi[3], Dr N G Raghavendra Rao[4], Prashant Sharma[5]

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ABSTRACT

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KEYWORDS: Schizophrenia, Quetiapine fumarate, pKa, Muco-adhesive, Residence Time

ICBHE- OP0401

EXTRUSION SPHERONIZATION PELLETIZATION TECHNIQUE AND WURSTER COATING (BOTTOM SPARY) : A REVIEW

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ABSTRACT:

This review article covers a range of topics related to the extrusion-spheronization method. The first section covers several pellet production steps like granulation, extrusion, spheronization, and drying. In the second section, it is discussed how various factors, such as equipment (mixer, extruder, friction plate, and extrusion screen), formulation (moisture content, granulating liquid, excipients, and medications), and procedure (spheronizer load, spheronization time, spheronization speed, and drying method), can affect the quality of pellets. The final section

explains the many ways for characterising the pellets, including their particle size distribution, surface area, shape and sphericity, porosity, density, hardness and friability, flow characteristics, disintegration, and dissolution. Wurster coating, utilizing bottom-spray fluid-bed advance technologies, is usually used them to manufacture controlled with spraying the fixed amount of coating factor with the substrate.

KEYWORDS: Extrusion, spheronization, pelletization, granulation.

MICROEMULSION AS PROMISING DRUG DELIVERY: A REVIEW

Neeshu Tevetia[1]*

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ABSTRACT:

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KEYWORDS: Micro emulsion, Colloidal system, Surfactant, transdermal drug delivery, *stratum corneum*

ICBHE- OP0409

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ABSTRACT

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KEYWORDS: Artificial intelligence, Personalized Medicine, Genetic code.

ICBHE- OP0110

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ABSTRACT

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KEYWORDS: Nanotechnology, magnetic nanoparticles, biomedicine, hyperthermia.

ICBHE- OP0111

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ABSTRACT

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ICBHE- OP0113

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ABSTRACT

Solubility is amount of solute that can be dissolved in water at a specific temperature to form solution. Solubility is an important property that affects the drug product. Majority of new molecules discovered today are hydrophobic in nature because of combinatorial chemistry and high throughput screening that is used in discovery phase of molecule hence resulting in reduced bioavailability of drug and thus making a challenging problem in formulation development and acts as a major limiting step in launch of drug despite their good pharmacokinetic properties. According to BCS classification of drug class II and class IV are poorly soluble and hence by increasing the dissolution rate and release of the drug from dosage form can enhance its solubility

leading to increased bioavailability of drug. There are a variety of methods used to increase the solubility of the drug such as reducing the particle size by milling, micronization, nanomilling, nanocrystals formation methods. Another method is by using lipid based system such as self-emulsifying system, self-micro-emulsifying system, solid lipid nanoparticles. By using buffers, altering pH and crystallisation are methods based on chemical characteristics of drug that can be used. There are various other methods such as supercritical fluid process, spray drying, freeze spray drying, kneading method that can also be used to enhance the solubility of drug. The type of dosage form to be made, the physical and chemical properties of the active ingredient and excipients used, as well as various regulatory requirements, all play a role in choosing the right technique. The application of these methods, either singly or in combination, aids in the improvement of drug solubility, which leads to the formulation of a medication with better patient acceptance and low production costs.

FORMULATION AND OPTIMIZATION OF BIOADHESIVE TYPE GASTRORETENTIVE DOSAGE FORM OF AN ANTI-PSYCHOTIC AGENT (QUETIAPINE FUMARATE)

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ABSTRACT

Schizophrenia is a chronic, debilitating illness characterised by disruptions in cognition, affect, and behaviour, all of which have a bizarre aspect. Delusions, which are also generally bizarre, and hallucinations, which are generally auditory in nature, are also common. As the drug Quetiapine fumarate having pKa value of 3.3, so it is largely present in a unionized form and as well better absorb from the acidic pH of stomach than the basic pH condition of intestine. This drug also has a plasma half-life of 6 hours and a low oral bioavailability (9%) due to extensive first-pass metabolism, which is why Quetiapine fumarate was chosen for the current study. The study's goal was to prepare and test in vitro Quetiapine Fumarate muco-adhesive tablets. Various trials with different polymers (HPMC K100, Carbapol 934, Guar gum) were conducted during the formulation development process to improve the muco-adhesion of Quetiapine Fumarate. Increasing gastric residence time. The tablets were made using the direct compression method. The effect of HPMC polymer concentration and viscosity grades on drug release profile was investigated. According to the results of the in vitro release profile, formulation (F10) was the most promising formulation because the extent of drug release from this formulation was greater than that of other formulations suitable for once-a-day medication. Result of in-vitro muco-adhesive study and the swelling study indicate that the formulation (F10) was having considerable muco-adhesion strength and desirable swelling index.

KEYWORDS: Schizophrenia, Quetiapine fumarate, pKa, Muco-adhesive, Residence Time

ICBHE- OP0401

EXTRUSION SPHERONIZATION PELLETIZATION TECHNIQUE AND WURSTER COATING (BOTTOM SPARY) : A REVIEW

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ABSTRACT:

This review article covers a range of topics related to the extrusion-spheronization method. The first section covers several pellet production steps like granulation, extrusion, spheronization, and drying. In the second section, it is discussed how various factors, such as equipment (mixer, extruder, friction plate, and extrusion screen), formulation (moisture content, granulating liquid, excipients, and medications), and procedure (spheronizer load, spheronization time, spheronization speed, and drying method), can affect the quality of pellets. The final section

explains the many ways for characterising the pellets, including their particle size distribution, surface area, shape and sphericity, porosity, density, hardness and friability, flow characteristics, disintegration, and dissolution. Wurster coating, utilizing bottom-spray fluid-bed advance technologies, is usually used them to manufacture controlled with spraying the fixed amount of coating factor with the substrate.

KEYWORDS: Extrusion, spheronization, pelletization, granulation.

MICROEMULSION AS PROMISING DRUG DELIVERY: A REVIEW

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ABSTRACT:

The colloidal systems known as microemulsions were developed by Jack H. Shulman and they have made significant advancements in the use of micro emulsion systems in numerous scientific and industrial activities. Traditional dosage forms, including lotions and ointments, have flaws like instability issues, stickiness, poor absorption, and penetration, especially when it comes to big molecules. To combat this, the development of emulgel, which primarily focuses on the delivery of hydrophobic medicines, occurred. Emulsion has been a widely used system for many years. A family of thermodynamically stable colloidal systems known as microemulsions are made up of the dispersions of two or more immiscible liquids, one of which is continuous phase and the other is dispersed phase. The three main components of the formulation of a micro emulsion are the oil phase, the aqueous phase, and Smix (surfactant + co surfactant). The transparency, low viscosity, and thermodynamic stability of microemulsions make them easily distinguishable from regular emulsions. Due to the internal phase's high surface area, topical micro emulsions enable quick penetration of active molecules, and their constituents lessen the stratum corneum barrier function. Due to their potential for transdermal drug delivery, microemulsions thereby improve cutaneous absorption when compared to traditional formulations and are a promising carrier. Microemulsions are special drug delivery methods for medicines because of their clarity, high stability, and simplicity of manufacture. Until now, it has been demonstrated that micro emulsions can protect

labile drugs, regulate drug release, increase drug solubility, boost bioavailability, and decrease patient variability.

KEYWORDS: Micro emulsion, Colloidal system, Surfactant, transdermal drug delivery, *stratum corneum*

ICBHE- OP0409

FORMULATION AND EVALUATION OF CARBAMAZEPINE TABLETS USING BIOSURFACTANT IN TERNARY SOLID DISPERSION SYSTEM

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ABSTRACT

Carbamazepine is on the World Health Organisation's list of essential medicines. It is an anti convulsant drug used to treat epilepsy and neuropathic pain by blocking the sodium channel. Its use also lies in the treatment of bipolar disorder. According to biopharmaceutical classification system it belongs to class II as it has low solubility and high permeability. Low solubility of a drug also leads to decrease in dissolution rate which also limits the bioavailability of the drug after oral administration. In order to increase the dissolution and oral bioavailability of carbamazepine tablet ternary solid dispersion system technique using a biosurfactant has been used. Ternary solid dispersion system is dispersion of one or more active pharmaceutical ingredients in two different components at solid state. In this method drugs with low aqueous solubility like carbamazepine are molecularly dispersed in hydrophilic polymers such as polyvinyl pyrolidine, hydroxyl propyl methyl cellulose, polyethylene glycol along with the addition of biosurfactant and poloxamer 407 to improve their dissolution profile. Biosurfactants are surfactant of natural origin generally produced by microorganisms and these have good biodegradability and low critical micelle concentration. Rhamnolipids can be used as biosurfactant in ternary solid dispersion of carbamazepine. Carbamazepine ternary solid dispersion is prepared by solvent evaporation technique and then tablet preparation is done by direct compression and then tablet is evaluated to determine the enhancement in dissolution rate and bioavailability.

ARTIFICIAL INTELLIGENCE IS A TOOL THAT IMPROVES THE APPLICABILITY OF PERSONALIZED MEDICINES

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ABSTRACT:

In today's fast growing world artificial intelligence is day by day penetrating our life, one of its breakthrough applications is its use in the field of personalized medicines, advancement in the field of artificial intelligence makes the field of personalized medicine more precised and accurate in disease detection, prevention, diagnosis and treatment of the disease. Artificial intelligence uses different algorithms such as artificial neural network (ANN), support vector machines (SVM), Naïve Bayes, and fuzzy logic to analyse different groups of data sets to identify a relationship

between them which leads to form a more accurate way of treatment. In recent times much of the use of AI in the development of personalized medicines has focused on the treatment of individuals with clinically obvious disease: identifying the underlying pathology, determining which interventions might make most sense to provide given what is known about that pathology and the mechanisms of action of interventions, and testing to see if a chosen intervention works also future trends of the personalized medicines & artificial intelligence are very fascinating where we could imagine a wending machine analysing your genetic code and advising you over food preferences so you could skip diseases tomorrow or a fist size robot conducting surgery over humans over different locations such as in deep space missions or in between a Warfield.

KEYWORDS: Artificial intelligence, Personalized Medicine, Genetic code.

ICBHE- OP0110

DEVELOPMENT APPROACH AND APPLICATION OF MAGNETIC NANOPARTICLES AND ENCAPSULATION METHOD

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ABSTRACT

Today's varied and developing field is nanotechnology. Nanoparticles' importance achieves the highest levels in pharmaceuticals, medicine, or diagnostics for medication delivery. Out of all the magnetic nanoparticles, which are new, simple to make, and have a variety of applications in biomedicine. Magnetic nanoparticles' distinctive properties display a variety of uses, including cancer treatment, customised drug administration, and illness diagnostics. An overview of this subject covers its background, benefits, and drawbacks. Magnetic nanoparticle preparation techniques and biological applications As well concentrates on the broad facts about magnetic nanoparticles and their potential. Engineered inorganic nanoparticles have been intensively examined, explored, and implemented in the biomedical area during the past few years because the platforms that have emerged from this work expand the use of the nanoparticles for specific theranostic applications. Nanosystems have the potential to create a theranostic mode that combines imaging, targeting, and therapy in a way that can deliver

individualised and tailored medicine while also integrating illness detection and treatment into a specific system. Due to their unique abilities in magnetic targeting, magnetic resonance imaging, chemotherapy, hyperthermia, bioseparation, gene therapy, enzyme immobilisation, and controlled drug release, the manipulation of magnetic nanoparticles (MNPs) as therapeutic agents has attracted growing consideration in material science. MNPs have been decorated to increase their therapeutic and diagnostic effectiveness.

KEYWORDS: Nanotechnology, magnetic nanoparticles, biomedicine, hyperthermia.

ICBHE- OP0111

STABILITY ASPECTS AND UTILIZATION OF BIOPOLYMER IN FORMULATION DEVELOPMENT

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ABSTRACT

Biopolymers have their distinct role in formulations development because of its low toxicity, stability, renewable nature, and biodegradability. The term biopolymer is assigned for materials that arise somewhere or altogether from biodegradable sources like microorganisms, plants or trees. Biopolymers have the capacity to form the hydrogels that can stimulate and supports the tissues and it also resemble the extracellular matrix and stabilize bio-components like DNA, RNA and proteins. These polymers are used in hydrogels which further utilize in biochemical processes. Addition of functional groups will provide the specific coupling which improves the process. Comparatively biopolymers contribute more biodegradability, recyclability and reduced process energy requirements. Biopolymers have appealing properties like biocompatibility and selective permeability. Biopolymers are available in broad ranges and used to apply in modern applications of different structures. Biopolymers such as xanthan are being used oilfield operations successfully, where the stability of the biopolymer is a main issue. Several known biopolymers are being utilized in pharmaceutical applications as synthetic polymers like poly-lactides (PLA), polyhydroxyal kanoates (PHAs) and poly-glycolides (PGA) and polylactide-co-glycolide co polymers (PLGA). These biopolymers are very promising and compatible with human

body. Traditionally biopolymers were also used as excipients for a long period and played a role of safeguard for formulations from its decay. Now a days Lignin based biopolymers going used in valorization and sustainable development. Biopolymers are examined and used in pharmaceutical formulation development in last decades and also used for drug delivery system.

KEYWORDS: Biodegradability, Extracellular Matrix, Coupling, Biocompatibility, Selective Permeability

ICBHE- OP0113

SOLUBILITY ENHANCEMENT TECHNIQUES FOR POORLY SOLUBLE DRUGS

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ABSTRACT

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leading to increased bioavailability of drug. There are a variety of methods used to increase the solubility of the drug such as reducing the particle size by milling, micronization, nanomilling, nanocrystals formation methods. Another method is by using lipid based system such as self-emulsifying system, self-micro-emulsifying system, solid lipid nanoparticles. By using buffers, altering pH and crystallisation are methods based on chemical characteristics of drug that can be used. There are various other methods such as supercritical fluid process, spray drying, freeze spray drying, kneading method that can also be used to enhance the solubility of drug. The type of dosage form to be made, the physical and chemical properties of the active ingredient and excipients used, as well as various regulatory requirements, all play a role in choosing the right technique. The application of these methods, either singly or in combination, aids in the improvement of drug solubility, which leads to the formulation of a medication with better patient acceptance and low production costs.

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KEYWORDS: Schizophrenia, Quetiapine fumarate, pKa, Muco-adhesive, Residence Time

ICBHE- OP0401

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Mayank Tyagi*, Anuj Pathak, N.G. Raghavendra Rao, Shashikant Goswami

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This review article covers a range of topics related to the extrusion-spheronization method. The first section covers several pellet production steps like granulation, extrusion, spheronization, and drying. In the second section, it is discussed how various factors, such as equipment (mixer, extruder, friction plate, and extrusion screen), formulation (moisture content, granulating liquid, excipients, and medications), and procedure (spheronizer load, spheronization time, spheronization speed, and drying method), can affect the quality of pellets. The final section

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KEYWORDS: Extrusion, spheronization, pelletization, granulation.

MICROEMULSION AS PROMISING DRUG DELIVERY: A REVIEW

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ABSTRACT:

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KEYWORDS: Micro emulsion, Colloidal system, Surfactant, transdermal drug delivery, *stratum corneum*

ICBHE- OP0409

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ABSTRACT

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ABSTRACT:

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between them which leads to form a more accurate way of treatment. In recent times much of the use of AI in the development of personalized medicines has focused on the treatment of individuals with clinically obvious disease: identifying the underlying pathology, determining which interventions might make most sense to provide given what is known about that pathology and the mechanisms of action of interventions, and testing to see if a chosen intervention works also future trends of the personalized medicines & artificial intelligence are very fascinating where we could imagine a wending machine analysing your genetic code and advising you over food preferences so you could skip diseases tomorrow or a fist size robot conducting surgery over humans over different locations such as in deep space missions or in between a Warfield.

KEYWORDS: Artificial intelligence, Personalized Medicine, Genetic code.

ICBHE- OP0110

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Keshav Sharma[1], Anuj Pathak[2] , Aryan p. Rawat[3], Garima Katyal[4]

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ABSTRACT

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KEYWORDS: Nanotechnology, magnetic nanoparticles, biomedicine, hyperthermia.

ICBHE- OP0111

STABILITY ASPECTS AND UTILIZATION OF BIOPOLYMER IN FORMULATION DEVELOPMENT

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ABSTRACT

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KEYWORDS: Biodegradability, Extracellular Matrix, Coupling, Biocompatibility, Selective Permeability

ICBHE- OP0113

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ICBHE- OP0401

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KEYWORDS: Extrusion, spheronization, pelletization, granulation.

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[1] KIET school of pharmacy, KIET group of Institutions Delhi NCR, Ghaziabad 201206, India

ABSTRACT:

The colloidal systems known as microemulsions were developed by Jack H. Shulman and they have made significant advancements in the use of micro emulsion systems in numerous scientific and industrial activities. Traditional dosage forms, including lotions and ointments, have flaws like instability issues, stickiness, poor absorption, and penetration, especially when it comes to big molecules. To combat this, the development of emulgel, which primarily focuses on the delivery of hydrophobic medicines, occurred. Emulsion has been a widely used system for many years. A family of thermodynamically stable colloidal systems known as microemulsions are made up of the dispersions of two or more immiscible liquids, one of which is continuous phase and the other is dispersed phase. The three main components of the formulation of a micro emulsion are the oil phase, the aqueous phase, and Smix (surfactant + co surfactant). The transparency, low viscosity, and thermodynamic stability of microemulsions make them easily distinguishable from regular emulsions. Due to the internal phase's high surface area, topical micro emulsions enable quick penetration of active molecules, and their constituents lessen the stratum corneum barrier function. Due to their potential for transdermal drug delivery, microemulsions thereby improve cutaneous absorption when compared to traditional formulations and are a promising carrier. Microemulsions are special drug delivery methods for medicines because of their clarity, high stability, and simplicity of manufacture. Until now, it has been demonstrated that micro emulsions can protect

labile drugs, regulate drug release, increase drug solubility, boost bioavailability, and decrease patient variability.

KEYWORDS: Micro emulsion, Colloidal system, Surfactant, transdermal drug delivery, *stratum corneum*

ICBHE- OP0409

FORMULATION AND EVALUATION OF CARBAMAZEPINE TABLETS USING BIOSURFACTANT IN TERNARY SOLID DISPERSION SYSTEM

Sahil Tyagi[1], Anuj Pathak[2], Shagun Nehra[3], Rohit Tomar[4]

KIET school of pharmacy, Delhi-NCR Ghaziabad-Meerut road Pin code- 201206

Email id- sahil.tyagi250@gmail.com

ABSTRACT

Carbamazepine is on the World Health Organisation's list of essential medicines. It is an anti convulsant drug used to treat epilepsy and neuropathic pain by blocking the sodium channel. Its use also lies in the treatment of bipolar disorder. According to biopharmaceutical classification system it belongs to class II as it has low solubility and high permeability. Low solubility of a drug also leads to decrease in dissolution rate which also limits the bioavailability of the drug after oral administration. In order to increase the dissolution and oral bioavailability of carbamazepine tablet ternary solid dispersion system technique using a biosurfactant has been used. Ternary solid dispersion system is dispersion of one or more active pharmaceutical ingredients in two different components at solid state. In this method drugs with low aqueous solubility like carbamazepine are molecularly dispersed in hydrophilic polymers such as polyvinyl pyrolidine, hydroxyl propyl methyl cellulose, polyethylene glycol along with the addition of biosurfactant and poloxamer 407 to improve their dissolution profile. Biosurfactants are surfactant of natural origin generally produced by microorganisms and these have good biodegradability and low critical micelle concentration. Rhamnolipids can be used as biosurfactant in ternary solid dispersion of carbamazepine. Carbamazepine ternary solid dispersion is prepared by solvent evaporation technique and then tablet preparation is done by direct compression and then tablet is evaluated to determine the enhancement in dissolution rate and bioavailability.

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A Novel Online Quizzing System for Blind People by implementing Modern Voice Recognition Techniques

Publisher: IEEE

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Vikas Kamra ; Alankrita Singh ; Priyanshi Sharma ; Ritu Yadav All Authors

19
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Document Sections

I. Introduction

II. Related Work

III. Voice Recognition Techniques

IV. Proposed Methodology

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Abstract:

Online assessment of students is a new challenge to the old education system. It is even more difficult to track the da
progress made by an individual student in online learning environment. To solve this problem, we need a novel ap
online assessments. "Quizi for Malvoyant" is a web-based application that not only provides solution to the above problem but also provides a platform that can also be used by visually impaired students. The increasing use of online system in our educational environment and lack of proper monitoring in student's progress is a big threat to the education system. Moreover, the existing online modes cannot be easily accessed by any visually impaired student which is a prominent gap in online mode of learning. "Quizi for Malvoyant" is a web-based application which can be used by a normal person or visually impaired person. To use the proposed platform, a user can simply log in to be able to create and join quizzes via sharing the quiz code. For blind students, there will be some speech commands that can be followed for smooth conduction of online quizzes. This system will do automated marking which help teachers by saving their time. Teachers can also set up quizzes which will auto-grade itself. Students can answer the quiz from any location and get immediate results. This research paper will provide a unique web-based approach for online quizzing and assessment work which is implemented on MERN STACK technology.

Published in: 2023 2nd Edition of IEEE Delhi Section Flagship Conference (DELCON)

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Contents

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The creation of a full-stack quiz application is mostly needed by students and learners who want to study for exams directly on their smartphones and tablets [1]. The major objective of this project is to make it easier for students to study, acquire, and develop their knowledge and abilities. A program called "QUIZI FOR MALVOYANT" makes it easier to take tests efficiently without wasting time looking through the paper. The major objective of this research is to properly assess a candidate's performance using an automated approach that not only saves a massive amount of time but also produces results much more quickly than a manual system [2].

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Comparative Analysis of Different Algorithms in Link Prediction on Social Networks

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Abstract:
In today's world, the social-based online network systems are rapidly expanding, which results in large accumulation of data. When we try to examine this enormous amount of data that has been collected in these systems, we face new difficulties. The forecasting of user social relationships is one of the intensively researched topics. Link prediction locates broken links or forecasts the probability of new links. The problem of Link prediction is an extremely well-researched issue and has uses across a wide range of fields, some of which can frequently be observed in recommendation algorithms, like new connections (suggested friends/followers) on social networks or associated merchandise on online store. A lot of algorithms have already been presented in context for solving the link prediction problem. We selected three real-world social networks and seven most widely used link prediction algorithms. To the best of our knowledge, we conduct a survey of these Link Prediction approaches that are currently in use and compare them in this work.

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References

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Contents

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With the rise of social media, almost everyone might be familiar with the concept of a social network. A cluster of people and different associations amid them make up a Social network. The connections here, any social connection that establishes a bond between two individuals. The Social networks can be visualized as graphs, where a vertex corresponds to an individual in some group and the edges represents some sort of association between the corresponding individuals. The connections are typically brought about by internal to a group mutual interests.. It is possible for new edges and nodes to appear in the network, indicating new network interactions. Thus, these social networks are highly dynamic in nature [1].

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IoT enabled obstruction evasion Robots for enhancing the security of the Systems

Publisher: IEEE Cite This PDF

Sapna Juneja ; Shivam Mudgil ; Shilpa Saini ; Arti Sharma All Authors

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II. Literature Survey

III. Hardware Design

IV. Design And Fabrication Of The Robot

V. Results

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Abstract:
The surveillance of homes and other places like homes, restaurants, clubs, cafes, schools etc have become a major task in this technological era. There are various reasons required for this surveillance. One being the increasing crimes like that of theft. The major reason being the unattended homes by parents, either alone or under the care of babysitter or nanny. We don't know how these house service keeps on working and what they do at our homes, while we are away, leaving our homes completely unattended. So, to keep a check on it, we came on an idea of Mobile Controlled Surveillance Robot. This paper is based on the concept of Internet of Things, creatively called as IoT. The aim of this paper is to establish the communication between the owner and is/her unattended belongings, also to keep an eye on the surroundings. Thus, this research work will act as a game changer, i.e. nothing would go un-noticed now.

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Date of Conference: 27-29 January 2023

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Contents

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The recent advancements in the field of technology and the communication area, includes IoT. The robot is considered as a game changer due to the features it provides like advanced connectivity of systems, devices which go beyond the machine-to-machine communications. This project makes use of IoT in a secure way. It uses SSH (secure Shell

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Networking) tunneling Protocol, which provides the end-to-end encryption. As, only the designated person can see the online live streaming of robot, through using the Internet Protocol (IP) address of the Raspberry Pi, the brain of the robot. This project is mainly to provide live surveillance and act as a communication between the two places. Moreover, as it can be controlled by a mobile phone wirelessly, its ease of access becomes top notch.

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A Game Theory Based Collaborative Security Detection Method for Internet of Things Systems
IEEE Transactions on Information Forensics and Security
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Blockchain for General Digital Ledgers

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Abstract
Document Sections
I. Introduction
II. Applications
III. Limitations
IV. Consensus Algorithms
V. Proposed Solution
Conclusion
Authors
Figures
References
Keywords
Metrics
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Abstract: The general idea of blockchain has implications in almost every aspect where computers and computation have laid their foot on. However, there are domains where its practical feasibility is challenged by conventional alternatives. One such domain is general-purpose digital ledgers. This includes all ledgers ranging from basic lending to high-scale businesses. The prime impedance to the use of blockchain technologies in the general digital ledger can be attributed to high transactional fees and a lack of available access to the general public. This paper lays insight into a solution to the above problem which will enable the use of a system that offers the robustness of a blockchain system. This system can be used for general ledgers as well as bill settlements.

Published in: 2023 3rd International Conference on Innovative Practices in Technology and Management (ICIPTM)

Date of Conference: 22-24 February 2023

INSPEC Accession Number: 23120592

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ISBN Information:

Publisher: IEEE

Conference Location: Uttar Pradesh, India

Contents

I. Introduction

The concept of blockchain was brought forward to people after Satoshi Nakamoto unveiled it in Bitcoin. Since then, it has become a topic of curiosity amongst tech enthusiasts. Speaking of the concept of blockchain, it is a chain of blocks (nodes) which is by default decentralized in nature. The blocks, also known as peers are the fundamental blocks in a blockchain. It has expanded its features, especially in the distributed ledger technology, which functions by the preservation of computations performed on other peers. This comes as an added advantage to blockchain in terms of reliability as the ledger is shared. Each peer is unique in terms of hash value which is obtained as the end result of a costly resource-intensive mathematical hash function. This heavy-duty computation ensures the immutability of the blockchain.

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2023 Somaiya International Conference on Technology and Information Management (SICTIM)
Published: 2023

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AR Museum: A Virtual Museum using Marker less Augmented Reality System for Mobile Devices

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I. Introduction

II. Literature Review

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Abstract:

As the most effective hand-held devices are readily available in the world, while not the latest topic, Augmented Reality (AR) has become one of the fastest growing research topics. These robust devices can calculate large amounts of data in the blink of an eye. Enabling the integration of manufactured, interactive, and graphic computing in the real world to enhance the in-depth user experience. In this paper, we developed a Mobile Augmented Reality Experiences [1] through an application that allows users to explore and interact with virtual museum locally using marker-less AR. till now this work is not been done in this field. Using this AR technology, it enables museums to exhibit a whole collection of artifacts in limitedspace. Typically, in conventional artifacts exhibitions, the artifacts are protected in galleries which require wide spaces, and this causes only part of the artifacts to be exhibited. Thus, by digitizing the artifacts, there is no need to put the virtual artifacts in the gallery since it is a virtual model. Consequently, available space can be used to display the other artifacts to the public. The app was developed using the Google AR Core SDK and Unity 3D and will serve as a useful tool for producing a museum anytime and anywhere, giving the user virtual stimulation of museum.

Published in: 2022 3rd International Conference on Issues and Challenges in Intelligent Computing Techniques (ICICT)

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Contents

I. Introduction

The technique of employing technology to superimpose images, text, or sounds on top of what a person can already see is known as augmented reality. It uses an application on a smartphone or tablet to make changes to an existing image. The user stands in front of a scene with their gadget held aloft. It will present them with a distorted view of reality. Museumscould use augmented reality in a variety of ways and even themuseum completely can be made using

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II. Literature Survey

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A sizable segment of the world's population lacks access to quality healthcare. The success of healthcare ultimately ... on the doctor's skill. In this study, we investigate if this knowledge may be represented as an information corpus, ... that has been retrieved using data mining methods, particularly the Machine Learning & Deep Learning Model, to m... diagnosis. When the medical diagnosis is made widely available, coverage increases, and life quality improves. In or... determine whether inferences about the causes of various diseases can be made from the data, this paper provides an overview of machine learning approaches used in the classification of various diseases. We outline a few of our findings from the trials we ran before offering some suggestions for the future. The difference between the current state of health and an acceptable or desirable health condition is the health problem. By lowering doctor visits, hospital stays, and diagnostic testing procedures, monitoring systems are designed to lower health care expenditures. Using the data mining modeling technique, the integration of clinical decision support with computer-based patient records could decrease medical errors, increase patient safety, stop unwelcome practice variance, and improve practice outcomes. Connecting patients and doctors through a user-friendly interface will make it easier for patients to use in emergency situations.

Published in: 2023 6th International Conference on Information Systems and Computer Networks (ISCON)

Date of Conference: 03-04 March 2023

INSPEC Accession Number: 23115409

Date Added to IEEE *Xplore*: 04 May 2023

DOI: 10.1109/ISCON57294.2023.10112144

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I. Introduction

Machine learning (ML) is a branch of artificial intelligence that uses "learning ability provided to computers without additional programming" to address problems in the real world. Research into whether computers could learn to emulate the human brain led to the development of machine learning. When Arthur Samuel created the first checkers game-playing software in 1952, ML made its initial attempts to generate the necessary skills to defeat a world champion. Later in 1957, Frank Rosenblatt developed an electronic system that can mimic the way the human brain works to learn how to handle complex issues [5].

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Publisher: IEEE

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Arti Sharma ; Niyati Aggarwal ; Harsh Khatter ; Saurabh ; Abhinav Tripathi ; Shashank Awasthi All Authors

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Abstract

Document Sections

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Abstract:
In today's world, the social-based online network systems are rapidly expanding, which results in large accumulation of data. When we try to examine this enormous amount of data that has been collected in these systems, we face new difficulties. The forecasting of user social relationships is one of the intensively researched topics. Link prediction locates broken links or forecasts the probability of new links. The problem of Link prediction is an extremely well-researched issue and has uses across a wide range of fields, some of which can frequently be observed in recommendation algorithms, like new connections (suggested friends/followers) on social networks or associated merchandise on online store. A lot of algorithms have already been presented in context for solving the link prediction problem. We selected three real-world social networks and seven most widely used link prediction algorithms. To the best of our knowledge, we conduct a survey of these Link Prediction approaches that are currently in use and compare them in this work.

Published in: 2023 International Conference on Artificial Intelligence and Smart Communication (AISC)

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DOI: 10.1109/AISC56616.2023.10085359

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ISBN Information:

Conference Location: Greater Noida, India

Contents

I. Introduction

With the rise of social media, almost everyone might be familiar with the concept of a social network. A cluster of people and different associations amid them make up a Social network. The connections here, any social connection that establishes a bond between two individuals. The Social networks can be visualized as graphs, where a vertex corresponds to an individual in some group and the edges represents some sort of association between the corresponding individuals. The connections are typically brought about by internal to a group mutual interests.. It is possible for new edges and nodes to appear in the network, indicating new network interactions. Thus, these social networks are highly dynamic in nature [1].

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Adaptive Methodologies for Tenders as a Thrust for Emerging Startups

Publisher: IEEE

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Conference Location: Dubai, United Arab Emirates

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Contents

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One of the key elements affecting employment is the emergence of startups. These startups act as a source of opportunity for economic growth, such as the creation of jobs, and the profits from these result in an increase in per capita income. There are certain setbacks that startups undergo during the early phases of the establishment. The obstacles startups face includes financial limitations, a lack of commercial experience, and managerial issues. Among these, the most important is financial assistance; startups frequently rely on financial resources and supportive infrastructure, among other things, to survive. [6] [7] Thus, it becomes important to look forward to a new alternative for the availability of the same resource. In general, the resources that startups seek are available in some government or private organisations that have been in operation for a longer period. The government disposes of these old but useful resources through online tenders. These might be very useful in acting as a push for the startups and making them available with the same product at a relatively cheaper price. [10] Thus, the resource can be accessed by struggling startups with minimal funding.

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II. Litrature Review
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References
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Abstract:
The recommendation system has been rapidly developed due to web technology that provides a new way for the technician to get the customer's requirements. However, recommendation systems provide customers with enough information to decide whether to recommend a technician, and they do analyze recommended information. The existing available systems also lack feedback mechanisms for customers, which would diminish their zeal. We created a database recommendation system to address these issues. When customers cannot find the technician, they are looking for, they will be directed to the recommended pages. Recommended pages contain all the essential and extension information that customers can refer to. Furthermore, customers can make recommendations by providing a rating according to the service provided by the technician, and the recommendation system will examine the recommended data to make a rational buying choice. The usage of the recommendation system demonstrates a considerable improvement in both the use of recommended content and customer satisfaction.

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Publisher: IEEE

Conference Location: Uttar Pradesh, India

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Contents

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The common car user faces more and more problems every day, such as rising engine temperature, poor road condition causing tire damage, engine failure, physical damage, etc. Customers are limited by their own knowledge and find it difficult to choose the right technician, which always satisfies customer requirements. To tackle these problems, experts and researchers are trying to combine the principles of scientific decision-making by building a decision-making system to assist clients in making scientific judgements using database and decision-making technology. However, there are certain drawbacks to decision-making systems as well. For example, the assessment of right technician is mainly dependent on customers feedbacks and location of technician, so suitable technicians are suggested by considering more features like ratings, years of experience, expertise. Basically, they cannot achieve accurate decision-making, which hinders their development. With the rapid development of web technologies, a database recommendation system appeared. It integrates a massive set of information and features of a technician on basis of which our recommended system filters out the best suitable technicians for the customers. Customers can share their experiences and important procedures to other customers directly on the website. The emergence of the recommendation database system changes the traditional way to get technician from the limited options, it wider the scope of finding best technician hence increasing the healthy competition in market. In this paper, we proposed a database recommendation system. First, the system gets the keywords that customers have submitted to our system. Second, the system will display detailed information about technicians to customers using the web service through a recommendation system. Thirdly, customers can give their opinions on the services along with the rating. The system will decide scientifically based on suggested data. Finally, system will notify customers when the recommended technicians have been delayed with a short message and email. Compared to existing systems, our system can reduce the steps for a quick decision of choosing the appropriate technician, which makes it quite simple to use. It can assist customers in making decisions and prevent blind choice. In addition, it can provide more humane service to customers and stimulate their enthusiasm for recommendation.

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Publisher: IEEE

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Abstract:
Automation of appliances is a key factor that plays a major role in easing human life and controlling appliances like light, fans, etc. through the portable device (mobile). It can be easily accomplished by using the internet, but the problem arises where there is no internet or low signals of the internet (ex: highway, War-torn or conflict zones Protected areas such as natural reserves, national parks, highly secure or classified locations, Remote or isolated areas) To automate appliances that don't have internet connectivity, RF modules like ZigBee or LoRa can be used. Each ZigBee module is connected with a microcontroller (to upload functions) to transmit data wirelessly and end devices have relays and sensors to follow the command or to send the response to the command. A Network topology will be created by the coordinator, routers, and end devices. By use of congestion control avoidance protocol communication between nodes will be set up so that no disturbance will have occurred. RA(random access) protocol is used as the congestion avoidance protocol.

Published in: 2023 8th International Conference on Communication and Electronics Systems (ICCES)

Date of Conference: 01-03 June 2023

INSPEC Accession Number: 23516021

Date Added to IEEE *Xplore*: 01 August 2023

DOI: 10.1109/ICCES57224.2023.10192701

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Conference Location: Coimbatore, India

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The automation of appliances involves the use of technology to control and manage appliances in a more efficient and convenient way. Automation of appliances is a key factor that plays a major role in easing human life and controlling appliances like light, fans, etc through the portable device (mobile).it includes not only controlling appliances but also making appliances intelligent to work accordingly to the situation.

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Sentiment Analysis on User Feedback of a Social Media Platform

Publisher: IEEE

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Aaryan Singh ; Harsh Srivastava ; Mohd. Aman ; Gaurav Dubey All Authors

50
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Document Sections
I. Introduction
II. Related Work
III. Methodology
IV. Result
Conclusion
Authors
Figures
References
Keywords
Metrics
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Abstract:
The paper proposes a methodology for implementing Sentiment Analysis on user feedback of a social media website named "DevelopersBay". This study has performed a sentiment analysis of user feedback received on the website by using basic machine learning method and BERT model of deep learning. The process of sentiment analysis utilizes algorithms to evaluate the tone of feedback, indicating whether it is positive, negative, or neutral. This information is then used to enhance the quality of the services or products provided by the organization. In our research we found the deep learning method to be more accurate in determining the sentiment of the feedback received on the website. The results obtained from sentiment analysis help us improve our website to meet the needs of our users.

Published in: 2023 International Conference on Sustainable Computing and Data Communication Systems (ICSCDS)

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A large quantity of global people actually uses social media sites to express or share their feelings, opinions with the rest of the globe. Social media is now recognized as a surprisingly impactful tool, and as a result, it produces significant amount of big data. To analyze this record efficiently and effectively, sentiment analysis can be used. It has turn out to be crucial for industries and businesses to understand the sentiments of user[l]. The manner of sentiment analysis, also known as opinion mining or subjectivity analysis, involves extracting the opinions of users from their feedback or reviews of a product or service. Over the last few years, sentiment analysis has gained broad recognition and is now being utilized not only by researchers but also via businesses, governments, and corporations [2]. The manner of ascertaining a speaker or writer's attitude or emotion towards a specific topic or subject is known as sentiment analysis. Views or opinions are crucial to all human activities as they play great role in influencing our behavior [3].

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Document Sections
I. Introduction
II. Literature Survey
III. METHODOLOGY
IV. RESULT
V. CONCLUSION
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Figures
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Abstract:
With the technological advancement in the field of medical health care we need a best possible health care system that can predict the disease only on the basis of symptoms. In this study we applied various machine learning algorithm including KNN, support vector machine, decision tree, Na ve Bayes and logistic regression on various disease dataset to find the most accurate algorithm on particular disease. The objective of this study is to provide fast and efficient machine learning algorithm that will help doctors to choose the best suited algorithm for the particular disease.

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Contents

I. Introduction

Nowadays health issues are quite common. We need a model which can predict the disease accurately based on symptoms and help in early treatment and save vital organs from damaging. In our research we are applying different machine learning algorithms on the disease of liver, lung cancer, heart, diabetes, brain stroke. The data sets used in this model are taken from an open source and the model is trained in such a manner that it comes up with the best algorithms among different machine learning techniques to prognosticate the health state of patient accurately.

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Document Sections
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II. Literature Review
III. Methodology
IV. Conclusion
Authors
Figures
References
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Abstract:
The full form of EQI is the environmental quality index. The three elements which are included in our study are the most precious naturally occurring elements on the Earth i.e., Soil, Water, and Air. These resources though are present in abundant quantity, the quality of these resources varies greatly over a small distance. The health of our body is dependent on these resources. The quality of all these resources must be checked before using them. The results of all these techniques help us to evaluate the quality of soil, water, and air results in single values of AQI, WQI, and SQI. These single values help in easily judging the quality of these natural resources. The quality of these resources helps in both economic and environmental aspects of life. This paper presents a detailed study on AQI, WQI, and SQI and focuses on the factors affecting these values. There is also a focus on precautions from the harmful levels of these factors and what should be done to protect ourselves.

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I. Introduction

EQI is composed of WQI, AQI, and SQI. Let’ s get a brief introduction about each one of them. What is air quality index? It is a tool that is used to check the level of air pollution in a region. Its information is obtained by averaging readings from an air quality sensor, which can increase due to vehicle traffic, forest fires, or anything that can increase air pollution. In India, the quality of air is divided into six major parts - Good, Satisfactory, Moderately Polluted, Poor, Very Poor, and Severe. This classification is done by the National Air Quality Index Standard (NAQI). According to the level of air, the measures are different for people living in different cities. The calculation of AQI is normally done according to the type of pollution present in the country. It is done differently for different countries. WQI stands for water quality index. Water is the basic everyday need of an individual. Water has different uses, and for different uses, the characteristics of water must be different. To keep the standard of water specific for specific use, water quality analysis to check the water quality is performed. It is a very important exercise as it leads to a rise in the level of living of individuals [13]. Some of the chemical indicators which are used in water quality analysis are pH level, Hardness of water, Nitrates amount, Sulphates, etc. Some of the biological indicators used are Bacteria, Worms, Fungi, etc. SQI stands for soil quality index. The quality of soil is indirectly responsible for our health. Soil quality has a direct relation with environmental issues as well as crop yield. But the calculation of SQI is not a simple task. It cannot be done directly using APIs and so must analyze the different soil samples based on their characteristics, or indicators [10]. Now, some of the indicators used for evaluating the value of SQI are pH, Electrical conductivity (EC), Bulk Density (BD), etc.

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Document Sections

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II. Factors

III. Learning Models Analyzed

IV. Additional Investigation

V. Experimental Results

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Apartment prices are projected based on various apartment attributes such as location, square footage, population, latitude, and longitude. Real estate is generally seen as an investment vehicle for the modern consumer, which is reflected in the volatility of real estate prices and the impact of real estate markets on the global economy. A literature review is conducted to analyze relevant properties and the most efficient models for predicting property prices. The results of this paper demonstrate the effectiveness of machine learning techniques such as linear regression in predicting accurate prices. Our results also suggest that location and structural characteristics are important factors in predicting house prices. The study identifies key attributes used by property developers and researchers to determine property prices, and is particularly helpful in identifying the best machine learning models for conducting research in this area.

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Contents

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II. Literature Review
III. Methodology
IV. Conclusion
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Metro systems are essential for meeting urban transportation requirements, particularly in large cities. The Automated Fare Collection (AFC) system used by the current metro systems is designed to simply keep track of single users. To be time-efficient, this article suggests the idea of a "Multiuser metro card" that would enable numerous people to utilize a single metro card. Card scanning, the number of passengers, and the destination are the only three inputs needed in the simple, three-step technique that is presented.

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Contents

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It has become critically important to enhance the present transportation infrastructure due to technological progress. The creation of the time-saving method presented in this study was motivated by this desire for improvement. The focus of this study is metro systems. Metro is essential in today's agile environment, as everyone strives for optimal time utilization. Due to the expanding population, the metro system urgently must be extended. The metro has a significantly lower accident rate than other modes of transportation due to its lack of pollution. The metro system's frequent service and time restrictions aid in easing traffic congestion and enhancing time management utilization. Metro now uses an AFC system with Smart Card Data. Numerous studies have been done in this area that focuses on improving the metro facilities; these studies are described in Section II. This study can be used to get over the restriction that the existing fare collection technique may only be used by one person. In order to reduce the time needed to take tokens in the case that metro cards are not accessible, this study aims to provide a "Multi-user metro card" technology that enables several passengers to ride with a single card. This article suggests a way to improve the current fare-collecting system based on the balance that is available by taking a digital user input at the entrance gate of the number of passengers and the destination and then deducting the charge appropriately.

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Student Chatbot System: A Review on Educational Chatbot

Publisher: IEEE

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Sarthak Kesarwani ; Titiksha ; Sapna Juneja All Authors

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1. Introduction
2. Related Work
3. Proposed Work
4. Result
5. Conclusion
Bibliography

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Abstract:
A chatbot is an automated system that talks with the client and answers the client's questions according to the input provided by human. While the user is chatting with the computer, it appears as if they chatting with a human being. With the chatbot, students can find out about the college activities anytime, anywhere with an internet connection. Marketing, support systems, education, healthcare, cultural heritage, and entertainment are just a few of the industries that chatbots have supplanted in recent years. In a student's life, a chatbot can have a huge impact on the student's life because it is capable of resolving a great deal of academic difficulties, placement preparations, extracurricular activities in the college, and saving a great deal of time by providing answers to student's questions within seconds. It is not only a way for educators to stay informed, but it also makes it easy for students to get their questions answered. As a result of this chatbot system, departments are able to reduce the amount of work they have to do by providing the required information to students and this reduces their workload to keep on answering all the queries from students.

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Contents

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Student chatbot could be used to provide a platform for easy query resolution for students. This technology has artificial intelligence built in to respond to the student's question. The responses are pertinent to the user's inquiries, but if the user believes his response to be incorrect, he can pick the button labelled "incorrect answer," which will alert the administrator. Administrators can view invalid users by logging in. The system enables the administrator to add a specific answer to that equivalent question or to eliminate the invalid answer. Here, the databas e will be kept in the cloud, creating an internet connection between the application and the cloud server. The Chatbot systemsearches the cloud-based database for the solution to the student's question using certain keywords of the query. The chatbot has no set format that students must adhere to while asking questions. The technology allows students to submit any questions about their academics, college related activities, placement preparation, relevant courses and jobs, hackathons and many more. This systemresponds to the user through a graphical user interface, making it appear as though a real person is conversing with the user and the learner. The method assists the student in receiving answers to their questions as well as keeping abreas t of college activities.

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Publisher: IEEE Cite This PDF

Tanishq Soni ; Deepali Gupta ; Mudita Uppal ; Sapna Juneja All Authors

100
Full
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Document Sections
I. Introduction
II. LITERATURE SURVEY
III. Bibliometric analysis and discussion
IV. CONCLUSION
Authors
Figures
References
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Abstract:
Marvin Minsky, the father of Artificial intelligence (AI), defined AI as machines that are smarter than humans and can-do tasks that humans cannot easily do. Artificial intelligence has grown at a rapid rate never before seen in a variety of industries. Different types of AI are already used by insurance companies, service providers and companies. Now, with the addition of AI, the healthcare sector is also emerging. Increased availability of medical data and rapid advances in analytical techniques are causing a paradigm shift in healthcare. The literature reveals multiple AI applications for healthcare services and an incompletely covered body of research. The authors explored the current situation of AI technology in healthcare was examined, in addition to their long-term prospects. As a result, the goal is to use a bibliometric method to analyze the dynamics of the interconnection between digital health and AI approaches while taking into account responsible AI and ethical elements of scientific output throughout time.

Published in: 2023 International Conference on Artificial Intelligence and Smart Communication (AISC)

Date of Conference: 27-29 January 2023

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Date Added to IEEE *Xplore*: 03 April 2023

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Artificial intelligence refers to computing techniques that replicate human cognitive processes including reasoning, engagement, deep learning, adaptation, and sensory perception [1]. A perfect mix of faster computer processing ability, greater data gathering data banks and a huge AI skillset has allowed for the swift development of AI tools and technologies including in healthcare [9]. It's fast, inexpensive and saves you a lot of time and money. [2]–[3]. AI applications with sophisticated algorithms and deep learning capabilities are being used by physicians and medical professionals in healthcare information systems, geocoding healthcare information, epidemic and syndrome monitoring, decision support, predictive analysis and medical imaging [4]–[5]. There are several reasons why AI will just not replace humans in large medical procedure sectors for many years [4]. AI will function better than humans in an important part of healthcare jobs such as diagnosing illnesses and surgeries [1]. AI has a broad and expanding potential to improve clinical decision-making and management of heart disease and stroke. [6]. Furthermore, an AI system can aid in the reduction of diagnostic and treatment mistakes that are unavoidable in traditional medical practice [7]. AI's potential for supporting clinical decision-making and regulating stroke or heart disease is broad and expanding. [8].

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Publisher: IEEE

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Amish Mishra ; Sapna Juneja All Authors

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Abstract:
The Web is an enormous part of many organizations and business activities. It holds hefty amount of confidential data which needed to be secured. Most Common vulnerability threat in Website hacking is Cross Site Scripting. Around 40% attacks on websites globally occurred due to XSS (Cross Site Scripting). Cross Site Scripting targets both vulnerable and non-vulnerable website. To protect and prevent the website from XSS we must know the complexity and different ways of prevention. However, the research of finding the optimal way of detection of Cross Site Scripting is still in progress. XSS attacks can also be used to steal user information, such as cookies or session tokens, which can be used to gain access to the victim's account. XSS can also be used to inject malicious code into a page, which can be used to redirect the user into the malicious sites, or to execute malicious code on the user's machine. However, in this paper we will be focusing on XSS attacks and its types. In addition, this paper will introduce some techniques to prevent user's data from XSS attacks.

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Contents

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Cross Site Scripting is also known as XSS is a commonly a website security vulnerability which enables attackers to inject malicious scripts into the website. When the user views the webpage, the malicious code is executed which allows the attackers to steal information or perform other malicious actions [1], [2]. XSS can be used to steal delicate/restrictive/classified information such as cookies and session IDs, hijack a user's session, or redirect the user to a malicious website [3]. Additionally, it can be used to execute arbitrary code on a victim's computer, potentially allowing the attacker to gain full system privileges [4]. One of the many reasons for the high standing of the XSS vulnerability is that web-based application developers have little or no security background [5].

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Character Recognition Technique Implementation for Complicated Deteriorated Scene

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Document Sections
I. Introduction
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III. Methodology
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Figures
References
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Abstract:
There has been an increase in interest in digitizing and preserving old books and papers in the last few years. The quick advancement of data innovation and the Internet's quick spread has also contributed to the enormous volume of image and video data. The texts that are included in the image and video assist us in analyzing them and are also utilized for indexing, archiving, and retrieval. Different noises, such as Gaussian noise, salt and pepper noise, speckle noise, etc., can readily damage an image. Several image filtering algorithms, including the Gaussian filter, mean filter, median filter, etc., are employed to eliminate these various noises from images. This article analyses the impact of several pre-processing approaches, such as thresholding, morphology, and blurring procedures, to maximise text extraction strategies. The experiment's findings demonstrate that pre-processing approaches unquestionably improve the document's structural and visual quality.

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DOI: 10.1109/ISCON57294.2023.10112185

Publisher: IEEE

Conference Location: Mathura, India

Contents

I. Introduction

The Internet's development resulted in a significant increase in the database of photographs and videos. The majority of the pictures and videos are made up of a lot of text-based data. Additionally, there has been a rise in interest in digitizing and preserving old books and records recently. However, it is a laborious task to extract text from these real photos, scanned documents, or movies. During picture acquisition, processing, transmission, and reproduction, noise frequently results in image distortion [1–3]. One of the primary goals of image processing is to restore the original image after the noise has been removed. Even though many algorithms have been developed in the past, there is still room for improvement in text extraction from photos and videos. Word orientation, font size, varied backgrounds, poor quality, varying text colours, noise interference, etc. are the key obstacles to text extraction from complex degraded pictures. Therefore, pre-processing techniques are essential for improving the caliber of text extraction [4–6]. In this study, we examine how basic pre-processing techniques impact image quality and, consequently, text extraction.

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Document Sections
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II. Literature Review
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Conclusion
Authors
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References
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Abstract:
Peer-to-peer (P2P) sharing of individuals who match private providers and users is another way that sharing can occur in addition to the participation of cooperative providers. The use of carpools is one illustration of this. Carpooling is the practice of sharing a vehicle. We have frequently observed notable and extensive study on various sorts of pooling strategies. There has been a lot of research in recent years on the reasons why consumers utilize these sharing platforms. India is rapidly urbanizing following the global trend, and using a private car as a mode of transportation is now increasingly widespread in industrialized nations. Building new roads and maintaining them, as well as the high level of energy use, are all very expensive costs associated with people's growing reliance on automobiles and other forms of transportation.

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Contents

I. Introduction

India is a rising and developing nation, and the main challenge that the majority of people are currently experiencing is a problem with transportation management. Air and noise pollution are just two of the dangerous issues that this transportation system may cause. The emissions of CO2 and other pollutants resulting from automobile travel are caused by urban traffic. The standard of living in metropolitan regions has decreased. The number of automobiles and their use are both rising quickly at a very high pace along with the expansion in the population and their demands on the transportation system. Since the public transportation is less effective than in cities, a huge rise in the trend of carpooling has been observed to commute, which is less expensive and polluting.

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Document Sections
I. Introduction
II. Literature Survey
III. METHODOLOGY
IV. RESULT
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Abstract:
With the technological advancement in the field of medical health care we need a best possible health care system that can predict the disease only on the basis of symptoms. In this study we applied various machine learning algorithm including KNN, support vector machine, decision tree, Na ve Bayes and logistic regression on various disease dataset to find the most accurate algorithm on particular disease. The objective of this study is to provide fast and efficient machine learning algorithm that will help doctors to choose the best suited algorithm for the particular disease.

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Contents

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Nowadays health issues are quite common. We need a model which can predict the disease accurately based on symptoms and help in early treatment and save vital organs from damaging. In our research we are applying different machine learning algorithms on the disease of liver, lung cancer, heart, diabetes, brain stroke. The data sets used in this model are taken from an open source and the model is trained in such a manner that it comes up with the best algorithms among different machine learning techniques to prognosticate the health state of patient accurately.

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IV. EXPERIMENTS
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Abstract:
Due to the speedy expansion in human community the energy consumption in the whole world has sharply raised. Prediction of energy consumption is very important because the produced energy from the electricity plants is consumed at a simultaneous rate. Below is a neural network model that employs the CNNLSTM network to forecast a power grid's power usage. The suggested neural network model can read aggregated and difficult to read variables linked to energy usage according to research and testing. The LSTM (Long Term Short Memory) layer is good for modelling information in time series configuration while the CNN (Convolutional Neural Network) layer is good for reading features between different variables related to energy consumption. This combination has pulled off fantastic results than the subsisting methodologies. Furthermore, it stores the lowest number for RMSE for separatehouse energy consumption.

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Contents

I. INTRODUCTION

Energyutilization is a time dependent production issue. Information that has to be collected from the sensors is unreliable and may change with time [1]. Due to the rapid increase in population worldwide, ask for energy is surging out. To fulfil all increasing demands of power consumption, networked control of microgrids is used. The demand for power consumption depends upon the consumer’ s use of power appliances and their behavior. Therefore, the authorities who have the control of power grids are testing to discoverlatest and efficient ways to handle the consumption of power in residential and industrials areas so as to regulate the demand for power consumption. Nowadays, things are going smart so many residential buildings have the facilities that are smart, energy saving and can also be accessed by the mobile phones remotely. Some of the devices consume more energy due to the presence of the sensors whereas some devices consume less energy due to the energy saving feature. Due to this high amount of energy is wasted annually [2]. Now, because of its multivariate time series pattern it is a real issue to forecast the power utilization with the help of old classification methodologies. Nowadays, neural networks have come into play and are really very much useful as compared to previous statistics-based prediction models because of its provided easier mapping functions. over time[3]. It’ s just not used in the prediction of energy consumption but it has produced great results in other fields too where theproblem is a multivariate time series problem. Also, it has achieved finer and accurate results in the areas of reading images, speech and emotion recognition, and NLP (Natural Language Processing). It is also broadly used in medical areas, especially to detect the disease of arrhythmias. The subsequent are the benefits of this study:

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References
Keywords
Metrics

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Applications of Artificial Intelligence and Machine Learning, pp 791–800

Real Time Location Tracking for Performance Enhancement and Services

Gaurav Dubey, Anant Kumar Jayaswal, Akhilesh Srivastava & Anurag Mishra

Conference paper | First Online: 14 September 2022

580 Accesses

Part of the Lecture Notes in Electrical Engineering book series (LNEE,volume 925)

Abstract

In today's world, many delivery businesses rely upon optimization of their services in allotment of employees according to demand. These business models use GPS and Web Services endlessly. In the current scenario, in many of the prominent delivery systems, many employees who are specifically intended for the delivery of the products of their organizations, that the client has ordered for, are employed for the whole duration of the day, even when there are less requests for the delivery of the product, leading to the wastage of man power as well as the time. This is mainly due to lack of proper analysis of the real time data. This paper proposes a model that works in a real-time environment and can be used to generate some real time co-ordinates of delivery persons, which can be used for developing a Machine Learning Model. The same Model can be used for the enhancement of a particular business to facilitate the consumption and integration of the resources.

Keywords

Artificial intelligence **Machine learning** **Global positioning system**

General packet radio service **Time series model**

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Micro-Electronics and Telecommunication Engineering pp 531–542

Comparative Analysis of Three Waves of COVID-19 in India: A Deep Study of Three Waves Based on Selected Parameters

Ayasha Malik, Veena Parihar, Bharat Bhushan, Jaya Srivastava & Rohit Sharma

Conference paper | First Online: 02 June 2023

122 Accesses

Part of the Lecture Notes in Networks and Systems book series (LNNS,volume 617)

Abstract

The coronavirus disease-2019 (COVID-19) has drastically impacted each and everyone's life in the whole duration, and those critical impacts can be seen in today's life also. A very less number of studies are there which present a detailed comparison among the hospitalized patients, during the distinct three waves of this disease in India. So, this particular study aims at presenting a comparison of the clinical data and laboratory results of the patients who were infected by this virus and were hospitalized for the duration of wave 1, wave 2, and the ongoing, wave 3. The duration of wave 1 was from January to August 2020, from March 2021 to October 2021, and was wave 2 duration, whereas the impact of wave 3 started in December 2021. The goal is also to find the risk aspects for the criticality of this virus and to discuss the causes of infection. This paper is an effort to perform a thoughtful study by analyzing the medical data of 500 distinct patients of which 200 were from wave 1, 150 from wave 2, and 150 patients from wave 3. The analysis considering various aspects and factors was performed for all three waves. This particular study discusses various symptoms of COVID-19, mediums of spread, standard characteristics such as gender, age, and disease, analysis of the result data of laboratory testing, and finally presents the cure provided to the different infected patients. Lastly, on the basis of this study, it is concluded that wave 1 was more dangerous as compared to wave 2 and wave 3.

Keywords

COVID-19 **Symptoms** **Statistical study** **Wave** **Diseases** **Virus** **Patients** **Infection** **Cure** **Analysis**

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Micro-Electronics and Telecommunication Engineering pp 519–529

Artificial Intelligence-Based React Application (Powered by Conversational ALAN-AI Voice Assistance)

Ayasha Malik, Veena Parihar, Bharat Bhushan, Jaya Srivastava & Lamia Karim

Conference paper | First Online: 02 June 2023

126 Accesses

Part of the Lecture Notes in Networks and Systems book series (LNNS,volume 617)

Abstract

The field of conversational AI is growing at a fast pace. It basically includes the methods for developing software agents that are capable of involving in a conversation with humans just like other humans. This research paper is an effort of presenting a glimpse of how a conversational React news application controlled by voice can be developed by making use of ALAN-AI. ALAN-AI is an innovative technology that allows the inclusion of voice capabilities in any application. It enables an application to be controlled completely by the voice, and it is very easy to integrate it. The paper describes several npm commands and discusses the functionality of ALAN-AI in the proposed react application along with the ALAN Studio itself. A brief differentiation of react, Angular, and Vue is also presented to give an idea of the certain advantages that react has over other libraries and frameworks. The paper elaborates how voice scripts can be created via the Web portal of ALAN Studio which provides a set of tools for convenient scriptwriting and testing, including a source code editor, testing and debugging tools, and analytics tool. The paper ends up by explaining the ALAN-AI's ability to mimic human look-like communication between the user and the app. They work together to allow ALAN to understand human speech, create answers, and complete the app's tasks.

Keywords

ALAN-AI **React.js** **Dynamic entities** **Visual state objects** **News API** **Voice assistants**

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Blockchain Technology for Better Security by Using Two-Way Authentication Process

Ayasha Malik, Jaya Srivastava, Bharat Bhushan, Veena Parihar, V. S. Anoop & Ahmed Alkhayyat

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Abstract

In today's era, blockchain is an emerging and successful technology. Blockchain has an incredible impact on many companies or trades that can change society's problems in several regions. Due to the invention of blockchain, the cryptocurrency is manufactured and Bitcoin which is the initial digital crypto-forex. It is a document that can visibly give each Bitcoin's transaction, this is a computer-generated supply of chunks, while the blockchain skills are additionally more consistent and have suitable contributions such as the protection difficulties, and commanding the original or progressive circumstances at the back are also have many dynamic points that need to pay attention. The main problem related to the blockchain is the protection of data with maintaining confidentiality by giving access to the right person; at present, certain studies are there on the blockchain, but there is the absence of a logical assessment on the protection of the data. This research paper delivers a methodical aspect of the protection risks to blockchain and talks about by what means two-way authentication (2-WA) can be established to manage the absence of capacity of individual verification formations. The paper presents the leading fact of blockchain production along with its enhanced confidentiality and the implementation of 2-WA to the block/chunk for an additional level of protection. 2-WA is the primarily valuable element of security that is used to keep data privately and run smoothly without any intervention. In addition, this research paper contains an assessment of the improvement of security solutions for blockchain that can be utilized in the advancement of various blockchain structures and advise some future instructions to do research attempts hooked on this site.

Keywords

Security **Blockchain** **Two-way authentication** **Data** **Transaction** **Cybercrime** **Privacy** **Distributed** **Block**

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Genetic Algorithm: An Approach for Software Testing Based on a Given Source Code

Jaya Srivastava, Ayasha Malik, Bharat Bhushan, Veena Parihar & Shyam Nair

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Abstract

In the progression of computer-based structures and products, software has turned out to be a vital element. Software testing is an utmost effort of an intense segment in the software development life cycle. In the same manner, everyone like to minimalize the struggle and distinguish the most of the number of errors. Automatic test case production helps to minimize the price and time effort. Worldwide a single or most significant method of automatic test case production is a crucial issue in software testing and a warm problem in the study of software testing. The paper proposed a genetic algorithm (GA) to improve the test case and the submission of the artificial intelligence (AI) approaches that is applied in software testing for automatic software testing. The data of test cases are produced randomly by put on the conditional coverage on the source code and creating the control flow graph (CFG) of the source code and then applying GA test cases that are automatically generated. GA makes the test cases optimized and outperforms which is produced by a type of testing named random testing (RT). It is an effective technique for enhancing test cases by applying GA and conditional coverage as well that implemented in MATLAB. Automated test case production improves the software testing approaches and advances the quality of software. Like this automated test, case production decreases the complete cost of software development for software-based systems.

Keywords

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Abstract:
The technology of blockchain is widely spread and used in different sectors, which include security too. Blockchain has many applications including bitcoin and handling cryptocurrency. Blockchain has recently been analyzed for exploring the applications of data science. The decentralized nature of blockchain can facilitate the tasks of data scientists more securely. Blockchain technology holds immense promises for a variety of the industry, including financial services, healthcare, academia, and more. Blockchain is a distributed digital ledger which is responsible for forming trust in an untrusted system which makes it potential for cybersecurity also. For transactions security, blockchain technology has been very effective. Sharing sensitive information among financial institutes is very difficult and there is high financial risk control cost, for this problem blockchain is the solution for securing the data. Blockchain has the ability to bring trust in decentralized data storage and also has the capacity to bring changes in business automation. This research discusses how the features of blockchain architecture can serve the purpose of data scientists and cyber security.

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II. Diabetes Mellitus

III. Review of Pre-Processing Techniques of Related Work

IV. Methodology Used

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Abstract:
One of the life-threatening and deep root diseases leading to raise the level of sugar in the blood is Diabetes Mellitus (DM) and if it is kept anonymous and untouched then many difficulties have to be faced as a result. Generally, when it is identified a patient visits a diagnostic center and takes a consultation with the doctor. Now, this critical problem can be solved using Machine Learning (ML) approaches as it is booming. A model has been designed in this study that can prognosticate the prediction of DM in patients with a certain level of accuracy. Hence 3 ML algorithms based on classification namely Decision tree, Support Vector Machine (SVM), and Na ve Bayes are used in our study for early detection of DM. Database which is sourced from UCI ML repository namely Pima Indians Diabetes Database (PIDD) is used for performing experiments. Measurement of the performance of all 3 algorithms is based on various criteria like Accuracy, Recall, Precision, and F-Measure. Measurement of Accuracy is done on both correct and incorrect classified instances. After comparative analysis, it has been found that Na ve Bayes is having the highest accuracy among other algorithms. For verification of results Receiver Operating Characteristic (ROC) curves are traced in an organized manner.

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I. Introduction

In the field of medicine, it is needed to categorize the data set in so many classes, therefore many different classification techniques are used in this regard which are based on some constraints rather than a single classifier. The production of Insulin hormone is affected and the body is unable to produce the same or not to the required level for proper functioning in the Diabetes Mellitus (DM) disease. Due to this level of glucose in the blood is increased also there is an abnormality in the metabolism of carbohydrates. DM leads to high blood sugar in the person suffering from it. Some of the frequent symptoms that can be seen in DM are escalated thirst and hunger pangs and the urge to urinate repeatedly. If DM remains untreated it may lead to severe issues later. Some of them are non-ketonic hyperosmolar coma and diabetic ketoacidosis. DM is having a serious concern as there is no control over the measure of sugar level in the blood. Though height, insulin, weight, and hereditary factor are the factors that lead to DM the main reason is the high amount of sugar in the blood. To be safe from the complications of DM there is a need for early detection of the disease. That's why many researchers are using various algorithms based on classification under Machine Learning (ML) for doing experiments for detecting the disease [1]. The work of many researchers is explained, Kalagotla et al. [2] described the PIMA Indian Diabetes (PID) database that was gained from the University/Irvine UCI ML warehouse for investigation commitments. The research was conducted in three phases named, the merging process based on the selection of features, the AdaBoost process was applied to the selected components of the classification, and a fresh installation process with Multiple Layers of Perceptron (MLP), SVM, and Logistic Regression (LR) was planned and established for the designated structures. Tigga et al. [3] measured the insecurity of DM in the person based on their health, way of living, and heredity. The threat of type 2 DM was expected via dissimilar ML methods as per extremely sophisticated algorithms that are highly sought in the medical sector. When the proposed model will be trained with decent accurateness then the people can assess the risk or threat of DM properly. Zhu et al. [4] suggested a model based on the mining of data that was designed for the initial diagnosis and prediction of DM using the PID database. The main objective was to find the techniques used to develop the K-means clustering and LR effects. The proposed model consists of Principal Components Analysis (PCA), K-means, and LR methods. Anwar et al. [5] implemented a literature survey on curing methods of DM using Artificial Intelligence (AI), Neural Networks (NN), ML, hybrid methods, deep learning, clustering, and data mining. The main aim of this study is to highlight all the limitations of surviving mechanisms that prevent them from providing better curing of DM. Khanam et al. [6] used the PID database, composed of the UCI ML repository database that comprehends all related statistics of 768 patients along with their 9 distinct symptoms. Seven ML algorithms are used to predict DM, it is found that the LR and SVM inherit models work very well in DM prognosis. Moreover, the NN model proposed with an unlike hidden layer with different times, and it is noted that two unseen layers gave an accuracy of 88.6%. Vaishali et al. [7] improved the accurateness of present diagnostic techniques for calculating type 2 DM along with ML algorithms. The suggested algorithm chooses the key structures in the PID dataset collaborates with Goldberg's Genetic (GG) algorithm in the pre-treating phase and uses the MOEF classifier in the database. Hence, the total number of structures was reduced to 4 from 8, and the separation rate was enhanced to 83.0435%. Gupta et al. [8] used sklearn to generate a PID database model and equated many algorithms or methods to gain the finest efficiency. Expecting or guessing DM in females is more important as it not only confirms the start of cure in the initial phase and also aids to protect against highly developing conditions. By calculating many algorithms, it is discovered, which area desires to be worked on to improve better health care methods. Shanriare et al. [9] described a hybrid ML expecting a model that can easily identify type 2 DM even more professionally as compared to preceding activities by gathering PID data from Kaggle UCI ML. after that, outliners are classified and spotted by looking at the interquartile series from this database. A small sampling process was used to estimate this data. After that, the diabetic data was sorted using a simple combination of k-mean clustering. Ahmad et al. [10] compared the correctness of the multilayer perceptron prediction at NN against tree-based algorithms, particularly ID3 and J48 algorithms in the PID mellitus data set, and determined DM or non-DM category and data of 768 patients. The outcomes exposed that the J48 tree algorithm was made an extraordinary exactness that is 89.3% as equated to the multi-layer perceptron algorithm that is 81.9%. Temurtas et al. [11] comprehended a comparative understanding of PID. For this, a multilayer NN model was developed and the NN framework was also used. The outcomes of the training were compared with the results of prior pieces of training. It is reportedly focused on DM testing the same UCI ML database. Huang et al. [12] identified the key factors that contribute to DM management, through the use of feature extraction methods and data mining methods in an effective patient administration organization to support better quality, grouping, and discovery of information. To better develop performance and the overall status of the proposed system, a feature selection procedure by using supervised-based construction was used along with improved ReliefF. The key motivation of this work is as follows. •

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The work highlights the various categories of DM with all facts ad figures for a better understanding of the disease so that better and improved curing will be provided to the patients.

- The work deliberates the numerous pre-processing techniques along with detail of various related studies in this domain.
- The work described and implement the ML techniques named Na ve Bayes, SVM, and, Decision tree.
- The work implements the proposed model based on ML techniques for better identification, classification, and diagnosis of DM.
- Finally, the work concludes the result after testing the model based on some decision parameters.

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Abstract:
Intelligent network orchestration and management are crucial components of the 6G network. Therefore, machine learning and artificial intelligence play a big part in the 6G paradigm that is being imagined. However, the combination of 6G and AIML utilization may frequently be a double-edged sword because AI has the capacity to either protect or compromise security and privacy. Proactive threat detection, the use of mitigating intelligent techniques, and network automation in future are needed to enable the achievement of independent networks in 6G. As a result, this paper has detailed focus on the ongoing projects based on 6G and factors that make 6G technology necessary. The role of ZT architecture is discussed in detail, use of AIML in 6G, Various application areas and challenges associated in 6G has been mentioned in this paper.

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The new wireless technology i.e., 6G is recently announced in India [1] and trying to lunch by 2030. 6G, has taken the place of fifth-generation mobile technology because of its features shown in fig 1 [2]. The battery life is approximately 20 years which is a good number in the era of sixth generation technology. Latency signifies the delay. Delay between the message send from sender to the receiver end received by the receiver. This network will have greater bandwidth and less delay compared to 5G networks since they can operate at higher frequencies. 6G internet have 1 latency which is approximately one thousand times faster than throughput and has 1/1000th the latency. The 6G computational infrastructure will be able to decide where computing should occur as well as the optimal methods for processing, transferring, and storing data. With this ability, artificial intelligence will work together. It's critical to recall that 6G is still a very new technology [3]. Apart from that, different approach of communication will be used by 6G communications to accept and transfer different categories of mobile data via radio-frequency networks which is already upgraded [4]. While using such type of communication, like wired communication, 6G will provide almost the same dependability with error-rate approximately very low i.e., 10^9 which is minimum acceptable bit error rate. The launch of 6G internet is scheduled for 2030. The technique improves the utilisation of Radio Access Network (RAN) [2]. While there have been some previous discussions and conclusions about the technologies, the research in the field of 6G has been started in 2020. To support 6G, advanced technologies of mobile communications is related to the secure network for data that will be created.Furthermore, far faster spectral bandwidth expansion than that of 5G will be required. To prepare for the deployment of 6G, network designers must overcome the challenges associated with the deployment of millimeter wave radio for 5G.

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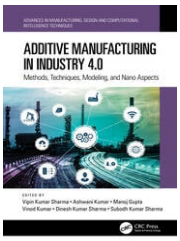
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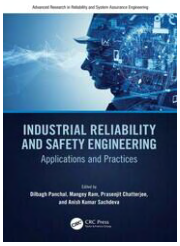
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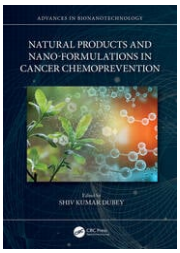
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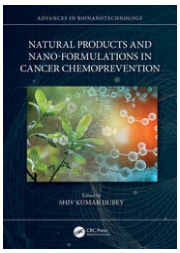
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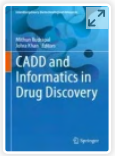
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Computational Modelling and Simulations in Drug Design

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Abstract

One of the key operations in the pharmaceutical sector is the creation of new drugs. The time and expense associated with drug discovery have been significantly lowered by various computer techniques. For more than three decades, the generation of therapeutically significant small molecules has been greatly facilitated by computer-aided drug discovery and design technologies. The use of contemporary molecular modelling tools to aid in the teaching of crucial principles of drug design to undergraduate students of chemistry and pharmacy is encouraged by the growing usage of information technology in the discovery of new molecular entities. In this chapter, we will discuss in detail about the study of the Computational Modelling and Methods in Drug Discovery such as “Structure-Based Drug Design” (SBDD) and “Ligand-Based Computer-Aided Drug Design,” ADMET prediction in Computer-Aided Drug Design, and Molecular Dynamic simulation in Drug Discovery.

Keywords

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Chapter 6 - Technological advancement in tool and technique used for biodegradation analysis

Om Prakash [1 2], Sumit Kumar [3], Kanchan Chauhan [4], Abhishek Pathak [2], Neeraj Kumar [5], Akansha Agrwal [6], Saurabh Gangola [7], Samiksha Joshi [7], Viveka Nand [2], Ajay Kumar Meena [1]

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Abstract

The deterioration of an organic material induced by biological activity is known as biodegradation. It is a natural process that recycles biologically necessary materials in the earth's biogeochemical cycles. Biodegradation knocks the door of bioinformatics, which includes the databases, pathways prediction system, and next-generation sequencing method, all of these are revolutionary method for the prediction of biodegradation studies computationally. Various techniques are also used in biodegradation process including polymerase chain reaction, which is used to determine the desired genes in microorganism for biodegradation of organic contaminants, Fourier transform infrared spectroscopy (FT-IR) that provides us information about the unknown metabolites formed after biodegradation, and high-pressure liquid chromatography, which can also detect organic compounds according to the molecular size. Gas chromatography–mass spectrometry is utilized to detect and measure the metabolites formed during biodegradation, gel permeation Chromatography that is useful in the determination of degradation of polymers on the basis of their size, nuclear magnetic resonance (NMR) spectroscopy (1H and 13C NMR) is a technique that is frequently used to investigate organic metabolites formed in biodegradation, and scanning electron microscopy, which will determine the morphological changes in the cell occur during biodegradation at microlevel. This chapter provides detailed information of all the aforementioned tools and techniques used for biodegradation analysis.

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Keywords

Biodegradation; Bioinformatics tools; NGS; Spectroscopy

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Chapter - 5

Design and Implementation of Computational Model for Cataract Detection in Rural Areas

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Chapter - 5

Design and Implementation of Computational Model for Cataract Detection in Rural Areas

Dr. Deepti Seth

Currently, deep learning-based approaches for identifying cataracts have flourished; nevertheless, the work of enhancing the mechanism remains a top priority in the research sector. The purpose of our study is to detect and type of cataracts using ocular pictures taken by a smart-phone camera. Type of Cataract will automatically display on the camera screen enabling the patient to see the type of cataract (based on their photometric appearance) this all information shall be compiled in the form of an Application (App). Cataracts are addressed by removing the whole lens and replacing it with an artificial one. Cataracts can be categorized into four types i.e. nuclear cataracts that affects center of the lens, cortical cataracts that affects the edges of the lens, posterior subcapsular cataract affecting back of the lens and congenital cataracts are the ones that shows from birth itself.

a) Practical/Scientific utility

Health apps have the potential to greatly improve global health especially in rural areas. The cataract is one of the primary causes of visual impairment and affecting people aged 40 and older. Cataract screening is a process usually carried out by an ophthalmologist using specialized equipment. This diagnostic procedure requires expensive medical equipment; besides, manual procedures of diagnosis are time- consuming and subjective according to clinician's experiences. The challenges that we are facing today to screen for cataract include the availability of medical practitioner and proper equipment, especially in the rural area. Other problems include the cost and time involved to do eye examination from the medical practitioner. In the case that cataract is discovered in more severe stages, it may be more difficult to perform the cataract surgery as it may lead to major complications during the surgery. The surgery will take a longer time to perform and the medical cost incurred maybe higher. The recovery period after surgery is also longer as compared to the earlier stages. We propose to develop a solution using mobile technology that solve the above challenges.

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Chapter 4 - Satellite image-based spectral indices for assessing linkage of land use/land cover change and land surface temperature

Atul Kant Piyoosh [a], Sanjay Kumar Ghosh [b]

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Abstract

Expansion of urban areas around fast-growing cities is a cause of concern. The increase in urban infrastructure leads to changes in the land use and land cover (LULC). This is directly correlated with the environment of the region since it influences the surface and air temperature. Satellite data are good data source to derive information regarding LULC. However, it is found that the similarity in spectral characteristics of built-up area and bare soil leads to confusion in identifying them. This results in misclassification among themselves. For improving accuracy of satellite image classification to map LULC, various spectral indices have been developed. The role of LULC change (LULCC) is important in the climate system. There is impact of LULCC on temperature, precipitation, and other climatic factors, such as land surface temperature (LST). These impacts of LULCC vary from local and regional scale to subcontinental and global scale. Regional climate is affected by LULCC by modifications of water balance and energy budget. In general, such impacts may be expressed by changes in the amount and frequency of precipitation and alteration of surface temperatures. In a warming climate, geospatial techniques have been proven to be useful tools for the assessment of thermal changes in fast-growing urban regions due to LULCC. In this chapter, the relationship between LST and spectral indices highlighting different LULC has been explored using univariate and multivariate modelling. Results of univariate modeling reveal that LST has a positive correlation with indices such as built-up and soil indices, while it has a negative correlation with vegetation and water indices. Newly developed normalized ratio urban indices ($NRUI_{ms}$ and $NRUI_{OLI}$) for multisensor and operational land imager (OLI) data, respectively, are found to be negatively correlated with LST, while newly developed modified normalized soil index (MNDSI) has a positive correlation with LST. The ordinary least-square (OLS) regression was carried out for 3 best models out of potential models identified using multivariate modeling, and models were improved using geographically weighted regression (GWR) due to heteroscedasticity and nonstationarity of data. Values of Moran's I were improved by GWR models of LST and LULC for different multisensor Landsat data; however, residuals of models were not found random and were found to be clustered or dispersed. To visualize clustering of residuals, a hot spot analysis was carried out. It has been found that clustering of residuals in OLS models was significant, which has been found to be least in GWR models. The multivariate modeling shows that new indices $NRUI_{ms}$ and MNDSI are useful variables, which in combination with other variables have been used in different LST models for Landsat OLI, Thematic Mapper (TM), and Enhanced TM plus (ETM+) data.

Introduction

Information of different LULC, extracted from satellite data, is useful for the policy makers in understanding the dynamics of environment (Gashu and Gebre-Egziabher, 2018) to ensure the sustainable development (Nwokoro and Dekolo, 2012). Therefore, identification of the LULC types in any region has become an important area of research nowadays (Zhang et al., 2006). Satellite data are very good data source to derive information regarding LULC. In an urban context when remotely sensed multiband satellite data is used, sometimes the correlation, spectral confusion, and redundancy between different bands may be high. Due to this, all of the features, present in an urban area, may not be distinguished properly (Mwakapuja et al., 2013). In urban areas, assessment and quantification of LULCC is a challenging task as these areas have large spatio-temporal variations and activities of diversified nature take place (Faridatul and Wu, 2018). Thus, a more precise image classification methodology for LULC mapping is needed (Sinha et al., 2015).

The spectral characteristics of built-up area and bare soil are quite similar; thereby, it causes confusion and misclassification among themselves (Piyoosh and Ghosh, 2018). Various spectral indices may be used for improving accuracy of mapping of LULC. Mwakapuja et al. (2013) have applied spectral indices, viz., normalized difference built-up index (NDBI), modified normalized difference water index (MNDWI), and soil-adjusted vegetation index (SAVI) for supervised classification, and results show that the spectral signatures of the considered urban LULC classes were found to be more discernible in the composite image of indices. Sinha et al. (2015) used combination of thermal and vegetation indices, which contributed to enhance overall accuracy for LULC classification when compared with maximum-likelihood classifier (MLC) using the false color composite (FCC). Ozbakir and Bannari (2008) analyzed the performance of transformed difference vegetation index (TDVI) in urban image classification. Results indicated that the performance of TDVI in urban image classification is better than normalized vegetation index (NDVI) and SAVI. For improving urban LULC mapping, the study carried out by Faridatul and Wu (2018) proposed three new spectral indices for bare land, vegetation-water and shadow, and an automated approach using a decision tree algorithm for improved classification of major LULC types, viz., water, vegetation, bare land, and impervious.

The role of LULCC is important in the climate system. Mahmood et al. (2014) reviewed the literature and found that many studies have been carried out during recent past, highlighting the impacts of such changes in LULC on temperature, precipitation, and other climatic factors. These impacts of LULCC vary from local and regional scale to subcontinental and global scale. Regional climate is affected by LULCC by modifications of water balance and energy budget. In general, such impacts may be expressed by changes in the amount and frequency of precipitation and alteration of surface temperatures (Salazar et al., 2015). Thus, the LST has an important role in climatology of urban areas. Mallick et al. (2008) have carried out a study for the estimation of LST for Delhi, India, using Landsat 7 ETM+ images. Investigation reveals that a strong correlation exists between LST and NDVI over different LULC classes.

The results of studies carried out by Xiao and Weng (2007) and Jiang and Tian (2010) have shown that the LULCC is an important factor for an increase in LST. Kayet et al. (2016) analyzed LST distribution by using Landsat TM/ETM+ data in different regions of Jharkhand, India. This study demonstrates that due to the growth of rapid mining areas, a decrease in the vegetated areas has been noticed, which has increased the surface temperature. Bernales et al. (2016) studied LST and LULC using Landsat 8 and LiDAR (light detection and ranging)/orthophoto datasets, respectively. They created a model for relationship between two parameters, and this model was able to predict LST using LULC.

Geospatial techniques were used by Zhou and Wang (2011) to find out the impact of LULC on LST in a fast-growing Kunming City of southwest China. Results of this study indicated that in fast-growing urban areas, there may be a change in local thermal environment. For LST and LULC modeling, remote sensing indices were used to represent LULC and these were implemented as explanatory variables. A location-dependent model named as geographically weighted regression (GWR) was used for LULC and LST modeling. Further, it was concluded that the presence of vegetation and water mitigated the urban heat island effect, while urban and barren land were responsible for a rise in LST. Normalized LST may be computed by excluding climatic effects (Zhou and Wang, 2011). Normalization of LST relative to various environmental factors has its importance in research and other applications. Weng et al. (2019) carried out a study to develop physical models based on energy balance equations for the normalization of satellite-derived LST relative to environmental parameters.

Zhao et al. (2018a) used statistical techniques and applied global regression (GR) and GWR to investigate the effect of underlying biophysical attributes on the surface urban heat island (UHI) phenomenon. The results indicate that

composition and spatial pattern of LULC are closely related to those of the UHI effect. The GWR had higher explanatory power of the underlying factors compared to GR. Zhao et al. (2018b) carried out a study to estimate the spatial distributions of UHI intensity by using hot spots analysis. To explore the spatial nonstationarity and scale effects of the relationships between LST and related factors, the GWR model was used. The scale effect of the relationships between LST and six driving indicators was studied for Zhengzhou City. The results showed that the spatial patterns of LST show statistically significant hot spot zones in the center of the study area, indicating that the intensity of the urban heat island is significantly spatial clustering in Zhengzhou City. Also, the GWR model, when compared with OLS model, has a better ability to characterize spatial nonstationarity and analyze the relationships between the LST and its impact factors.

In this chapter, the work related to the use of various relevant existing and new spectral indices has been presented for two purposes. The first objective of this study is to model and establish relationship between LST and various individual indices, highlighting different LULC, as single explanatory variable. The second objective is to carry out multivariate modeling of LST using more than one explanatory spectral index variables. To achieve these objectives, initially, the satellite image-based spectral indices have been combined with selected raw bands of satellite images acquired in the year 2003 (Landsat ETM+), 2008 (Landsat TM), and 2014 (Landsat OLI) for accurate LULC mapping to get boundaries of different LULC types. Subsequently, these indices have been used as representative of different LULC types for univariate and multivariate modeling with LST estimated from thermal bands of Landsat 5 TM/Landsat 7 ETM+ and Thermal Infrared Sensor (TIRS) bands of Landsat 8. The existing indices that have been used include components of Tasseled Cap (TC) (Brightness TC1, Greenness TC2, Wetness TC3) computed for Landsat 5 (Crist and Cicone, 1984), Landsat 7 (Huang et al., 2002) and Landsat 8 (Baig et al., 2014), NDVI (Rouse Jr. et al., 1973), biophysical composition index (BCI) (Deng and Wu, 2012), normalized difference soil index (NDSI) (Deng et al., 2015), NDBI (Zha et al., 2003), and MNDWI (Xu, 2006). A new index $NRUI_{ms}$ (Piyoosh and Ghosh, 2020) for multisensor Landsat data has also been used. In addition to these, MNDSI and normalized ratio urban index (NRUI) (Piyoosh and Ghosh, 2018) have been used, which are applicable for Landsat 8 data. NRUI for Landsat 8, which is computed from BCI and MNDSI, is denoted by $NRUI_{OLI}$ to distinguish it from $NRUI_{ms}$.

Section snippets

Study area and data used

The study area is located in Dehradun district of Uttarakhand, India, and it includes Dehradun City and surrounding valley region. The coverage of area chosen for study is taken on the basis of amended master plan—2025 of Dehradun (http://mddaonline.com/master-plan↗) (Fig. 1). It is located between 30°13′36.17″ and 30°25′20.63″ N and 77°52′24.64″ and 78°9′39.70″ E, which approximately covers a total area of 362 km^2.

Satellite images of study area have been extracted from Landsat data (Path/Row No…

Methodology

The methodology adopted for establishing the relationship between LST and LULC using univariate and multivariate modeling has been represented by a flowchart shown in Fig. 2. Satellite data used was preprocessed, and it was atmospherically corrected using a model which is based on the Cosine of solar zenith angle (COST) as explained by Chavez (1996). Spatial enhancement was carried out for Landsat 8 data using high-pass filter (HPF)-resolution merge pan-sharpening technique (Gangkofner et al.,…

Results and discussion

For the assessment of linkages between LULCC and LST, results obtained from methodology adopted for modeling the LST with various indices are presented and discussed in the subsequent sections.…

Conclusions

The relationship between LST and various individual indices, highlighting different LULC as single explanatory variable, has been modeled using univariate modeling procedures. Scatterplots of LST and different indices for whole study area and also for some of LULC, such as urban, fallow land, and forest, were analyzed. It has been observed that LST has a positive correlation with BCI, TC1, NDBI, and NDSI, while it has a negative correlation with TC3, NDVI, TC2, and MNDWI. Newly developed urban…

Acknowledgments

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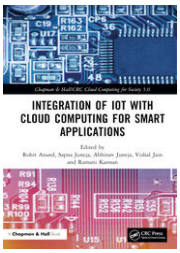
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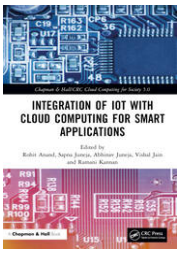
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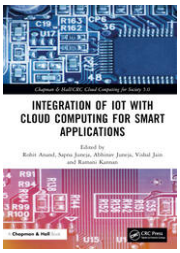
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Chapter Eleven - Heart disease prediction with machine learning and virtual reality: from future perspective

Ashima Arya [1], Mitu Sehgal [1], Neha Bhatia [1], Sapna Juneja [2], Deepika Koundal [3]

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Abstract

Maintaining health of human body is essential and complex in multifaceted ways. It consists of several organs out of which heart is counted as one of the major parts of body. It helps in pumping the blood and supplies it in the whole body. Heart disease is one of the major threats to any human being. It may cause anyone life's to death. Predicting cardiac disease is a tough task in medical science. Data analytics is the approach which is used to predict the disease from the related information. Huge amount of data has been recorded and stored by the medical centers. The collected data help in prediction of future outcomes. From the literature review, it has been observed that classification (regression, decision tree, naïve Bayes, etc.), clustering (K-means), neural networks (forward and backward propagation), and virtual reality (VR) algorithms that are used to envisage heart disease. This chapter provides sight toward existing algorithm giving overall summary of the existing work. In this study, a VR model is proposed, and three algorithms naïve Bayes, logistic regression, and random forest have been considered to predict the accuracy of prediction of heart diseases on the given data set. When it comes to predicting heart disease, the algorithm with the utmost precision is used.

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Keywords

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- « Previous Chapter
- Table of contents
- Next Chapter »

Abstract

Smart healthcare systems are useful for the prediction of diseases to provide a proper diagnosis, prevention, and cure by analyzing them. Blockchain (BC) is one of the emerging and trending technologies for various smart and intelligent health care systems that are very much required in the current scenario to expand the medical boundaries. The mechanism used in it gives assurance of security of data of patients which is the most important aspect of a healthcare system. But with one issue resolved, cannot stop the other issues to rise like attacks and double spending. To pick up these issues, analytics of data is required on the secured data for better results in the diagnosis and analysis in the healthcare industry. Till now, machine learning algorithms for recognizing the patterns in healthcare, data analyzing, and making some decisions based on the data have also shown their value among different sectors. The basic characteristic of ML is to modify the accuracy of results by involving the rational amount of healthcare data for precise diagnosis or decisions. To make positive decisions, the proper amount of data is required. So, the combination of these two technologies - machine learning and BC technology - can improve the results to a better precision of improvement to the next level which may be very important and useful for medical or healthcare systems. Support vector machines (SVM), deep learning (DL), convolution neural network (CNN), and long - short-term memory (LSTM) are some of the traditional ML techniques which can be useful for the analysis of the issues like the attack on the BC network. In this study, we will discuss about a detailed comparison of smart applications in the healthcare sector that mainly includes applications like smart grid, smart cities, etc. Data

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- 6.3 Healthcare systems implemented by ML
- 6.3.1 ML in prognosis
- 6.3.2 ML in diagnosis
- 6.3.3 Applications of ML in treatment of patients
- 6.3.4 Applications of ML in clinical workflow
- 6.4 Challenges faced in healthcare systems and its applications
- 6.4.1 Safety challenges
- 6.4.2 Ethical challenges
- 6.4.3 Privacy challenges
- 6.4.4 Accessibility of good quality data
- 6.4.5 Causality is a challenge
- 6.4.6 Distribution shifts
- 6.5 ML adaptation in BC: basic application
- 6.6 Future research and open issues
- 6.6.1 Framework
- 6.6.2 Privacy
- 6.6.3 Security
- 6.6.4 Implementation
- 6.6.5 Memory
- 6.6.6 Quantum resilience
- 6.6.7 Suitability
- 6.7 Conclusion and future scope
- References

Chapter - 3

Critical Role of Information and Communication Technology in Healthcare

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Chapter - 3

Critical Role of Information and Communication Technology in Healthcare

Dr. Seema Maitrey

Abstract

ICT (Information and Communication Technology) plays a critical role in healthcare, enabling healthcare providers to deliver better and more efficient care to patients. Every aspect of human action will change significantly as information and communication technology (ICT) is incorporated, and tasks will become simpler to complete. It can be beneficial for medical education and healthcare networks. ICTs have the power to advance patient-centered healthcare at a lower cost, improve the standard of care and information sharing, inform patients and healthcare workers, encourage a new type of interaction between patients and healthcare providers, and cut down on travel time. The reliance on technology in the healthcare system is rising. ICT unifies all tools, systems, programmes, frameworks, and other elements that enable people and groups to interact in the digital world. Information and Communication Technology (ICT) has revolutionized healthcare in numerous ways. It has made possible to analyze vast amounts of health data and conduct research more efficiently. This has led to new discoveries, improved treatments, and better outcomes for patients. ICT has enabled the exchange of health information between different healthcare providers. This has improved the coordination of care, reduced medical errors, and saved lives. Therefore, this chapter aimed to assess utilization ICT and its associated factors.

Introduction

The nation already benefits from a robust information technology fibre network, domestic satellite transmission technology, and skilled human resources. Globally, the way people live, work, develop, and distribute information and power has been revolutionized by computer technology and the digital world. It is crucial to evaluate health science students' factors to use computers and ICT technologies because the integration of informatics

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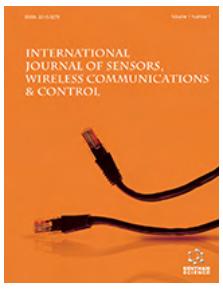
Abstract

Nowadays, the acquisition of different deep learning (DL) algorithms is becoming an advantage in the healthcare sector. Algorithms like CNN (Convolution Neural Network) are used to detect diseases and classify the images of various disease abnormalities. It has been proven that CNN shows high performance in the classification of diseases, so deep learning can remove doubts that occur in the healthcare sector. DL is also used in the reconstruction of various medical diagnoses images like Computed Tomography and Magnetic Resonance Imaging. CNN is used to map input image data to reference image data, and this process is known as the registration of images using deep learning. DL is used to extract secrets in the healthcare sector. CNN has many hidden layers in the network so that prediction and analysis can be made accurately. Deep learning has many applications in the healthcare system, like the detection of cancer, gene selection, tumor detection, recognition of human activities, the outbreak of infectious diseases, etc. DL has become famous in the field of healthcare due to its open data source. In the case of the small dataset, CNN becomes an advantage as it does not provide an excellent way to statistical importance. Deep Learning is a technique that includes the basis of ANN (Artificial neural networks), appears as a robust tool for machine learning, and encourages recasting artificial intelligence. Deep learning architecture has more than two hidden layers, as in ANN; it is only one or two. Therefore, this chapter represents a survey of the role of deep learning in the healthcare industry with its challenges and future scope.

Keywords: Artificial neural networks (ANN), Auto-encoders (AEs), Bioinformatics, Biological neural networks, Boltzmann machine, Convolution neural networks (CNN), Deep autoencoders, Deep belief networks (DBNs), Deep learning (DL), Deep neural nets (DNNs), Deep structures, Electronic health records (EHRs), Genomics, Machine learning (ML), Medical images, Medical informatics, Pervasive sensing, Restricted boltzmann machines (RBMs), Recurrent neural nets (RNNs), State-of-the-art ML, Unified medical language system (UMLS).

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Chapter 1
Role of Blockchain Technology in 6G Network Management

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ABSTRACT

Blockchain technology is a revolutionary technology for the sixth-generation (6G) network. Blockchain offers significant advantages of transparency, immutability, flexibility, traceability, and security to the 6G network management. This chapter focuses on the survey of an emerging field of blockchain technology in 6G-based application and network management. Blockchain could enhance resource management and spectrum management more broadly. Blockchain could record the idle spectrum usage between primary users and secondary users. In addition, the network management chapter briefs about the security concern of the 6G network. Further, the impact of emerging technologies on the 6G network are also introduced.

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INTRODUCTION

The evolution of 6G networks is characterized by ubiquitous connectivity and integration of emerging technology such as Artificial Intelligence (AI), IoT, Blockchain, and cloud computing. Moreover, 6G is developed to offer high-level data security and transparency services. Blockchain has the potential to offer these services. 6G is the systematic evolution of 1G, 2G,3G,4G, and 5G. 6G is a future network, and Integration of 6G with Blockchain makes network management tasks efficient, secure and transparent. Blockchain technology provides the substantial potential to create secure communication in 6G networks due to its effective control and monitoring of spectrum and resource sharing mechanism (Bindu et al., 2022; Wang et al., 2021).

4G, 5G, 6G, and Blockchain

The cellular network has been the most convenient and popular wireless transmission technology in the last few decades (30 years). From 1st generation (1G) in the early 1990s to 5th generation (5G) in 2020, the data transmission rate has increased multi-fold (from 2.4kbs to higher than 1Gbps), and the number of users has increased sharply (Shah et al., 2022; Singh et al., 2022a). These users must require the best-connected resources in any network (Singh & Agrawal, 2018).

The fourth generation (4G) of mobile networks was introduced in late 2010, and its main goals were to provide top-notch services like high speed, high capacity, greater security, and affordable information and voice services. All mobile gadgets in this technology are connected through an Internet Protocol (IP) based network system. With the use of OFDM techniques, 4G is able to solve a critical shortcoming of the CDMA strategy used in 3G. Additionally, it combines additional wireless technologies, including LAS-CDMA, MC-CDMA, and organization LMDS, to provide seamless transitions between them.

However, long-distance Evolution (LTE) and Wi-Max are also regarded as 4G technologies. It might theoretically offer a 20MHz data capacity and a 1 Gbps data throughput. The existing 5G network is designed to serve the Internet of Everything (IoT), and it is working at high-frequency mm-wave. The goal of 5G is to provide M2M (Machine-to-Machine) communication, the connectivity of persons and machines, and to provide quick, full inclusion, unlimited access to information, the ability to share data whenever and wherever, as well as an intelligence network. 6G-enabled IoT technology offers a stand for data collection and processing at high speed network that too in low latency (Pajooh et al.,2022).

To support transmission capacity, the core technology of 5G combines a vast array of MIMO radio wires at the real layer. Even though the 5G supports ultra-reliable

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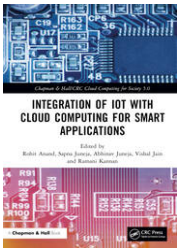
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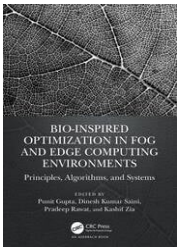
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Deceptive Content Analysis Using Deep Learning

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***Abstract*— Fake news is the deliberate spread of false or misleading information through traditional and social media for political or financial gain. The impact of fake news can be significant, causing harm to individuals and organizations and undermining trust in legitimate news sources. Detecting fake news is crucial to promote a well-informed society and protect against the harmful effects. Tools such as machine learning and natural language processing are being developed to help identify fake news automatically. Necessity of fake news detection is very important to maintain a trustworthy and responsible media environment. We have used Word2Vec model for word vectorization and represents words in a multi- dimensional space based on their semantic and syntactic relationships [3]. The use of the LSTM with 256 units allows our model to capture the sequential nature of the data and make predictions based on past information [2]. The proposed model uses Word2Vec and LSTM models to provide a powerful approach to fake news detection, combining the ability to capture the complexity of language and the sequential nature of the data [3]. The model hasthe potential to accurately detect fake news and promote a well-informed society. The accuracy achieved by building the model was 97%.**

Keywords—Fake news, LSTM (Long Short Term Memory), word vectorization,Word2Vec.

I. INTRODUCTION

Fake news has become a pervasive problem in our society, causing harm to individuals and communities by spreading misinformation and sowing seeds of distrust in the media and democratic institutions. It is crucial that we all take responsibility for verifying the accuracy of information before sharing it and actively seeking out reputable sources of news and information. The spread of false information has the potential to create mass confusion and incite anger, particularly when it comes to sensitive topics like politics, health, or national security. Moreover, it can also undermine trust in journalism and institutions responsible for verifying the authenticity of news. The situation has become even more complex with the rise of deepfake technology. which allows for the manipulation of audio and video to create false content that appears to be real.

Fake news has impacted various domains, including politics, sports, health, and science, and has led to many negative consequences, thus making it mandatory to check information before sharing it with others. As the spread of misinformation continues to be a pressing issue, there is an urgent need for effective and efficient fake news detection mechanisms. Recent advancements in machine learning and natural language processing have opened up new possibilities for detecting fake news.

The spread of fake news has become a major concern in recent years, particularly with the rise of social media and the ease of sharing information online. Fake news can cause real harm by spreading misinformation and influencing people's beliefs and actions. The research by Common Sense Media showed that young people are no better than the rest of the society in identifying fake news and that they may unknowingly spread false information. This situation has raised concerns about digital literacy and the need for individuals to be able to navigate and critically assess the information they encounter online.

Researchers have developed numerous machine learning models that utilize linguistic features. The commonly used models for training include decision trees, support vector machines (SVM), and logistic regression. Additional features such as user engagement and stance detection are often employed to improve the results of these models. Some studies have even incorporated social and psychological theories and data mining algorithms to construct these models.

A study was conducted in the political domain to determine the effectiveness of combining text and speaker features, and also the metadata elements apart from this, to achieve accuracy up to higher extent in natural language processing. Results showed that 27.7% was the accuracy achieved when text and speaker features were combined, and 27.4% when all metadata elements were combined with text. Another approach to stance detection was proposed by Riedel et al., which involved classifying articles as "agree", "discuss", "disagree", or "unrelated" based on the article's headline and text. Linguistic properties were the methods used, along with the term frequency and term frequency-inverse document frequency, as features, and a multilayer perceptron (MLP) classifier with one hidden layer and a SoftMax function on the output of the final layer. The model achieved an accuracy of 88.46% in the overall classification of articles.

II. LITERATURE REVIEW

In the research paper "Linguistic Feature Based Learning Model for Fake News Detection and Classification" [1], a linguistic model is created to find out the properties of data which contains news articles by which Language driven features will be created. The model finds syntactic features, grammatical features, readability features and sentimental features from the

news article to process it into fake or real. Dataset used were Buzzfeed Political News Data and Random Political News Data. Both data-sets are available as Horne2017_FakeNewsData1 repository. Methodology was that model was classified into three models. Model 1 contains Syntax based features, Grammatical features and Sentiment based features represented by a group of 13 features. [1] Model 2 contains Readability features represented by group of 87 features. [1] Model 3 contains all the lingual features, i.e., 20 in count.[1] It results in a total accuracy of 84.52% with Epoch 100 batch size 5 and 10 using model 3 .[1] Results are also compared with LSTM model, training time of LSTM model was much more than that of our model therefore LSTM model was excluded.

The research paper "Fake News Detection: A Deep Learning Approach" [8] employs stance detection technique to identify fake news. The FNC-1 dataset is utilized to train the model, which consists of news articles and their corresponding headlines, as well as a label indicating their relatedness or stance. The dataset is categorized into four stances: agree, , unrelated, disagree and discuss. To enhance the results, preprocessing techniques such as stop word and punctuation removal are employed. Various word embedding methods are used to train the dense neural networks. In the first study, the TF-IDF approach is utilized for embedding, and the embedded vector serves as the input to the neural network, resulting in an accuracy of 94.3%. In the next study, the bag of words (BOW) technique is combined with a neural network, achieving an accuracy of 89.23%. Finally, the Word2vec method is employed in a model that delivers an accuracy of 75.67%.

Next, we picked “Long Short-term Memory” [9]: Recurrent Neural Network (RNN) is a type of neural network that is commonly used to make predictions based on sequential input data. LSTMs is a variation of RNNs that was specifically designed to address the problem of long-term dependencies in large text inputs. Like RNNs, LSTMs also have a chain-like structure, but they use a Cell state to retain relevant information, discard irrelevant information, and update data to a new Cell state. LSTMs have three essential gates, namely the Forget gate, Input gate, and Output gate, to carry out their operations. The Forget gate is responsible for removing extra information from the Cell state. It uses a Sigmoid function to predict a value between 0 and 1 based on a combined vector of the current input and previous output. The Input gate is used to store information in the Cell state, and it uses two layers, one of which is a Sigmoid layer, and the other is a tanh layer. Finally, the Output gate determines how much information to use for output. In conclusion, LSTMs are a type of RNN architecture that are effective at modelling complex sequential data, due to their ability to handle long-term dependencies and learn high-level representations. However, they do have limitations such as the inability to handle long-term temporal dependencies and a limited context window size. To address these limitations, researchers have proposed different solutions such as training larger LSTMs, using Attention-based models or GRUs, or exploring alternative neural network architectures such as the Neural Stack Machine. Despite these limitations, LSTMs continue to be a popular choice in various applications due to their effectiveness in many tasks and their efficient gradient-based learning algorithm.

III. METHODOLOGY

A. Dataset Used

To pick a perfect Dataset to match our expected accuracy rate we need a dataset whichnot to small and also contains Real time news from Twitters, News Websites, News channels, Podcasts and from Newspapers. We can also combine different Datasets to make our news Dataset which has all our desired features to train our model.

Our Dataset is taken from Kaggle named as WelFake_Dataset it contains 72134 entries out of which we have 35028 Real News and 37106 Fake News.

Attribute	Type
unnamed	Numeric
title	Text
title	Text
label	Numeric (0 or1)

Table.1. Specifications of WelFake_Dataset

B. Word Coud

A word cloud is a visual representation of the most frequently used words in a text or speech. It typically displays the words in different sizes and colors, with the size and color of each word indicating its frequency of use in the text. The idea behind word clouds is to provide a quick, easy-to-understand overview of the key themes and topics discussed in a piece of text.

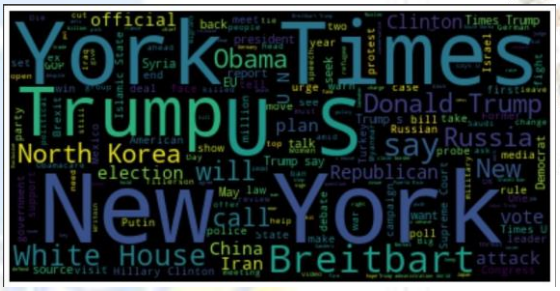


Fig.1. Word Cloud of title attribute with label 0 (Fake)

C. Pre-Processing

First Convert data in text and title attributes to lower case.

Second merge both ‘text’ and ‘title’ attributes of our database. Both of these attributes contain news so it is perfect to merge them which will help us in model training and maintain our performance.

Third removal of null rows from the database.

Fourth removal of Special characters like , “ . ; / [ ] - ? : ! @.

1. We used our own made package to pre-process our Data - DivyamPal/pre-processing (github.com)
   To make this library we used spaCy and Beautiful Soup and combined it and made a package of it anyone can use this pakage by using the link given above
2. spaCy is an open-source software library for advanced Natural Language Processing (NLP) in Python [4].
3. Beautiful Soup is a Python library used for web scraping and pre- processing of unstructured data, especially HTML and XML.

D. Proposed Model

1. Word2Vec [3]

Word Vectorization is a crucial step in the field of machine learning and nlp (natural language processing). The process of word vectorization involves converting words into numerical vectors, which can then be fed into machine learning models for training and prediction tasks. The purpose of this conversion is to provide the machine with a numerical representation of words so that it can understand and work with textual data.

There are several methods for word vectorization, including one-hot encoding, count- based methods, and prediction-based methods. One-hot encoding represents each word in a vocabulary as a binary vector, where each dimension represents a unique word in the vocabulary. However, one-hot encoding is not suitable for representing the semantic meaning of words and their relationships. Count-based methods, on the other hand,represent words as the frequency of their occurrence in a given corpus. Although count- based methods capture the frequency of words, they do not consider the semantic meaning of words.

Prediction-based methods, such as Word2Vec, are more advanced and sophisticated. Word2Vec is a widely used word vectorization technique that represents words in continuous vector spaces. It operates by learning the relationship between words in a corpus and their context, represented by surrounding words. The technique uses a neural network to determine the target word given its context. The hidden layer of the neural network can be thought of as a dense representation of words, which can be used for information retrieval i.e., to understand the deep contextual meaning of the given input text.

The dimensions of the word vectors are an important factor that affects the performance of a word vectorization model. A high-dimensional vector can capture the complex semantic relationships between words, but it also increases the computational cost of the model and can lead to overfitting. On the other hand, a low-dimensional vector may not capture the complexity of the relationships between words. The choice of the dimensions of the word vectors depends on the specific task and the corpus being used. A common dimension used in Word2Vec is 100.

2. LSTM (Long Short Term Memory) [2]

Long Short Term Memory (LSTM) has been widely used in various applications, especially in areas where the input data is sequential in nature such as nlp (natural language processing), speech recognition, and financial time series prediction. It is one of the most popular deep learning models for sequential data. The main advantage of LSTM over traditional RNNs is its ability to handle long-term dependencies in sequential data, making it more suitable for tasks that require the model to remember information from previous inputs.

The structure of an LSTM model is comprised of a series of memory cells, which are responsible for retaining information from the input sequence, and gates that regulate the flow of information into and out of the memory cells. The gates in an LSTM model are designed to keep important information in the memory cells and forget irrelevant information, allowing the model to learn long-term dependencies in sequential data. There are three types of gates in an LSTM model: the input gate, the output gate and the forget gate.

From memory cell which information should be discarded is determined by the forget gate. It isimplemented using a sigmoid activation function and receives inputs from the previous hidden state and the current input. The forget gate computes a probability value, which determines the extent to which the current information should be forgotten. If the probability is high, the memory cell will discard more information and retain less information. If the probability is low, the memory cell will retain more information and discard less information.

The information stored in the memory cell is regulated by the input gate. It is also implemented using a sigmoid activation function and receives inputs from the previous hidden state and the current input. The input gate computes a probability value, which determines the extent to which the current information should be stored in the memorycell. If the probability is high, the memory cell will store more information and discardless information. If the probability is low, the memory cell will store less information and discard more information.

The Forget gate is responsible for removing extra information from the Cell state. It is also implemented using a sigmoid activation function and receives inputs from the previous output and the current input vectors. The output gate computes a probability value, which determines the extent to which the information stored in the memory cell should be passed to the next hidden state. If the probability is high, the memory cell will pass more information to the next hidden state and retain less information. If the probability is low, the memory cell will pass less information to thenext hidden state and retain more information.

In conclusion, LSTM is a powerful deep learning model for sequential data. Its ability to handle long-term dependencies in sequential data makes it more suitable for tasks that require the model to remember information from previous inputs.

3. Model Used

For our model, the model used for word vectorization is Word2Vec [1][3]. This model is known for its ability to capture semantic and syntactic relationships between words. By converting words into vectors, Word2Vec is able to represent words in a multi- dimensional space, where similar words are close to each other and dissimilar words arefar apart.[3]

In this particular case, the dimensions used for the model are 100. The number of dimensions refers to the size of the vectors that are used to represent words. By using 100 dimensions, the model is able to capture the complexity of language while still being computationally efficient. The use of the Word2Vec model with 100 dimensions in this case provides a balance between capturing the complexity of language and being computationally efficient.[3]

The LSTM model used for training has 256 units, which means it has 256 memory cells that can store information over a period of time. The quantity of units is an adjustable hyperparameter that is dependent on both the complexity of the task and the amount of data that is accessible for training.[2]

The activation function used in this LSTM model is the Sigmoid function. The activation function is a mathematical operation that maps the inputs to outputs and helps the model make predictions. The Sigmoid function is a common activation function used in deep learning models, especially in binary classification problems like fake news detection, where the output is either 0 (Fake News) or 1 (Real News). The Sigmoid function maps the input in the range between 0 and 1, which represents the probability of a certain

class. In this case, the model outputs a probability of the given news being fake or real, and thelabel with the highest probability is considered as the prediction.[2]

Optimizer used is Adam. The Adam optimizer is often used in training Long Short-Term Memory (LSTM) networks, as it is well-suited to optimize the complex and non-linear dynamics of these models [2]. LSTMs require accurate and stable weight updates to effectively capture long-term dependencies and model sequential data. The Adam optimizer's ability to dynamically adapt the learning rate for each parameter helps to stabilize the optimization process and prevent oscillations in the training process, leading to faster convergence and improved performance. Additionally, the Adam optimizer's relatively low memory requirements compared to other optimization algorithms make it well-suited for large-scale LSTM networks.[2]

Loss function used is Binary cross-entropy. The binary cross-entropy loss function is used for binary classification problems and measures the difference between the predicted and true probability distributions. The true distribution has a value of 1 for the positive class and 0 for the negative class. The goal of this loss function is to minimize the dissimilarity between the predicted and true distributions to improve the accuracy of the model's predictions. The binary cross-entropy loss function is defined as:

$$Loss = -(y * \log(p) + (1 - y) * \log(1 - p)),$$

where y is the true label and p is the predicted probability of the positive class. The goal ofthe optimization process is to minimize this loss, resulting in improved model predictions. The binary cross-entropy loss is sensitive to imbalanced class distributions, so it's important to consider the class distribution when using this loss function.

IV. RESULTS

The outcome of this project to find the best performing model for fake news detection. We monitor our model's performance during different epochs. Results are noted for all epochs with different batch sizes and found the highest accuracy of all. Final accuracy achieved was 98.14 % with 6 epochs.

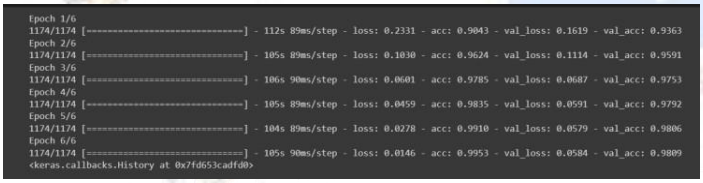


Fig.2. Model's Result after every epoque

Tabel.1. Classification Report

	Precision	Recall	F1-score	support
0	0.98	0.98	0.98	8672
1	0.98	0.98	0.98	9213
Accuracy			0.98	17885
Macro accuracy	0.98	0.98	0.98	17885
Weighted average	0.98	0.98	0.98	17885

V. CONCLUSION

This paper represents model to detect fake news using LSTM with the help of text classification problem. We started studying the linguistic feature-based learning model forfake news detection, this study used two political news datasets and divided the models into three, with Model 3 having the best result of 86% average accuracy at epoch size 500and batch sizes 5 and 10[1]. This model used all lingual features (20 features), while Model 1 used syntax, grammatical, and sentiment features (13 features) and Model 2 usedreadability features [1].

LSTMs are more effective than traditional RNNs in handling long-term dependencies and modelling complex sequential data [2].

The model prepared for this research paper detect fake news using a deep learning model based on LSTM. A dataset of news articles and tweets was used to detect fake news. The dataset has 4 columns: unnamed, title, text, and label [2]. The label column contains binary numbers, 0 for fake news and 1 for real news [2]. In the pre-processing stage, special symbols were removed and the title and text columns were merged. Null lines and extra spaces were also removed. Word vectorization was used to convert words into numerical vectors for training, using the Word2Vec method with 100 dimensions. The training was done using a LSTM deep learning model, which is capable of learning long-term dependencies for sequence predictions [2]. The LSTM model had 256 units and used a sigmoid activation function. The LSTM model was trained for 6 epochs with sigmoid activation function and 256 units, achieving an accuracy of 98.14% [2]. The results of the project are shown in a matrix and a screen shot of the working project is also presented. The system correctly classified a real news article about a recent incident in Uttarakhand.

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Data Rate Aware Reliable Transmission Mechanism in Wireless Sensor Networks using Bayesian Regularized Neural Network approach

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ABSTRACT

Wireless Sensor Networks consists of interconnected nodes that exchange information wirelessly enabling its deployment in innovative application areas. Network reliability streamline this exchange of information and communication technology to improve the overall performance of the network. The network reliability is categorized as: node reliability and link reliability. In this article, the node reliability is quantified with the help of packet reliability. The packet reliability is enhanced by optimizing the data rate using Bayesian Regularized Neural Network approach, which thus makes the network more reliable and sustainable. The optimization is carried out in three phases: network designing, data rate prediction and reliability evaluation. The network design includes the deployment of sensor nodes for gathering the communication data using NS-2.35. In the next phase, data rate prediction is carried out to enhance the reliability of the network. The reliability of a network is directly influenced by the packet loss ratio. According to research and the network experts, the acceptable threshold limit for the packet loss ratio is 5 percent. The data rate prediction is carried out to minimize the packet loss using the Bayesian Regularized Neural Network algorithm. The packet reliability is measured in terms of packet loss across the wireless network. Finally, a novel framework is presented for evaluating the packet reliability of the wireless network.

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1. Introduction

Wireless Sensor Networks (WSNs) are of paramount importance for communicating information wirelessly from source to destination [1,2]. It is widely used for flood, forest fire and landslide detection; military surveillance; industrial, environmental, and health monitoring applications [3–7]. Sensor nodes are dispersed in the region of interest where they capture the data and deliver it to the sink node wirelessly. Hop-by-hop communication takes place for communicating the data to the sink node. The sink node receives the sensed data, processes it and forwards it to the remote user [8,9]. The data is collected from multiple source nodes and transmitted to the sink node. This process is known as data agglomeration.

The data agglomeration generates congestion around the sink node. The packet loss in the network increases due to the collision of these packets travelling towards the sink node [10–12]. It also generates interference between the packets. Transmission errors and node failures are also responsible for packet loss because the depletion of the battery generates permanent faults in the network [13,14]. There are several unforeseen reasons for packet loss in the network [15]. It is a challenging job to send agglomerated data to the sink node with a high degree of reliability.

Network reliability is an imperative parameter to enhance the performance of the network. It enhances the overall Quality of Service (QoS) of the network [16,17]. Reliability is described as "the ability of a system or component to perform

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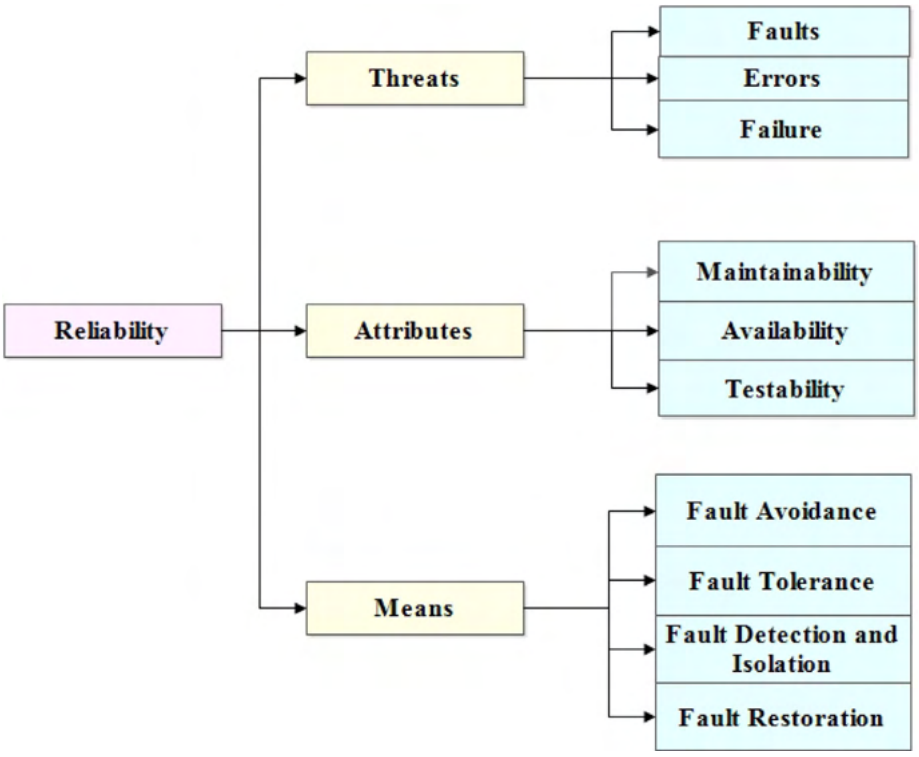


Fig. 1. Reliability taxonomy [18].

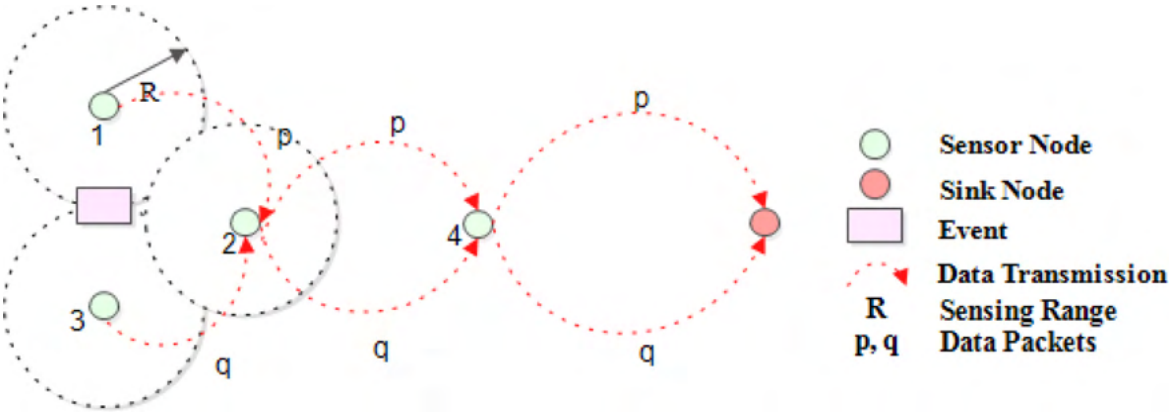


Fig. 2. Illustration of packet reliability [21].

its required functions under stated conditions for a specific period of time" [10]. Reliability taxonomy is classified into three parts: threats, attributes and means shown in Fig. 1 [18]. Threats are activities that breach the sensitive information in the network thereby diminishing its performance. Due to these, distinct types of faults are generated such as transient and permanent faults [19]. A fault is a defect that deviates actual response from the predicted response. This deviation paves a way for an error and can ultimately lead to network failure [20].

The attributes associated with reliability are availability, maintainability and testability. Availability is described as "the ability of a system to be in a state to perform a required function at a given instant of time or at any instant of time within a given time interval; assuming that the external resource if required, is provided" [22]. It is strongly correlated with reliability with the exception that reliability deals with failure-free operation during an interval, and availability deals with the failure-free operation when the system is first accessed to provide the resources and services to the user. Reliability and availability are inculcated in a system using four strategies namely: fault avoidance, tolerance, detection and restoration. These strategies are used in the designing phase of the network and provide reliable communication [23–25]. Maintainability and testability are other attributes of reliability which deal with fault tolerance [26].

An event can be summarized as a evocative change in the state of the environment in which an end user is interested. This leads to an understanding of the event and packet reliability. The reliability is based on the amount of sensed data that must be communicated towards the sink node. The main goal of packet reliability is to ensure that the sensed data is reliably transported to the sink node in its entirety using a hop-by-hop delivery mechanism. The packet reliability is shown in Fig. 2.

Fig. 3 represents the event reliability which is used for monitoring the occurrence of an event in the region of interest. The

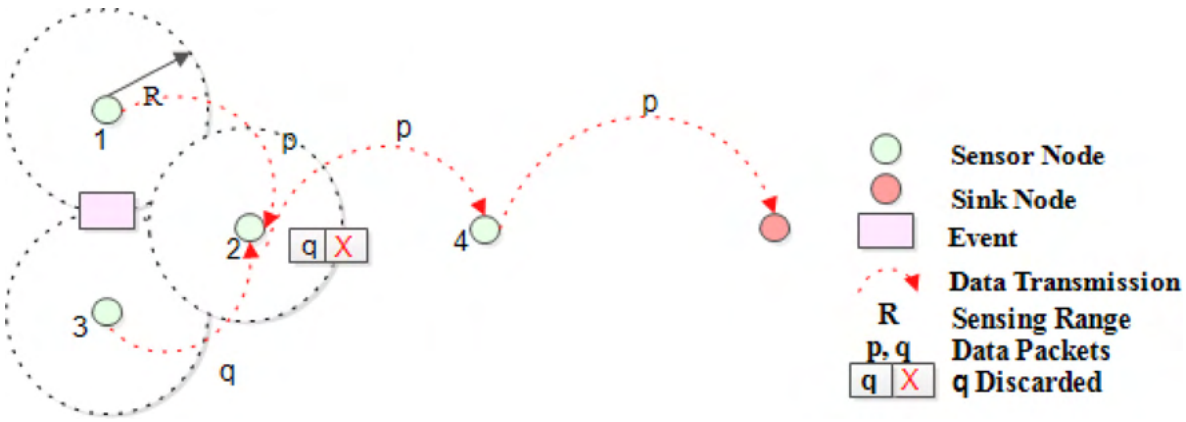


Fig. 3. Illustration of event reliability [21,27].

sensed data in its entirety is not communicated to the sink node, instead only the useful information is communicated [27].

Fig. 4 represents the proposed framework DRRTWSN (Data Rate Aware Reliable Transmission Mechanism in WSN). In this framework, the sensor nodes are positioned in the sensing field using Relative Identification and Direction-Based Sensor Routing (RIDSR) topology [28,29]. The dataset is generated with the help of NS-2.35. This dataset includes 11 performance parameters namely Transmitted Packets (TP), Packet Loss (PL), Received Packets (RP), Throughput (TH), Routing Overhead (RO), Routing Agent (RA), Packet Delivery Ratio (PDR), Number of Nodes (NN), Protocol Name (PN), Average Path Length (APL) and Data Rate (DR) [30]. DR is the dependent variable and remaining performance parameters are the independent variables. The network reliability is evaluated based on the threshold value of the packet loss ratio. Based on the literature, it is observed that the threshold value of acceptable packet loss ratio is 5 percent [31,32]. The performance of a communication network can be greatly enhanced by optimizing the data rate. This optimization is carried out using Bayesian Regularized Neural Network (BRNN) approach. The optimized data rate reduces packet loss and enhances the reliability of the network [33,34]. The reliability of the entire network is quantified in terms of packet reliability which is inversely proportional to the packet loss.

1.1. Contribution

This research work focuses on the enhancement of network reliability by optimizing data rate and reducing the packet loss. The contribution of this paper is highlighted below:

- DRRTWSN framework is designed to enhance network reliability which is explored with the help of packet reliability. It is calculated in terms of packet loss across the deployed wireless network.
- The dataset comprises of simulated data generated using NS-2.35. The data rate parameter is the dependent variable and is used to minimizes packet loss throughout the network.
- A minimum threshold value has been considered for the packet loss ratio throughout the network. And then BRNN technique is applied to optimize the data rate considering this threshold value.
- The reliability range is quantified for two most prevalently used routing protocols AODV and DSR.

1.2. Organization

The rest of the paper is organized as: Section 1 discusses the introduction to reliability. Section 2 elaborates on the related literature in detail. Section 3 presents the proposed framework DRRTWSN for reliable functioning of the network. It includes the dataset description, data rate optimization using BRNN and reliability computation. The detailed result discussion has been carried out in Section 4. Section 5 concludes with the main findings and future scope of this work.

2. Literature review

The researchers have focused on the enhancement of network reliability using node reliability, link reliability and network reliability. The different type of faults is identified that affect the network reliability. PTN-RRP scheme is proposed to determine the link failure [35]. Two reliability models enhance reliability in static as well as dynamic conditions of the network [36]. ML helps to predict network parameters and improves QoS [37]. High reliability with minimum cost is achieved by using multipath communication across the network [38]. Energy efficient clustering mechanism is also responsible to provide a reliable network because the battery plays a very important role in WSN and enhances node reliability during communication [39]. The data rate mechanism is presented for congestion control in an literature [40]. The shuffled frog leaping algorithm is used in multipath communication that improves link failure, and node failure. It minimizes the interference of external factors [41].

Learning automata with the A-star approach provides a secure and high-quality neighbour link in routing and enhance reliability [42]. The maximum flow technique is used to provide a reliable and secure network [43]. The expectation maximum algorithm addressed the problem of maximum likelihood estimation [44]. RCB-MRT approach uses a redundancy mechanism to provide reliability during the transmission of data from source to destination [45]. A deep learning mechanism is used to predict the quality and secure link for data transmission [46].

The data rate is responsible to enhance data discretization [47]. A data flow mechanism is used to avoid congestion across the network [48]. It minimizes packet loss and improves network maintenance and reliability. DAEERR approach delivers delayed sensitive data with reliability in the heterogeneous network [49]. The broken links issue is addressed in the article [50]. It uses three ways to improve the reliability: directly transmits data to the target node, uses a cluster head to transmit data towards the base station, the sensor transmits data to its cluster node and it forwards the data to the target node using other cluster nodes.

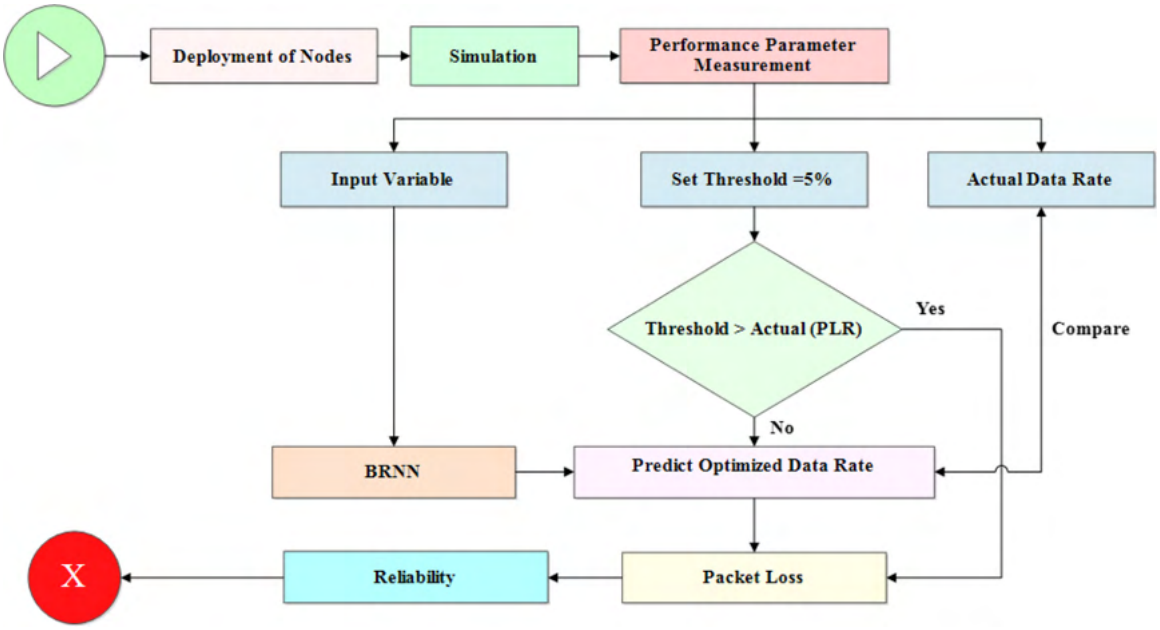


Fig. 4. Proposed workflow.

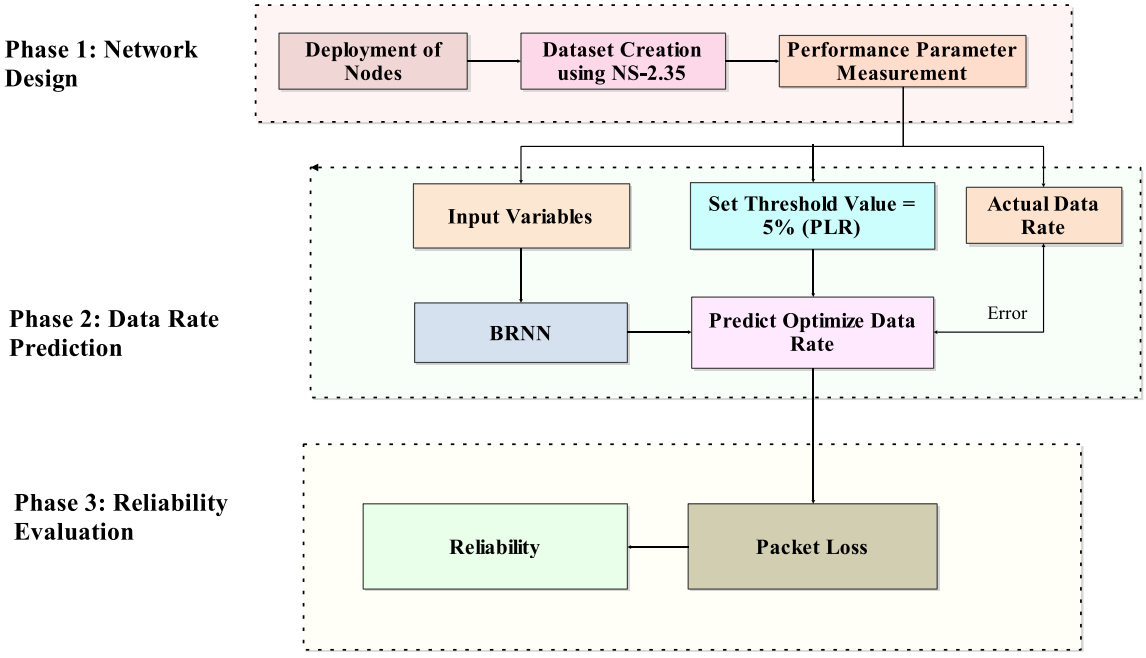


Fig. 5. DRRTWSN framework.

A reliability framework improves the packet delivery ratio using machine learning [51]. A data rate-based congestion avoidance approach is used to improve the throughput of the network [52]. End-to-end reliability is provided by the transport layer using a cost-based mechanism [53]. Temporal correlation is used to determine the faulty data which is corrected using an ANN-based approach [54]. This approach enhances data reliability. The literature summary is presented in the following Table 1.

3. DRRTWSN-proposed framework for reliability

Network reliability is an important aspect during the transmission of packets from source to destination [55]. DRRTWSN framework is proposed to enhance reliability in a wireless network in terms of packet reliability. This framework includes three phases: network design, data rate prediction and reliability evaluation. Nodes are dispersed in the sensing area using RIDSR topology. The optimized data rate prediction reduces packet loss and enhances packet reliability quantitatively. Fig. 5 represents the DRRTWSN framework.

Phase 1: Network Design

RIDSR topology is used to deploy the sensor nodes in the sensing field. This topology is energy efficient and enhances network lifetime [28,29]. It selects the nodes based on battery level and provides stable topology. The good reliable range of battery level is between 81 to 100 percent. If its range lies below 53 percent

Table 1
Reliability and data flow using machine learning.

Year	Author name/Ref	Work description	Tools	Research gap	Proposed approach (DRRTWSN)
2023	Putty Srividya et al. [35]	A proficient Trustworthy Node ID dependent Resource Reservation Protocol (PTN-RRP) scheme is proposed to resolve the issue of connection failure. It determines the shortest route using the likelihood of connection failure.	MATLAB	• The author has only considered the node and link failure. • Clear understanding between the performance parameters and QoS of the network need to be established.	• The proposed approach works on packet reliability. • Effect of enhance reliability is studied.
2023	Xiaoyue Wang et al. [36]	Two reliability models are used for balanced systems. One model is used for static perspective and the other is for dynamic perspective. System imbalance with failure conditions is included in static and rebalanced consideration is used in a dynamic model.	Markov Modelling, Monte Carlo Simulation	• The author has carried out the numerical analysis, validated by practical engineering applications.	• DRRTWSN approach enhances reliability in wireless sensor network. • It addresses the process from the initial network design, prediction, evaluation phase.
2023	Osman Gokhan Uyan et al. [37]	Machine Learning models are used to predict the network parameters such as energy consumption, network lifetime in UWSN. Neural network and regression ML techniques are used to improve energy efficiency and network parameters.	Scikit-learn and Keras	• The author has explored the impact of packet duplication, fragmentation of data, multipath routing on the network lifetime.	• The presented approach works on packet reliability. • This approach works on the core parameter of network thereby enhancing the lifetime.
2022	Hakim Abdulrab et al. [38]	Multi-Path Routing (MPR) based approach is presented to enhance reliability with minimum delay and cost for industrial wireless mesh networks. It includes three multi-paths and each path contains a backup node. It provides transmission reliability during data communication and improves the network's performance.	Wireless HART Simulator using Network Simulator (NS2)	• The MPR works on enhancing the network parameters such as latency, power consumption, packet delivery ratio and network lifetime. • The main advantage of the proposed algorithm is the robustness.	• The proposed approach improves reliability from basic level by using the RIDSR topology deployment. • The proposed approach is beneficial for all the small-scale deployments of WSN.
2022	Fatma H. El-Fouly et al. [39]	Environment-aware routing is proposed to enhance the network's performance in terms of energy and reliability. Integer Linear Programming (ILP) provides good solutions for optimal routing. It improves the quality of the link during routing.	MATLAB	• The author uses integer linear programming for path planning, data routing and clustering. • The performance is evaluated in terms of network lifetime, deadline miss ratio, delay, packet delivery ratio. • The main drawback of this approach is the time complexity.	• In the proposed DRRTWSN approach, the BRNN technique is used for data rate optimization. • This technique is a neural network-based prediction technique which decreases the time complexity.
2022	Amit Grover et al. [40]	Rate Aware Congestion Control (RACC) mechanism is used to minimize congestion across the network.	NS2	• The authors propose a new Rate Aware Congestion Control (RACC) technique. • This technique enhances the network lifetime and also performs congestion control simultaneously. • The design phase can also be modified for further enhancement of network lifetime.	• DRRTWSN is also based in the data rate optimization. • RIDSR topology is used for energy efficient deployment of sensor nodes. • Overall reliability is enhanced starting from the design phase itself.

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Table 1 (*continued*).

2022	Changlong Sun et al. [41]	A shuffled frog leaping algorithm is used for multipath transmission to improve node failure and link failure. It minimizes energy consumption and external interference to enhance network reliability.	MATLAB 2014b	• The author concluded that the particle swarm optimization leapfrog algorithm outperforms the two basic algorithms. • Further exploration is required for the latest swarm optimization techniques such as the butterfly algorithm.	• The presented work focuses on the fastest and the shortest path for communication rather than multipath communication. • The data rate is optimized for reliable network.
2021	Sateesh Gudla et al. [42]	The learning automata approach is used to evaluate the next node selection based on several parameters such as the link's quality, the node's score and the probability of the previous node selection. The hybrid approach of learning automata and the A-star algorithm provides a reliable and energy-efficient routing mechanism.	Network Simulator-3 (NS3)	• The author uses A* approach based on learning automata for reliability and energy efficiency. • The proposed solution is complex.	• The proposed approach optimizes the data rate and quantifies reliability in a comparatively easy way. • This technique can be easily explored for various other machine learning classifiers.
2021	Turki Ali Alghamdi et al. [43]	Maximum Flow Technique (MFT)is used to improve security which provides a reliable network for data communication. It finds all the possible paths during routing and selects the best optimal path.	NS2	• Maximum Flow Technique (MFT) is proposed. • This technique focusses on the security aspect of Quality of Service.	• This technique focusses on data rate optimization thereby considerably enhancing the Quality of Service of the network.
2021	Jianfeng Yang et al. [44]	A reliability model is used to solve the issue of maximum likelihood estimation (MLE). It uses general masked data and expectation maximization (EM) approach.	Numerical Analysis	• A novel reliability model is proposed to deal with the problem of Maximum Likelihood Estimation (MLE). • This model only works well on failure processes of independent clusters.	• This approach works well on all types of simulated data as it considers the network core parameters. • Also, quantitative analysis of reliability is also presented.
2020	De-gan Zhang et al. [45]	RCB-MRT approach uses redundancy technique to enhance reliability during multi-path data transmission. Data packet transmission efficiency is increased using woven multi-path technology.	MATLAB 2013a	• The authors use the redundancy-based technique to calculate the reliability of data transmission. • This technique can only be applied to marginal WSN.	• This technique is applicable to any deployment of WSN as it uses the network performance parameters for reliability calculation. • This work is scalable to various types of WSN.
2020	Ru Huang et al. [46]	This article focuses on reliable link prediction using deep learning techniques. It uses Dual Convolutional Neural Network (WL-DCNN) and Weisfeiler-Lehman kernel for the extraction of lightweight subgraphs and labelling. It improves self-learning of mining topological features.	MATLAB 2019a	• The survivability and resilience of the network is considered. • The authors consider only dynamic topology and attacks on the network.	• This paper deals with the packet reliability in terms of packet loss. • The quantitative analysis of reliability is presented.
2020	Jasminder Kaur Sandhu et al. [47]	A data discretization approach has been applied creating bucket value of the data. Machine Learning techniques are applied on the normal data and the discretized data with suitable comparison.	NS-2.35	• The paper deals with the data discretization process. • The data flow optimization has been carried out using various machine learning algorithms.	• DRRTWSN also considers the data flow as the main parameter for prediction. • This work quantifies the reliability of the network using BRNN.
2020	Vikas Srivastava et al. [48]	The main focus of this technique is on the congestion control mechanism which is linked directly with the data rate of the network. Also, a study on reliability has been presented.	MATLAB	• This technique is limited to rate-based congestion control mechanism. • This technique is only applied to clustered nodes.	• The data rate optimization can be carried out on WSN considering various deployment paradigms.

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Table 1 (*continued*).

2019	Sonam Maurya et al. [49]	Delay Aware Energy Efficient Reliable Routing (DA-EERR) is used to deliver sensitive information in restricted search spaces. It provides the guarantee of sensitive information delivery on time. It uses the energy-delay balanced path during communication for fast information delivery using energy-efficient nodes.	OMNeT++ v4.6 using Castalia-3.2 framework	• This technique guarantees timely delivery of data across the network. • This technique considers the load balancing scheme as well. • This technique can only be applied within a defined search space.	• This approach works for all the sensor network deployment and can be scaled to large-scale deployments as well.
2019	Jacques Bahi et al. [50]	This paper discusses the issue of good diagnosis during data agglomeration. The proposed approach uses three schemes to provide reliability. Nodes can directly transmit the data to the sink node. It can transmit data through cluster nodes. In the next scheme, data transmission occurs only between the distinct clusters.	Scikit-learn	• Strategies to reduce the packet transfers are discussed. • Random forest and Gradient Boosting are combined and fine-tuned for reliable diagnostics. • Various other models can be applied to study their impact.	• The neural network-based model is used to efficiently predict the data flow of the network. • Neural network-based models generally work well on all kind of simulated data. • Lastly the network reliability has also been quantified.
2018	Jasminder Kaur Sandhu et al. [51]	A machine learning based novel framework has been suggested to improve the overall accuracy of the network.	NS-2.35	• Conditional Interface Tree (CIT) technique provides 96.37% accuracy for data rate optimization.	• This work provides 96.67% accuracy for optimal data rate using the BRNN approach. BRNN provides scalable solution for large scale networks also.
2017	Majid Gholipour et al. [52]	A congestion avoidance approach is used to enhance the performance of the network in terms of throughput. The data rate is used as a core parameter to avoid congestion in the network. The optimized data rate is achieved using SVM and genetic algorithm.	NS-2.35 and MATLAB (2013a)	• This approach discusses the transmission rate control method. • This approach deals with computation related to the buffer occupancy and is time-consuming.	• The proposed technique deals with the data rate across the network. • Optimizing data rate using machine learning algorithm is comparatively simpler approach.
2016	Amir Ehsani Zonouz et al. [53]	The cost function-based end-to-end reliability is provided in the transport layer. It uses the integration of battery-powered and energy-harvesting sensor nodes for deployment.	Maple Software	• This work considers battery-powered and energy-harvesting sensor nodes. • A cost function-based routing technique is proposed to enhance Quality of Service.	• This work represents the reliability of network as a crucial parameter for enhancing the Quality of Service of the network.
2015	Adil Amzad Sheikh et al. [54]	This article provides an ANN-based approach to determine faulty data. It corrects the data and improves data reliability across the network. It uses temporal correlation to determine faulty data.	Theoretical approach	• This approach deals with the faulty data across the network. • Two case studies considered in this work are: road traffic and parking system. • The Quality of Service of the network is not quantified.	• The Quality of Service of the network is quantified in terms of Reliability parameter.

then it is considered poor reliability in terms of battery [5,18]. The poor battery is not used in the network because its energy is exhausted during the life cycle of WSN and it hampers the network performance. Radio propagation is active during the simulation set-up and it is shown in Table 2. It uses two-ray ground radio propagation for routing. The wireless channel is used with an omnidirectional antenna for communication. The simulation area is 1000×1000 m^2. The range of nodes is 5 to 50. The total simulation time to generate one record is 20 ms. The interface queue type is DropTail/CMUPriQueue with 150 maximum packets. The data rate range is set between 0.1 to 10 Mbps. DSR and AODV reactive protocols utilize minimum resources with minimum routing overhead.

The dataset is generated using NS-2.35 and includes the performance parameter [30]. TP, RP, PL, PDR, APL, RO, RA, TH, PN, NN and DR are the network performance parameters shown in Table 3.

- Transmitted Packet: The total count of packets transmitted by the sender to the receiver.
- Received Packets: The total count of packets received by a receiver.
- Packet Loss: The total count of packets discarded during communication.
- Packet Delivery Ratio: It is the ratio of the total count of packets received by the receiver to the total packets transmitted by the sender.

Table 2
NS-2.35 Set-up.

Parameter	Value
Channel	Wireless
Radio Communication Model	Propagation Model Two-Ray Ground
Antenna Model	Omnidirectional
X dimension	1000 m
Y dimension	1000 m
Number of Nodes	Range 5–50
Simulation Time	20 ms
Interface queue type	DropTail/CMUPriQueue
Interface Queue Size	150
Data Rate	0.1–10 Mbps
Routing protocols	DSR/AODV

Table 3
Dataset description.

Features	Information	Description
TP	Transmitted Packets	Computed by Simulation
RP	Received Packets	Computed by Simulation
PL	Packet Loss	Computed by Simulation
RA	Routing Agent	Computed by Simulation
PDR	Packet Delivery Ratio	Computed by Simulation
TH	Throughput	Computed by Simulation
RO	Routing Overhead	Computed by Simulation
APL	Average Path Length	Computed by Simulation
NN	Number of Nodes	Range 5–50 nodes
DR	Data Rate	0.1–10 Mbps
PN	Protocol Name	DSR = 1, AODV = 0

- Average path length: It is the mean of total length along the shortest path with all pairs of sensor nodes.
- Routing Overhead: The total count of packets transmitted for route discovery.
- Routing Agent: It is responsible for the communication of the packet with its neighbour's node.
- Throughput: It expressed the speed of the transmitted data during communication.
- Protocol Name: There are two types of protocols used in this article namely AODV and DSR.
- Number of Nodes: It indicates the total count of nodes used in the topology.
- Data Rate: The data rate is a significant core parameter which enhances the other performance parameters [56,57].

DR is used as a dependent variable and evaluates the packet reliability. Table 4 represents a sample of the dataset.

Fig. 6 represents the Pearson correlation between the parameters of a dataset. Correlation (r) lies between −1 to +1 [58]. The sign signifies the direct or inverse relationship between the parameters. The plus (+) sign indicates direct relation and the minus (–) shows the inverse relation among parameters. The value of r represents the strength of the relationship between variables. The range of strong relationships is 0.7 to 1 and weak relation is less than 0.3. The figure represents there is an inverse relationship between packet loss ratio and reliability.

The Pearson Correlation Matrix of the dataset shows that there is no relation between the DR and PN because the correlation value between DR and PN is 0. Similarly, NN is independent of DR but the DR feature of the dataset affects the PLR and reliability. The value of correlation between the DR and PLR is 0.608 which represents there is a direct relation between DR and PLR. When the data rate increases then it increases the packet loss. DR is inversely proportional to the reliability because the correlation value between them is −0.608. The minus sign shows the inverse relation between the features. The correlation value between the reliability and PLR is −1.00 which indicates the strong inverse relation between the reliability and PLR.

Phase 2: Data Rate Prediction

This phase deals with the optimized data rate prediction during an exchange of data between sensor nodes. This optimized data rate is used to enhance packet reliability in the network. The packet loss affects packet reliability and degrades the network's performance. There are several reasons for packet loss across the network. When multiple data are transferred towards a single target node then it generates congestion towards the target node and leads to packet loss. Similarly, buffer overflow is also responsible for packet loss. There are distinct unforeseen causes for packet loss in wireless network [59].

In this phase, a threshold limit of the packet loss ratio is considered as 5 percent. If the threshold limit is lower than the packet loss ratio then there is a requirement for an optimized data rate which maintains the network reliability [31,32]. The packet loss is minimized using adjusting the data rate across the network. It also works to reduce congestion in a wireless network and reduces packet loss [34,60]. Data rate and packet loss ratio are directly correlated with each other. If the value of the data rate increases then it increases the packet loss ratio. There is a need for an optimized data rate that minimizes packet loss and improves the packet reliability of the network. The prediction of an optimized data rate is achieved using the BRNN approach. The Pearson correlation shows the inverse relationship between reliability and data rate discussed in Section 3.

Bayesian Regularized Neural Network (BRNN)

BRNN is combination of Bayesian inference and Artificial Neural network (ANN). It is more robust as compared to traditional back-propagation networks and minimizes the lengthy cross validation [61,62]. Bayesian regularization uses the mathematical approach to convert nonlinear problem to statistical problem. BRNN provides model's choice, validation set, size of validation effort and optimal network architecture. It resolves the problem of overfitting in model [63]. This approach is widely used in distinct application of WSN such as localization, security, delay computation, congestion detection and traffic management system [64–66].

Regularization

Here, A represents the independent data matrix having N_p rows and N_q columns. b is a dependent data having N_p rows and one column. The other columns can be easily determined using linear regression as depicted by Eq. (1) [67]:

$$\hat{b} = \mathrm{m} + \mathrm{nA} \tag{1}$$

where $\hat{b}$ is the estimate of b derived from the model. The Sum Square Error (SSE) is represented with the help of Eq. (2):

$$SSE_p = \sum_{i=1}^{N_p} (b_i - \hat{b}_i)^2 \tag{2}$$

In Eq. (3), $\hat{n}$ is coefficient which is derived from SSE

$$\hat{n} = (A^T A)^{-1} A^T b \tag{3}$$

where T indicates the transpose of matrix. Here, one column has been entered into A for account of m. The generalized linear regression is represented by Eq. (4):

$$\hat{b} = \mathrm{Dw} \tag{4}$$

where D denotes the design matrix and it comprise functions of a. The D elements represented as $d_{ij}(\mathrm{a})$ where i lies between 1 to N_p and j lies between 1 to N_g. N_g is the count of parameters used to build the design matrix D. w is a vector of weight and it replaced n.

The least square value for w is represented with Eq. (5):

$$\hat{b} = \mathrm{f(A)} = \sum_{i=1}^{N_g} w_i d_i(\mathrm{A}) \tag{5}$$

Table 4
Dataset sample.

TP	RP	PL	RA	RO	PDR	APL	TH	DR	PN	NN
1501	492	1009	1559	103.8641	32.77815	4.168699	724.38	0.6	1	30
1751	484	1267	1565	89.3775	27.64135	4.233471	1150.36	0.7	1	30
2000	484	1516	1565	78.25	24.2	4.233471	824.93	0.8	1	30
2250	453	1797	1609	71.51111	20.13333	4.551876	891.7	0.9	1	30
2501	401	2100	1659	66.33347	16.03359	5.137157	927.95	1	1	30
2750	647	2103	1402	50.98182	23.52727	3.166924	976.49	1.1	1	30
3001	477	2524	1578	52.58247	15.8947	4.308176	1030.14	1.2	1	30
3250	485	2765	1612	49.6	14.92308	4.323711	1076.84	1.3	1	30
3500	479	3021	1571	44.88571	13.68571	4.279749	1479.88	1.4	1	30
3751	401	3350	1659	44.22821	10.69048	5.137157	1183.95	1.5	1	30
25000	491	24509	1609	6.436	1.964	4.276986	5532.67	10	1	35
251	250	1	803	319.9203	99.60159	4.212	261.12	0.1	1	40
501	490	11	1552	309.7804	97.80439	4.167347	514.87	0.2	1	40
750	373	377	1434	191.2	49.73333	4.844504	606.41	0.3	1	40
1001	481	520	1600	159.8402	48.05195	4.326403	632.01	0.4	1	40
1251	446	805	1605	128.2974	35.65148	4.598655	845.62	0.5	1	40
2000	459	1541	1613	80.65	22.95	4.514161	829.24	0.8	1	40
2250	485	1765	1562	69.42222	21.55556	4.220619	874.29	0.9	1	40
2501	457	2044	1564	62.53499	18.27269	4.422319	936.14	1	1	40
2750	469	2281	1573	57.2	17.05455	4.353945	971.37	1.1	1	40
3001	398	2603	1494	49.78341	13.26225	4.753769	1031.37	1.2	1	40
3250	475	2775	1561	48.03077	14.61539	4.286316	1075.81	1.3	1	40
3500	346	3154	1464	41.82857	9.885714	5.231214	1117.18	1.4	1	40
3751	350	3401	1449	38.6297	9.330845	5.14	1205.66	1.5	1	40
4000	480	3520	1596	39.9	12	4.325	1232.69	1.6	1	40
4251	480	3771	1541	36.25029	11.29146	4.210417	1275.29	1.7	1	40
4500	377	4123	1433	31.84444	8.377778	4.801061	1358.64	1.8	1	40
9750	238	9512	774	7.938	2.441	4.252	2154.7	7.8	0	30
251	250	1	753	300	99.601	4.012	205	0.1	0	35
750	500	250	1507	200.93	66.66	4.014	461.62	0.3	0	35
5500	500	5000	1507	27.4	9.09	4.014	1434.42	2.2	0	35
7501	500	7001	1507	20.09	6.66	4.014	1844.22	3	0	35
9000	500	8500	1507	16.74	5.55	4.014	2151.22	3.6	0	35
10001	500	9501	1507	15.068	4.999	4.014	2356.22	4	0	35
10501	500	10001	1507	14.351	4.761	4.014	2458.62	4.2	0	35

	DR	PN	NN	Reliability	PLR
DR	1.00	0.00	0.00	−0.608	0.608
PN	0.00	1.00	0.00	0.025	−0.025
NN	0.00	0.00	1.00	−0.229	0.229
Reliability	−0.608	0.025	−0.229	1.00	−1.00
PLR	0.608	−0.025	0.229	−1.00	1.00

Fig. 6. Pearson Correlation Matrix for features of the dataset.

It is determined by minimizing Eq. (2)

$$SSE_p = \sum_{i=1}^{N_p} (b_i - f(A_i))^2 \tag{6}$$

The Eq. (6) faces the issue of local minima. This issue is resolved by using additional diagonal matrix, Λ to D (Design Matrix) is used for regularization. Sometimes, Λ is referred as weight penalty. When diagonal matrix Λ is constant then it is equal to ρ, Eq. (6) is replaced by cost function C(w) in Eq. (7).

$$\mathrm{C(w)} = \sum_{i=1}^{N_p} (b_i - f(A_i))^2 + \rho \sum_{i=1}^{N_p} {w_j}^2 \tag{7}$$

where ρ lies between 0 and 1. The optimal value of ρ is evaluated as:

$$\hat{w} = X^{-1} D^T b \tag{8}$$

where X = $D^T D + \Lambda$

Eq. (8) is similar to Eq. (3). The optimal value of the ρ is achieved by iterating Eq. (8) and Eq. (9):

$$\hat{\rho} \frac{B^T P^2 Y (X^{-1} - \hat{\rho} X^{-2})}{\hat{W} X^{-1} \hat{W} trace(P)} \tag{9}$$

where P represents the projection matrix of b on plane or line for best fit by b=P$\hat{b}$. It can be written as illustrated in Eq. (10):

$$P = I_P - DX^{-1}D^T = D(D^T D + \Lambda)^{-1} D^T \tag{10}$$

ρ is used to regularized the regression and is called as regularization parameter. The effective count of parameters is denoted as α represented in Eq. (11).

$$\alpha = N_g - \text{ trace } (P) \tag{11}$$

It shows the count of terms required to form the model.

Bayesian Inference

Bayes theorem is referred to as an inverse probability law because it determines event probability using the given information [55]. When two events are independent then the conditional probability is represented as:

$$\mathrm{P(N|M)} = \mathrm{P(M\ and\ N)/P(M)} \tag{12}$$

After rearrangement P(M and N) = P(M)P(N| M)

$$\mathrm{P(M|N)} = \mathrm{P(M\ and\ N)/P(N)} \tag{13}$$

After the combination of Eqs. (12) and (13) is:

$$\mathrm{P(M|N)} = \mathrm{P(N|M)P(M)/P(N)} \tag{14}$$

This theorem is used for regularization and making efficient ANN. The cost function minimizes shown in Eq. (15):

$$\mathrm{C(w)} = \sum_{i=1}^{N_p} (b_i - f(A_i))^2 \tag{15}$$

This equation provides efficiency towards the backpropagation of errors. This is an iterative equation. There is a requirement to stop this iteration because it creates an overfitted problem. This issue is resolved using BRNN.

Eq. (7) can be represented in the terms of hyperparameters β and γ.

$$\mathrm{C(w)} = \beta \sum_{i=1}^{N_p} (b_i - f(A_i))^2 + \gamma \sum_{j=1}^{N_w} {w_j}^2 \tag{16}$$

where N_w indicates the count of weight, β and γ shows the initial value of hyperparameters. The new value of β and γ maximize the evidence.

According to the Gaussian probability distribution, the probability of weight is expressed as Eq. (17):

$$\mathrm{P(w|}\gamma\mathrm{D)} = \frac{1}{Z_w(\gamma)} \exp(-\gamma SSE_w) \tag{17}$$

where

$$\text{where} \quad SSE_w = \sum_{i=1}^{N_w} {w_j}^2 \tag{18}$$

Eq. (18) is the error of weights. The probability of the error can be written as:

$$\mathrm{P(p|w,}\ \beta,\ \mathrm{D)} = \frac{1}{Z_p(\beta)} \exp(-\beta SSE_p) \tag{19}$$

where $SSE_p = \sum_{i=1}^{N_p} (b_i - f(A_i))^2$ is error of data.

For Model D, Eq. (14) can be rewritten as:

$$\mathrm{P(w|p|}\gamma,\ \beta,\ \mathrm{D)} = \frac{P(p|w,\ \beta,\ D)P(w|\gamma,\ \mathrm{D})}{P(p|\gamma,\ \beta,\ D)} = \frac{1}{Z_C} \exp(-\mathrm{C(w)}) \tag{20}$$

Using Taylor expansion C(w) can be expressed as:

$$\mathrm{C(w)} \approx \mathrm{C}(w_{MP}) + \frac{1}{2}(w - w_{MP})^T H (w - w_{MP}) \tag{21}$$

where H represents the Hessian matrix of the total error function.

$$\mathrm{H} = \nabla\nabla \mathrm{C}(w_{MP}) = \beta \nabla\nabla SSE_p\,(w_{MP}) + \gamma I = \beta p + \gamma I \tag{22}$$

where p is the Hessian data and w distribution is represented as a Gaussian,

$$\mathrm{P(w|p|}\gamma,\ \beta,\ \mathrm{D)} \cong \frac{1}{Z_C^*} \exp(-\mathrm{C}(w_{MP})) - \frac{1}{2}(\Delta w^T H \Delta w) \tag{23}$$

where $w - w_{MP} = \Delta \mathrm{w}$ and Z_C^* behaves as a normal function.

After dropping Model D, the inference of hyperparameters is:

$$\mathrm{P}(\gamma,\ \beta|\mathrm{p}) = \frac{P(p|\gamma,\ \beta)P(\gamma,\ \beta)}{P(p)} \tag{24}$$

P(p| γ, β) can be maximized as with respect to hyperparameters:

$$\log \mathrm{P(p|}\gamma,\ \beta) = \gamma SSE_w^{MP} - \frac{1}{2}\mathrm{ln}(|\mathrm{H}|) - \frac{N_w}{2}\log\gamma - \frac{N_p}{2}\log\beta - \frac{k}{2}\log 2\pi \tag{25}$$

The new value of γ and β is evaluated as:

$$\gamma = \frac{\alpha}{2SSE_w},\ \beta = \frac{N_p - \alpha}{2SSE_p} \text{ and}$$
$$\alpha = \sum_{i=1}^{N_w} \frac{\rho_i}{\rho_i + \gamma} = N_g - \gamma\ \mathrm{trace}\ (H^{-1}) \tag{26}$$

α represents the count of effective parameters required to build model.

The variance of prediction is represented as Eq. (27):

$$\sigma^2 = \frac{1}{\beta} + k^t H^{-1} k \tag{27}$$

where k is the derivative of b and H is the hessian data.

Based on BRNN approach, data rate is optimized to enhance reliability in the network.

Phase 3: Reliability Evaluation

The reliability is classified into two parts: packet and event reliability. This work emphasizes packet reliability and estimates in a quantified manner in terms of packet loss. There is an inverse relation between packet reliability and packet loss ratio [68]. It is defined as "the ratio of packets loss in the network to the number of packets generated by the node" [69]. The packet loss can be occurred due to buffer overflow, congestion and collision at the link layer. It hampers network reliability, so there is a need to minimize packet loss in the wireless network. This reliability can be enhanced by adjusting the data rate based on protocol and the number of nodes in a wireless network. It is supposed that Ft is the failure time in the network. The network survival probability until time t is known as the Reliability(t) of the network.

$$\mathrm{Reliability(t)} = \mathrm{P(Ft} > \mathrm{t)} = 1 - \mathrm{Dst(t)} \tag{28}$$

where Dst indicates the distribution function of Ft. Reliability function is derived from [70]:

$$\mathrm{Reliability\ (t)} = 1 - \frac{N_{PL}}{N_{TP}} \tag{29}$$

where N_{PL} is the total count of packet loss that occur in the network. N_{TP} is the total count of data transmitted to the destination node which is a constant value.

The network reliability range lies between zero to one. The value near one represents higher reliability and the value near zero represents lower reliability. The Reliability Vs Packet Loss plot is represented in Fig. 7.

It shows that reliability is inversely proportional to the packet loss. When the packet loss ratio decreases, the packet reliability of the network increases.

4. Result and discussion

This section deals with the BRNN technique applied to dataset bifurcated into the training and testing data. The dataset includes network performance parameters which are used to evaluate packet reliability. BRNN predicts optimized data rate in terms of correlation, RMSE, coefficient of determination and accuracy. At last, k-fold cross-validation is used to improve model prediction.

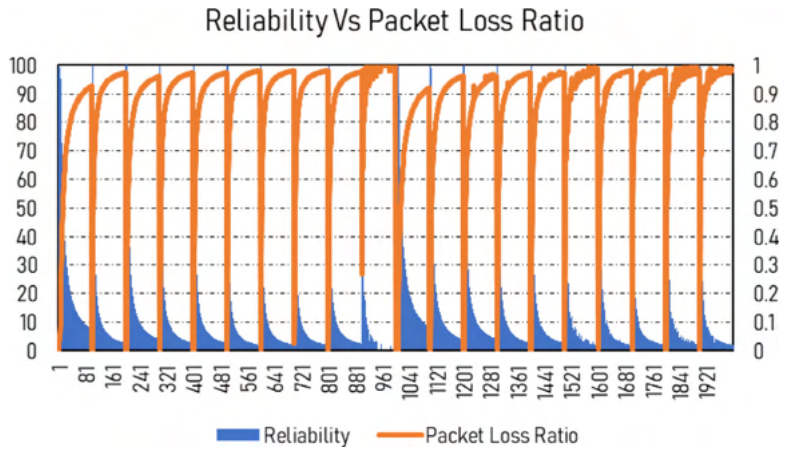


Fig. 7. Reliability vs packet loss ratio.

4.1. Performance evaluation

The effectiveness of the BRNN is evaluated in terms of Correlation (r), RMSE, Coefficient of Determination (R^2) and Accuracy.

4.1.1. Correlation (r)

Correlation deals with the relationship between the dataset features and is discussed in Section 3. The formula of correlation is expressed as:

$$r = \frac{\sum_{k=1}^{N}(m_k - \overline{m})(n_k - \overline{n})}{\sqrt{\sum_{k=1}^{N}(m_k - \overline{m})^2 \sum_{k=1}^{N}(n_i - \overline{n})^2}} \tag{30}$$

where m denotes the actual value, $\overline{m}$ shows the mean of actual values, n represents the expected value, $\overline{n}$ indicates the mean of expected values and N denotes the total number of instances.

4.1.2. Coefficient of determination (R^2)

It is defined as "it is the proportion of the variance of response variable which is predicted from independent variable". Its range lies between zero to one where one indicates the best fitting of the model and 0 signifies the worst-fit model. It is represented as:

$$R^2 = r * r \tag{31}$$

4.1.3. Root Mean Square Error (RMSE)

RMSE is the standard deviation between the predicted and actual values. RMSE is expressed as:

$$\text{RMSE} = \sqrt{\frac{\sum_{k=1}^{N}(n_k - m_k)^2}{N}} \tag{32}$$

where n is the expected output variable, m is the actual output variable and N is the total number of instances.

4.1.4. Accuracy

Accuracy defines the nearness amongst the actual and expected value. Accuracy decides the selection of the best model. It is estimated as:

$$\text{Accuracy} = \frac{100}{N}\sum_{k=1}^{N} p_k \tag{33}$$

$$p_k = \begin{cases} 1 & \text{if } abs\ (n_k - m_k) \le e \\ 0 & \text{otherwise} \end{cases}$$

where n_k is the expected outcome, m_k is the actual output, N indicates the total number of instances and e denotes an acceptable error

Table 5
BRNN performance.

Parameter	Value
Correlation (r)	0.97
Coefficient of Determination ($\boldsymbol{R^2}$)	0.94
RMSE	0.35
Accuracy	96.67%

Table 6
10-fold cross validation for prediction of optimized data rate.

Runs	r	R^2	RMSE	Accuracy
1	0.974	0.95	0.36	96.17
2	0.971	0.94	0.35	96.59
3	0.973	0.95	0.36	96.35
4	0.970	0.94	0.35	96.80
5	0.969	0.94	0.35	96.90
6	0.967	0.93	0.34	97.24
7	0.972	0.94	0.35	96.40
8	0.970	0.94	0.35	96.80
9	0.972	0.94	0.35	96.40
10	0.968	0.94	0.35	97.10

4.2. Results

BRNN approach provides a good result for best fit shown in Table 5. The cross-validated results of the BRNN model are shown in Table 6. It shows the results in terms of correlation, RMSE, $\boldsymbol{R^2}$ and accuracy. The correlation achieved in the BRNN model is 0.97, $\boldsymbol{R^2}$ is 0.94, RMSE value is 0.35 and the accuracy is 96.67%.

The cross-validation is applied to assess the performance of a model and to estimate how well it will generalize to new and unseen data. The BRNN model achieved an average accuracy of 96.17% to 97.24% across the 10-fold cross-validation as shown in Table 6. This suggests that the model is performing well in terms of predicting the optimized data rate.

Fig. 8 represents the plot of correlation in 10-fold cross-validation. The highest correlation value achieved is 0.974, which indicates a very strong positive linear relationship between the predicted outputs and the actual outputs. Similarly, the minimum value of 0.967 indicates a strong positive linear relationship. The average value of 0.97 suggests that the model's performance is consistent across the dataset and that it is performing well.

Similarly, Fig. 9 shows the plot of the coefficient of determination. The highest value of coefficient of determination is 0.95, which means that 95% of the variance in the target feature is expressed with the help of independent variables. The lowest value is 0.93, which means that 93% of the variance in the target

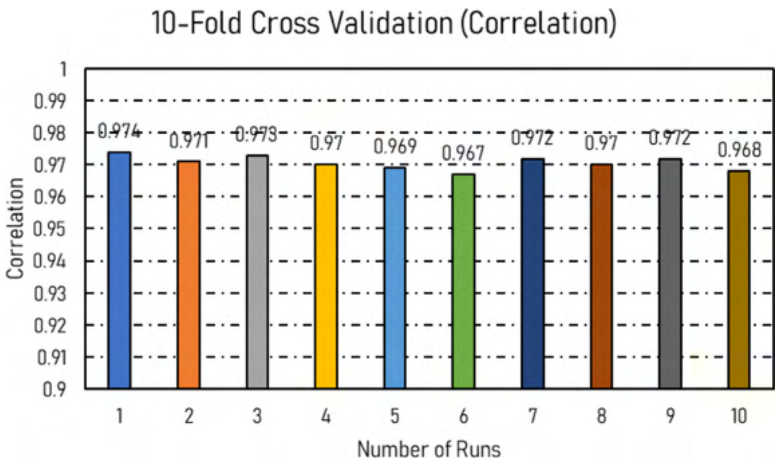


Fig. 8. Correlation in 10-fold cross-validation.

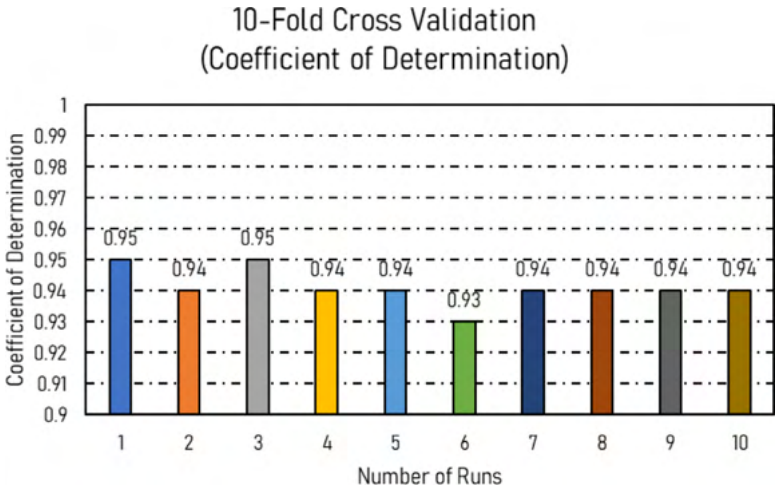


Fig. 9. Coefficient of determination in 10-fold cross-validation.

variable is expressed using the independent variables. The average value is 0.94, which suggests that the model is performing well in explaining the variance in the target variable based on the independent variables.

The highest value of RMSE is 0.36, which indicates that on average, the predicted values are 0.36 units away from the actual values. The minimum value of RMSE is 0.34, which indicates that on average, the predicted values are 0.34 units away from the actual values. The average value of RMSE is 0.35, which suggests that the model is performing well in predicting the values of the dependent variable based on the independent variable as shown in Fig. 10.

Accuracy is the percentage of correct predictions made by the model on a given dataset. The highest value of accuracy achieved is 97.24%, which indicates that the model predicted the correct class label for 97.24% of the instances in the test dataset. The minimum value of accuracy is 96.17%, which indicates that the model predicted the correct class label for at least 96.17% of the instances in the test dataset. The average value of accuracy in BRNN is 96.67%, which suggests that the model is performing well in predicting the class labels based on the input data (see Fig. 11).

When BRNN performance is compared with the existing literature then it shows that it performs well. The comparative analysis of BRNN with other models is shown in Table 7. In 2019, Non-Convex Penalized Quantile Regression model generates 91 percent accuracy. Traffic Path Planning algorithms based on Data Prediction (TPPDP) and Bayesian-based Network traffic Prediction (BNTP) approaches provides 80 percent accuracy. Ensemble Models give 93.8 percent accuracy. In 2022, Long Short-Term Memory (LSTM) gives 95 percent accuracy for data rate optimization. The proposed framework DRRTWSN provides 96.67 percent accuracy for optimized data rate.

Table 7
A comparison of data rate optimization.

Year	Model name	Accuracy
2019	Non-Convex Penalized Quantile Regression [71]	91%
2020	TPPDP (KNN) [72]	80%
2021	Bayesian based Network Traffic Prediction [73]	80%
2021	Ensemble Models (Random Forest, Ada Boost and Gradient Boosting) [74]	93.8%
2022	Long Short-Term Memory (LSTM) [75]	95%
Proposed (2023)	DRRTWSN	96.67%

The proposed approach framework optimizes the data rate with good accuracy. Here accuracy greater than 70% is considered a better accuracy [76,77]. The maximum accuracy gain is 97.24% and the minimum gain is 96.17%. There is no bad accuracy in this proposed approach.

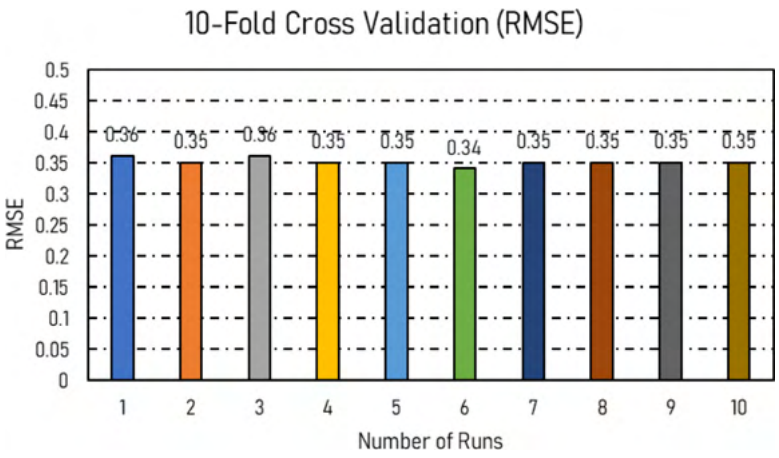


Fig. 10. RMSE in 10-fold cross-validation.

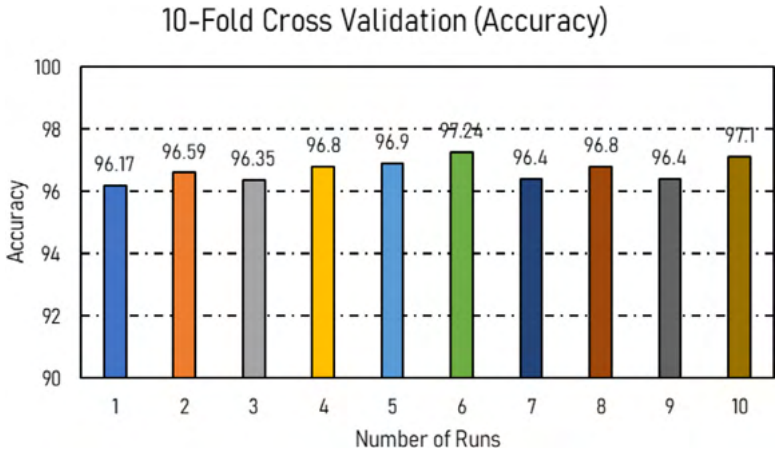


Fig. 11. Accuracy in 10-fold cross-validation.

Table 8
Reliability in AODV.

Data Rate	10 Node reliability	20 Node reliability	30 Node reliability	40 Node reliability	50 Node reliability
0.1	0.996016	0.996016	1	0.976096	0.733068
0.2	0.998004	0.998004	0.996016	0.852295	0.702595
1.3	0.205231	0.204923	0.146462	0.148923	0.004308
2.4	0.111167	0.111	0.079307	0.080667	0.057
2.5	0.106703	0.106543	0.076136	0.077428	0.00224
3.8	0.070203	0.070098	0.050095	0.050942	0.001474
3.9	0.06841	0.068308	0.048811	0.049744	0.001436
4.7	0.056766	0.056681	0.040511	0.041191	0.001191
4.8	0.055579	0.055495	0.039667	0.04033	0.001167
5.1	0.05231	0.052231	0.037333	0.037958	0.001098
5.2	0.051304	0.051227	0.03661	0.037228	0.001077
7.9	0.03377	0.03372	0.024101	0.024505	0.000709
8	0.03335	0.0333	0.023798	0.0242	0.0007
9.2	0.029	0.028957	0.020694	0.021043	0.000609
10	0.02668	0.02664	0.019038	0.01936	0.00056

The data rate is the core network parameter that deals with congestion control [78]. The optimized data rate minimizes packet loss and enhances network reliability [79]. Here, the threshold value of the packet loss ratio is set as 5 percent. If its value increases then it degraded the QoS of the network. DRRTWSN emphasizes packet reliability using a packet loss ratio. Reliability results are achieved based on two scenarios: reliability achieved for normal data rate and for optimized data rate. The comparison of these two scenarios shows the significance of optimized data rate on reliability.

4.2.1. Reliability for normal data rate

Table 8 represents the values of reliability with respect to the data rate in the AODV. The plot of data rate and reliability shows the inverse relationship between them. It is generated based on the number of nodes such as 10, 20, 30, 40 and 50 nodes.

Similarly, Table 9 shows the reliability values in the DSR protocol. When the data rate increases, the reliability of the network is degraded.

Fig. 12 represents the plot of reliability with respect to the data rate in the AODV protocol. When data rate is 0.1, the value of

Table 9
Reliability in DSR.

Data Rate	10 Node reliability	20 Node reliability	30 Node reliability	40 Node reliability	50 Node reliability
0.1	0.9920318	0.996016	0.996016	0.996016	0.996016
0.2	0.9940119	0.998004	0.998004	0.978044	0.994012
0.7	0.5653912	0.379783	0.276413	0.282696	0.270702
0.8	0.4945	0.3315	0.242	0.2295	0.242
0.9	0.4386666	0.295556	0.201333	0.215556	0.222667
1	0.3942423	0.265494	0.160336	0.182727	0.157937
1.1	0.3592727	0.241091	0.235273	0.170545	0.176
2.9	0.1357054	0.091436	0.069232	0.031306	0.066198
3	0.1311825	0.088655	0.053326	0.064258	0.051193
3.1	0.1270967	0.085806	0.082968	0.052903	0.060774
4	0.0982901	0.066193	0.048995	0.048095	0.049095
4.3	0.0912558	0.061767	0.046605	0.044837	0.027907
9.9	0.0391111	0.026828	0.010222	0.016687	0.01996
10	0.03856	0.02664	0.02008	0.0198	0.0188

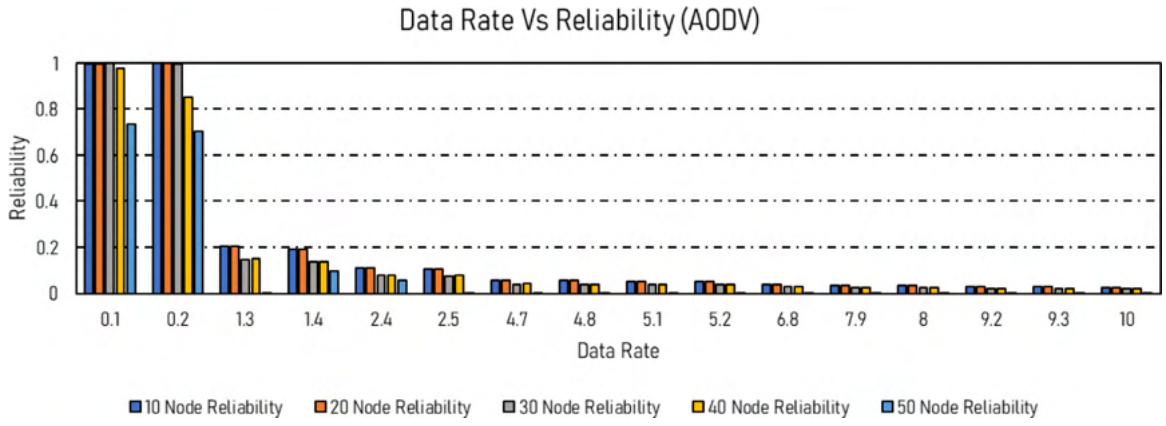


Fig. 12. Plot of reliability Vs data rate in AODV.

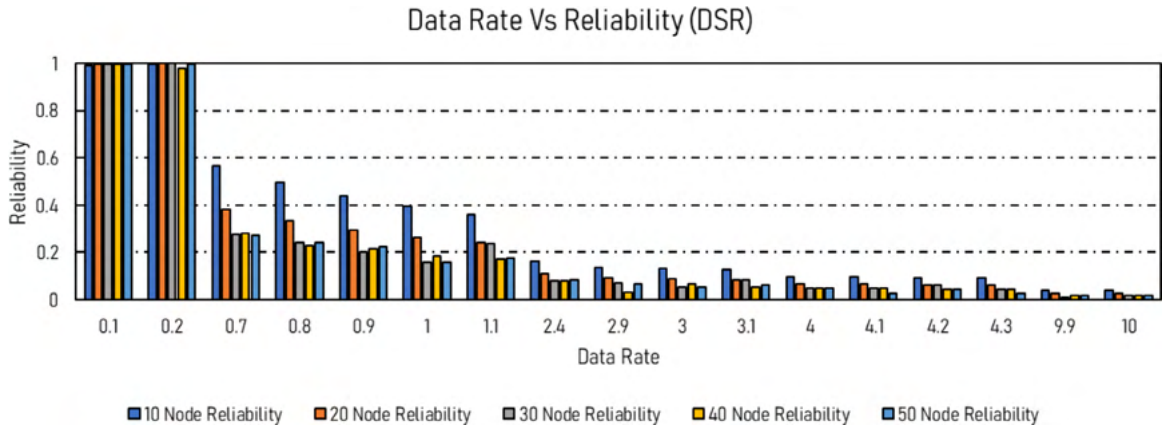


Fig. 13. Plot of Reliability Vs Data Rate in DSR.

reliability at 10 nodes is 0.996, 20 nodes is 0.996, 30 nodes is 1, 40 nodes is 0.976 and 50 nodes is 0.733. When data rate increases, the reliability value decreases because both are inversely related to each other. At data rate 5.1, the value of reliability at node 10 is 0.052, 20 nodes is 0.052, 30 node is 0.0373, 40 node is 0.0379 and 50 node is 0.001.

Fig. 13 represents the plot of reliability with respect to the data rate in the DSR protocol.

When data rate is 0.1, the value of reliability at 10 nodes is 0.992, 20 nodes is 0.996, 30 nodes is 0.996, 40 nodes is 0.996 and 50 nodes is 0.996. At data rate 10, the value of reliability at node 10 is 0.038, 20 nodes is 0.026, 30 node is 0.020, 40 node is 0.0198 and 50 node is 0.0188.

Table 10
Minimum and maximum value of reliability for normal data rate.

No. of nodes	AODV		DSR	
	Min	Max	Min	Max
10	2.6	99.8	0.04	99.7
20	2.6	99.8	0.03	99.8
30	1.9	100	0.01	99.8
40	1.9	97.6	1.4	99.6
50	0.05	73.3	0.8	99.6

Table 10 shows the minimum and maximum values achieved in reliability for normal data rate in terms of packet loss.

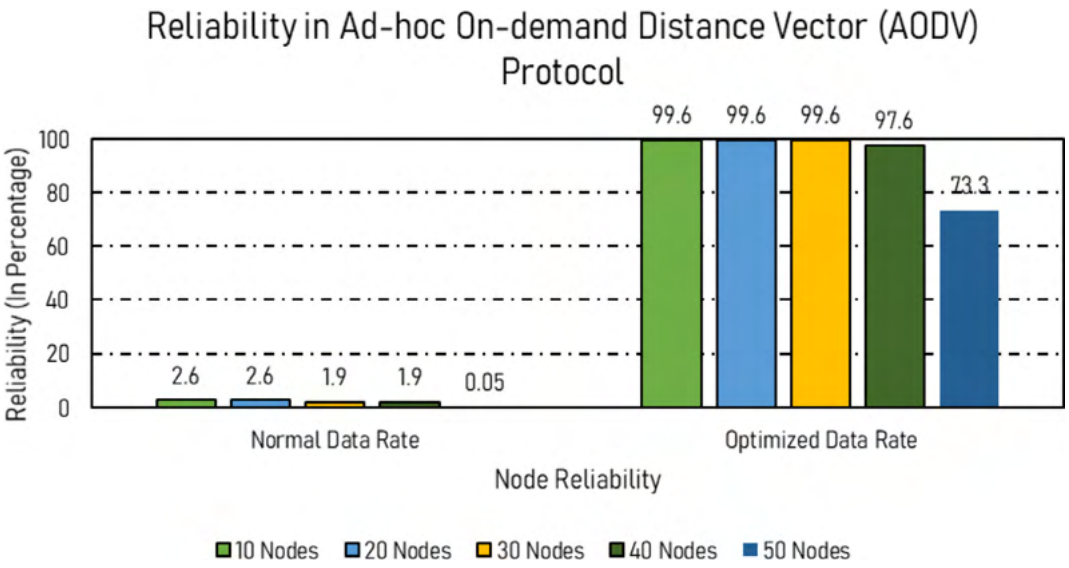


Fig. 14. Minimum reliability for normal and optimized data rate in AODV.

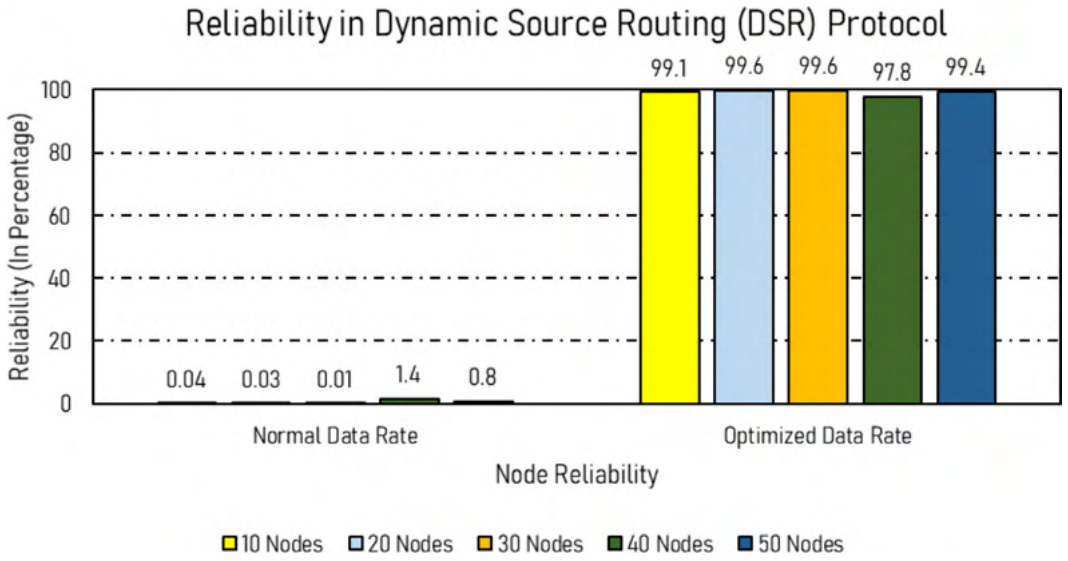


Fig. 15. Minimum reliability for normal and optimized data rate in DSR.

The minimum value achieved in AODV is 0.05 percent for 50 nodes and the maximum reliability achieved is 100 percent for 30 nodes. Similarly, the minimum value achieved in DSR is 0.01 percent for 30 nodes and the maximum value achieved is 99.8 percent for 20 and 30 nodes in DSR.

4.2.2. Reliability for optimized data rate

When the reliability value is lower than 95 percent then network performance is degraded because the packet loss acceptable range is 5 percent. So, there is a requirement for data rate optimization to enhance packet reliability. Table 11 shows the minimum and maximum values achieved in reliability for optimized data rate. The minimum value of reliability achieved in DSR is 97.8 percent for 40 nodes. The maximum reliability achieved is 99.8 percent for 20 and 30 nodes. But in AODV minimum value achieved is 73.3 percent for 50 nodes. The maximum reliability achieved is 100 percent for 30 nodes. The proposed framework works well in all DSR protocol cases. But in AODV, it works only 5 to 45 nodes.

The graphical representation of reliability in AODV and DSR is shown in Figs. 14 and 15. In general, the reliability range lies between 0 to 1. If its range lies below 0.6 then it is considered poor reliability. If it lies between 0.6 to 0.8 then it is assumed fair reliability and a range greater than 0.8 is considered good reliability [80–88]. The graphical representation shows the significance of data rate on reliability in a quantified manner. Fig. 14 represents the minimum reliability achieved in normal data rate and optimized data rate in AODV.

The minimum reliability achieved for normal data rate at node 10 is 2.6, node 20 is 2.6, node 30 is 1.9, node 40 is 1.9 and node 50

Table 11
Minimum and maximum value of reliability for optimized data rate.

No. of nodes	AODV		DSR	
	Min	Max	Min	Max
10	99.6	99.8	99.1	99.7
20	99.6	99.8	99.6	99.8
30	99.6	100	99.6	99.8
40	97.6	97.6	97.8	99.6
50	73.3	73.3	99.4	99.6

is 0.05. These values of reliability provide poor results in wireless network. But optimized data rate improves the results shown in Fig. 14. The minimum reliability achieved for optimized data rate at node 10 is 99.6, 20 is 99.6, 30 is 99.6, 40 is 97.6 and 50 is 73.3. Similarly, Fig. 15 represents the minimum reliability achieved in normal data rate and optimized data rate in DSR.

In DSR protocol, the minimum reliability achieved for normal data rate at node 10 is 0.04, node 20 is 0.03, node 30 is 0.01, node 40 is 1.4 and node 50 is 0.8. These values of reliability are not acceptable for the smooth functioning of network. Reliability is enhanced using optimized data rate shown in Fig. 15. The minimum reliability achieved for optimized data rate at node 10 is 99.1, 20 is 99.6, 30 is 99.6, 40 is 97.8 and 50 is 99.4. The results show that optimized data rate improves QoS in terms of reliability in quantified manner for AODV and DSR protocols.

5. Conclusion and future work

The performance of the Wireless Sensor Networks depends on the deployment of the sensor nodes in the sensing area. Network reliability is an essential parameter during communication in a wireless network. It is further divided into two parts: node and link reliability. This article presented a novel framework DRRTWSN to enhance node reliability quantitatively in terms of packet reliability. This framework is divided into three phases namely network design, data rate prediction and reliability evaluation. Initially, sensor nodes are placed in a wireless network using the RIDSR topology. The generated dataset consists of several network performance parameters with data rate as the target variables. The data rate is optimized using the Bayesian Regularization Neural Network technique. It is a technique which include the features of Bayesian inference and the Artificial Neural Network (ANN). This technique is evaluated based on correlation, accuracy, RMSE and coefficient of determination parameters. It provides a high accuracy of 96.67 percent for data rate optimization. The optimal data rate is responsible to enhance packet reliability in terms of packet loss. The acceptable range of packet loss ratio is considered as 5 percent in a wireless network and is known as the threshold value. The packet loss ratio is compared with the threshold value and decides the requirement of optimized data rate. If the value of the packet loss ratio is smaller than the threshold value then, it evaluates the reliability using normal data rate. But if the value is greater than the threshold value then, it estimates the packet reliability using an optimized data rate. There is a direct relation between data rate and packet loss and an inverse relation between data rate and packet reliability. Packet reliability is evaluated using AODV and DSR protocol in terms of packet loss. In this article, reliability is quantitatively calculated for normal and optimized data rate. The highest reliability for DSR is 99.8 percent in 30 and 40 nodes scenario. The minimum reliability is improved using an optimized data rate in DSR and the value is 97.8 percent for 40 nodes. In AODV, the highest reliability gained in AODV is 100 percent for 15 nodes and the minimum reliability is enhanced using an optimized data rate of 97.6 percent for 40 nodes. The proposed framework performs well for 5 to 45 nodes in AODV but it provides 73.3 percent packet reliability for 50 nodes. In future, the work can be extended from 5 to 50 nodes and can be scaled up for enhanced deployment strategies.

CRediT authorship contribution statement

Meena Pundir: Study conception and design. **Jasminder Kaur Sandhu:** Study conception and design. **Deepali Gupta:** Data collection, Draft manuscript preparation. **Thippa Reddy Gadekallu:** Analysis and interpretation of results. **Abhinav Juneja:** Analysis and interpretation of results. **Yonis Gulzar:** Analysis and interpretation of results. **Ali Nauman:** Draft manuscript preparation.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

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All authors reviewed the results and approved the final version of the manuscript.

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Espousing AI to Enhance Cost-Efficient and Immersive Experience for Human Computer Interaction

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***Abstract*—Because of recent technological and interface advancements in the field, the virtual reality (VR) movement has entered a new era. Mobility is one of the most crucial behaviours in virtual reality. In this research, popular virtual reality mobility systems are compared, and it is shown that gesture control is a key technology for allowing distinctive virtual world communication paradigms. Gesture based movements are very beneficial when there are a lot of spatial restrictions. With a focus on cost-effectiveness, the current study introduces a gesture-based virtual movement (GVM) system that eradicates the obligation for expensive hardware/controllers for virtual world mobility (i.e., walk/ jump/ hold for this research) using artificial intelligence (AI). Additionally, the GVM aims to prevent users from becoming dizzy by allowing them to change the trajectory by simply turning their head in the intended direction. The GVM was assessed on its interpreted realism, presence, and spatial drift in the actual environment in comparison to the state-of-the-art techniques. The results demonstrated how the GVM outperformed the prevailing methodologies in a number of common interaction components. Additionally, the empirical analysis showed that GVM offers customers a real-time experience with a latency of ~65 milliseconds.**

***Keywords*—Artificial intelligence; dizziness; gestures; human computer interaction; user experience; virtual reality**

I. Introduction

Virtual reality (VR) has been around for years, but it has only lately piqued the attention of customers and professionals as the technology grows increasingly economically viable. VR economies are exploding, with the overall global demand estimated to approach four billion revenues by 2025, involving 45 million VR headset deployed and a global population coverage of 3% [1]. Human-computer interaction approaches in the earlier years compelled human behaviour to conform to the computer's capabilities; however, VR perspective is unique in that the computer now must mirror the actual environment to deliver the most authentic view feasible. To provide individuals an immersive experience, VR develops a variety of participation activities relating to visual, auditory, and tactile sensitivities. Widely available methodologies for VR mobility are heavily reliant on a controller to explore and move, or actual relocating in a constrained geographic space, disregarding proliferating necessities on the strategy for travelling an unregulated virtual space by physically strolling the user's legs, which causes fatigue [2]. The most extensively used VR movement methods are listed below.

1) Gadgets: A frequent strategy for navigation in the VR world is to use gadgets such as joysticks and head orientation tracking with Gyro in VR head mounted displays. For consumers focused on control movement in VR, these gadgets are intuitive and comfortable, straightforward to use, and productive. However, because of a perceptual mismatch [3] between visual and vestibular inputs [4], joysticks frequently influence the vision to act swiftly [5] and erratically, creating dizziness [6].

2) Teleportation: Another typical strategy for reducing dizziness is to provide many gateway locations allowing players to swiftly move from one location to the next. Unfortunately, due to the discontinuous movement that negatively impacts the user's experience and may induce vertigo, these tactics are not organic enough to boost the interactive experience in the virtual environment [7].

3) Walking-in-place (WIP): The WIP approach allows users to travel in a specific location while controlling the character's motion and orientation using real body gesture detection sensors such as Microsoft Kinect [8]. This technique enhances the matching among mechanoreceptors of data from a person's body movements and tactile senses through machine screens, rendering it more natural and potentially lowering operator dizziness. Nevertheless, this technique requires the user to remain in one place and use their entire body, as well as a large amount of underlying hardware, that are costly and not available to all. A good travel experience, on the other hand, must cause less fatigue in a walk-through arrangement [9].

4) Hand gestures: In virtual reality, a gesture is a stance or motion of the user's body which is employed as input. The

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WIP approaches tend to depend on the same gesture for triggering forward perspective motion: leg gestures like those used while climbing a stairway [10]. This motion emerges to be more exhausting than actual walking. Hand gestures, on the other contrary, can be an organic and efficient technique for controlling motions in virtual reality. Furthermore, movement based on hand gestures has the benefit of requiring less exertion and decreasing dizziness as it can be performed while sitting or standing [11]. For VR engagement, there are a range of gesture communication devices that facilitate communication more authentically with items in the virtual environment. These gesture communication devices are classified on the mode of input as wearable sensor, touch, and computer vision [10].

The authors in current research introduce a gesture-based virtual movement (GVM) system to facilitate an inexpensive solution for supporting individuals with walk-through activities in virtual worlds, which allows customers to unwind while sitting or standing in a place as if they're in reality

A. Key Contributions

The authors' goal in this study is to enrich the user's immersive experience. The following are the major findings of this research.

1) Cost efficiency: GVM is a low-cost solution that eliminates the requirement for any additional costly gesture recognition gear.

2) Purging dizziness: GVM reduces dizziness by letting users modify their trajectory by merely tilting their head in the desired direction and hand movements for gesture recognition to move in VR.

3) Handling strain: GVM relieves the user of physical strain.

4) Usability: The usefulness of the suggested approach is demonstrated by user input on several factors such as interpreted realism, presence, and spatial drift in the real world.

5) Real-time experience: With a latency of ~65 milliseconds, the suggested system offers consumers a real-time experience.

B. Paper Organization

The manuscript is further divided into sections. Section II presents a brief literature survey of the various VR techniques. Section III introduces the proposed model, GVM. Section IV explains the experimentation done and the results achieved that highlights the suitability of GVM. Section V concludes this research. Finally, Section VI highlights the future work.

II. Literature Survey

Table I shows a comparison of various widely used VR movement methods based on the dimensions of motion sickness and physical strain. Hand gestures have been shown to be a remedy for motion sickness and physical strain; however, using a hand gesture detection system necessitates the acquisition of expensive gears. Thus, the authors introduce a GVM system to facilitate an inexpensive solution for supporting individuals with walk-through activities in virtual worlds, which allows customers to unwind while sitting or standing in a place as if they're in reality.

TABLE I. Comparison of Most Extensively Used VR Movement Methods

#	Methodology	Motion Sickness	Physically Straining
1	Gadgets	Yes	Yes
2	Teleportation	Yes	No
3	Walking-in-place	No	Yes
4	Hand Gestures	No	No

Mine [12] proposes using hand-based communication to manage mobility and walk-through in a simulated world. An elevated hand-gesture tracer gadget, such as Leap Motion, is a unique technology which delivers input via hand gesture mapping, allowing for bare-hand interactivity [13] in a three-dimensional world. Ni et al. [14] investigates menu selection employing freehand signals, whereas Kulshreshth et al. [15] provides the findings of the first thorough research on finger-count panels to assess their suitability for 3D menu choice applications. Beattie et al. [16] demonstrates a CAD Engagement Facility that allows users to deconstruct a kinematic model in virtual reality and operate and analyse constituent parts. Lee et al. [17] offer TranSection, a hand-based communication strategy for executing a strategy game in virtual reality. Salomoni et al. [18] describes research in which recreational virtual world interfaces are reconsidered in view of the rise of head-mounted displays. These concepts, unfortunately, do not yet include how to handle walk-through activity in a simulated world.

Numerous studies have investigated ways to execute a natural and pleasant interaction approach in VR employing Leap Motion to solve this research gap. Codd- Downey et al. [19], for instance, offers a finger tracking movement approach that uses a 2DOF driving paradigm like typical mouse and keyboard control in 3D computer gaming. Khundam [20] presents a novel engaging single-hand-gesture control drive system with palm norm. The results reveal that controlling tour activity with hand gestures is more natural than to use a joystick. There are several aspects of VR controller hardware for diverse approaches, and some studies have developed a system that gathers multiple devices for a certain objective. The Oculus Rift and Leap Motion have lately been employed in several studies, particularly in virtual reality. Programmers are particularly interested in studying usage patterns and determining what the most productive utility for them in the future is through VR engagement.

Prior studies on in-air controllers and hand monitoring intended to develop and deploy VR applications. The precision of hand monitoring is critical for a reliable system. Sato et al. [21] provide a technique for monitoring a user's hand in three dimensions and identifying hand gestures in real time even without any intrusive sensors connected to the hand. Several cams are used to assess the location and direction of a user's hand floating in 3D environment. A neural network that is adequately trained recognises specified motions in a rapid and reliable fashion. 3D item processing for a desktop machine and

3D movement for a big holistic projection system are two typical applications. Many studies have been done on hand gestures and their uses. Chastine et al. [22] describe research comparing single hand gestures to typical keyboard, mouse, and controller input of first-person gameplay. The purpose of this study is to enable game analysts, architects, and builders to better understand how to include gesture control in current applications. The findings demonstrate that in FPS games, human rehearsals are crucial for gestural-based gaming system performance. As people continued through the activities, users were increasingly skilled at using the gadget, indicating that gesture-based handling can be used by users with no prior knowledge. This feedback helps programmers to employ Leap Motion as a device in virtual reality and ensures that there is a compelling incentive for them to do so in the long term.

Many people use virtual reality headsets to interact with 3D models. Stefan Greuter and David J. Robert [23] present the SpaceWalk technology. This system, which consists of two hardware devices: a motion sensing unit and a cordless VR gear, allows for low-weight full-body VR experience while wandering around the living area. The preponderance of the equipment in this system are made up of an Oculus Rift (DK1) HMD and a backpack tablet which operates standard VR program (Unity3D) alongside their extension script that connects all the elements. Participants may move and engage with things in the virtual world in this research's living area, however this framework is not designed for huge VR environments. Webel et al. [24] describe how to build a moderate, fully interactive, stochastic virtual world setup that allows users to naturally perceive intangible cultural assets. They look at new technology including the Oculus Rift virtual reality headset, Microsoft Kinect, and the Leap Motion controllers. When it comes to constructing HMD VR situations, modern technologies such as the Oculus Rift HMD, Microsoft Kinect, and Leap Motion provide excellent results. The usage of the Kinect or Leap Motion in conjunction with organic conversational inputs lets users engage directly with the virtualized world. However, because of the user's movement control, this VR system is generally limited to the comparatively small region in front of the sensing element. As a result, adopting engaging hand gestures for motion in VR will increase the VR system's admin tools via rigorous positioning and replacing previous techniques.

Users can employ an expanding number of input gadgets to engage with systems and apps. When building applications for technological innovations, though, there are no defined interface guidelines or benchmarks, and the customer satisfaction suffers the consequences. Jake Araullo and Leigh Ellen Potter [25] give a study that investigates the perspectives of a set of people who used the Oculus Rift and the Leap Motion device to play. The incorporation of blended conventional and non-traditional input methods, as well as depending on existing interface paradigms when leveraging innovative methods, were found to have a detrimental impact on system adoption in this study.

The present research proposes a gesture-based virtual movement (GVM) system that eliminates the need for pricey equipment for immersive virtual movement (i.e., walk/jump/hold for this research) with a focus on affordability. By enabling users to alter the trajectory by merely rotating their head in the desired direction, the GVM also seeks to prevent users from feeling dizzy.

III. Proposed Model

The goal of authors is to employ user hand gestures to create movement in the virtual environment. The suggested GVM's overall process flow is shown in Fig. 1. The overall procedure is segmented into the following:

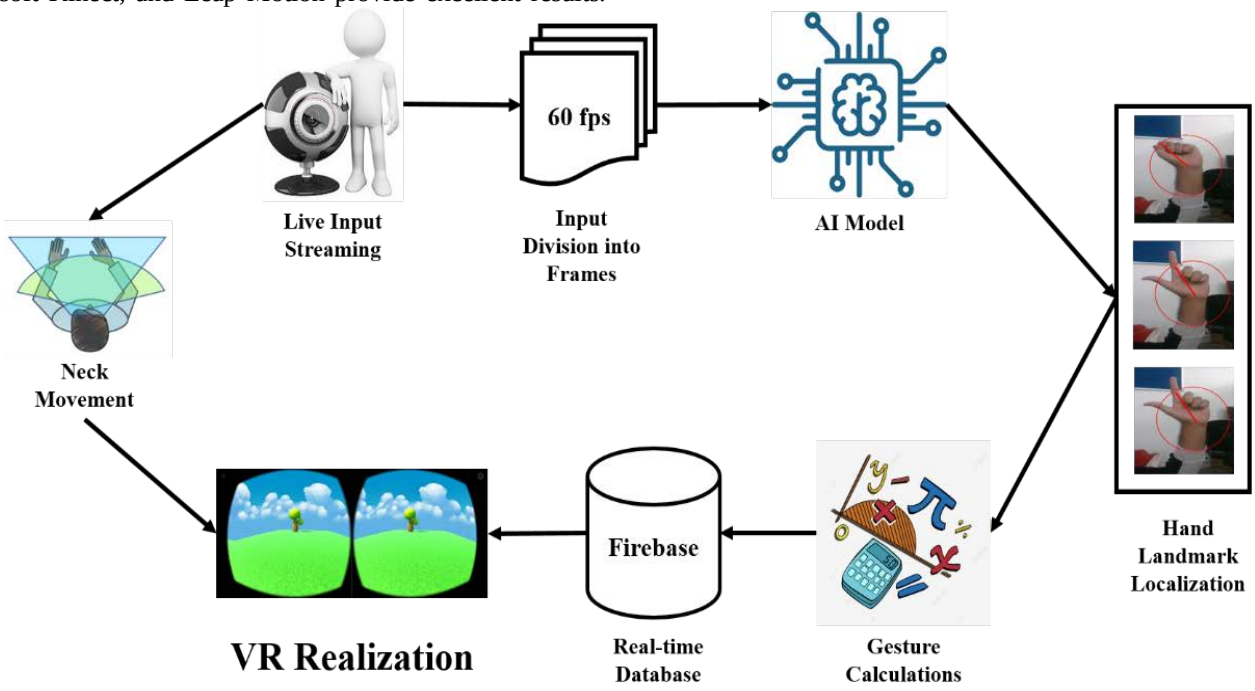


Fig. 1. Process flow of the proposed model

- Input Processing
- Gesture Identification
- Database Interaction
- VR Realization

A. Input Processing

The suggested approach uses streamed live video as an input. The footage is divided into frames at a 60 frames per second rate rather than being supplied directly to the model. Webcam data is used to provide each frame to the model that are further fed to an AI model for recognizing the hand landmarks.

B. Gesture Identification

An artificial intelligence (AI) model built on top of MediaPipe's [26] recognises the hand motions. A platform for creating pipelines that do interpretation over any type of sensory input is entitled MediaPipe. The AI model works in two phases i.e., palm detection and hand land-marking achieved through a palm detector and hand landmark model, respectively.

- Using an aligned hand bounding box, a palm detector identifies palms on a whole input picture. A single-shot detector model tailored for cellular real-time is utilised to find the first hand placements.
- A hand landmark model which generates high-definition 2.5D landmarks based on the palm detector's clipped hand bounding box. After detecting the palm across the entire picture, a second hand landmark model uses regression, or direct location projection, to carry out exact feature point placement of 21, 3D hand-knuckle positions inside the identified hand areas. Only six of them were used for the suggested gestures model, as seen in Fig. 2. The model acquires a reliable inherent hand posture depiction and is unaffected by self-occlusions or semi-transparent hands. In every instance, the landmarks are almost perfectly spotted.

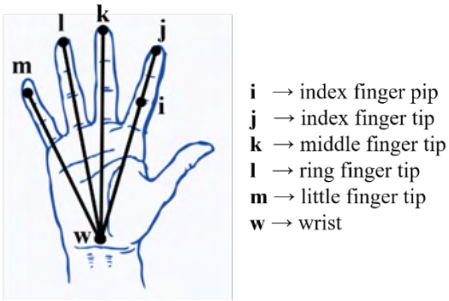


Fig. 2. 3D hand-knuckle coordinates used in proposed model

Rather than employing hard computing, authors have opted to soft computing to identify gestures more precisely. The proportionate placements of various landmarks serve as the basis for codes. Utilizing relative locations, authors programmed three distinct gestures: hold, move, and jump.

- Hold: In this gesture, the radius is formed by the line connecting the wrist and the tip of the index finger, as shown in Fig. 3(a).
- Jump: In this gesture, the radius of the circle is established by the line connecting the wrist and the pip of the index finger, and the tips of the remaining fingers are contained within the circle, as seen in Fig. 3(b).
- Move: In this motion, all finger tips are located outside the circle, with the radius being the line between the wrist and the tip of the index finger (see Fig. 3(c)).

Every live streamed hand gesture is labelled as either one of three (hold/jump/move) and further the gesture calculations are used to classify the gestures accurately. The gestures calculation starts with the identification of Euclidian distance, δ between the coordinates of wrist (x_w, y_w) and index finger pip (x_i, y_i) as per equation (1)

$$\delta = \sqrt{(x_w - x_i)^2 + (y_w - y_i)^2} \quad (1)$$

After the δ is calculated, the behavior of index (j), middle (k), ring (l) and pinky (m) fingers are identified using equation (2) and (3)

$$a = \Psi_{finger \in j}(x_{finger}^2 + y_{finger}^2 - \delta^2) \quad (2)$$

$$b = \Psi_{finger \in k,l,m}(x_{finger}^2 + y_{finger}^2 - \delta^2) \quad (3)$$

The gesture, Ω is the calculated based on equation (4)

$$\Omega = \begin{cases} \boldsymbol{hold}, if\ a < 0\ and\ b < 0 \\ \boldsymbol{jump}, if\ a < 0\ and\ b > 0 \\ \boldsymbol{move}, if\ a > 0\ and\ b > 0 \end{cases} \quad (4)$$



Fig. 3. Gestures for (a) Hold; (b) Jump; and (c) Move

C. Database Interaction

The AI Model [27, 28] subsequently sends the gesture to the real-time database (Firebase in current research), which updates the motion parameter with the potential movement gestures (isMove, isHold or isJump). The Firebase database gives the system the most recent value of the information as well as modifications to that information by using a single API. The clients are able to retrieve their data from any platform, including the web and mobile devices, owing to real-time synchronization.

On the other side, the Unity3D Engine [29] is coupled to the real-time database. The Unity3D engine serves as the base layer for the present VR experience. Additionally, C# scripting is used to fetch data from the real-time database each time a database update is triggered.

D. VR Realization

The user has complete freedom to roam around the area and may utilise gestures to commence any movement. In the virtual environment, neck movement provides the directional input. Users of Virtual Reality (VR) may freely spin their heads 160° while viewing the surroundings owing to rotational tracking (as presented in Fig. 4).

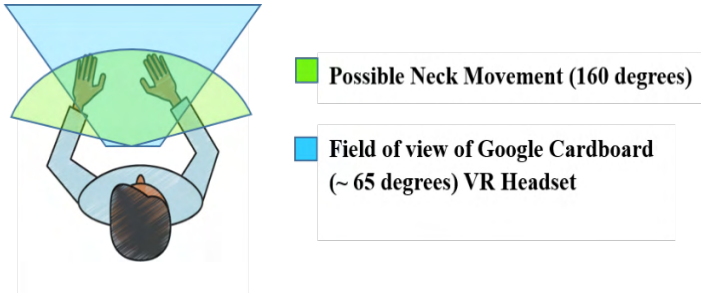


Fig. 4. Neck movement for VR environment

The user's head movement determines how the player rotates. The trajectory of the avatar's movement is controlled by the Head Mounted Display (HMD) spin. The field of view (FOV) of cell phone based VR headsets like Google Cardboard is only approximately 65 degrees (as presented in Fig. 4). The avatar travels both in translation and rotation inside the VR environment based on the data received.

IV. Experiments and Results

Current research's objective is to assess the system behavior, empirical characteristics, and experience aspects that are most important for VR locomotion [30]. To evaluate the efficacy of GVM, a comparison research using four approaches i.e., walking-in-place, controller/joystick, teleportation, and GVM (the proposed approach) is conducted. Current research investigates the propose model on two aspects i.e., 1) Latency and 2) User Experience.

A. Environmental Setup

The HTC Vive headgear and Epic Games' Steam VR SDK for Unreal Engine 4 were used in the development of the experimented-with VR locomotion methods. With a display resolution of 1080 x 1200 (2160 x 1200 combined pixels), 90 Hz refresh rate, 110 field-of-view, and complete 360 room-scale human monitoring, the HTC Vive headgear allows high-fidelity visuals. It is well known in the commercial VR industry and is made to use room-scale equipment, which uses sensors to transform a place into a 3D world. The HTC Vive monitoring system, an extra sensor that can be utilized to monitor tangible goods and translate them into activities or items in the simulated space, is supported by the system. Using a pristine HD 720p/30 fps camera with a diagonal field of view of 55 degrees and automatic light adjustment, the Hand Gesture Detection feature of Logitech C270 Digital HD webcam is employed.

1) Walking in place: The participant's limb motions during walking in place must be converted into virtual reality activity. The participants' right foot-mounted HTC Vive tracker and HTC Vive controllers were used to record and, respectively, manage the VR movement velocity and direction. The VR movement velocity is closely correlated with the users' actual walking speed; that is, the quicker the participants moved around in actual situations, the quicker their avatars moved in the simulated space. Right footstep speed is used to imitate left footstep speed. The HTC Vive controllers' orientation affected the motion direction. Users have to manually turn themselves in the intended way in order to adjust the movement's trajectory.

2) Controller/joystick: In this approach, the type of controller can be anything from a straightforward joystick to a gaming remote or a keyboard. To enable controller-based VR movement, the HTC Vive controllers have been used as a touchpad. Motion is initiated by tapping the touchpad, and the velocity of motion is controlled by where the thumb is placed on the touchpad. The HMD system displayed a directional line to indicate the direction of motion, which has been governed by the orientation of the HTC Vive controllers.

3) Teleportation: With this method, you may point or use a controller to indicate where you want to teleport to. The HTC Vive Controllers' grip trigger is used. Whenever the trigger is pulled, a graphical signal that showed the movement's location, a ray accompanied by a marking on the simulated ecosystem's ground appeared. The trigger is pushed to initiate movement. The teleportation's orientation has been decided by the participant's body orientation.

4) GVM: GVM is a low-cost solution that eliminates the requirement for any additional costly gesture recognition gear. It reduces dizziness by letting users to modify their trajectory by merely tilting their head in the desired direction and hand movements for gesture recognition to move in VR. GVM relieves the participant from the physical strain. The usefulness of the suggested approach is demonstrated by user input on several factors such as interpreted realism, presence, and spatial drift in the real world. With a latency of approximately 65 milliseconds, the suggested system offers consumers with a real-time experience.

The virtual 3D environment is build using Unity 3D Engine, version 2019.4.40f1 (LTS) and deployed for Android and IOS platform. A simple Unity3D scene as presented in Fig. 5 is setup for the survey having 3D assets and paths to explore.

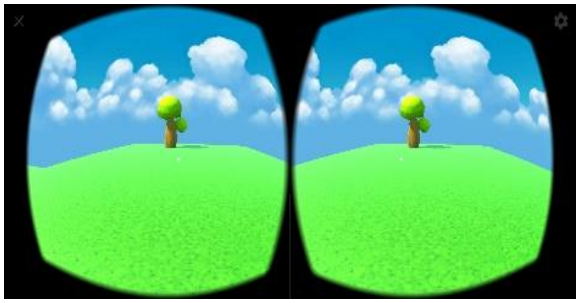
Participants can perform various movement actions like Jump/Hold/Move within the environment and move freely. This investigation gathers information to create an assessment of the strategies' efficacy in real-world settings. It moreover gathers information through semi-structured questionnaires to create a "rich description" of the perspectives of the participants.

B. Latency

The duration that it takes for information which is fed at an end of the connection to appear at the opposite end is referred to as latency. Typically, authors gauge how long it takes for information to go from one end to the other. In this setup we actually measure the round trip time (RTT), the "latency" (time of event from real-time database to Unity3D Engine) can easily be estimated as $\Delta i = 0.5 * RTT$, where Δi represents the latency.



Scene 1



Scene 2

Fig. 5. Virtual environment created for experimentation

The tests were run with both/all clients on the same machine, located behind a 100mbits connection. For the Firebase Real-time Database, the location [us-central1] was selected. The average latency for three hundred observations is used to summarize the time offset between the data flow and RTT is calculated as approximately 65 milliseconds.

C. User Experience

Utilizing the Game Experience Questionnaire (GEQ) [31], the user experience is assessed. Due to its capacity to address a broad variety of experiential aspects with strong reliability, the GEQ is a customer experience questionnaire which has been utilised in numerous areas (including gaming, virtual reality, and location-based services) [32, 33]. In numerous research on subjects including VR education [34], haptic engagement in VR [35], virtual reality orientation and mobility [36, 37] and virtual reality entertainment [38], the usage of GEQ has also been validated in the VR arena. The GEQ's Competence, Sensory and Imaginative Immersion, Flow, Tension, Challenge, Negative Affect, Positive Affect, and Tiredness categories are deemed pertinent and helpful for current investigation of the underlying strategies. According to a sequence of phrases in the GEQ questionnaire, the participant has been prompted to describe how he or she experienced throughout the encounter. It had 16 assertions that have been scored on a five-point severity scale from 0 ('not really') to 4 ('strongly') and included phrases like "I forgot everything around me". At the beginning of the research, demographic information was gathered, including age, gender, regularity of VR exposure ('never, seldom, often, and every day'), and familiarity with VR technology.

1) Analysis of participants: Within our institution zone, the participants have been sought for between October 2022 and December 2022. Participants needed to be physically capable of using VR technology, although prior VR experience wasn't really necessary. Participants have been informed of the possibility for dizziness as well as their right to withdraw from the research at any moment. To be a part of the study, every participant provided their informed permission.

The four VR locomotion strategies were tested on thirty people (N = 30, mean age: 22.7, male/female: 18/12). Twelve individuals had only sometimes used virtual reality (VR), whereas eight people had used it regularly. Ten participants had never utilized VR. Twenty participants had earlier used VR; six had done so with HMDs and portable VR headsets, eleven had done so solely with HMDs, and three had done so only with portable VR headsets. Each participant finished the episode satisfactorily.

2) Methodology: After providing the informed consent, the participants responded to demographic and VR encounter forms within approximately ten minutes' duration. Then, the participants had additional trial opportunities to discover at their leisure and witness a "clean" rendition of the VR world, that is, one that had no time restrictions and did not use the VR locomotion approach for an average five minutes). The exercise was then completed by the participants within a duration of ten minutes on average. The participants may provide vocal comments while traversing using the GVM approach, and the investigators have been taking notes in order to tackle these issues in the discussion. The GEQ questions have been completed once the work has been finished within a duration of five minutes on average.

3) Results & discussions: There have been thirty tasks in total, one for each participant. The typical assignment took thirty-seven minutes to complete. The GVM technique stood out magnificently outstanding in the majority of the GEQ constituents (i.e., Competence, Sensory and Imaginative Immersion, Flow, Tension, Challenge, Negative Affect, Positive Affect, Tiredness) after the couple mean leader board analysis (depicted in Table II).

TABLE II. GEQ RANKING FOR VR LOCOMOTION TECHNIQUES

S.No.	VR Locomotion Techniques	Benchmark GEQ Rating
1	WIP	Ok
2	Controller	Borderline excellent
3	Teleportation	Good
4	GVM	Excellent

The participants felt that WIP offered excellent degrees of immersion because of its authentic and organic movement. However, most participants indicated the approach to be exhausting due to the difficulty of translating actual body action to virtual reality motion. Others said this function added a certain amount of amusement, enjoyment, and exercise. Eventually, amidst the investigators attempting to take all necessary precautions, such as setting up a virtual boundary structure and an open area, participants still reported experiencing a pause in their exploration in the simulated space due to their fear of running into actual physical items in the real

world. It was discovered that the controller/joystick VR movement was simple to use and has been described as "pleasant," "simple," and "pleasant." However, a few users mentioned experiencing brief motion nausea at the beginning of the questionnaire job.

Owing to its visible 'jumps' and irregular mobility, teleportation was deemed the weakest engaging of the four modalities. On the contrary, the participants judged GVM to be more engaging and competent than the majority of the GEQ aspects. In addition to reducing fatigue compared to WIP, it also eliminated motion sickness brought on by hand gestures. The user had fewer difficulties using GVM because of the predetermined hand movements. The majority of participants praised GVM and rated it as the easiest and perhaps most enjoyable approach. Fig. 6 and Table III shows n normalized mean value (NMV) between 0 - 10 of each technique for every GEQ Components.

- *Competence:* The tests revealed that the Competence scores for the various strategies differed statistically significantly. On analyzing the Competence grade of GVM with all other techniques, the NMV showed substantial variances, favouring GVM with a NMV of 8.87.
- *Sensory and Imaginative Immersion:* The findings indicated statistically significant contrasts among the four strategies for the Sensory and Imaginative Immersion aspect favouring GVM in close vicinity to WIP.
- *Flow*: Following the test, there have been no appreciable variations in the Flow component amongst the four strategies; nonetheless, participants gave the Teleportation approach a higher rating.
- *Tension*: GVM obtained the lowest mean value (3.64) in the assessment, followed by WIP, Teleportation, and Controller, in that order.
- *Challenge*: The challenge score between GVM and Teleportation differed significantly according to the MSR, showing that GVM (mean value: 5.02) is a less difficult approach than teleportation and others.
- *Negative effect*: The testing activity for Negative effect demonstrated significant differences throughout all technique analyses. In the mean assessment of GVM, WIP, Controller, and Teleportation, the GVM showed minimal negative effect. Teleportation on the other hand put extra strain on the participants due to continuous transition in the virtual world.
- *Positive effect*: The GVM and teleportation had greater value, but the assessment did not reveal any changes in the Positive Affect component amongst the four approaches.
- *Tiredness*: The Tiredness aspect exhibited substantial variations according to the assessment. In each instance, GVM, Teleportation, and Controller all scored much lower on Tiredness compared to WIP

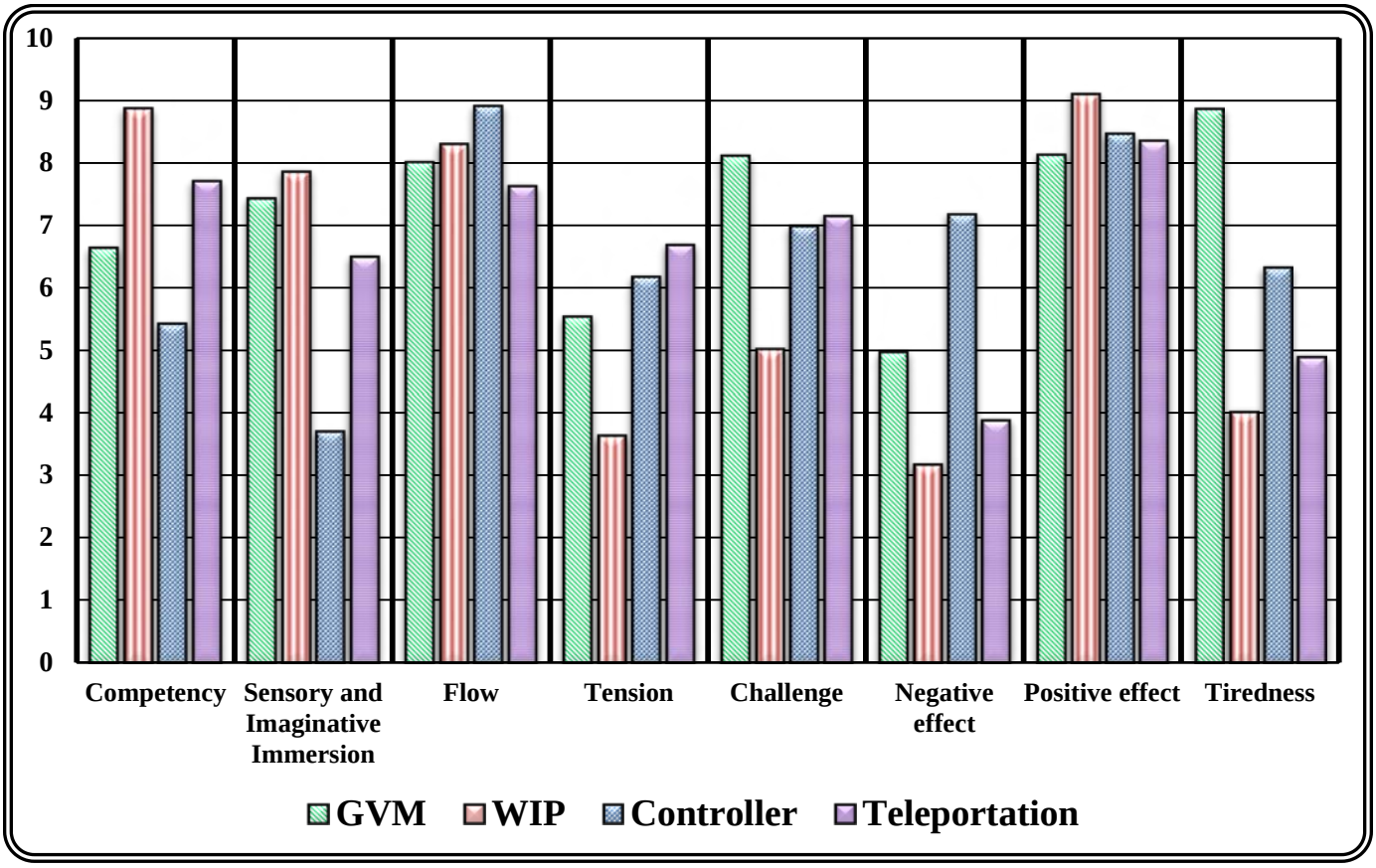


Fig. 6. Normalized mean value for various GEQ components

TABLE III. GEQ COMPONENTS NORMALIZED MEAN VALUE FOR EXISTING TECHNOLOGIES

Evaluation Parameter	Proposed Method (GVM)	WIP	Controller	Teleportation
Competency	6.63	8.87	5.42	7.71
Sensory and Imaginative Immersion	7.42	7.86	3.7	6.5
Flow	8	8.3	8.9	7.63
Tension	5.53	3.64	6.17	6.69
Challenge	8.1	5.02	6.98	7.15
Negative effect	4.96	3.18	7.17	3.89
Positive effect	8.12	9.1	8.46	8.35
Tiredness	8.85	4.02	6.32	4.9

Fig. 7 shows overall positive components mean values for each techniques, positive GEQ components include Competence, Sensory and Imaginative Immersion, Flow, Positive Effect. In this the mean value of GVM is highest. Further, Fig. 8 shows overall negative components mean values for each technique, negative GEQ components include Tension, Challenge, Negative Effect, Tiredness. In this the mean value of GVM is lowest.

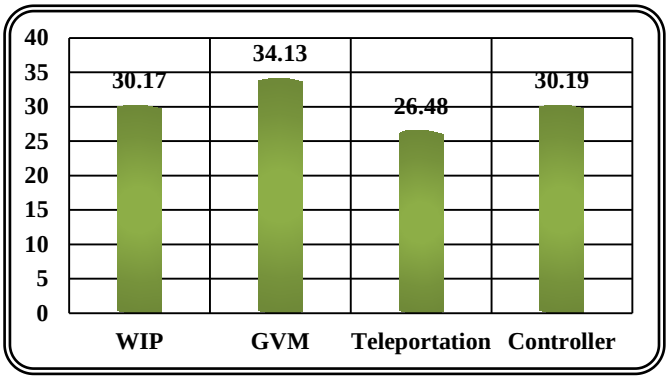


Fig. 7. Mean value for various positive GEQ components

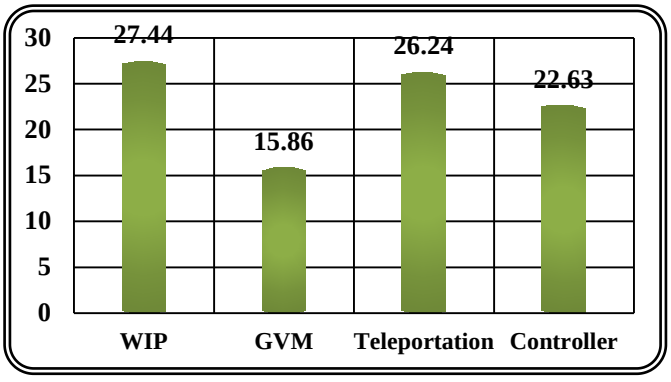


Fig. 8. Mean value for various negative GEQ components

V. CONCLUSIONS

A range of hand gestures must be recognised and reliably classified by gesture recognizers in order to provide improved user interfaces for Virtual or Augmented Reality goods. This study compares the most common virtual reality mobility systems and finds that gesture control is a crucial technology for enabling unique virtual world communication paradigms. The present research proposes a gesture-based virtual movement (GVM) system using artificial intelligence (AI) that eliminates the need for pricey equipment for immersive virtual movement (i.e., walk/jump/hold for this research) with a focus on affordability. By enabling users to alter the trajectory by merely rotating their head in the desired direction, the GVM also seeks to prevent users from feeling dizzy. In comparison to cutting-edge methods, the GVM's interpreted realism, presence, and spatial drift in the real world were evaluated. According to the empirical analysis, GVM offers customers a real-time experience with a latency of ~65 milliseconds. Additionally, the results demonstrated how the GVM outperforms the existing techniques in many standard interaction elements.

VI. FUTURE WORK

A proof-of-concept for using hand motions identified by computer vision to enable movement in a virtual world is provided by the work discussed in this paper. However, there remains lots of opportunities for enhancement and more research.

- *Enhancement of Gesture Lexical Items*: Authors aim to increase the number of hand gestures available for use in directing the movement of the virtual world. This can entail introducing fresh motions that let users navigate across the area or control items.
- *User Interface Layout:* It will be crucial to create a user interface that is simple to understand and use as the system grows increasingly complicated and feature-rich. We will investigate several methods for creating a user interface that permits individuals to swiftly and simply manipulate the virtual world in upcoming work.
- *User Experience:* In order to enhance the user experience, we will research several ways to let users know when their gestures have been effectively identified. This can entail adding haptic or visual feedback features to let users know when they have performed a motion correctly.
- *Reduce delay:* Making the virtual reality environment feel more realistic by lowering system delay may significantly enhance user experience. Optimizing data communication between the AI model and the Unity3D engine is one method for lowering latency. This can entail transferring data using more effective methods or requiring less data to be transferred in real-time.

In conclusion, there are a wide range of prospective directions for further research in this field, including increasing the gesture lexicon, improving gesture detection, enhancing user interface, offering users input, and lowering latency. Future research in these areas has the potential to dramatically improve user engagement and increase the effectiveness and efficiency of the gesture-based movement mechanism.

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Feature Engineering to Heterogeneous Cross Software Projects Defect Prediction: A Novel Framework

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Abstract

Heterogeneous cross-project defect prediction (HCPDP) aims to predict defects in a target project with limited historical defect data via a defect prediction (DP) model trained with defect data of another source project. The accuracy of a DP model is highly dependent on the set of features selected in feature engineering (FE) phase. The study evaluates the effectiveness of proposed four-phase HCPDP framework with more focus on FE phase using the stacking-based ensemble learning method. Auto-encoder (AE), a deep learning-based FE technique is used for the proposed analysis. In addition, two novel techniques to deal with imbalance dataset and to determine correlation between features are also proposed in this paper. For comparative analysis, accuracy, recall, F-score and area under curve (AUC) are used as the output parameters. To compare DP model's output with or without FE phase, ten prediction pairs from four open source projects have been considered. The experimental results show that the AE technique is able to reduce the number of features by an average of 50% as compared to data-driven approaches. Also, the proposed model gave better performance in comparison with traditional heterogeneous models with highest AUC of 0.8901.

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An Approach to DNA Sequence Classification Through Machine Learning: DNA Sequencing, K Mer Counting, Thresholding, Sequence Analysis

Sapna Juneja, Annu Dhankhar, Abhinav Juneja, Shivani Bali

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ML) has been instrumental in optimal decision making through data, including the domain of bioinformatics. In bioinformatics tural genes and the genes that are infected by disease called invalid plex task. In order to find the applicability of a fresh protein through DNA sequences need to be classified. The current work identifies quence using machine learning algorithm. These classes are basically sequence of nucleotides. With a fractional mutation in sequence, nding change in the class. Each numeric instance representing a gene family including G protein coupled receptors, tyrosine kinase, his paper, the authors applied the classification algorithm on three o identify which gene class they belong to. They converted sequences a defined length. That 'k value' defines the length of substring which to analyze the sequence.

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Top

n

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two chains of nucleotides spiraled around each other, joined together bonds while moving in diverse directions. It has a double-helix consisting of two DNA chains coiled around each other (Chou & Shen, chains possess four complementary nucleotides – adenine (A), ine (G) and thymine (T) (Akhtar et al., 2008),(Akhtar et al., 2008), '),(Ramachandran et al., 2012) with an A on one chain always the other, and C always matched with G (Kinsner, 2010). The vas discovered by Francis Crick. This methodology of expressing gene edical sciences is employed to determine human disease structure Phongwattana et al., 2015). DNA sequencing is an operation of e of nucleotides in DNA i.e. nucleic acid sequence. It is the process of sical order of these bases. There a number of techniques for the order of four bases. Traditionally most of the biologists use Machine dels to resolve their problems like functional genomics, gene-itions, gene signatures and gene interactions. Previous research nes through experimentation on realistic cells, a veracious but costly present-day work uses machine based approaches to identify the ent accuracy driven advantage of these methods. Machine ne prediction can be categorized as Content-based approaches and proaches (Wang et al., 2004). Similarity-based formulation search for candidate and public sequence database of existing genes. rmulation are computationally costly and miss original genes. mulation is advanced technique of gene-prediction that overcomes similarity based technique. These approaches use several attribute codon utilization, sequence length and GC content. They then employ g or applied mathematics approaches to predict whether a read genes. ML has been evidentially effective to resolve various problem ation, regression and clustering.

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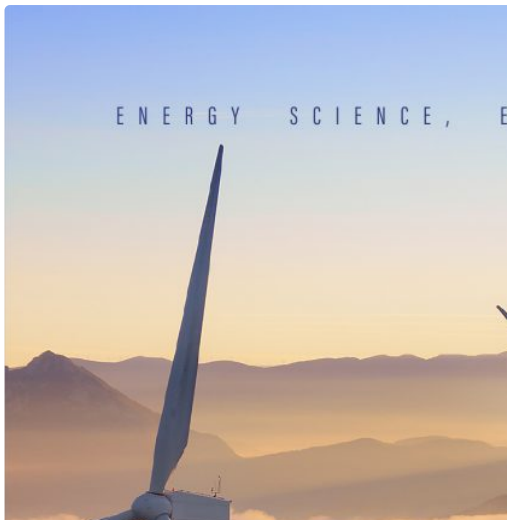
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Table of Contents **Publish with Us**

Table of Contents

Preface

Acknowledgments

List of Reviewers

Chapter 1. Photovoltaic Generators: Development, Simulation and Perspectives
Hocine Belmili
Unité de Développement des Equipements Solaires, UDES/Centre de Développement des Energies Renouvelables, CDER, Bou Ismail, W. Tipaza, Algérie

Chapter 2. Performance Analysis of Solar Energy Conversion Technology
Ajay Pratap Singh[1], Sumit Tiwar[1], Harender[1], Prabhakar Tiwari[2] and S.N. Singh[3]
[1]Shiv Nadar University, Dadri, India

[2]M.M.M. University of Technology, Gorakhpur, India
[3]Indian Institute of Technology Kanpur, India

Chapter 3. An Extended Study of Frequency-Supported Wind Energy Conversion Systems

Maloth Ramesh[1], Anil Kumar Yadav[1], Rajan Kumar[1] and Pawan Kumar Pathak[2]
[1]National Institute of Technology Hamirpur, Hamirpur (H.P.), India
[2]School of Automation, Banasthali Vidyapith, Rajasthan, India

Chapter 4. RERNN-BCMO-Based Load Frequency Control in Multi-Area Power Systems Using Hybrid Renewable Energy Sources

Arshad Mohammed and R Srinu Naik
Andhra University, Visakhapatnam, India

Chapter 5. A Review on State-of-the-Art Wind Energy Conversion Systems and Associated Control Strategies for Normal and Fault Conditions

Arika Singh[1],[2], Kirti Pal[1] and Hemant Ahuja[3]
[1]Gautam Buddha University, Greater Noida, India
[2]KIET Group of Institutions, Ghaziabad, India
[3]Ajay Kumar Garg Engineering College, Ghaziabad, India

Chapter 6. Simulation and Analysis of Three-Phase and Five-Phase Variable Speed PMSMs under Open Phase Fault Conditions

Khadim Moin Siddiqui[1], Farhad Ilahi Bakhsh[2], Bhavesh Kumar Chauhan[1] and Arif Iqbal[3]
[1]Shri Ramswaroop Memorial College of Engineering and Management, Lucknow, India
[2]National Institute of Technology Srinagar, Srinagar, Jammu and Kashmir, India
[3]Rajkiya Engineering College, Ambedkar Nagar, India

Chapter 7. Investigation and Mitigation of Distribution-Side Power Quality Issues

A. Sharma[1] and B. S. Rajpurohit[2]
[1]Rajkiya Engineering College, Bijnor, India
[2]Indian Institute of Technology Mandi, Mandi, India

Chapter 8. Enhancement of Power Quality in Microgrid Using Optimized PV-Based DSTATCOM

Alok K. Mishra[1], Suvendu M. Baral[2], Somya R. Das[3], Prakash K. Ray[2], Tapas K. Panigrahi[3], Asit Mohanty[2], and Akshaya K. Patra[1]
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[3]Department of EE, PMEC, Berhampur, Odisha, india

Chapter 9. Role of Machine Learning in Forecasting Solar and Wind Power Generation

Rachna Vaish and U. D. Dwivedi
Rajiv Gandhi Institute of Petroleum Technology, Jais, Amethi, India

Chapter 10. Technological and Communicational Advancements in the Energy Grid: A Review

Sandhya Shrivastava, Anam Tariq, Kirti Verma and Ankit Kushwaha

Shri Ramswaroop Memorial College of Engineering and Management, Lucknow, India

Chapter 11. Renewable Energy and Energy Storage Systems

Hemlal Bhattarai
Jigme Namgyel Engineering College, Dewathang, Bhutan
Chapter DOI: https://doi.org/10.52305/WXNJ6607

Chapter 12. A Review of Energy Storage System Technologies in Microgrid Applications: Characteristics, Issues and Challenges

Hannan Ahmad Khan[1], Mohd. Zuhaib[1], Mohd. Rihan[1] and Anil Kumar[2]
[1]Zakir Husain College of Engineering and Technology, Aligarh Muslim University, Aligarh, India
[2]Ministry of New and Renewable Energy, New Delhi, India

Chapter 13. Determination of Optimal Size for Battery Energy Storage System in Distribution Networks

Soumyabrata Das[1] and Ashutosh Kumar Singh[2]
[1]Visvesvaraya National Institute of Technology, Nagpur, India
[2]Dr. Shakuntala Misra National Rehabilitation University, Lucknow, India

Index

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To Design an Optimal PV/Diesel/Battery Hybrid Energy System for Havelock Island in India

Mohammad Shariz Ansari, Aishwary Gautam, Bhavishya Tomar, Madhuram Gautam & Mohd. Faisal Jalil

Conference paper | First Online: 23 May 2023

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Abstract

In the case of hybrid model design, the Hybrid Optimization Model for Electric Renewables (HOMER) software is employed for optimization. This work aims to reduce overpriced net present cost (NPC) and cost of energy (COE) at Havelock Island in India and lower the air pollution index by utilizing non-conventional energy sources. Havelock Island's average daily radiation is 5.30 kWh/m^2/day. The HOMER simulates, optimizes, and does sensitivity analysis on the proposed model for thousands of combinations to find the best answer. We are employing diesel generators, solar panels, and battery storage to develop the optimal hybrid system possible for modeling reasons. This model yields the lowest NPC and COE. In this analysis, the sensitivity variables for simulation are diesel generators' run time and fuel cost. The diesel price of Rs. 77/L and the generator run periods of 720 min were used as sensitivity variables for the optimized model. For these values of sensitivity variables, the NPC and COE come out to be Rs. 1.82 B and Rs. 19.87/kWh, respectively. Using an optimal hybrid system instead of an existing diesel-only system at Havelock Island, the pollution will also be reduced by 83.21%.

Keywords

Hybrid model **Net present cost (NPC)** **Cost of energy (COE)** **Renewable energy** **HOMER**

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To Design an Optimal Hybrid Energy System for Agatti Island in India

Mohammad Shariz Ansari, Aditya Srivastava, Aditya Singh, Adesh Gupta, Ameer Faisal & Mohd. Faisal Jalil

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Abstract

Since diesel generators are used to generate electricity mostly on smaller, isolated islands, the net present cost (NPC) and cost of energy (COE) are very high. The use of diesel generators also causes increased pollution. As a result, by using renewable energy sources such as solar, this initiative intends to reduce NPC, COE, and pollution. In India's union territory of Lakshadweep, Agatti Island would be the research site (UTL). The daily radiation on Agatti Island is 5.68 kWh/m^2/day. Using HOMER software, modeling, simulation, and optimization of an ideal hybrid model were all done. The optimum solution is to combine diesel, PV, and battery power. In this approach, the NPC and COE are the least. The investigator has included the fuel rate (Rs) as a sensitivity factor. The best system uses the Rs. 72/L diesel price as a sensitivity variable. Furthermore, this optimal hybrid system reduces the pollutants by 90%.

Keywords

Hybrid model **Net present cost (NPC)** **Cost of energy (COE)** **Renewable energy** **HOMER**

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Back

Chapter 4

Cloud-Based Architecture for Effective Surveillance and Diagnosis of COVID-19

Shweta Singh, Aditya Bhardwaj, Ishan Budhiraja, Umesh Gupta, Indrajeet Gupta

Book Editor(s):Danda B. Rawat, Lalit K Awasthi, Valentina Emilia Balas, Mohit Kumar, Jitendra Kumar Samriya

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Summary

Coronavirus disease 2019 (COVID-19) has spread in multiple countries and caused major worldwide concern. The continual increase in the number of COVID-19 cases is overwhelming the world economy and has become a serious concern to global health. It is supposed to as an absolute to severe acute respiratory syndrome (SARS), formally known as beta-coronavirus, which was termed as COVID-19 through World Health Organization (WHO). Even with its deadly recurrence, several actions have been taken to diagnose and treat the disease as fast as possible. Rigorous quarantine efforts and global containment are being performed. Apart from this, the incidence of pandemics, similar to COVID-19, had been into existence a few decades back. Various techniques and technologies are being introduced previously, by various authors, to tackle the pandemic. Health authorities, worldwide, concluded with surveillance and tracking of individuals, while others opted for application-based techniques to keep track of the infected individuals, etc. The study proposed a cloud-based network to manage pandemic situations like COVID-19. With this proposed scenario and detailed survey, government authorities and researchers (worldwide) can opt for appropriate ways to control its recurrence; and will help to stop further propagation using dynamic surveillance.

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Back

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Back

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Back

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Back

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Back

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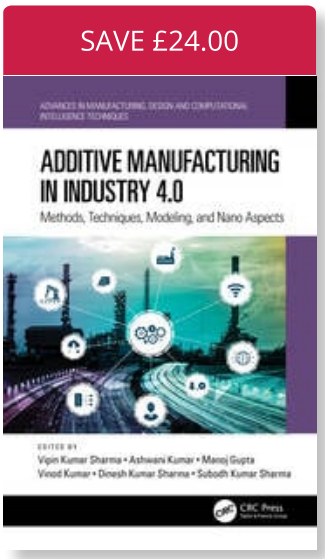
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Table of Contents

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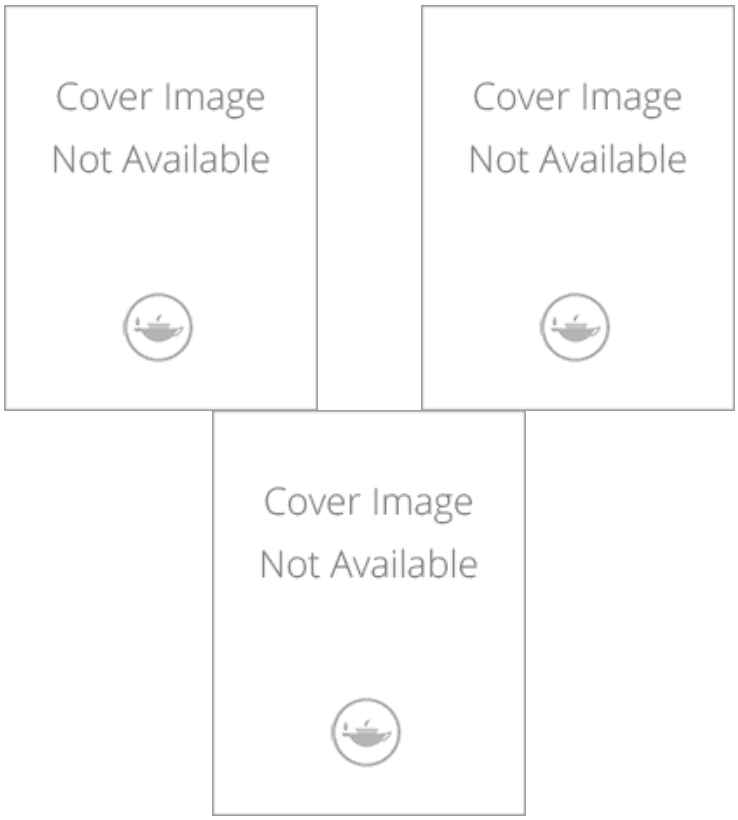
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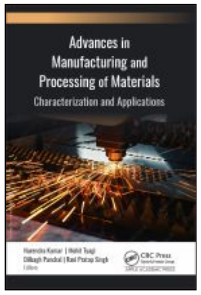
Materials Science

Advances in Manufacturing and Processing of Materials

Characterization and Applications

Editors: Narendra Kumar, PhD
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CONTENTS:

Preface

Introduction

1. Additive Manufacturing of FCC-Based High Entropy Alloys
Poonam S. Deshmukh and Dan Sathiaraj

2. Characterization of Composite Materials Using Natural and Synthetic Fiber: A Review
Ghanshyam Satnami, Deepesh Bhavsar, Anil Kumar Rao, and Anil Khurchania

3. Topology Optimization Techniques Employed for Additively Manufactured Medical Implants
Priyanshu Soni and Parnika Shrivastava

4. A Review on Hybrid Friction Stir Incremental Sheet Forming of Tailored Blanks
Suhas Chavhan and Parnika Shrivastava

5. 3D Printing Parts: Mechanical Characterization, Applications, Challenges, and Techniques
Pradyumn Kumar Aryaa, Pankaj Kumara, Neelesh Kumar Jaina, Girish Vermaa, and Dan Sathiaraja

6. 3D and 4D Printing Technologies and Their Applications: Current Status and Future Perspectives
Hussam Bin Mehare, Mohammed Zainul Arefeen, Israr Ahmad, and Faisal Talib

7. Feature Optimization Methods: A Step Towards Improvement in Medical Image Processing
Shelly Garg and Balkrishan Jindal

8. Starch-Based Biodegradable Packaging Materials: Characterization and Multifarious Applications in the Pharmaceutical and Food Industries
Pratap Kalita, Abdul Baquee Ahmed, Saikat Sen, Satyabrat Sarma, and Satyendra Deka

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Frontiers of Mechanical and Industrial Engineering
Innovation Management and Computing
Innovations and Challenges in Micro Irrigation

9. Semiconductor/Semiconductor Core/Shell Nanomaterial: A Versatile Novel Material
Pallabi Boro, S. Rijuwana Haque, and Suparna Bhattacharjee

10. Spiral Fluid Jet for Micro-Components Finishing
Kelvii Wei Guo

11. Analysis of SG Iron Machining in Turning Operations
Nirvedh Umesh Shirke, Apurva Rane, Afnaan Sayyed, Atulkulkarni, and Satish Chinchaniker

12. Additive Manufacturing: A Look at the Current Technology, Materials, and Applications
Aditya Verma, Pulkit Dureja, Mandeep Dhanda, and R. S. Walia

13. Methods of Hardfacing of Aluminum Alloys
Shivank A. Tyagi, Neha Bhadauria, and Prashant Vashishtha

14. Cubosomes: An Approach to a Novel Drug Delivery System
Pratap Kalita, Swabnam Khataniar, Ratnali Bania, and Probin Kr. Roy

Index

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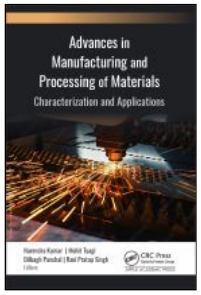
Materials Science

Advances in Manufacturing and Processing of Materials

Characterization and Applications

Editors: Narendra Kumar, PhD
Mohit Tyagi, PhD
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CONTENTS:

Preface

Introduction

1. Additive Manufacturing of FCC-Based High Entropy Alloys
Poonam S. Deshmukh and Dan Sathiaraj

2. Characterization of Composite Materials Using Natural and Synthetic Fiber: A Review
Ghanshyam Satnami, Deepesh Bhavsar, Anil Kumar Rao, and Anil Khurchania

3. Topology Optimization Techniques Employed for Additively Manufactured Medical Implants
Priyanshu Soni and Parnika Shrivastava

4. A Review on Hybrid Friction Stir Incremental Sheet Forming of Tailored Blanks
Suhas Chavhan and Parnika Shrivastava

5. 3D Printing Parts: Mechanical Characterization, Applications, Challenges, and Techniques
Pradyumn Kumar Aryaa, Pankaj Kumara, Neelesh Kumar Jaina, Girish Vermaa, and Dan Sathiaraja

6. 3D and 4D Printing Technologies and Their Applications: Current Status and Future Perspectives
Hussam Bin Mehare, Mohammed Zainul Arefeen, Israr Ahmad, and Faisal Talib

7. Feature Optimization Methods: A Step Towards Improvement in Medical Image Processing
Shelly Garg and Balkrishan Jindal

8. Starch-Based Biodegradable Packaging Materials: Characterization and Multifarious Applications in the Pharmaceutical and Food Industries
Pratap Kalita, Abdul Baquee Ahmed, Saikat Sen, Satyabrat Sarma, and Satyendra Deka

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Innovations and Challenges in Micro Irrigation

9. Semiconductor/Semiconductor Core/Shell Nanomaterial: A Versatile Novel Material
Pallabi Boro, S. Rijuwana Haque, and Suparna Bhattacharjee

10. Spiral Fluid Jet for Micro-Components Finishing
Kelvii Wei Guo

11. Analysis of SG Iron Machining in Turning Operations
Nirvedh Umesh Shirke, Apurva Rane, Afnaan Sayyed, Atulkulkarni, and Satish Chinchaniker

12. Additive Manufacturing: A Look at the Current Technology, Materials, and Applications
Aditya Verma, Pulkit Dureja, Mandeep Dhanda, and R. S. Walia

13. Methods of Hardfacing of Aluminum Alloys
Shivank A. Tyagi, Neha Bhadauria, and Prashant Vashishtha

14. Cubosomes: An Approach to a Novel Drug Delivery System
Pratap Kalita, Swabnam Khataniar, Ratnali Bania, and Probin Kr. Roy

Index

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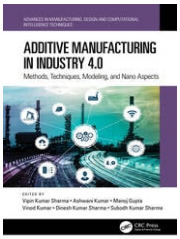
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ABSTRACT

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Advances in Modelling and Optimization of Manufacturing and Industrial Systems pp 175–182

Atomization Casting of Al–Si Alloys and Their Characterization

Krishna Vijay ✉, Utkarsh Mishra & Subodh Kumar Sharma

Conference paper | First Online: 24 February 2023

243 Accesses

Part of the Lecture Notes in Mechanical Engineering book series (LNME)

Abstract

Atomization casting provides the low-cost casting process with better attributes and performance. It acts as a major competitor for existing technologies, such as normal casting and powder casting route. The economy benefit in this process is derived from a step integrated operation of converting superheated molten alloy directly into a semi-finished product. Atomization casting converts a molten stream into a spray of droplets by high pressure gas atomization. The grain refinement is occurred in Al-6%Si and Al-12%Si atomization cast alloys.

Keywords

Atomization casting **Mechanical property** **Convergent divergent nozzle**

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Ergonomic Assessment of Tractor Seat for Anthropometric Dimensions of Indian Population

Arunesh Chandra, Bibekanad Pathak, Subodh Sharma, Pawan Arora & Harish Kumar

Conference paper | First Online: 22 July 2023

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Abstract

Industrial design, apparel design, tool design, and workplace design all heavily rely on anthropometry. For farmers, a tractor is their primary form of power. The design of a contemporary tractor seat must therefore take these human issues into account. When anthropometric dimensions are appropriately considered in the design of seat, these variables enable the operator to carry out a variety of different activities with maximum effectiveness, safety and minimum fatigue. For drivers to have a better driving experience and comfort, the tractor seat's design is crucial. In present study Rapid Upper Limb Assessment (RULA) was used for assessment existing and proposed the design of the tractor seat where it was observed that RULA score (risk factor) was reduced from 5 to 2 when the tractor seat was modified taking into consideration of anthropometric dimensions.

Keywords

Anthropometry **Ergonomics** **Tractor seat** **RULA** **Working posture**

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Chapter Navigation

BOOK CHAPTER

Chapter 11: Galangal – a Promising Herb in Ayurvedic Formulations: Phytochemistry and Pharmacological Evaluations

By Guruprasad C. Nille ; Shardendu Kumar Mishra ; Omkar S. Nille ; Angad Kumar Singh ; Anand Kumar Chaudhary

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Galangals, the commonly used designation for three different species, namely *Alpinia galanga* (L.) Willd. (greater galangal), *Alpinia officinarum* Hance, and *Alpinia calcarata* Roscoe (lesser galangals), are widely used medicinal plants with a prevalent traditional name, *Rasna*, in Ayurveda. They are substitutes for each other in the name of *Rasna* in many Ayurvedic formulations. In the Ayurveda system of medicine, *Rasna* has effectively been used to manage various inflammatory disorders, neurodegenerative diseases, diarrhoea, stomachache, diabetes, dementia, fever, bronchial catarrh, *etc.* The principal phytochemicals in galangals are alkaloids, terpenoids, flavonoids, coumarins, saponins, tannins, essential oils, apigenin, chrysin, galangin-3-methyl ether, galangin, zingerone, diterpene, diterpene B, 1,8-cineol, α-pinene, galangoisoflavonoid, 1′-acetoxyeugenol acetate, protocatechuic acid, *etc.* Galangals are cited for their antimicrobial, antidiabetic, anti-inflammatory, antipyretic, anticancer, antispasmodic, antiviral, antifungal, cytoprotective, hepatoprotective, neuroprotective, aphrodisiac, antiemetic, antihelminthic, antiulcerative, antidiuretic, antidementia, and antiallergic properties. This chapter aims to provide comprehensive data about galangals by addressing details of the species and their present utility in various Ayurvedic formulations. It also includes their ethnomedicinal, phytochemical, and pharmacological aspects.

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Natural Products in Vector-Borne Disease Management

2023, Pages 291-307

Chapter 12 - Plants with antidengue properties: A systematic review

Parul Grover [a], Monika Bhardwaj [b], Lovekesh Mehta [c], Pooja A. Chawla [d], Viney Chawla [e], Shubham Sharma [a]

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Abstract

This chapter introduces about various medicinal plants effective against Dengue virus (DENV). Dengue is a mosquito-borne viral infection that causes flu-like illness and in severe cases can also cause potentially lethal complications. It is reported that every year around 50 to 200 million people are diagnosed with dengue. Several approaches are used to find a suitable treatment for the disease but researchers have observed that plants of medicinal value are the eventual preferences to fight against virus infection caused due to dengue. Various plants displaying virucidal properties have comprehensively been utilized in traditional system of medicine. There exists a huge reservoir of compounds in nature that can be explored for ascertaining innovative leads with potential to be used as pharmaceuticals or as lead molecule that can be improved toward the expansion of new antiviral compounds active against dengue. As plant-based medicines are usually considered nontoxic, safe, and less harmful than man-made drugs, so their demand is continuously increasing. This chapter highlights the transmission of dengue, the recent status of dengue cases, symptoms, diagnosis, various plants used in its treatment, and the medicinal plant formulations available for its treatment. This compilation will be very much beneficial to establish that natural products and natural product-based compounds are a potential source for DENV medication.

Previous Next

Keywords

Medicinal plants; Antidengue; Dengue fever; Phytochemical

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CHAPTER 14

PERSONALIZED TELEMEDICINE UTILIZING ARTIFICIAL INTELLIGENCE, ROBOTICS, AND INTERNET OF MEDICAL THINGS (IOMT)

KIRAN SHARMA

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ABSTRACT

The technical advanced artificial intelligence (AI) and robotics with the aid of the internet of medical things (IoMT) is extremely needed for the development of capacity for the future needs of in-person care across geographies and health professional organizations. Both AI and telemedicine were versatile and flexible and offered an unending opportunity to produce improved health services. Trends in the use of this technology may be grouped into four: patient monitoring, information technology in the field of healthcare, intelligent assisted diagnostics, and collaboration in information analysis. These can be utilized in shifting medical services from healthcare centers and organizations to houses and smart devices with increased convenience and lower costs. As AI has an immense potential to support doctors in their everyday schedule of image investigation and alleviate their occupational load. In addition, the operating room (OR) is presently an advanced combination of medical robots, workstations for telepresence, software-integrated surgery, and powerful imaging equipment. Robots have enhanced surgeon dexterity and offered the least intrusive procedures and have increased the

Handbook of Research on Artificial Intelligence and Soft Computing Techniques in Personalized Healthcare Services, Uma N. Dulhare, A. V. Senthil Kumar, Amit Datta, Seddik Bri, Ibrahiem El Emary, (Eds.)
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access to the target organ. However, the use of AI may also be controversial in relation to a number of legal, ethical, and societal questions.

14.1 INTRODUCTION

The utilization of medical information to enhance patient's health is telemedicine or telehealth. The reorganization of medical services, funding of electronic health records (EHRs) and support systems for clinical decisions can speed up the incorporation of telecommunications into the provision of healthcare as shown in Figure 14.1. In this regard, the usage and delivery of telemedicine can play a significant role for artificial intelligence (AI) and robotic technology. Even though the idea of AI was primarily created some 60 years ago, the fast development of AI-centered technology and applications took place after the graphical treating units were improved in 2010. As it currently stands, AI-based algorithms can imitate the judgment and behavior of people in the highest level with equal or even greater precision. The fourth industrial revolution of the human race has now been led and our everyday lives are gradually changed by AI, as have several other technical breakthroughs including the internet of things (IoT) [1].

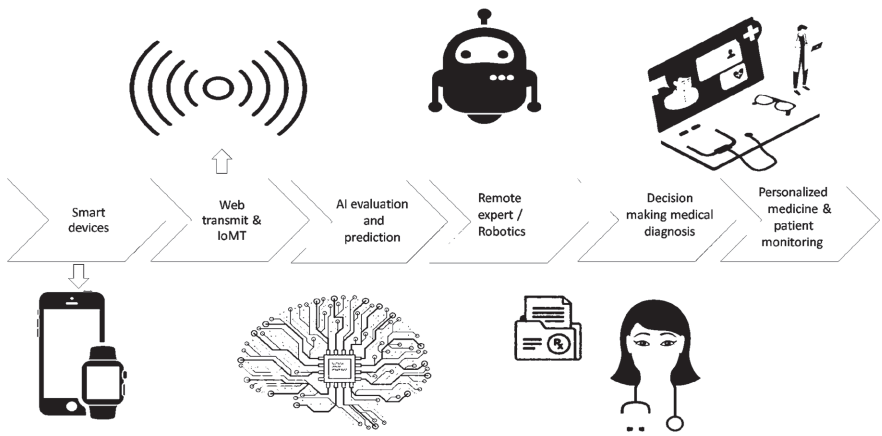


FIGURE 14.1 Artificial intelligence (AI)-based personalized telemedicine approach is shown starting from smart devices data collection to patient monitoring.

Many IT and researchers spend a lot of time and money studying novel AI algorithms and applications and apply them in the field of health sciences using different devices. These devices are generally divided into two primary classes: Machine learning (ML) and natural language processing (NLP) [2].

Chapter - 8

Common Blood Cell Disorders/Anaemias: An Overview

Author

Dr. Roma Ghai
Professor, KIET School of Pharmacy, KIET Group of Institutions, India

Chapter - 8

Common Blood Cell Disorders/Anaemias: An Overview

Dr. Roma Ghai

Anaemia

Definition: Anaemia (An-without, emia-blood) is a decrease in the RBC count, haemoglobin and/or haematocrit values resulting in a decreased ability for the blood to carry oxygen to the body tissues.

Haemoglobin is a component present in red blood cells that binds with oxygen and through blood, oxygen is carried to various parts of the body. Due to decreased amount of hemoglobin or RBC, there is a decreased O_2 carrying capacity of blood which produces the following symptoms of anaemia.

Symptoms

Anemia is characterized by

Pallor (paleness) of skin, nails and mucous membranes & sclera of eye, brittle nails

Lethargy, weakness, lack of concentration, Fatigue, leg cramps, insomnia, sensitivity towards cold

Palpitation, Dyspnoea (shortness of breath) on exertion

Normal values of haemoglobin

Category Values	Reference value
Men	13.5-17.5g/dl
Women	12.0-15.5g/dl
Child	>12g/dl

Epidemiology of anaemia

Anaemia is a major killer in India. Anemia affects both adults and children of both sexes. However, pregnant women and adolescent girls are more at risk in developing anemia. Statistics reveal that every second Indian woman is anemic. One in every five maternal deaths is directly due to anemia.

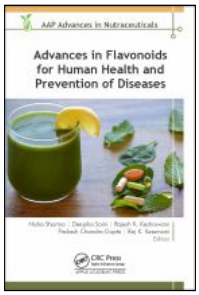
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Advances in Flavonoids for Human Health and Prevention of Diseases

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Recently, there has been an upsurge of interest in the therapeutic potential of medicinal plants, which might be due to their phenolic compounds, specifically flavonoids. Flavonoids are a group of phenolic compounds that have pharmacological properties and are mostly found in stems, fruits, vegetables, bark, grains, and roots of plants. Researchers are interested in these natural compounds because of their potential as antidepressants and immune boosters and for their antioxidant, antimitogenic, and anti-inflammatory properties.

This new book, **Advances in Flavonoids for Human Health and Prevention of Diseases,** offers an important overview of advances in flavonoids for their potential applications. The chapters explore the applications and characteristics of polyphenol (flavonoids) derivatives for human health and in the management and prevention of diseases. Various flavonoids such as tea flavonoids, vegetable flavonoids, berry flavonoids, cocoa flavonoids, and citrus flavonoids are explored in detail.

Chapters examine the nutritional and pharmacological properties of polyphenols and flavonoids, including their ability to prevent the start and development of diseases and how they aid in the management of several chronic pathological illnesses, including cancer, diabetes, cardiovascular disease, neuro-degenerative illness and aging, pregnancy-induced disorders, and others. Also discussed in depth are the properties, classes, and degrees that formulate a compound and which subsequently support the development of drugs/products with health benefits.

Topics also include the benefits of natural food dyes (such as anthocyanidins and anthocyanins) as nutraceuticals and their functions, how flavonoid-rich diets are good for better health and help to prevent chronic noncommunicable diseases, the neuroprotective effects of flavonoids, and much more.

Advances in Flavonoids for Human Health and Prevention of Diseases sheds new light on the value of the diverse group of phytonutrients found in almost all fruits and vegetables. The book should interest nutritional and pharmaceutical researchers and drug developers, medical practitioners, and many others.

CONTENTS:

Preface
1. Nutritional Properties of Polyphenols
Shubham J. Khairnar, Eknath D. Ahire, Mohini R. Jagtap, Khemchand R. Surana, Sanjay J. Kshirsagar, and Raj K. Keservani

2. Phytonutrients Anthocyanidins and Anthocyanins: Dietary and Medicinal Pigments with Possible Health Benefits
Suruchi Singh, Pankaj Bhatt, Vipin Kumar, and Neha Singh

3. Management and Prevention of Diseases by Flavonoids
Shubham J. Khairnar, Eknathd. Ahire, Mohini R. Jagtap, Khemchand R. Surana, Sanjay J. Kshirsagar, and Raj K. Keservani

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5. Neuroprotective Effects of Flavonoids
Vipin Kesharwani, Sagarika Kabra, Bhupesh Chandra Semwal, and Deepika Saini

6. Overview and Potential Benefits of Flavonoids in Diabetes
Sagarika Kabra, Akhand Pratap Singh, Vipin Kesharwani, and Deepika Saini

7. Antidiabetic Benefits of Dietary Flavonoids
Richa Singh and Deepika Dhawan

8. Application of Flavonoids in Pregnancy-Induced Disorders
Tarkeshwar and Pradip Kumar Saini

9. Flavonoids and Their Anti-Cancer Properties
Shivam Singh, Deepika Saini, Deepa Devi, and Kamal Kant Sharma

10. Plant Metabolites as Immunomodulators
Saumya Das, Manas Kumar Das, Urmila Jarouliya, and Eknath D. Ahire

Index

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Chapter 11 - Futuristic aspect of nanocarriers on targeted delivery for dementia

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Abstract

Alzheimer's disease (AD) is one of the most common neurodegenerative diseases. Analysis conducted over the past 20 years has shown that macromolecules accumulating in the brain known as Amyloid-β (Aβ) are fundamentally responsible for the chronic effects of the disease. Amyloid-β builds up in the brain, forming plaques, and clumps that block neuronal signaling and break down the connections between neurons. Many researchers have been looking at the involvement of tau, a protein that causes the production of "neurofibrillary tangles" in the brain, which is another signal of neuronal death. Proteolytic therapies for AD are one of the novel strategies where the proteolysis targeting chimera (PROTAC) is selectively initiating protein degradation within the cell. In this novel approach, these techniques are small-molecule PROTACs peptide, TH006, and Neprilysin-2 (NEP-2). The traditional drug delivery technologies confront difficulties in targeting specific parts of the brain. For drug discovery and development in order to make medications more effective in the brain and to have a specific action. The first line of defense for the brain is the blood–brain barrier, which is followed by the blood-cerebrospinal fluid barrier. These membranes are more than just barriers; they also serve as selectively permeable membranes, allowing particular molecules to invade the brain. These mechanisms all operate as impediments to effective drug delivery in the brain. As a result, improved strategies for facilitating the administration of such medications in the brain must be developed. Nanotechnology is now playing an important role in research, with a large number of nanoparticles intended to deliver drugs to specific target areas. Liposomes, dendrimers, microneedles, polymeric nanoparticles, and other nanoparticles are examples. Antibody-coated nanoparticles are a novel strategy to treating AD in the nanosystem.

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Keywords

Alzheimer's disease; Proteolytic therapies; Nanocarrier; Drug release; Nanotech; Brain targeted drug delivery; Nanospheres; Nanotechnology; Dendrimer; Toxicity

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Chapter - 7

Potential Therapeutic Targets for Alzheimer's Disease: An Overview

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Chapter - 7

Potential Therapeutic Targets for Alzheimer's Disease: An Overview

Dr. Roma Ghai

Abstract

Alzheimer's disease is a neurological disease that begins slowly and progresses gradually and its prevalence is rising in countries. Amyloid plaque formation and hyperphosphorylated tau neurofibrillary tangles are two prominent pathologies of this neurodegenerative disease process. Due to pathologies, symptoms range from memory loss to a decline in physical abilities. Existing research criteria focus on biomarker status for amyloid and tau employing positron emission tomography and cerebrospinal fluid analyses. ApoE4 and age have been identified as the key risk variables in current epidemiological data. A tiny percentage of early-onset AD is caused by rare autosomal dominant mutations. The amnestic phenotype, which targets episodic memory, is the most common clinical phenotype upon presentation. Four distinct genes have now been discovered to carry mutations or polymorphisms linked to Alzheimer's disease. These include FAD genes APP, PS1, and PS2. Additionally, carrying the APOE4 allele increases one's chance of developing AD but is insufficient to cause the illness. The drugs available in the market for its treatment mainly target acetylcholinesterase enzymes that can enhance cholinergic neurotransmission. More research is being conducted to search for the strategies and targets for the treatment of Alzheimer's disease. This chapter reviews treatment techniques/strategies organized around a variety of targets for Alzheimer's disorder. The chapter will not only focus on the acetylcholinesterase enzyme but also concentrate on the compounds targeting beta-secretase, gamma-secretase, tau aggregation etc. The chapter has been compiled after reviewing several reputed journals belonging to PUBMED, Google Scholar and Elsevier.

1. Introduction to Alzheimer's disease

Alzheimer's disease (AD) is a neurological disease that progresses slowly and is named after the German psychologist Alois Alzheimer. It is a

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18 Antiviral Nanomaterials as Potential Targets for Malaria Prevention and Treatment

Kantrol Kumar Sahu, Sunita Minz, Madhulika Pradhan, Monika Kaurav, and Krishna Yadav

CONTENTS

18.1 Introduction....402
18.2 Current Methods of Preparation of Nanoparticles....404
18.2.1 Preparation of Polymeric Nanoparticles....404
18.2.1.1 Nanoprecipitation....404
18.2.1.2 Milling Technique....404
18.2.1.3 Extrusion Method....405
18.2.1.4 Supercritical Fluid Technology....405
18.2.1.5 Salting-Out Method....405
18.2.1.6 Ionic Gelation Technique....406
18.2.1.7 Sonication Method....406
18.2.2 Preparation of Lipid Nanoparticles....406
18.2.2.1 High-Pressure Homogenization (HPH)....406
18.2.2.2 Solvent-Emulsification Evaporation (SEE)....407
18.2.2.3 Emulsification and Solvent Displacement Method....407
18.3 Administration of Antiviral Drugs....408
18.3.1 Oral Route....408
18.3.2 Nasal Route....412
18.3.3 Brain Route....412
18.3.4 Nose-Brain Route....412
18.3.5 Ocular Route....412
18.3.6 Topical and Transdermal Route....413
18.3.7 Parenteral Route....413
18.3.8 Vaginal Route....413
18.4 Uptake and Processing of Antiviral Nanoparticles....414
18.5 Therapeutic Approach for Malaria Treatment....415
18.6 Conclusion and Future Prospects....417
References....419

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18.1 INTRODUCTION

Malaria is expected to be the most widespread and irresistible infection in the world, causing a predominantly serious health problem in Asia, Africa, and the Americas (Biamonte et al. 2013). According to the World Health Organization (WHO), in 2018 alone, there were an expected 228 million instances of malaria around the world, which caused about 405,000 demises (World Malaria Report 2019). About 93% of the cases and demises happened in an African Province of a region the WHO describes as the most elevated concern of malaria morbus. Children 5 years of age and under are the extremely susceptible group, addressing 67% of all malarial demises around the world (World Malaria Report 2019). Five distinctive species of *plasmodium* family can manifest malaria in people, including *P. falciparum*, *P. ovale*, *P. vivax*, *P. malariae*, and *P. knowlesi* (Greenwood et al. 2008). The malarial cycle is regulated by apicomplexial parasites of the *plasmodium* category that are spread to the mammalian host by the bite of a female Anopheles mosquito. Malaria is a deadly virus and uses human cellular machinery for its growth. The life cycle of these parasites is multifarious (Figure 18.1), switching back and forth between a mammalian and an invertebrate host, and contains three formative phases: the pre-erythrocytic or liver phase, the erythrocytic or blood phase, and the sporogonic or mosquito phase (Prudêncio et al. 2006; Cowman et al. 2016).

Numerous drugs have been used in the management of malaria, including chloroquine, hydroxychloroquine, doxycycline, quinine, atovaquone, and so forth

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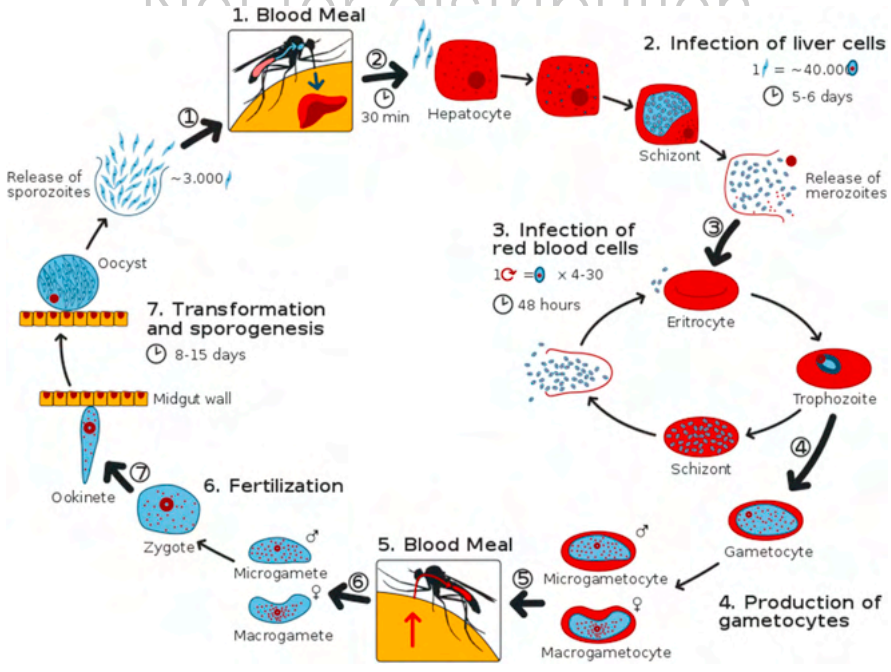


FIGURE 18.1 Illustration showing the life cycle of the malaria parasite.

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(Talapko et al. 2019). On the other hand, various endeavours have embrace the advancement of an effective vaccine for malaria, an aspiring objective that to date has not succeeded. Without appropriate inoculation to malaria, the WHO advises vector control to lessen the odds of mosquito bites and chemoprevention to stifle infection (World Malaria Report 2015, 2019). Because the existing pipeline of plasmodial antagonist is probably not going to be adequate to compensate the malaria-eradication schema, it is critical to find new treatment modalities with broad application to stop the growth and transmission of parasites (Prudêncio et al. 2006; Cowman et al. 2016).

Since drug development is expensive and tedious, alternate methodologies are important to restructure the discovery procedure of novel malaria therapeutics. Drug repurposing is a technique focused on the recognizable proof of different utilizations for already approved or trial medications that are out of the field of reference of the first clinical sign (Ashburn and Thor 2004; Pushpakom et al. 2019). As a matter of fact, their pharmacokinetic and pharmacodynamics parameters have already been known and can be strategies to target other disorders in search of new pharmacological activity.

Antiviral drugs, i.e. antiretroviral (ARVL), are the most potential candidates for to be repurposed as antimalarial therapeutics. In a few places around the globe, *plasmodium* parasites and HIV have a topographical similarity (Fontinha et al. 2020). In this sense, ARVL therapeutics used to treat HIV have been tested through in vitro and in vivo investigations in rats as well as human models for their efficacy against the *plasmodium* liver stage. In addition to these treatments in ARVL therapy, protease inhibitors (PIs) have also been the utmost choice of therapeutic for *plasmodium* parasites. PIs including saquinavir, ritonavir, lopinavir, and indinavir seem to have been effective in the hepatic phases of the *P. berghei* rodent parasites (Machado et al. 2017). In addition, lopinavir tended to affect the liver step of the *P. falciparum* parasite capable of infecting humans at a clinically relevant dose (Hobbs et al. 2009). Both PIs that demonstrate effectiveness against hepatic *plasmodium* parasite infections were additionally evaluated in vitro and in vivo against the subsequent blood phase of *P. falciparum*, *P. vivax*, and *P. berghei* (Fontinha et al. 2020) infections, with lopinavir seeming to have the most important activity in this category of ARVL. Other than affecting abiogenetic blood stages, saquinavir, lopinavir, and ritonavir also repressed *P. falciparum* parasites with gametocytogenesis (Peatey et al. 2010). This was subsequently supported by the second study, which found that saquinavir and lopinavir had decreased gametocyte development and had *P. falciparum* prevented transmission of activity (Hobbs et al. 2013).

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Despite the inaccessibility of explicit antiviral therapeutics for repurposing as antimalarial, utilization of most antiviral medications is also connected to their restricted solubility, short half-life time, and deficient penetration to determined anatomic compartments. Appropriately, a perpetual effort is required to improve the physico-chemical qualities of existing antiviral medications (Cojocaru et al. 2020). Since nanomaterials show significant physical and chemical assets, high surface zone-to-volume proportion, and expanded reactivity, new methodologies for antiviral delivery and repurposing may be achieved by using blends of nanomaterials with available therapeutics. Nanotechnology has arisen as quite possibly the most encouraging advancement because of its capacity to deliver therapeutics effectively,

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tending to the limits of conventional antiviral medications for repurposing. It has not only assisted us with defeating issues identified with solubility and toxicity of medications, it has also granted extraordinary properties to drugs, expanding their potency and selectivity toward target cells (Lembo et al. 2018). Nanomaterials offer novel physico-chemical attributes that have associated advantages for drug delivery as idyllic devices for treatment. As of now, various sorts of nanomaterials, specifically liposomes, nanoparticles, nanospheres, nanosuspensions, nanoemulsions, and nanogel, were investigated either in vitro or in vivo for drug conveyance of antiviral agents to repurpose them for the treatment of malaria with possibilities to be interpreted in clinical practice. The applications of antiviral nanomaterials as potential targets for malaria prevention and treatment are emphasized in this section. It covers a wide range of nanomaterials and fabrication processes, as well as their administration routes, uptake mechanisms, and therapeutic ability.

18.2 CURRENT METHODS OF PREPARATION OF NANOPARTICLES

Depending on the type of materials used in the preparation, such as polymers, lipids, and metals, several methods for preparing nanoparticles have been published in the literature. The following section discusses some of the most used polymeric and lipid nanoparticle preparation techniques.

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18.2.1 Preparation of Polymeric Nanoparticles

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18.2.1.1 Nanoprecipitation

Nanoprecipitation technique was developed and patented by Fessi et al. (1989). This method is based on the precipitation mechanism, in which the polymer precipitates in a nonsolvent. The polymer is dispersed into the aqueous phase (nonsolvent phase) under mild stirring after being dissolved in a water-soluble organic solvent (solvent phase). The organic solvent evaporates at room temperature or by the action of rotavapor, resulting in the formation of nanoparticles (NPs) in aqueous suspension. After that, the aqueous phase is removed through ultracentrifugation and freeze-drying. The drug molecules, a film-former/polymeric material, one/more lipophilic surfactant, and one/more lipophilic surfactant, are usually found in the solvent phase organic solvents (Miladi et al. 2016).

The most commonly employed solvents are ethanol, acetone, hexane or methylene chloride. Water is used widely as nonsolvent (or aqueous phase). During preparation of aqueous phase, hydrophilic excipients must be added to the nonsolvent phases. Polymeric materials used could be of synthetic, semisynthetic, or natural origin. Further, to improve the stability of the NPs and to avoid its aggregation, surfactants could be added into the formulation (Minost et al. 2012).

18.2.1.2 Milling Technique

This method involves different techniques, such as wet milling, milling media, and high-pressure homogenization for the preparation of nanoparticles (Loh et al. 2015). In wet milling, drug and excipients are suspended in a liquid medium and are milled

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using beads to get suspension of NPs. The nano suspension produced is subsequently dried using freeze-drying or spray drying. This technique is well suited for potent therapeutic moieties, as well as for the drugs' high moisture content. Media milling and high-pressure homogenization are two common top-down approaches for production of drug NPs without using beads. Micro fluidizer and piston-gap homogenizer are employed for high-pressure homogenization. The size of NPs is controlled by homogenization speed, characteristic of drug, number of cycles, and temperature. This technique offers robust processing, economic, and easily scalable.

18.2.1.3 Extrusion Method

It's a simple, scalable, and cost-effective method for transforming aqua-phobic drugs into nanoparticles. This is a continuous method in which starting material is pumped at high pressure and temperature, resulting in uniformly sized NPs (Maniruzzaman et al. 2012). Hydrophobic nanoparticles are made using the nanoporous membrane-extrusion (NME) process. The four main techniques used in NME are vesicle extrusion, membrane emulsification, precipitation extrusion, and biological-membrane extrusion. These methods are used to make a range of NPs, including liposomes, emulsions, nanoparticles, nanotubes, and nanofibers (Guo et al. 2018). A downside of this method is the clogging of raw-material filtration residue at the feeding site of the channel, which can block the channel easily.

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18.2.1.4 Supercritical Fluid Technology

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This is one of the most common methods for making polymeric nanoparticles because it doesn't require high temperatures and doesn't use organic solvents. This technique is a green and novel method for increasing the solubility of poorly soluble medicines, improving polymer plasticization, and modifying surfaces, nanosizing, and nanocrystals. Fluid is converted to gas using this method when the density of the liquid is greater than its critical temperature and pressure (Chakravarty et al. 2019). The use of supercritical CO_2 and H_2O in the preparation of nanomaterials is common.

Surfactants and capping agents can be used to monitor the size and surface modification of NPs under supercritical fluid (SCF) conditions. The SCF technology employs a variety of approaches (Yeo and Kiran 2005), including:

- Static supercritical fluid process
- Rapid expansion of supercritical solutions
- Particles from gas-saturated solutions
- Gas anti-solvent process

18.2.1.5 Salting-Out Method

The salting-out approach was created to address the drawbacks of both the emulsification-solvent evaporation and nanoprecipitation techniques. The polymer and drug are dissolved in a water-miscible organic solvent, such as acetone, and then emulsified into an aqueous gel with a salting-out agent (magnesium chloride, calcium chloride, magnesium acetate, and sucrose) and a colloidal stabilizator (Mendoza-Muñoz et al. 2012).

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After that, a large quantity of aqueous medium is applied to the emulsion (o/w) to enable the solvent to diffuse into the aqueous phase and form nanoparticles. Crossflow filtration is used to eliminate the salting-out agent and solvent. This method offers various advantages, including high efficiency, ease of scale-up, and utility for heat-sensitive substances. The disadvantages include the need to extensively wash NPs and the limited applicability for lipophilic drugs.

18.2.1.6 Ionic Gelation Technique

The NPs are formed by crosslinking an ionic polymer with a counterionic material using the ionic gelation technique. To build cross-links, if the polymer material is negatively charged, the counterionic material must be positively charged. Electrostatic interactions between the counterionic material and the polymer cause crosslinking. Ionic gelation, which involves converting the substance from a liquid to a gel at room temperature, follows cross-linking. The cluster is formed in the pre-gel process because of a reaction between the polymer and the gelling agent, and then stabilized by forming a complex with polyelectrolyte (Krishnamoorthy and Mahalingam 2015). Improper surface morphology, fragibility of NPs, and high poly dispersibility index are the major drawbacks of this method.

18.2.1.7 Sonication Method

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This approach involves simply dissolving the drug and polymer in an organic solvent to make NPs. The resulting mixture is sonicated under controlled conditions, the solvent is filtered out, and the residue is washed several times to obtain drug-loaded NPs (Shi et al. 2012). For the dispersion of noninert and nonfunctionalized metal nanoparticles such as Cu, Mn, and Al, the sonication approach is favoured. The release of metal from metal nanoparticles is accelerated by sonication, which can be further accelerated by adding solubilizing agents like bovine serum albumin (Pradhan et al. 2016a).

18.2.2 Preparation of Lipid Nanoparticles

18.2.2.1 High-Pressure Homogenization (HPH)

HPH is the most popular method for creating lipid NPs in the pharmaceutical industry. This technique has many benefits, including improved drug stability, increased drug loading, no use of organic solvents, and large-scale manufacturing (Corrias and Lai 2011). HPH could be carried out in two ways, i.e. cold homogenization and hot homogenization.

Hot homogenization takes place at a temperature above the lipid's melting point. In this technique, the drug is mixed with melted lipid and the resultant mixture is then dispersed into an aqueous phase under homogenization. Lipid NPs are produced upon solidification of the nano-emulsion at room temperature (Naseri et al. 2015). This method is well suited for lipophilic and thermostable drugs, but it has several drawbacks, including drug loss in the aqueous phase and a complicated crystallization process.

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High-pressure milling of suspension is used in the cold homogenization process, where lipid microparticles are first manufactured by melting the lipid with the drug and then allowed to solidify rapidly using liquid nitrogen or dry ice. The nanoparticles are made by homogenizing prepared microparticles in a cold aqueous surfactant using high-speed stirring below room temperature. This method generates large particles with a broad size distribution. (Singh et al. 2020).

18.2.2.2 Solvent-Emulsification Evaporation (SEE)

This technique uses a lipid phase containing lipid excipients, and the therapeutic moiety is solubilized in a volatile organic solvent. Other excipients, such as a stabilizing agent, are dissolved to make an aqueous phase. To obtain a small droplet-formed emulsion (O/W), the lipid phase is applied to the aqueous phase, followed by high-energy homogenization or sonication. Furthermore, the organic solvent is removed by evaporation or decreased pressure. This process subsequently results in the formation of lipid NPs. Ethyl acetate is an extensively used organic solvent because it offers better toxicological profile as compared to earlier used solvents, such as dichloromethane and chloroform (Pradhan et al. 2017, 2020). The NPs are washed repeatedly with distilled water by ultracentrifugation, and then the pellets of lipid NPs are collected. The physico-chemical properties of prepared nanoparticles are influenced by experimental parameters, such as processing temperature, solvent-evaporation method, aqueous-phase length, surfactant quantity, and polymer-molecular weight (Pradhan et al. 2016b). This is well suited for lipophilic and thermolabile drugs because this technique does not involve thermal stress. However, this method has limitations, such as time consumption and coalescence during the solvent evaporation (Singh et al. 2016).

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18.2.2.3 Emulsification and Solvent Displacement Method

This method is a variation of SEE. The drug and lipid excipients are dissolved in a partly water-miscible organic solvent, and the resulting mixture is then saturated with water to reach thermodynamic equilibrium between the two liquids. Since the organic solvent is partly miscible with water, it diffuses into it, causing lipid NPs to precipitate from the dispersed process. This technique can generate NPs with a size of less than 100 nm and a low polydispersity index. Further, the solvent from the system could be eliminated by evaporation or filtration. Nonionic surfactants lead to the formation of larger particles than ionic surfactants (Pineda-Reyes et al. 2021). This technique offers many advantages, such as high encapsulation efficiency, good reproducibility, avoidance of homogenization, easy scale-up, and narrow particle-size distribution. Process parameters such as polymer and surfactant nature and concentration, type of solvent, agitation speed and time, type of stirrer, temperature of dilution water, and viscosity of external phase affect the properties of prepared nanoparticles. The main disadvantages of this method are the removal of large amounts of water from suspension and the risk of hydrophilic drug leakage into the aqueous external process during emulsification.

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18.3 ADMINISTRATION OF ANTIVIRAL DRUGS

In the field of drug repurposing to target antiviral drugs for antimalarial activity, new or superior formulations for manufacturing techniques are considered necessary to expand their efficacy. Novel drug-delivery system-based approaches are utilized to reduce dose and dosing frequency, reduce side effects, as well as improve therapeutic efficiency. Modern research work in the field of nanotechnology-based drug-delivery systems has gained extreme attention and seems to provide next-generation drug-delivery methodologies to improvise antiviral drug therapy (Cojocaru et al. 2020).

Nanoparticulate drug-delivery systems have been anticipated to improve drugs' pharmacokinetic drawbacks, such as solubility, absorption, and bioavailability profile. Nanoparticulate drug-delivery systems could be used for local as well as systemic drug delivery of antiviral drugs. In the case of systemic administration, i.e. intravenous administration of nano-sized drug formulations is required to maintain it in the bloodstream circulation and to cross over the pulmonary capillaries. To overcome the uptake mechanism by the reticulo-endothelial system (RES) and to increase the circulation half-life of nanocarriers, strategies such as sheathings or surface-decorated (PEG coated) nano-carriers have been employed (Lembo and Cavalli 2010).

Also, various types of nanoparticulate systems specifically provide characteristics that are more appropriately suitable for some administration routes, such as topical, nasal, oral, ocular, and pulmonary. Due to this concern, various types of nanoparticulate carrier systems have been researched, formulated by different methodologies to encapsulate antiviral drugs, characterized, and administered via different delivery routes. These delivery systems are mostly made up of natural and biodegradable polymers to provide physical and biological compatibility to ensure consumers' safety and to reduce toxicity. The administration of antiviral drug-based nanocarriers via possible delivery routes are discussed in detail here (Lembo and Cavalli 2010).

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18.3.1 Oral Route

The oral route is the one of the most preferred, accessible, and prevalent routes of drug administration for the attainment of significant therapeutic level of drugs. However, some major limitations are associated with oral drug administration, such as the requirement of higher drug dose for effective pharmacological effect due to respective obstacles such as stringent gastrointestinal milieu, biological membrane barrier action, chemical instability of drugs, and hepatic first-pass metabolism, thus patient compliance is also compromised. In this regard, to overcome all above discussed problems along with achievement of efficient therapeutic response with minimal patient related side effects, a number of novel drug-delivery system-based techniques and methods has been employed for the delivery of antiviral drugs. For example, a lipid-based nano-emulsion system (emulsifier coated nanosized lipid droplets) has been formulated with acyclovir to improve its solubility and oral bioavailability (Sapra et al. 2013). Similar types of delivery system-based formulations for oral antiviral drug administration are discussed in Table 18.1 (Patel and Sawant 2007; Sankar et al. 2012; Sapra et al. 2013; Kumar et al. 2015; Venkatesh et al. 2015; Kumar et al. 2016; Öztürk and Yurtdaş Kirimlioğlu2019).

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TABLE 18.1
List of Antiviral Drug-Based Delivery Systems Administered via Different Routes

Drug	Delivery System	Route of Administration	Significant Result	Reference
Zidovudine (AZT)	AZT loaded lactoferrin nanoparticles (NPs)	Oral	Improvement of pharmacokinetic profile (bioavailability and tissue distribution of zidovudine), reduced toxicity	Kumar et al. (2015)
Lamivudine (LAM)	LAM loaded polylactic-co-glycolic acid (PLGA) NPs	Oral	Improved stability, release rate, drug bioavailability	Öztürk and Yurtdaş Kirimlioğlu (2019)
Zidovudine-Lamivudine	PLGA, poly(lactic acid) PLA, Poly (methyl methacrylate) PMMA, methyl methacrylate-sulfopropylmethacrylate (MMA-SPM) NPs	Oral	Improved drug release rate kinetics with reduced side effect	Sankar et al. (2012)
Nelfinavir mesylate (NFV)	NFV loaded PLGA NPs	Oral	Enhanced drug bioavailability and reduced dosing frequency	Venkatesh et al. (2015)
Efavirenz (EFV)	Efavirenz-loaded lactoferrin NPs	Oral	Improved oral bioavailability and improved pharmacokinetic profile, no organ related toxicity	Kumar et al. (2016)
Acyclovir (ACV)	Lipid nanoemulsion system	Oral	Improved drug solubility and bioavailability	Sapra et al. (2013)
ACV	ACV loaded self-micro-emulsifying drug-delivery system (SMDDS)	Oral	Sustained release drug profile	Patel and Sawant (2007)
ACV	ACV loaded poly-N-vinyl-2-pyrrolidone (PVP) liposomes gel	Nasal	Due to muco-adhesion contact time at mucosal surface increase and facilitate drug absorption	Alsarra et al. (2008)
ACV	ACV loaded L-α-dipalmitoyl phosphocholine and cholesterol liposomes in PVP gel	Nasal	Via nasal route 3 times increased bioavailability as compared to oral route	Amel (2001)
Azidothymidine	Azidothymidine loaded transferrin (Tf) anchored PEGylated NPs	Brain	Enhanced uptake in brain as compared to unmodified nanoparticles	Mishra et al. (2006)
Saquinavir (SQV)	SQV loaded Tf-conjugated quantum rods (QR)	Brain	Significant uptake QR-Tf-Saquinavir in brain microvascular endothelial cells (BMVECs), significant	Mahajan et al. (2010)

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TABLE 18.1 (Continued)
List of Antiviral Drug-Based Delivery Systems Administered via Different Routes

Drug	Delivery System	Route of Administration	Significant Result	Reference
			enhancement in the crossing ability and observed reduction in HIV-1 viral replication in the PBMCs.	
AZT and lamivudine (3TC)	AZT and 3TC loaded polybutylcyanoacrylate (PBCA) and methylmethacrylate-sulfopropylmethacrylate (MMA-SPM) polymeric NPs	Brain	100% increase in the BBB permeability for both drugs due to the carrier mediated system	Kuo and Chen (2006)
Stavudine (D4T), delavirdine (DLV), and SQV	D4T, DLV and SQV loaded polybutylcyanoacrylate (PBCA) NPs,methylmethacrylate-sulfopropylmethacrylate (MMA-SPM) NPs, and solid lipid nanoparticles (SLNs)	Brain	Enhancement in the BBB permeability (3-16 folds)	Kuo and Su (2007)
Azidothymidine 5'-triphosphate (AZTTP)	AZTTP loaded magnetic liposomal formulation	Brain	Permeability and transport of AZTTP magnetic liposomes was observed 3-fold higher than AZTTP alone	Saiyed et al. (2010)
Saquinavir mesylate	Nanoemulsion	Intranasal (nose to brain)	Detectable amount of saquinavir mesylate was observed after intranasal administration as compared to intravenous route	Mahajan et al. (2010)
Efavirenz	Efavirenz loaded PEO–PPO polymeric micelles	Intranasal (nose to brain)	Detectable increased accumulation of Efavirenz micelles was observed and 5 times more relative exposure index in CNS as compared to intravenous administration	Chiappetta et al. (2013)

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ACV	Bovine serum albumin (BSA) NPs	Ocular	No cytotoxicity effect and in vitro transcorneal permeation studies results revealed that via BSA-NPs ACV could permeate into the corneal cells significantly as compared to aqueous ACV solutions	Suwannoi et al. (2017)
ACV	ACV loaded Biotin-12 hydroxystearic acid (B-12HS) micellar formulation	Ocular	Good ocular biocompatibility with no cytotoxicity effect and promising delivery of biotinylated lipid prodrug	Vadlapudi et al. (2014)
Acyclovir L-aspartate (L-Asp-ACV) and acyclovir D-aspartate (D-Asp-ACV)	Amino acid prodrug approach	Ocular	Observed enhanced transport of L-Asp-ACV in the corneal space due to amino acid transporter mediated transport of amino acid derived form	Majumdar et al. (2009)
ACV	SLNs and nanostructured lipid carriers (NLCs)	Ocular	Results revealed that NLCs faster permeation in the excised cornea due to its enhanced corneal penetration properties	Seyfoddin and Al-Kassas (2013)
Ganciclovir (GCV)	GCV loaded Ophthalmic liposomes	Ocular	Higher in vitro transcorneal permeability of GCV liposomes and Ocular tissue distribution of GCV-liposomes was 2 to 10 folds higher (sclera, cornea, iris, lens, and vitreous humour) as compared to solution form	Shen and Tu (2007)
ACV	ACV loaded chitosan nanospheres (NS)	Topical	Improved permeability with improved antiviral activity	Donalisio et al. (2018)
Penciclovir (PCV) and ACV	1% PCV and 3% ACV cream	Topical	Improved results observed in patients under treatment	Lin et al. (2002)
GCV	Borneol-modified GCV-loaded SLNs	Parenteral	Borneol-GCV-SLN enhances the transport of GCV to the brain	Ren et al. (2012)
Antiretroviral drugs	Mannosylated PLGA NPs	Parenteral	Results observed that mannosylated PLGA NPs are promising candidate for brain delivery	Patel and Sawant (2007)

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18.3.2 Nasal Route

The nasal route of drug administration has been primarily exploited for delivering the drug into the vicinity of the nasal mucosa surface. However, this route offers several advantages due to excessive permeability of nasal mucosal epithelium for higher molecular weight drug candidates (≤1000 Da) with rapid drug absorption rate, but the therapeutic effectiveness of administered drugs depends on mucus secretions, enzymes presence, mucus-secretion rate mucociliary-clearance rate, and deposition and uptake of drugs in nasal mucosa. Various novel drug formulations (mucoadhesive systems) are efficiently effective in the enhancement of drug facilitation in nasal mucosa along with stability and protection from nasal enzymes (Durai 2015). Mucoadhesive system based antiviral drug delivery via nasal route discussed in Table 18.1 (Amel 2001; Alsarra et al. 2008).

18.3.3 Brain Route

In the delivery of drugs to brain, blood-brain barrier (BBB) has been a major obstacle. The BBB acts as a diffusive barrier and impedes transition of most of the compounds rather than essentials into the brain blood. To cross over BBB and to deliver drugs in brain-space, nanocarriers have been employed. They enhance BBB permeability and drug deposition in the brain due to its nano-size and lipophilic characteristics through various mechanisms, such as via passive targeting to increase the local drug concentration gradient, receptor-mediated endocytosis of drugs, and blockage of its efflux transporters (Dong 2018). Mainly, few types of nanocarriers have been explored for the antiretroviral drug delivery to the brain; they include polymeric nanoparticles, dendrimers, lipid-based carriers, and micelle-based systems discussed in Table 18.1 (Kuo and Chen 2006; Mishra et al. 2006; Kuo and Su 2007; Mahajan et al. 2010; Saiyed et al. 2010).

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18.3.4 Nose-Brain Route

In recent years, the use of the nose-to-brain route (intranasal delivery) of drug administration to effectively deliver therapeutics to the brain has achieved considerable significance. This noninvasive drug-delivery method directly delivers the therapeutics into the brain via bypassing the BBB. The various preclinical and clinical studies have shown that via intranasal delivery, the effective transport of drugs directly from the nasal cavity to the brain can be achieved through the olfactory epithelium (Md et al. 2015). In a study, nanoemulsion of saquinavir mesylate was prepared for brain delivery. Results show that a high in vivo saquinavir concentration level was achieved by nanoemulsion after intranasal administration, as compared to intravenous administration (Mahajan et al. 2014). Similar results were also observed in another study (Chiappetta et al. 2013) (Table 18.1).

18.3.5 Ocular Route

To develop drug-delivery systems for ocular delivery is a very challenging task due to natural static (physical barriers) and dynamic barriers (blinking and tear

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secretions), as well as the anatomical characteristics of the eye, which block the entry of harmful chemicals, as well as drug substances, into the vicinity of eye. In this regard, consideration of all above factors is necessary for designing of ocular drug-delivery systems so that actual drug dosing and high drug absorption can be achieved. During the past decade, many studies were conducted to explore the liposomes-based antiviral drug delivery. Due to the biodegradable and nontoxic characteristics of nanosized colloidal drug carriers to the cells, phosphatidylcholine-cholesterol-dimethyl dioctadecyl liposomes had been utilized for acyclovir delivery to the eyes (Gote et al. 2019). Delivery systems used for antiviral drug delivery via the ocular route is discussed in Table 18.1.

18.3.6 Topical and Transdermal Route

These routes of drug administration provide the local effect in a noninvasive manner using a smaller drug amount for the targeted therapeutic effect. These routes also offer several advantages, such as improved patient compliance, reduced toxicity, and potential for multiple targets and systemic drug distribution (Hassan et al. 2016). The main obstacle in topical delivery is stratum corneum. This barrier is overcome using various physical practices, such as electroporation, sonophoresis, iontophoresis, and chemical practices, such as employing alcohols, terpenes, alkanes, phospholipids, esters, surfactants, and amines used to induce drug diffusion across skin surface along with novel delivery systems approaches (liposomes, niosomes, transferosomes, nanoparticles, etc.) (Hassan et al. 2016). Via topical and transdermal antiviral drug-delivery systems, protection against the entry and spread of pathogens can be achieved. To improve the topical delivery of antiviral drugs, such as acyclovir, micro- and nanoemulsion-based topical formulations have been developed and show significant improved effects (Shishu et al. 2009; Schwarz et al. 2012). Similar studies' results are discussed in Table 18.1 (Lin et al. 2002; Donalisio et al. 2018).

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18.3.7 Parenteral Route

Drug delivery of antiviral drugs via the parenteral route would cause many severe problems, such as thrombophlebitis at the application site and high-dose crystal formation in the kidney, which may lead to renal failure and renal damage (Fleischer and Johnson 2010; Seedat and Winnett 2012; Lu et al. 2014; Zhang et al. 2014). Recently, novel intravenous (IV) polylactic coglycolic acid (PLGA) stealth nanoparticles have been developed to increase antiviral drugs' plasma half-life, circulation time, and poor bioavailability issues (Kamel et al. 2009; Gupta et al. 2013). Similar types of novel delivery systems administrated via the parenteral route are listed in Table 18.1 (Ren et al. 2012; Patel and Sawant 2007).

18.3.8 Vaginal Route

Another noninvasive route of drug delivery is offered by the vaginal cavity, which avoids pain, tissue damage, and probable infections, as well as toxicity-associated

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side effects associated with the parenteral route. This route of drug delivery also bypasses hepatic first-pass metabolism and is fully equipped with a well-developed blood supply for drugs systemic delivery too. Additionally, the vagina cavity provides great permeability and drug absorption for certain drug candidates based on their physico-chemical characteristics, including molecular weight, dissolution, and ionization properties via active and passive transport mechanisms (Ferguson and Rohan 2011).

18.4 UPTAKE AND PROCESSING OF ANTIVIRAL NANOPARTICLES

Antimalarials are used extensively and at random, resulting in the growth of drug-resistant parasites. The use of nanomaterials containing antimalarials, which are capable of controlling and treating malaria through targeted delivery, will help to prevent or delay the production of resistance (Aditya et al. 2013; Borgheti-Cardoso et al. 2020). The key emphasis in nanomedicine science, putting this idea into practice, poses a significant challenge in the development of malaria drugs. The reason for this challenge is due to the parasite's intracellular and strewn location (Aditya et al. 2013).

Antimalarial drugs must overcome a variety of barriers, including host red cell membrane, the parasitephorous vacuolar membrane, and the parasite plasma membrane. Solutes and macromolecules move through these multiple membrane barriers on their way to the parasite. Therefore, it is necessary to understand how solutes pass from the intracellular parasite to the external solution without entering the erythrocyte cytosol. Solutes must first enter the erythrocyte via the red blood cell membrane before being picked up by parasites located intracellular. They will then enter the parasite either by endocytosis or by being transported across the parasitophorous vacuolar membrane and the parasite plasma membrane, in that order. However, the possibility of parallel routes for solutes to meet the parasite without going into the cytosol of the erythrocyte cannot be ruled out. Endocytosis does not occur in mature erythrocytes, and no other pathways for macromolecule uptake by erythrocytes are known (Haldar and Uyetake 1992; Pouvelle et al. 1994).

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But red blood cells infected with *plasmodium* species may endocytose. In mature red cells, a scaffold-like protein that lies underneath the membrane prevents endocytosis. Malaria parasites, on the other hand, rearrange the lipids in the membrane of red blood cells and proteins are intercalated through the red cell cytosol underneath the membrane and is capable of destroying spectrin, thus, mature RBCs may endocytose (Tokuyasu et al. 1979; Kilejian 1984; Burns and Pollack 1988).

Absorption of drugs requires effective transport through membrane barriers. Adsorption of nanoparticles on tissue and cells is easy. Due to their ultra-small size, they have large surface area; as a result, nanoparticles have high concentration and extended nanoparticles residence and payload at the site (Liu et al. 2013).

Transcellular pathways are currently thought to be one of the most important for nanoparticles absorption pathways. Endocytosis is one of the most popular methods for transporting nanoparticles through cell membranes. After opsonin, the cells first

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accept nanoparticles through a set of cell-surface receptors. The plasma membrane is then stimulated to generate tiny vesicles, and the invaginated small vesicles are then isolated from the plasma membrane and divided into cells; fused together with the lysosome, drugs are released after being hydrolyzed by enzymes. This endocytosis is further classified into two distinct forms, i.e. phagocytosis and pinocytosis, which are primarily determined by nanoparticle properties and target cells. The majority of nanocarriers are liquid dispersions that can pass through biological membrane barriers, primarily through pinocytosis.

Pinocytosis is classified as caveolae-mediated endocytosis, clathrin-mediated endocytosis clathrin- and caveolae-independent endocytosis, and micropinocytosis (Sun et al. 2019) (Table 18.2). Caveolar-mediated endocytosis is a clathrin-independent endocytotic mechanism involving bulb-shaped caveolae. Caveolae are 50-60 nm plasma membrane invaginations. Caveolae are formed by caveolins, which are integral membrane proteins, and cavins are peripheral membrane proteins. Clathrin-mediated endocytosis possesses complex protein machinery that transiently assembles on the plasma membrane and creates clathrin-coated endocytic vesicles. This machinery selects and concentrates cargo molecules and shapes the membrane into a vesicle.

Macropinocytosis is a mechanism in which a significant proportion of the fluid phase is absorbed in comparison to the cell volume. Most nanoparticles enter red blood cells through clathrin-mediated endocytosis, which is one of the most important pathways (Conner and Schmid 2003).

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18.5 THERAPEUTIC APPROACH FOR MALARIA TREATMENT

Recent viral outbreaks in the world, such as Coronavirus, Ebola, influenza, and dengue, have highlighted the urgent need for new antiviral therapeutics to save public health. One such epidemic is malaria, which exists from the past; its complete cure still needs attention. Considerable efforts have focused on developing antiviral nanoparticles for the treatment of this pathogenic disease. Some of these nanoparticles have been summarized, as follows:

1. Phyto-synthesized silver-NPs of a*rtemisia nilagirica* aqueous leaf filtrate would be promising antiviral therapeutics for malaria control. These NPs exhibit strong larvicidal and pupicidal action against developmental stages of

TABLE 18.2
Types of Cellular Uptake Mechanism

Endocytotic Pathway	Cellular Uptake Mechanism	Engulf Particles
Non receptor-mediated endocytosis	Phagocytosis	0.5–10 μm
	Macropinocytosis	100–5000 nm
Receptor-mediated endocytosis	Clathrin-mediated endocytosis	approx. 120 nm
	Caveolae-mediated endocytosis	approx. 80 nm

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An. stephensi and *Ae. aegypti*. Using these cost-effective and biodegradable natural resources techniques is an affordable method for prevention of not only malaria, but also dengue, chikungunya, and filariasis. Moreover, it is also a rapidly synthesised, viable, recyclable, nontoxic, and stable approach for treating this disease (Nalini et al. 2017).

2. Green-synthesized silver nanoparticles of *annona muricata* plant leaf extract is a powerful larvicidal as compared to other plant parts. It is active against third instar larvae of three medically important mosquitoes, i.e. *Aedes aegypti*, *Anopheles stephensi*, and *Culex quinquefasciatus*. Prepared NPs were tested with its different concentration and compared with aqueous crude leaf extract for larvicidal action. Significant larval mortality with lowest LC50 and LC90 values was observed after the treatment with NPs for 24 hours. Comparatively better larvicidal efficacy was shown by green-synthesized AgNPs rather than other plant parts, and as it is more toxic than aqueous crude extract. Silver NPs so prepared were also heat stable from 20 to 70°C and nontoxic. Thus, it can be a suitable and effective approach to control malaria in any aquatic system (Santhosh et al. 2015).
3. Synthetic molecules are one such approach for new directions in drug discovery. Bioactive hybrid molecules may be the improved version of their parent compounds. Designing and de novo synthesis of a series of betulinic acid/betulin based dimer and hybrid compounds carrying ferrocene and/or artesunic acid moieties opens new hope of its treatment. These newer synthesised molecules have been tested in vitro and show the increased cytotoxic properties against malaria parasites (growth inhibition of 3D7-strain *P. falciparum*-infected erythrocytes). The betulinic acid/betulin and artesunic acid hybrids 11 and 12 (in nanomolar and micromolar concentration) have found more potent and effective against *P. falciparum* among the series of hybrids/dimmers. Moreover, these molecules showed activity against human cytomegalovirus (HCMV) also. These activities were compared to the reference drug ganciclovir, where lowest EC50 values are noted in the range of 0.24–0.88 μM against HCMV. Significant potency has been showed by hybridization of betulin/betulinic acid and artesunic and thus can be suggested for new directions in drug discovery (Karagoz et al. 2018).
4. Artesunate is one of the well-known antimalarial drugs, but its efficacy and potency can be increased by formulating it as iron oxide-fortified artesunate nanoparticles. These nanoparticles are more selective and provide iron-radical-mediated irreversible damage of parasite biomolecules. The nanoparticle so designed and synthesized that it releases Fe^{2+} in pH-dependent sustained release manner in food vacuole of parasites. This will increase reactive oxygen species (ROS) attack and result in enhanced toxicity to *P. falciparum*. An experimental model has been designed in *Plasmodium berghei* ANKA-infected swiss albino mice and wild type and artemisinin-resistant *Plasmodium falciparum* (R539T) grown in O^{+ve} human blood. Whereas, the ring-survival assay method was performed for evaluating the efficacy of nanoparticles against resistant parasite. Various physiochemical and biochemical parameters were also employed to determine the NPs

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internalization, Fe^{2+} release, ROS generation, and attack of parasitic biomolecules. Results showed the significant growth retardation and damage to *P. falciparum* at very low concentration of NPs i.e. $1/8^{th}$ concentration of artesunate IC_{50}. All these clinical assessments proved that these NPs would be a promising and potent therapeutic agent in future toward multidrug-resistant and artemisinin-resistant malaria in humans (Kannan et al. 2019).

5. Cyclodextrines (CD) containing nanoparticles demonstrated good prospective as nanocarriers for drug delivery. These CD complexes are highly biocompatible and can interact with a wide range of molecules for easy functionalization to tune specific interactions. It increases solubility and oral bioavailability of low water-soluble molecules and thus would be a novel treatment option for already known lipophilic antimalarial drugs (Santos-Magalhães and Mosqueira 2010). Sulfated form of cyclodextrins showed significant action against *Plasmodium falciparum* in mM range. 7–17 sulphates containing compounds interact with anion transport protein, AE1, and arrest the growth of parasite. In the mouse model, it also inhibits the entry of *P. berghei* merozoite and thus reduces parasitemia infection caused by *P. berghei*. The result suggests that two plasmodium species are affected by these compounds by arresting the invasion pathway of merozoites. However, future study and development is still required to confirm, target, and understand the merozoite invasion process, which can lead to formulate better antimalarial therapeutics (Crandall et al. 2007).
6. Nanoparticles containing mesoporous silica has proved to be a potential nanocarrier system for variety of drug delivery with its high intracellular uptake ability. It has high loading capacity along with adjustable pore size and volume (Mehmood et al. 2017). Mesoporous MCM-41 is modified form of these nanoparticles for increased carrier ability of antimalarial drugs (Amolegbe et al. 2018). Beck et al. (1992) synthesised MCM-41 as silicate/aluminosilicate mesoporous nanoparticles, which is sieved molecularly and has higher bioavailability. This is useful for encapsulating the drug, which has short half-life in blood such as artesunate (Figure 18.2).

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In last decades, nanoparticulate formulation and treatment of malaria has received increased attention. Moreover, it provides promising pre-clinical results also, but to understand the nature and mechanism of nanoparticles this area still needs research of interest. It will not only overcome one another's limitation but also leads to development of better therapeutics to target different stages of infection and cure malaria.

18.6 CONCLUSION AND FUTURE PROSPECTS

After the application of chloroquine and hydroxychloroquine for the management of COVID-19, the repurposing of drugs is now emerging and pre-established drugs are been investigated for their other pharmacological utility. Compared to other infections, malaria is the most suffering cause of death in a large amount of populace. Around 228 million people on the globe suffer from malaria. It is the

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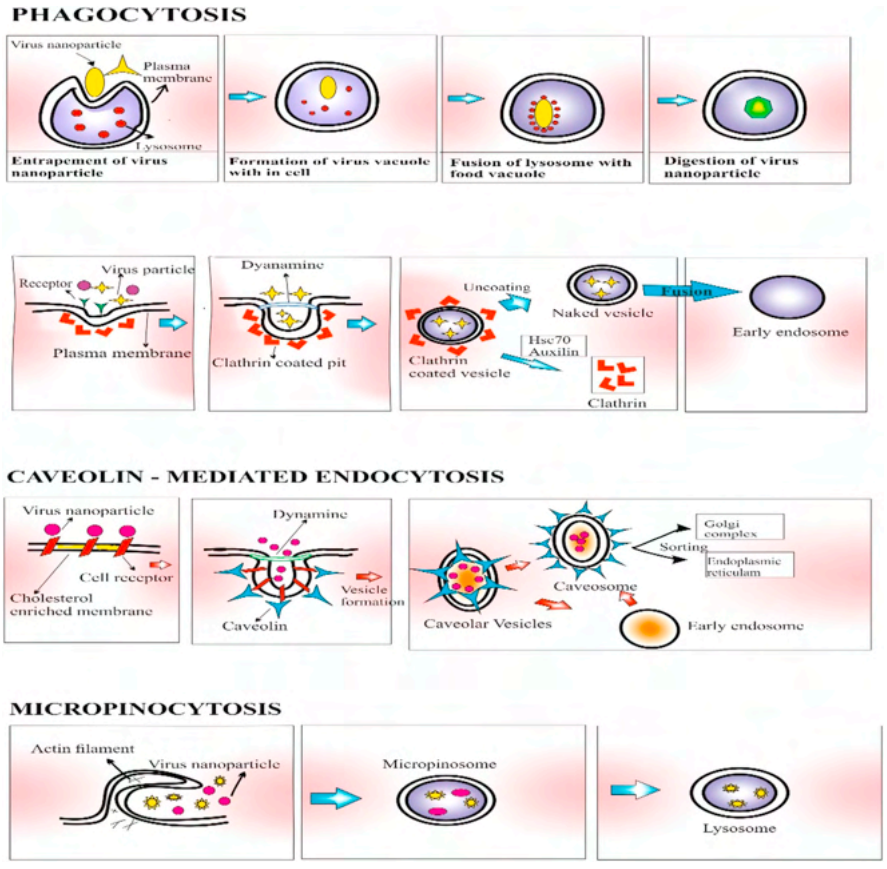


FIGURE 18.2 Cellular uptake mechanism of nanoparticles.

deadliest of viruses and uses human-cellular machinery for its growth, leaving an unhealthy human body behind. Numerous drugs have been used in the management of malaria, including chloroquine, hydroxychloroquine, doxycycline, quinine, atovaquone, and so forth. The inefficacy of vaccines and the limited option of therapeutics for the anticipation and management of malaria has forced the researchers to focus on other alternatives. Among existing classes of therapeutics, antiretroviral has proven to be a significant and potential candidate for their repurposing as an antimalarial. Despite the effectiveness of these drugs, limited drug choice, unpredictable and undesired side effects, and unconventional physico-chemical attributes limit their use, which could be compensated by the application of nanomaterial. The investigations included in this chapter have indicated the potential of antiviral drugs as antimalarial and their various aspects nanomaterials.

Drug repurposing is an undeniably well-known methodology in the development of therapeutics devices to battle illnesses or disorders for which novel therapeutic agents are needed. This repurposing is especially alluring when

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managing malaria and other disregarded illnesses that apply their financial burden in the absolute poorest regions of various countries. It has been contended that one of the critical boundaries to malaria therapy and chemoprevention lies in the hesitance of the pharmaceutical industry to put resources into the development of medications that would not merely restrict marketing possibilities. The expense decreases related to repurposing existing therapeutics, rather than creating drugs again, may in this manner help overcome a portion of the conservative obstacles in the method of the development of the existing antagonist of plasmodial pharmacological resources where the nanomaterials add on the novelty to effectively treat such condition. Notwithstanding ongoing advancement in the quest for a compelling immunization against malaria, with specific accentuation on antibody applicants that focus on the different phases of the *Plasmodium* life cycle, such an immunization stays elusive. In that capacity, the requirement for different procedures to forestall and treat malaria stays as squeezing as could be expected. In this specific circumstance, novel drugs that manage the cost of the effective chemoprophylaxis, treatment, and revolutionary therapeutics of *Plasmodium* disease keep on being earnestly required. While this may involve the improvement of novel chemotypes for antiviral-antimalarial intrusion, nanomaterial offers a promising option in contrast to conventional medication-advancement pipelines and can assist quick advance resolution with adequately combatting this distressing infection.

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Chapter 6 - Zinc and zinc oxide nanoparticles for theranostic applications

Laxmikant Gautam [1], Monica Kaurav [2], Pradeep Singh Thakur [3 4], Muniappan Sankar [3 4], Suresh P. Vyas [1]

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Abstract

Metal and metal oxide–based nanotechnology has seen huge progression over the last two decades. In this section, zinc (Zn) and zinc oxide (ZnO)-based nanoparticles (NPs) possess versatile unique low cost, low toxicity, semiconductivity, biocompatibility, biodegradability, piezoelectric and optical properties together provide a massive improvement in the field of biomedical applications and theragnostic interventions. ZnO-NPs are used in the field of anticancer and antimicrobial theranostics due to Zn^{2+} ion release, cell membrane disruption activity, as well as induction of excess reactive oxygen species which cause cell apoptosis. In the field of antidiabetics, ZnO-NPs increase insulin sensitivity and maintain its structural integrity along with a reduction in oxidative stress and increase glucose tolerance in diabetes treatment. In the tretment of topical wound healing Zno-NPs are effective treatment because of its antibacterial activity also it can perforate the bacterial cell membrane, and to reduce penetration in the skin through keratinocytes migration and re-epithelization. Here, we recapitulate the application of Zn and ZnO-NPs in several biomedical fields to develop an advanced research progress platform for potential clinical translation and to evolve a new focused future prospective for ZnO-NPs.

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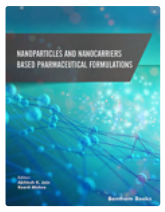
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Nanoparticles and Nanocarriers Based Pharmaceutical Formulations

Niosome: A Vesicular Drug Delivery Tool

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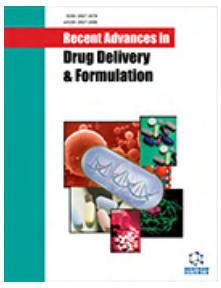
Abstract

Niosomes, which are well recognized for their non-ionic surfactant characteristics, are considered to be innovative drug delivery methods since they improve the solubility and stability of medicinal compounds when administered orally. It has been shown that niosome vesicles are closed bilayer structures that may exist in aqueous fluids and are produced by the self-assembly of different types of hydrated non-ionic surfactants and amphiphile monomers in aqueous media. Because the monomers maintain a wide range of kinetic activity inside the assembly, they are referred to as liquid crystal structures in terms of thermodynamics. It is just the total of different processes for the dispersion of monomers and solvents that results in the formation of the final systems. Niosomes are made up mostly of lipid molecules and nonionic surfactants, which are the two most important components in the process of making them. Nonetheless, as the name suggests, component surfactants play a key role in the creation of niosomes, owing to the fact that non-ionic surfactants were often employed to organize niosomes during their formation. They are especially well-suited for drug delivery because they have the ability to encapsulate medicines that are both lipophilic and hydrophilic in nature. These materials are appealing for a number of drug delivery goals, including drug targeting, controlled release, and permeability enhancement, because of their chemical stability, cheap production costs, and composed of biodegradable and non-immunogenic components. Niosomal vesicular carriers can also help to minimize problems such as physical and chemical instability. This book chapter contains a brief knowledge about structural components and integrity concerning the advanced method of noisome preparation. The characterization techniques essential for noisome have also been discussed in detail. The recent examples for different applications are also included for therapy /diagnostic purposes based on the route of administration and disease state.

Keywords: Anticancer, Drug delivery, Diagnostic, Drug targeting, Lipid nanocarriers, Niosome, Non-ionic surfactant, Transdermal delivery.

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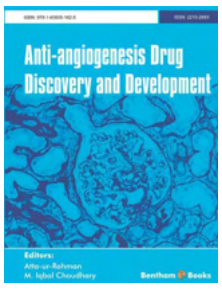
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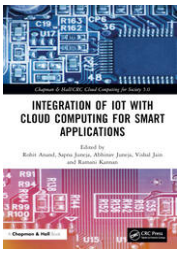
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Enabling Technologies for Effective Planning and Management in Sustainable Smart Cities pp 203–228

Blockchain-Powered Smart E-Healthcare System: Benefits, Use Cases, and Future Research Directions

Ayasha Malik, Bharat Bhushan, Veena Parihar, Lamia Karim & Korhan Cengiz

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Abstract

Blockchain technologies are deeply distributed and used in several dominions, including for E-healthcare. Internet of Things (IoT) strategies can arrange real-time sensual information from patients for their treatment. Composed information is aimed to combine for computation, dealing, and storing. Such centralism can be challenging, as it can be the only reason for lack of success, uncertainty, document management, interfering, and confidentiality elusion. Blockchain is able to resolve these kinds of consequent complications by giving distributed computation and proper storage for IoT data records. Consequently, the mixture of blockchain technologies in healthcare can convert into a realistic selection for the scheme of distributed Blockchain-powered smart E-healthcare systems. This paper discusses the background of blockchain technology with its features and categories. The paper explores the collaboration of blockchain with IoT for E-healthcare. Further, this paper highlights some popular consensus algorithms used in blockchain in the circumstance of E-health. Finally, this paper examines some use cases of E-healthcare that illustrate how key characteristics of the IoT and blockchain can be leveraged to maintain healthcare facilities and environments.

Keywords

Blockchain **E-healthcare** **Data management** **Internet of Things (IoT)** **Security** **Data analysis**

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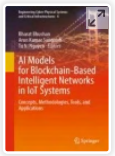
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AI Models for Blockchain-Based Intelligent Networks in IoT Systems pp 121–140

Empowering Artificial Intelligence of Things (AIoT) Toward Smart Healthcare Systems

Ayasha Malik, Veena Parihar, Bhawna, Bharat Bhushan & Lamia Karim

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Abstract

The internet's workings have undergone a transformation from an Internet of Computers (IoC) to an Internet of Things (IoT). Additionally, as a result of the integration of numerous aspects like infrastructure, embedded technology, smart objects, people, and physical environments, massively interconnected systems, often referred to as Cyber-Physical Systems (CPSs), are forming. The next smart revolution may be brought about by IoT and CPS combined with Data Science (DS). The challenge posed by the rapid expansion of data generation is how to effectively handle and process the large volumes of information, given the current limitations in computational capacity. An answer to this issue has shifted the focus of researchers over DS and Artificial Intelligence (AI). IoT with AI can therefore lead to a significant and advanced role in the development of the smart world. This is not just cost-effective, smart work, less human interaction, or following any smart activity for a better and developed world, it is more than that; it is enhancing human lives. But it has been seen that IoT is facing many issues, such as safety and ethical dilemmas. In the end, what matters is how the general public views IoT with AI—whether they see it as a benefit, a burden, or a threat.

Keywords

Artificial Intelligence **Healthcare** **Internet of Things**

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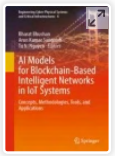
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AI Models for Blockchain-Based Intelligent Networks in IoT Systems pp 1–28

From Smart Devices to Smarter Systems: The Evolution of Artificial Intelligence of Things (AIoT) with Characteristics, Architecture, Use Cases and Challenges

Veena Parihar, Ayasha Malik, Bhawna, Bharat Bhushan & Rajasekhar Chaganti

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Abstract

An opportunity to continuously collect data about all aspects of a business's operations is provided by the Internet of Things (IoT). Companies globally are quickly leveraging IoT to create novel products and services that are creating new business opportunities and generating new revenue streams. This shift is ushering in a new era of how companies operate and interact with customers. There is a huge potential for businesses that are able to transform the raw IoT data into powerful market perceptions and efficient data analysis is the key to achieving this goal. Organizations must now delve deeper into their data to find innovative procedures to improve efficiency and competitiveness. With recent advancements in science and technology, particularly Artificial Intelligence (AI), organizations are adopting larger, more comprehensive analysis methods. To fully realize the benefits of IoT, companies must integrate it with the rapidly evolving AI technologies, enabling "smart machines" to mimic intelligent behavior and make well-informed decisions with minimal human intervention. This paper is an effort to examine the growth of IoT and explore how the best way to integrate with AI can benefit the business in the future. This paper also discusses the evolution, underlying architecture, applications, and challenges of implementing IoT with the integration of AI.

Keywords

IoT **AI** **Smart machines** **Data analysis** **AIoT** **Data science** **Integration** **Cyber-physical system**

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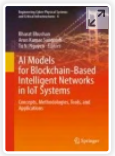
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AI Models for Blockchain-Based Intelligent Networks in IoT Systems pp 121–140

Empowering Artificial Intelligence of Things (AIoT) Toward Smart Healthcare Systems

Ayasha Malik, Veena Parihar, Bhawna, Bharat Bhushan & Lamia Karim

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Abstract

The internet's workings have undergone a transformation from an Internet of Computers (IoC) to an Internet of Things (IoT). Additionally, as a result of the integration of numerous aspects like infrastructure, embedded technology, smart objects, people, and physical environments, massively interconnected systems, often referred to as Cyber-Physical Systems (CPSs), are forming. The next smart revolution may be brought about by IoT and CPS combined with Data Science (DS). The challenge posed by the rapid expansion of data generation is how to effectively handle and process the large volumes of information, given the current limitations in computational capacity. An answer to this issue has shifted the focus of researchers over DS and Artificial Intelligence (AI). IoT with AI can therefore lead to a significant and advanced role in the development of the smart world. This is not just cost-effective, smart work, less human interaction, or following any smart activity for a better and developed world, it is more than that; it is enhancing human lives. But it has been seen that IoT is facing many issues, such as safety and ethical dilemmas. In the end, what matters is how the general public views IoT with AI—whether they see it as a benefit, a burden, or a threat.

Keywords

Artificial Intelligence **Healthcare** **Internet of Things**

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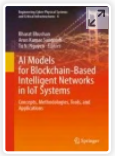
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AI Models for Blockchain-Based Intelligent Networks in IoT Systems pp 1–28

From Smart Devices to Smarter Systems: The Evolution of Artificial Intelligence of Things (AIoT) with Characteristics, Architecture, Use Cases and Challenges

Veena Parihar, Ayasha Malik, Bhawna, Bharat Bhushan & Rajasekhar Chaganti

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Abstract

An opportunity to continuously collect data about all aspects of a business's operations is provided by the Internet of Things (IoT). Companies globally are quickly leveraging IoT to create novel products and services that are creating new business opportunities and generating new revenue streams. This shift is ushering in a new era of how companies operate and interact with customers. There is a huge potential for businesses that are able to transform the raw IoT data into powerful market perceptions and efficient data analysis is the key to achieving this goal. Organizations must now delve deeper into their data to find innovative procedures to improve efficiency and competitiveness. With recent advancements in science and technology, particularly Artificial Intelligence (AI), organizations are adopting larger, more comprehensive analysis methods. To fully realize the benefits of IoT, companies must integrate it with the rapidly evolving AI technologies, enabling "smart machines" to mimic intelligent behavior and make well-informed decisions with minimal human intervention. This paper is an effort to examine the growth of IoT and explore how the best way to integrate with AI can benefit the business in the future. This paper also discusses the evolution, underlying architecture, applications, and challenges of implementing IoT with the integration of AI.

Keywords

IoT **AI** **Smart machines** **Data analysis** **AIoT** **Data science** **Integration** **Cyber-physical system**

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