HEI Response to DVV Findings

Criteria Number: 3 **Criteria Name:** Research, Innovation and Extension

Sub criteria Number: 3.3.1 **Sub-criteria Name:** Research Publication and Awards

3.3.1 Number of research papers in the Journals notified on UGC CARE list year wise during the last five years

This document contains the supporting documents for DVV clarification.

Summary

Year	Number of research papers published
2022-23	06
2021-22	16
2020-21	09
2019-20	03
2018-19	20
Total	**54**

Dr. Harish Vankudre
Principal

Supporting Documents

Sr. No.	Title of the paper	Name of author/s	Department of the Author	Name of Journal	Year of Publication	ISSN No	Link to article/ paper/ abstract of the article on institutional website	Is it listed in UGC Care list/Scopus/Web of Science/other, mention	Page Number of the paper
1	Effect of molybdenum desulfide and Bronze on Tribological Behaviours of Polytetrafluoroethylene Composites	Dr.Uday Aswalekar	Mechanical Engineering	Materials Today:Proceeding	2023	2214-7853	https://www.sciencedirect.com/science/article/abs/pii/S2214785323050265	**YES**	**10-12**
2	Breast Cancer Detection Using ML	Dr. Swapna Borde	Computer Engineering	International Journal of Advance Research and Innovative Ideas in Education	2023	ISSN: 2395-4396	https://ijariie.com/AdminUploadPdf/Breast_Cancer_Detection_Using_ML_ijariie19871.pdf	**NO**	**13-14**
3	WhatsApp Chat Analyzer Using Artificial Intelligence	Dr. Thaksen Parvat	Information Technology	IJIRSET	2023	e-ISSN: 2319-8753, p-ISSN: 2347-6710	http://www.ijirset.com/upload/2023/april/261_WhatsApp_NC.pdf	**NO**	**15-16**
4	Insights on coding gain and its properties for principal component filter banks	Dr. Ashish Vanmali	Information Technology	Sadhana- Indian Academy of Sciences	2023	0973-7677	https://www.ias.ac.in/article/fulltext/sadh/048/0076	**YES**	**17-19**
5	Scene Recognition Using Deep Learning	Dr. Archana Ekbote	Information Technology	International Journal of Research Publication and Reviews	2023	2582-7421	https://ijrpr.com/uploads/V4ISSUE4/IJRPR12241.pdf	**NO**	**20-21**
6	Attack Detection and Prediction Using Machine Learning	Mrs. Vaishali Shirsath	Information Technology	Indian Journal of Computer Science	2023	2456-4133	https://www.samvad.sibmpune.edu.in/index.php/tcsj/article/view/172775	**NO**	**22-23**

7	CFD analysis of absorber tube using phase change materials	Dr. Uday Aswalekar, Mr. Ganesh Wahile	Mechanical Engineering	Materials Today:Proceeding	2022	2214-7853	https://www.sciencedirect.com/science/article/abs/pii/S2214785322074831	**YES**	**24-26**
8	An Enhanced Spatial Correlation Framework for Heterogenous Wireless Sensor Networks	Dr. Sunayana Jadhav	Electronics and Telecommunication Engineering	International Journal of Sensors, Wireless Communications and Control	2022	2210-3279	https://doi.org/10.2174/2210327913666221213092904	**YES**	**27-29**
9	A Chat- Bot as a First Responder for Panic Attak	Ms. Trupti Shah	Electronics and Telecommunication Engineering	Gradiva Review Journal	2022	0363-8057	https://gradivareview.com/VOLUME-8-ISSUE-11-2022/	**YES**	**30-33**
10	Light weight cryptography for security in IoT devices	Ms. Shraddha Gosawi	Electronics and Telecommunication Engineering	Solovyov studies ISPU	2022	2076-9210	DOI:10.37896/ispu70.3/004	**YES**	**34-36**
11	Comparative Analysis of Naïve Bayes, Decision Tree, and XG-Boost for Crop Recommendation System	Mr. Anil Hingmire	Computer Engineering	Gradiva Review Journal	2022	ISSN: 0363-8057	Gradiva_AH	**YES**	**37-38**
12	Heatmap Analysis of Webpages	Mrs. Anagha Patil	Information Technology	Indian Journal of Computer Science	2022	2456-4133	https://www.indianjournalofcomputerscience.com/index.php/tcsj/article/view/172375	**NO**	**39-40**
13	Knowledge-Based Engineering Approach to Select Standard Parts and Design Automation for Flange Coupling	Dr. Umesh Mane	Mechanical Engineering	Springer Proceeding (Springer Proceeding(Recent Advances in Materials and Modern manufacturing)	2022	978-981-19-0243-7	https://doi.org/10.1007/978-981-19-0244-4_65	**YES**	**41-43**

14	Design & Analysis of independent suspension system of FSAE Vehicle	Mr. Sanjay Lohar	Mechanical Engineering	Lecture Notes in Mechnanical Engineering	2022	978-981-16-9951-1	https://doi.org/10.1007/978-981-16-9952-8_38	**YES**	**44-47**
15	Improved Generalized Regression Neural Network for Target Localization in Wireless Personal Communications	Dr. Sagar Tambe	Computer Engineering	Wireless Personal Communications	2022	0929-6212	https://dl.acm.org/doi/10.1007/s11277-022-09627-9	**YES**	**48-50**
16	Crop Disease Prediction using Deep Learning	Mr. Anil Hingmire	Computer Engineering	Gradiva Review Journal	2022	0363-8057	https://drive.google.com/file/d/1sU_zREsK_lFILQOrgucPV8iwssZdwhWv/view	**YES**	**51-53**
17	Breast Cancer Classification using Deep Learning	Mrs. Smita Jawale	Computer Engineering	Gradiva Review Journal	2022	0363-8057	https://drive.google.com/file/d/1ARHoZ2ADOT8lC3VKs4sTFTTDRVU8QTTi/view?pli=1	**YES**	**54-55**
18	Deep Video Surveillance-Anomaly Event Detection	Mrs. Smita Jawale	Computer Engineering	Gradiva Review Journal	2022	0363-8057	https://drive.google.com/file/d/1P6mBhmz4r9w9bj3IoJmMd9sicaW5kssO/view	**YES**	**56-57**
19	IPL Prediction Using Machine Learning	Dr. Archana Ekbote	Information Technology	Indian Journal of Computer Science	2022	2456-4133	https://www.indianjournalofcomputerscience.com/index.php/tcsj/article/view/171267/0	**NO**	**58-60**
20	EavesDrop	Mr. Sainath Patil	Information Technology	Indian Journal of Computer Science	2022	2456-4133	https://www.indianjournalofcomputerscience.com/index.php/tcsj/article/view/171268	**NO**	**61-62**
21	Language Interpreter and Speaker	Mr. Sainath Patil	Information Technology	Indian Journal of Computer Science	2022	2456-4133	https://www.indianjournalofcomputerscience.com/index.	**NO**	**63-64**

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22	IoT-based Smart Water Musical Fountain	Mr. Yogesh Pingle	Information Technology	Zeichen Journal	2022	0932-4747	https://drive.google.com/file/d/1Wf2zQyuttqdrVBvadVnLJl-lcSCg2Yqp/view?pli=1	**YES**	**65-66**
23	Modelling of Material Removal Rate in Micro-EDM of Inconel 600 Using Dimensional Analysis	Dr. Umesh Mane	Mechanical Engineering	Springer Proceeding (Recent Advances in Materials and Modern manufacturing)	2021	2195-4356	https://doi.org/10.1007/978-981-19-0244-4_36	**YES**	**67-69**
24	Artificial Intelligence for Prediction of Performance and Emission Parameters of CI Engine Using Bio-Fuel	Mr. Ganesh Wahile	Mechanical Engineering	AIP Conference Proceeding	2021	1551-7616	https://doi.org/10.1063/5.0060862	**YES**	**71-73**
25	Latent Heat Storage System by Using Phase Change Materials and Their Applications	Mr. Ganesh Wahile, Dr. Uday Aswalekar	Mechanical Engineering	Materials Today Proceeding	2021	2214-7853	https://doi.org/10.1016/j.matpr.2021.09.268	**YES**	**74-76**
26	An Integrative Approach for Analysis of Nonlinear Electrical Circuits Using-Polynomial B-Spline Expansion and B-Spline Krawczyk Operator	Dr. Deepak Gawali	Instrumentation Engineering	International Journal of Applied and Computational Mathematics, Springer	2021	EISSN2199-5796 Print ISSN2349-5103	https://link.springer.com/article/10.1007/s40819-021-01198-w	**YES**	**77-78**
27	Constrained global optimization of multivariate polynomials using polynomial B-spline form and B-spline consistency prune approach	Dr. Deepak Gawali	Instrumentation Engineering	RAIRO - Operations Research, EDP Sciences	2021	ISSN: 03990559, 12903868	https://doi.org/10.1051/ro/2021179	**YES**	**79-81**
28	Prediction of Building Construction cost using variable selection	Mr. Viren Chandanshive	Civil Engineering	NICMAR Journal of Construction Management	2021	0970-3675	https://publications.nicmar.ac.in/user/	**YES**	**82-95**

							publication/viewissues/2		
29	Experimental Performance of Glass based Synthetic Dye Sensitized Solar Cell	Mr. Ashish Chaudhari, Mr. Vinay Patel	Mechanical Engineering	Materials Today Proceeding	2021	2214-7853	https://doi.org/10.1016/j.matpr.2020.12.019	**YES**	**96-97**
30	Investigation of Performance Parameters Affecting the Efficiency of Solar Water Heater: A Review	Mr. Swapnil Mane	Mechanical Engineering	IOP Conference Series Materials Science and Engineering	2021	1757-8981	https://doi.org/10.1088/1757-899X/1091/1/012021	**YES**	**98-100**
31	Optimization of power and torque with lower exhaust noise for FSAE Vehicle	Mr. Sanjay Lohar	Mechanical Engineering	Journal of Physics:Conference Series	2021	1742-6588	DOI 10.1088/1742-6596/1969/1/012020	**YES**	**101-103**
32	Waste heat recovery from exhaust gas of an engine by using a phase change material	Mr. Ganesh Wahile	Mechanical Engineering	Materials Today Proceeding	2020	ISSN: 2214-7853	https://doi.org/10.1016/j.matpr.2020.03.247	**YES**	**104-106**
33	Enhancing Uplink/Downlink Performance of Massive MIMO System Using Time-Shifted Pilot signal Transmission with Pilot Hopping (TSPTPH)	Mrs. Amrita Ruperee	Electronics and Telecommunication Engineering	International Journal of wireless and mobile computing	2020	ISSN 1741-1084	https://doi.org/10.1504/IJWMC.2020.110193	**YES**	**107-108**
34	Prediction of Coronavirus Covid 19 cases using Linear Regression and Support Vector Machine	Mr. Yogesh Pingle, Mrs. Puja Kadam	Information Technology	International Journal of Advanced Science and Technology	2020	ISSN: 2005-4238	http://sersc.org/journals/index.php/IJAST/article/view/17901	**YES**	**109-110**
35	Resolving the Interference in 5G Millimeter WaveThrough Scheduling Technique In Estimated Channel	Dr. Vikas Gupta	Electronics and Telecommunication Engineering	Asian Journal Of Convergence In Technology	2019	2350-1146	https://asianssr.org/index.php/ajct/article/view/907	**YES**	**111-113**
36	Ringing artifacts inwavelet basedimage fusion: Analysis, measurementand remedies	Mr. Ashish Vanmali	Information Technology	Information Fusion	2019	ISSN 1566-2535	https://doi.org/10.1016/j.inffus.2019.10.003	**YES**	**114-116**
37	Effect of vertical location of the spark plug on the	Mr. Ashish Chaudhari	Mechanical Engineering	Energy and Environment	2019	2048-4070	https://www.jstor.org/stable/26783950	**YES**	**117-119**

	performance of a raw biogas fueled variable compression ratio spark ignition engine.								
38	Combined Impact of Compression Ratio and Re-circulated Exhaust Gas on the Performance of a Biogas Fueled Spark Ignition Engine.	Mr. Ashish Chaudhari	Mechanical Engineering	Journal of Renewable and Sustainable Energy	2019	ISSN· 1941-7012	https://doi.org/10.1063/1.5045742	**YES**	**120-122**
39	Design and development of automatic lubrication system for bearing and gearbox	Mr. Ashish Chaudhari	Mechanical Engineering	Journal of Emerging Technologies and Innovative Research	2019	ISSN-2349-5162	https://www.jetir.org/papers/JETIR1906E43.pdf	**NO**	**123-125**
40	Tri-variate copula modeling for spatially correlated observations in wireless sensor networks	Mrs. Sunayana Jadhav	Electronics and Telecommunication Engineering	Journal of communication	2019	ISSN: 1796-2021	https://www.jocm.us/index.php?m=content&c=index&a=show&catid=231&id=1443	**YES**	**126-127**
41	Time Shifted Pilot Signal Transmission With Pilot Hopping To Improve The Uplink Performance of Massive MIMO System for NGN	Mrs. Amrita Ruperee	Electronics and Telecommunication Engineering	KSII Transactions on Internet and Information Systems	2019	eISSN: 1976-7277	https://www.itiis.org/digital-library/manuscript/2481	**YES**	**128-128**
42	A B-spline Global Optimization Algorithm for Optimal Power Flow Problem.	Dr. Deepak Gawali	Instrumentation Engineering	WCGO 2019: Optimization of Complex Systems: Theory, Models, Algorithms and Application	2019	978-3-030-21802-7	https://link.springer.com/chapter/10.1007/978-3-030-21803-4_6	**YES**	**129-130**
43	Predictive Maintenance For Hydraulic System	Mr.Vishal Pande	Instrumentation Engineering	International Journal of Engineering Research and Applications	2019	2248-9622	https://www.ijera.com/papers/vol9no5/Series-1/H0905014446.pdf	**NO**	**131-131**

44	GSM andGPS Vehicle Antitheft Tracking System	Mr.Vishal Pande	Instrumentation Engineering	International Journal of Engineering Research and Applications	2019	2248-9622	https://www.ijera.com/papers/vol9no6/Series-2/D0906022224.pdf	**NO**	**132-132**
45	Automatic Controlling of Electronic Devices and Power Consumption Analysis using IoT	Mr. Vikrant Agaskar	Computer Engineering	International Journal of Emerging Technologies and Innovative Research (JETIR)	2019	ISSN-2349-5162	https://www.jetir.org/papers/JETIR1906F14.pdf	**NO**	**133-135**
46	Supply Bus Tracking Under Breakdown Condition	Mr. Anil Hingmire	Computer Engineering	International Journal of Emerging Technologies and Innovative Research (JETIR)	2019	ISSN-2349-5162	https://www.jetir.org/papers/JETIR1904C29.pdf	**NO**	**136-138**
47	Machine Learning in Video Surveillance for Fall Detection	Mrs. Sangita Chaudhari	Computer Engineering	International Journal of Emerging Technologies and Innovative Research (JETIR)	2019	ISSN-2349-5162	https://www.jetir.org/papers/JETIR1904D33.pdf	**NO**	**139-141**
48	Automated Data Entry using OCR	Mrs. Sangita Chaudhari	Computer Engineering	International Journal of Emerging Technologies and Innovative Research (JETIR)	2019	ISSN-2349-5162	https://www.jetir.org/papers/JETIR1904623.pdf	**NO**	**142-144**
49	Question Paper Generator	Mrs. Sangita Chaudhari	Computer Engineering	International Journal of Emerging Technologies and Innovative Research (JETIR)	2019	ISSN-2349-5162	https://www.jetir.org/papers/JETIR1904875.pdf	**NO**	**145-147**

50	IoT Based Retail Stock Management	Mr. Sunil Katkar	Computer Engineering	International Journal of Emerging Technologies and Innovative Research (JETIR)	2019	ISSN-2349-5162	https://www.jetir.org/papers/JETIR1904838.pdf	**NO**	**148-150**
51	Tweet Summarization: A new approach	Mr. Sunil Katkar	Computer Engineering	International Journal of Emerging Technologies and Innovative Research (JETIR)	2019	ISSN-2349-5162	https://www.jetir.org/papers/JETIR1904088.pdf	**NO**	**151-153**
52	Decentralized Crowd Funding Application using Blockchain	Mrs. Sweety Rupani	Computer Engineering	International Journal of Emerging Technologies and Innovative Research (JETIR)	2019	ISSN-2349-5162	https://www.jetir.org/papers/JETIR1903G08.pdf	**NO**	**154-156**
53	Genetic Syndrome Identification: An image Processing Approach	Mrs. Archana Ekbote	Information Technology	IETE Journal of Research	2019	Print ISSN: 0377-2063 Online ISSN: 0974-780X	https://doi.org/10.1080/03772063.2019.1619488	**YES**	**157-159**
54	Estimation of Building Construction Cost Using Artificial Neural Networks	Mr. Viren Chandanshive	Civil Engineering	Journal of Soft Computing in Civil Engineering	2019	2588-2872	https://doi.org/10.22115/SCCE.2019.173862.1098	**YES**	**160-160**

1_Effect of molybdenum desulfide and Bronze on Tribological Behaviours of Polytetrafluoroethylene Composites by Dr.Uday Aswalekar

ScienceDirect

Materials Today: Proceedings

Available online 31 October 2023

In Press, Corrected Proof What's this?

Effect of molybdenum disulfide and bronze on tribological behaviors of polytetrafluoroethylene composites

Prasad M. Patare [a], Shailesh Palekar [a], Uday Asolekar [b], Sandhya P. Patare [c], V. Suryawanshi [a]

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Abstract

The present paper explains study of the tribological behavior for composite materials having the filler combinations of Molybdenum Disulfide and Bronze with base material of Polytetrafluoroethylene. Polytetrafluoroethylene (PTFE) is polymer based compound also named as Teflon discovered by Roy J. Plunkett in the year 1938 with melting point of 327°C. It is a crystalline solid with good stability from –2700C to+2600C and is chemically inert to known reagents and solvents. The fillers used are 10% Molybdenum Disulfide and Bronze is varied in the proportions as 15%, 25% and 40%. The experimental testing is done using the ASTM G99 standards with three different sampling experiments. The experiments are analyzed using Taguchi and Grey Regression Analysis.

The experimental samples are tested using Energy Dispersive Spectroscopy and Scanning Electron microscopy. The results of the analysis of variance for this type of materials combinations shows the optimum level of parametric setting as A3B1C3D3 corresponding to factors conditions load (3Kg), sliding distance (2Km), velocity (3.29m/s) and material (PTFE+40%Bronze+10%MoS2). The maximum values of grey relational grades for the corresponding the factors are load (0.7610), sliding distance (0.6570), velocity (0.6688) and material (0.7176) from the ANOVA table for the experimental results. The rank order for the analysis are load>sliding distance>velocity>material. Also it can be noted that the load (50%), material (20%) have dominant effect on the coefficient of friction and wear. Among the interaction the effect of load-sliding distance (8%) is considerable one.

Introduction

As polytetrafluoroethylene (PTFE) is weaker in wear resistance, most of the authors have suggested to use different filler combination like Magnesium and glass fiber[4], SiC in metal matrix [5], bronze, carbon fiber [8], [16], molybdenum disulfide (MoS2) [9], [15], bronze and graphite [10] as filler materials. The results of these researchers have motivated us to develop new polymer composite materials having different filler combinations and to study their effect on the output parameters like wear and coefficient of friction (See Table 1.)

Further the results obtained by hybrid grey Taguchi method are processed for the optimization and simulation by using the artificial neural network. Zhang Z [7], Liujie Xu [11], Zhenyu Jiang [12], Gyurova Lada [13] have reported a scientific method named as artificial neural network for optimization. The ANN requires the training, testing, and validation0

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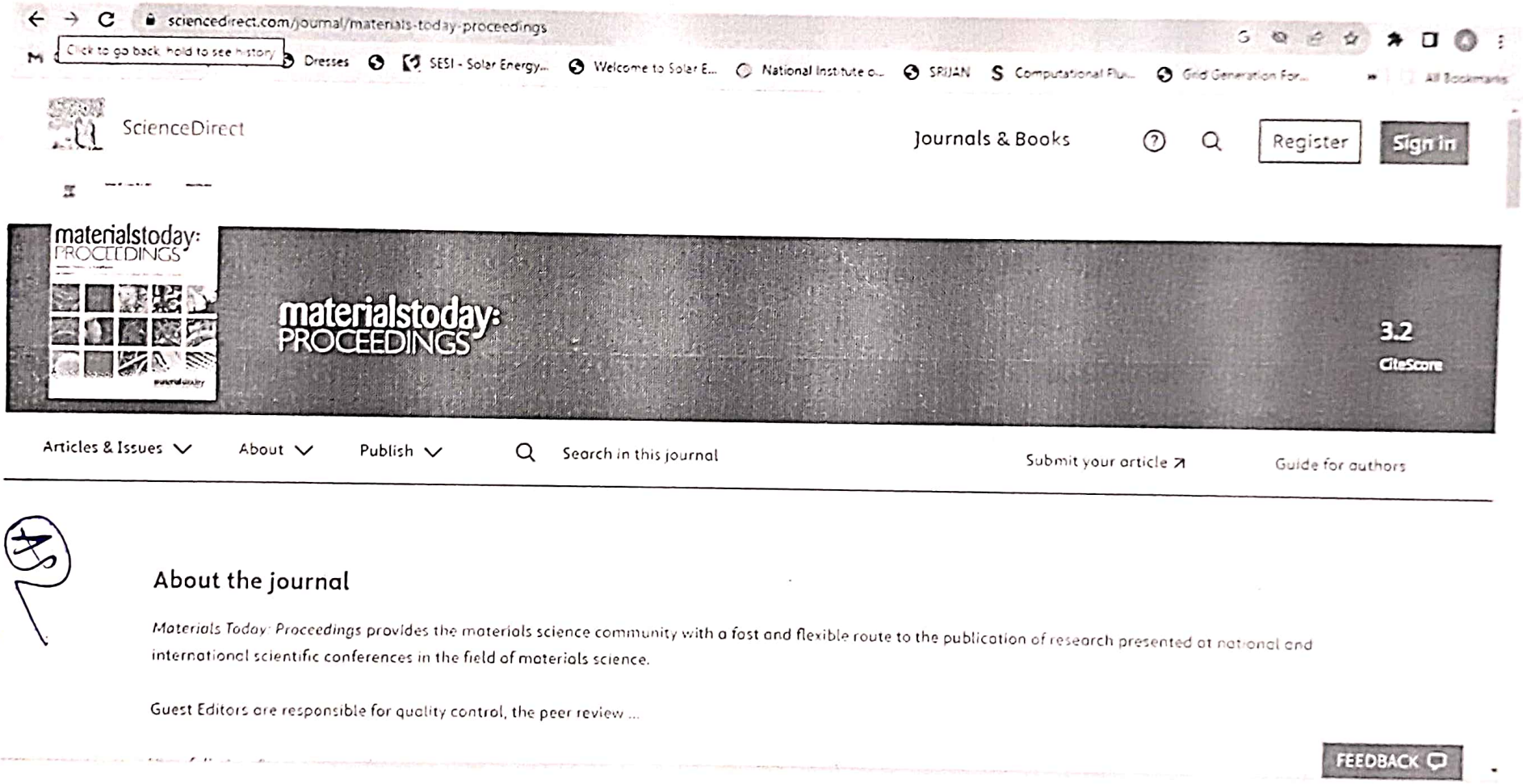

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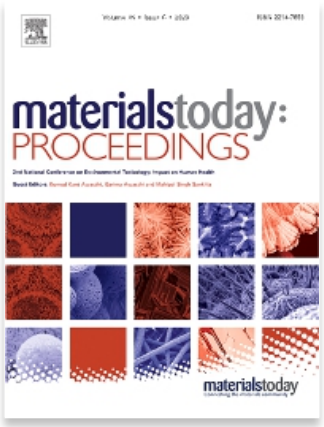

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2_Breast Cancer Detection Using ML by Dr. Swapna Borde

Vol-9 Issue-2 2023 IJARIIE-ISSN(O)-2395-4396

Breast Cancer Detection Using ML

Kritika Khandelwal Vidyavardhinis College of Engineering and Technology

Atul Mishra Vidyavardhinis College of Engineering and Technology

Shreyash Seth Vidyavardhinis College of Engineering and Technology

Dr. Swapna Borde Vidyavardhinis College of Engineering and Technology

Abstract

Breast cancer is the second most commonly diagnosed cancer among women globally, and early detection is crucial to improving survival rates. Machine learning (ML) and artificial intelligence (AI) techniques have shown promising results in detecting breast cancer in medical imaging data. In this study, we explore the application of ML and AI algorithms for breast cancer detection using mammogram images.

Breast cancer detection is a critical healthcare challenge worldwide, and Machine Learning (ML) and Artificial Intelligence (AI) are increasingly being used to aid in the detection process. ML algorithms can analyse vast amounts of data, identify patterns, and classify tumours with high accuracy.

The main idea here is to utilize all the open source datasets and breast cancer detection methodologies such as K-nearest neighbour, Convolutional Neural Network, Support Vector Machines, Generative Adversarial Networks to identify pros and cons of all the methodologies. The result of this would be to find the most efficient model to work in a particular scenario.

Moreover, machine learning algorithms can be trained to predict breast cancer risk and personalise screening recommendations for individual patients. As such, AI and ML have enormous potential in the fight against breast cancer, improving the diagnosis and treatment of the disease.
There are several machine learning algorithms available that are used in this system including KNN, SVM, CNN, GANS, Decision Tree, Random Forest, K-means.

Keywords—Decision Tree, Random Forest, Convolution Neural Networks, Support Vector Machine, K-Nearest Neighbour, Machine Learning, Breast Cancer Detection.

I INTRODUCTION

Breast cancer is one of the top causes of death among women. But, early detection of cancer helps in preventing it. If breast cancer is diagnosed early, the chances of survival are very good. Breast cancer is a disease that arises, but when a woman or man notices this symptom, it quickly progresses beyond its first stage. Breast cancer is a common and severe disease in women. Cancer is the development of aberrant cells that are genetically and altered. Different techniques are used to capture breast cancer such as Ultrasound Sonography, Computerised Thermography, Biopsy (Histological images). Machine Learning techniques and algorithms are a straightforward way to understand the data and predict it.

The radiologist examines and analyses himself, and then decides on the outcome after consulting with other professionals. This process takes time, and the results are dependent on the staff's knowledge and experience. Furthermore, experts are not available in every field around the world. Therefore, the research community proposed an automatic system called CAD (Computer-Aided Diagnosis) for better classification of tumours, which helps in accurate results and faster implementation without the need for radiologists or specialists.

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3_WhatsApp Chat Analyzer Using Artificial Intelligence by Dr. Thaksen Parvat

International Journal of Innovative Research in Science, Engineering and Technology (IJIRSET)

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|| Volume 12, Issue 4, April 2023 ||

| DOI:10.15680/IJIRSET.2023.1204261 |

WhatsApp Chat Analyzer Using Artificial Intelligence

Kushal Sankhe, Viditi Vartak, Sarvmbh Sawant, Thaksen Parvat

Department of Information Technology, Vidyavardhini's College of Engineering and Technology,

Vasai Road (W), India

ABSTRACT:The WhatsApp Chat Analyzer is a software tool designed to extract and analyze data from WhatsApp chats. The tool is capable of processing large volumes of chat content. The analysis can reveal patterns in the chat, such as the most frequently used words or topics discussed, the most active participants, and the time and date of messages. The analyzer can also detect sentiment and emotion in the messages, allowing users to understand the tone and context of the conversation. Overall, the WhatsApp Chat Analyzer provides a powerful way to gain insights into WhatsApp chats and understand the dynamics of group communication.

KEYWORDS:Text analytics, Natural Language Processing (NLP), Sentiment analysis, Rule Based Model; Word Cloud

I. INTRODUCTION

With over 2 billion active users globally, WhatsApp is one of the most widely used messaging services. The amount of conversation data collected by the app's users likewise grows as its usage continues to rise. Due to this, there is an increasing need for technologies that can extract information from WhatsApp discussions. An application created to address this need is the WhatsApp Chat Analyzer. With the help of the WhatsApp Chat Analyzer, you may analyse chat data in depth and learn more about the talks. Large amounts of chat data may be processed by the program, which can also extract pertinent data and produce visualisations that make it simple to comprehend conversation dynamics.

Users may comprehend the tone and context of the discussion by using the WhatsApp Chat Analyzer, which can also identify mood and emotion in the messages. Understanding the general tone of the discussion and seeing possible disagreements or trouble spots are two uses for this capability.

II. RELATED WORK

Previous research on WhatsApp chat analysis has been conducted in various domains, including customer service, social media monitoring, and marketing campaigns [1], [2], [3]. Researchers have explored different techniques for sentiment analysis, such as lexicon-based, machine learning, and hybrid approaches [1], [3], [4], [5].

To improve the quality of hotel services, Kim et al. (2020) studied WhatsApp client feedback using a lexicon-based technique to distinguish between positive and negative sentiment in customer feedback [4]. The findings of the sentiment analysis were connected with the customers' overall happiness with the hotel's services, the researchers discovered.

A hybrid methodology was utilised in different research by Alharbi et al. (2019) to examine tweets and WhatsApp messages pertaining to the Saudi Vision 2030 project [1]. The classification of sentiment into positive, negative, and neutral categories was done by the researchers using lexicon-based analysis and machine learning techniques. The study demonstrated that social media sentiment analysis may be a useful tool for tracking public opinion and shaping policy choices.

De et al. (2018) explored the use of WhatsApp for customer service in the hospitality industry and found that it was an effective and efficient way to communicate with customers [2]. The researchers used a mixed-method approach to analyse customer interactions and identified the most common issues faced by customers.

Jhanwar et al. (2020) studied the impact of WhatsApp marketing campaigns on consumer purchase intention using sentiment analysis [3]. The researchers used a machine learning approach to analyse sentiment and found that positive sentiment in WhatsApp messages had a significant impact on consumer purchase intention.

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4_Insights on coding gain and its properties for principal component filter banks by Dr. Ashish Vanmali

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Insights on coding gain and its properties for principal component filter banks

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Abstract. Principal Component Filter Bank (PCFB) is considered optimal in terms of coding gain for specific conditions. P P Vaidyanathan stated that coding gain does not necessarily always increase with the increase in the number of bands. However, very few attempts are made in the literature to go beyond the confines of work done by P P Vaidyanathan. We present the analytic proofs for the monotonicity of specific shapes of PSDs. This papers also derives properties of coding gain of PCFBs, which brings the new insights on the coding gain of Principal Component Filter Banks.

Keywords. Coding gain; principal component filter bank (PCFB); monotonicity.

1. Introduction

Filter banks are an integral part of signal processing techniques. Multi-rate filter banks are of special interest because of their ability to downsample the input signal into lower-rate components. These components are referred to as subbands. These subbands are further subjected to processing/analysis. A typical perfect reconstruction multi-rate filter bank is shown in figure 1(a). Here, input $x(n)$ is fed to the analysis bank, followed by downsampling by a factor of M. The filters $H_k(z)$ are called analysis filters. The subbands $w_k(n)$ are then processed by applying certain rules or criteria. These subbands are upsampled by M at the synthesis side, followed by filtering through synthesis filters $F_k(z)$ before recombination.

Implementing a basic filter bank, as shown in figure 1(a) is computationally inefficient. Instead, a polyphase representation, as shown in figure 1(b), is used in practical implementation. Here,

$$H_k(z) = \sum_{l=0}^{M-1} z^{l} H_{k,l}(z^M) \tag{1}$$

and,

$$F_k(z) = \sum_{l=0}^{M-1} z^{-l} F_{k,l}(z^M) \tag{2}$$

for $0 \le k \le L-1$ and L is the number of subbands ($L \le M$). We can also define the *analysis polyphase matrix* $\mathbf{H}(z)$ and the *synthesis polyphase matrix* $\mathbf{F}(z)$ as

$$[\mathbf{H}(z)]_{k,l} = H_{k,l}(z) \text{ and } [\mathbf{F}(z)]_{k,l} = F_{k,l}(z) \tag{3}$$

where, $0 \le k \le L-1$ and $0 \le l \le M-1$.

Coding gain is a standard measure of the filter bank's performance for the compression of a signal. A filter bank with a higher coding gain is more efficient at reducing the redundancies present in the signal across multiple subbands, consequently leading to a better compression performance.

A Principal Component Filter Bank (PCFB) was shown to be simultaneously optimal for several objectives [1–3]. PCFBs particularly enhance the performance of data compression. Vaidyanathan [4] has given the primary conditions required for a filter bank to be a PCFB and the procedure to derive the ideal frequency support of the filters of a PCFB. Unfortunately, these ideal filters have a brick-wall support and hence cannot be realized in practice (although close approximations can be made).

PCFB for 1D signals was studied by Tsatsanis and Giannakis [1]. Xuan and Bamberger [5] extended the concept to higher dimensions. The existence of PCFB was further studied by Akkarakaran and Vaidyanathan [3]. PCFBs are known to exist only for some special classes of

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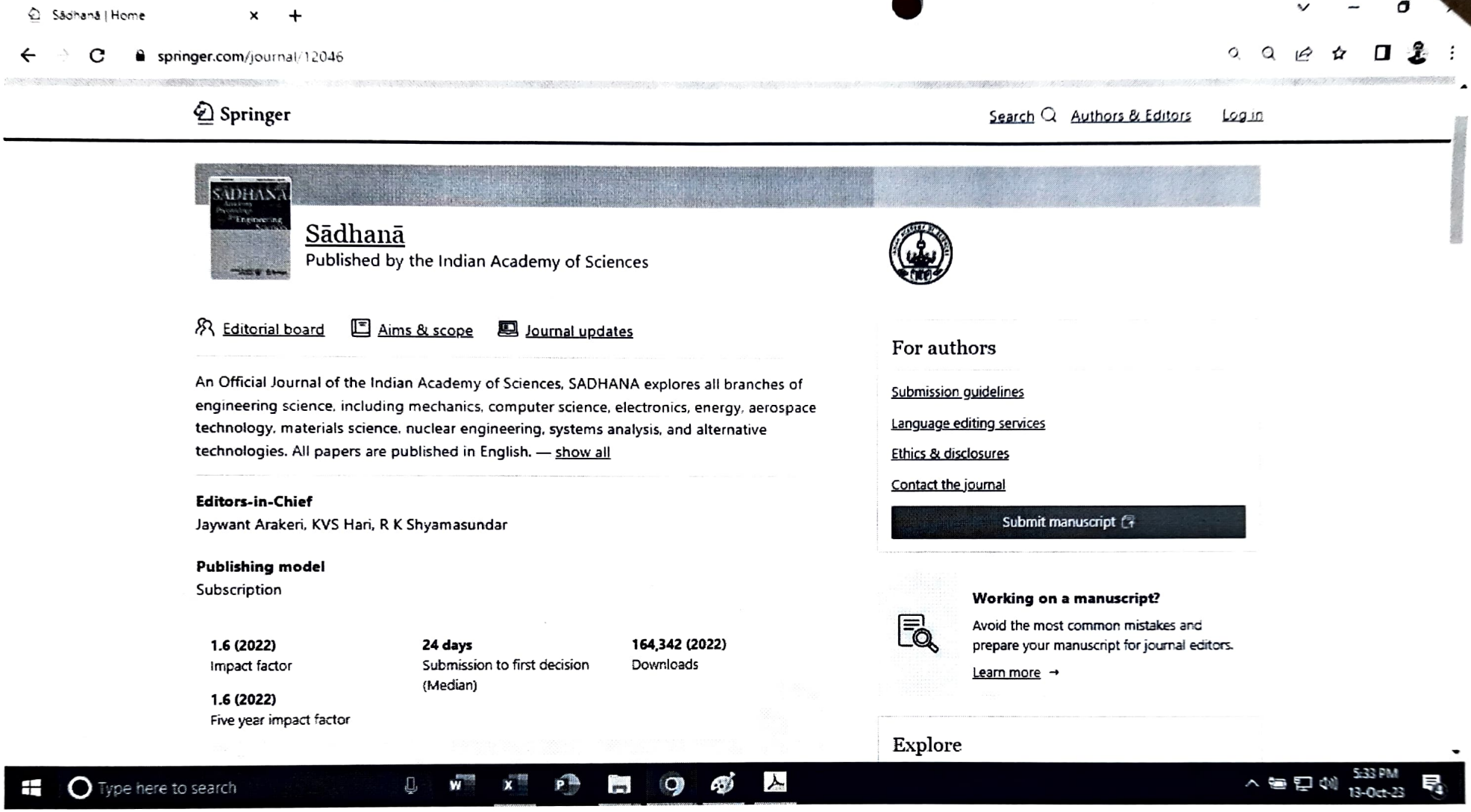

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Scene Recognition Using Deep Learning

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ABSTRACT—

Scene Recognition is becoming a important Ap- plication of deep learning, with undergoing several important evolution over the past years. Scene recognition is used in so many fields from automated cars to indoor localization this proves the importance of scene recognition and its growth in future. This project is an attempt to solve one of the most common and difficult problems of scene recognition. Scene Recognition is a application with a aim to classify a given scene image to a predefined category by analysing the whole image. The process of classifying scene images is very difficult because of similarity in attributes of various scenes. The goal of this project is to create a cnn (Convolution Neural Network) model which can accurately detect a scene with the help of extracting features from the image and analysing it. We have used a custom dataset of 10 different classes to predict the scene and the accuracy of the model is 75 percentage.We will use Flask Framework for frontend to show output in realtime.

***Index Terms*—Scene Recognition, Deep learning, Convolutional Neural Network, Flask.**

I. INTRODUCTION

A. Overview

A human being can easily classify a object or a thing by looking at it because of the brain . The brain can analyse the object at a glance. To differentiate between two different things will be very easy and take mere seconds .In human brain there is a neural network and these objects act as a input for this neural network . But can a computer do this impossible task as sufficiently as a human person. Yes ,with the help of Artificial Intelligence and Deep learning. Scene recognition is a growing in the field a Deep learning and ML and the requirement of scene recognition in the market is high .Scene recognition is a very challenging issue that requires a systematic approach to get the needed results. Scene recognition is used in various fields like map construction, robots, AI automated cars and if there is some errors in making it can cause some serious damage . In This project we are going to use ANN architecture which stores information like a human neural network which can help in recognizing and classify a image.The ANN architecture is CNN(Convolutional Neural Network) which has a layered architecture for feature extraction and classification.

B. Scene Recognition using Deep Learning

For the past few years Scene Recognition has become very important and challenging issue in IT industries. Scene Recognition is used in many fields like security, indoor localization, Robots, autopilot. A scene consists of various concepts , including scene attributes, background, objects. These characteristics are used to determine the image. To extract these characteristics and train the model for detection we have created a cnn model. CNN (Convolution Neural Network) is one of the most useful method to for image classification . CNN is a type of Artificial Neural Network which is very effective in areas like image classification and recognition. In this project we have created a cnn model from scratch to train the large dataset and later to detect the images with respect to their class. [5]. When we have to recognize a coloured image or scene or a video, the CNN(Convolutional Neural Network) is the best and most suitable option because of it's architecture. The CNN architecture has three layers for feature extraction and two layers for classification. The feature extraction consist of an Input layer then the Convolutional Layer after that the padding layer which is optional and then the Pooling layer.In Classification layer the output from the convolutional layer goes into fully connected layer and finally the output layer.

C. Motivation

Identifying or classifying a scene through out eyes are human vision is easy but through computer is very interesting thing to work on as we see different scenes on our day to day life.Classifying and recognizing a scene through a computer is itself a challenging task.CNN is the best technique to do this task with utmost accuracy. That's the motivation behind this project. Big Data companies is a big market for scene recognition for ads preferences basis of majority of scenes detected of a particular user.

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6_Attack Detection and Prediction Using Machine Learning by Mrs. Vaishali Shirsath

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Attack Detection and Prediction Using Machine Learning

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Abstract

Data plane and control plane are divided by Software Defined Networking (SDN). A centralized controller oversees and manages the entire network. With SDN, the network may be programmed and flow regulations can be created dynamically. Numerous benefits including adaptability, programmability, and centralized management are offered by this decoupling. However, SDN also creates new vulnerabilities as a result of desired data plane and control plane connectivity. Attacks on switch buffer overflows and control plane saturation are two examples of threats that exploit such flaws. The controller is vulnerable to Distributed Denial of Service (DDoS) attacks, which induce resource exhaustion and impair the controller's capacity to provide services. By flooding the control plane with TCP SYN packets from the data plane (i.e., switches), several attacks can be launched. SVM is the most popular and often used classifier, both for classification and regression, thanks to its high accuracy and low false positive rate. For DDoS detection, the SVM classifier is examined and contrasted with other classifiers. In order to identify anomalies, such as malicious traffic, and report them, Snort, an intrusion detection system, examines the traffic and packets. The entropy approach is used to assess the flow data's randomness. An IP address for the intended recipient and a few TCP flag attributes make up the entropy information. We implement it as an additional module in the Floodlight Controller and assess its viability and efficacy. We thoroughly evaluate how we have implemented things via Mininet, substantial emulation.

Keywords

Entropy Method, Distributed Denial of Services (DDoS), Machine Learning, Mininet, Software Defined Networks (SDN), Snort, Support Vector Machine (SVM)

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CFD analysis of absorber tube using phase change materials

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ABSTRACT

The solar energy is the largely feasible and promising source of alternative power of energy. India receives around 300 sunny days a year making solar energy an abundant and extremely lucrative energy source. Thus to cut energy costs in the medium to longer term solar energy can be harnessed. The added advantage of using solar energy is that equipment use are cheaper than other renewable energy sources. The process of latent heat storage using Phase change material (PCM) is effective method of storing heat energy, It has rich energy storage capability. The ultimate motive of this work is to maximize energy storing capacity of the absorber tube using PCM and thus promote extensive usage of solar energy especially for domestic heating purposes during times when solar energy is not available. The present research work has been concentrate to observe the possibility of solar energy storage using PCMs in the absorber tube and the same energy used to heat water for domestic purposes solar energy is not available. The purpose is to make hot water is available for the remainder of the time. The various criteria's are used for selection of PCM for different applications are discuss in the research. The PCM's used in the present work pentacosane and triacontane are use as PCM materials. The absorber tube consist of outer tube has a high transmission rate for heat radiation and inner copper tube is coated with a high absorptivity coating which increases the heat absorbing capacity. To developed geometry in ANSYS, finalization of meshing and boundary condition. The iterations were run for a transient based model in ANSYS FLUENT.
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1. Introduction

Increased global pressure have been the root cause for rise in fuel and energy prices. This has led to unprecedented inflation and uncertainty. The availability of crude, commodity and energy at exorbitant prices necessitates the use of unconventional energy resources. Solar energy is one of the most widely used, researched and comparatively more efficient technology. Solar water heater is best applications of solar energy. It has been observed that a broad applications used in buildings, factories and various other locations. These devices have seen a surge in usage. A basic solar water heater consists of an evacuated glass tube which contains an inner tube made up of copper which is epoxying black painted. Multiple rows of absorber tubes are placed parallely according to the capacity of the tank. Water is passed through this inner tube and gets heated due to the sun's radiation. Materials which absorb or release heat at transition phase to provide sufficient heating or cooling are known as phase change materials (PCM). Some PCM's are sublime Thermal energy storage systems. The phase change materials that is PCM's mainly categorized into three types as follow organic, inorganic and eutectic shown in Fig. 1. The organic phase change materials are categorized into two groups, paraffins and non-paraffins. Organic PCMs have a large fusion range. It has a lower latent heat value. Paraffins are the most widely used organic PCM. It is formed of straight chain *n*-alkanes. Some notable properties are as follows: cheap, stable, have large latent heat, are non-toxic, and chemically inert [1]. Inorganic PCM's classified into metallics and salt hydrates. The inorganic phase change materials have higher latent heat storage values, cheap and non-flammable. They are unstable and corrosive. It has unsteadiness because of decomposition in phase and not proper reverse solidification process [1]. Eutectic PCMs are materials which remain unaffected by cyclic cooling and heating. Eutectic PCM consist of a mixture of more than one phase change materials have lower melting points.

Fig. 1 shows the categorization of phase change materials as follow organic, inorganic and eutectic. Use of Phase Change Materials

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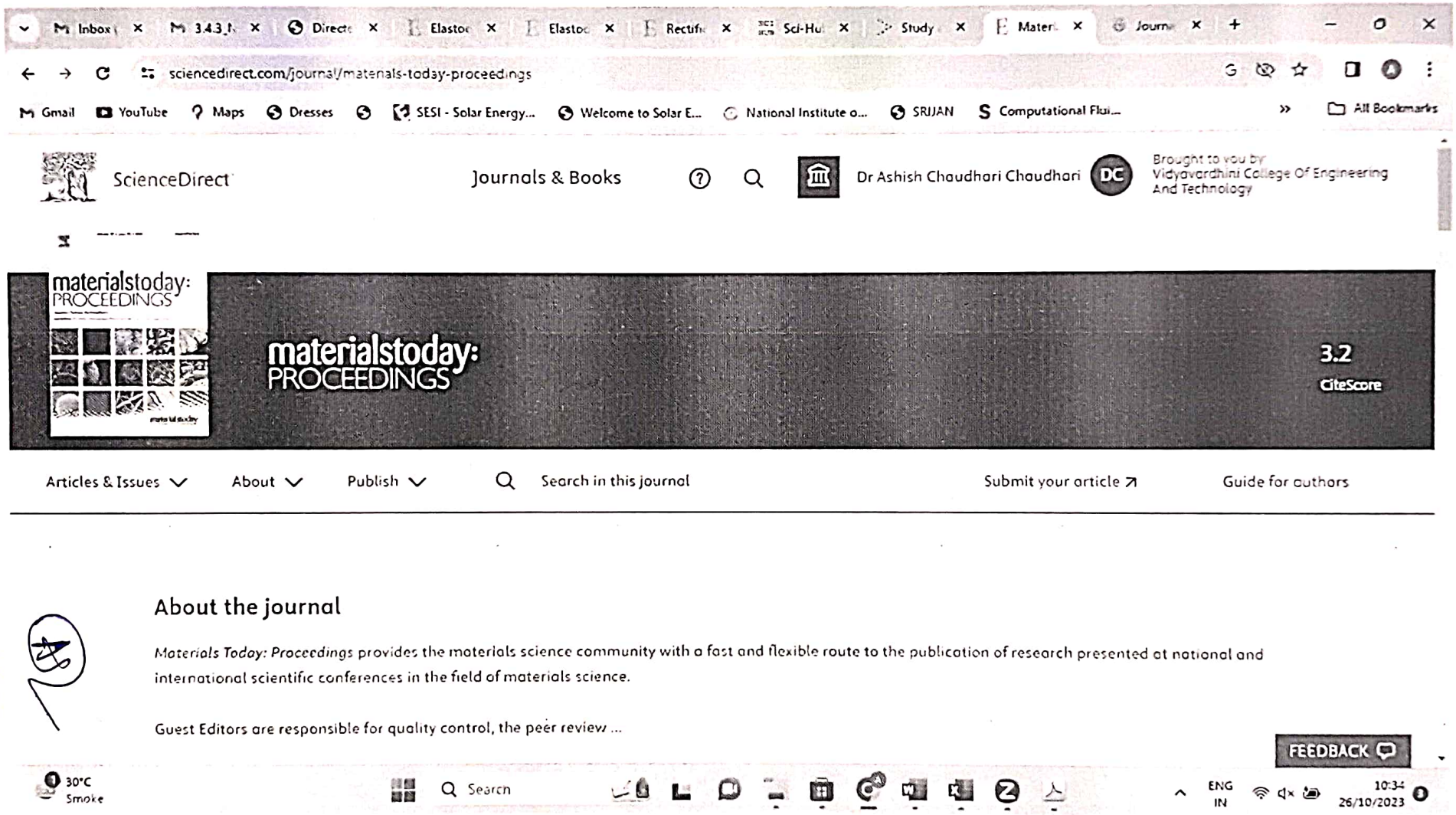

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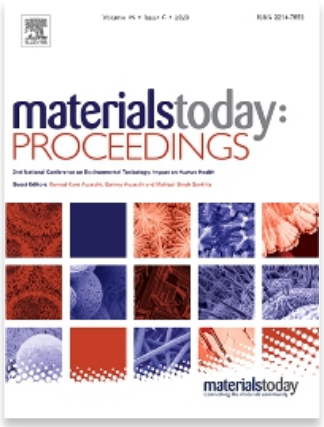

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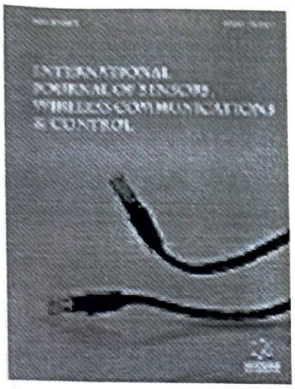

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Background: Event detection and monitoring applications involve highly populated sensor nodes in Wireless Sensor Networks (WSNs). Dense deployment of nodes leads to correlated sensor observations in the spatial and temporal domain. Most of the previous works focused on constant sensing radii for spatially correlated sensor observations. However, in real time scenario, the sensor nodes may have variable sensing coverage areas, which comprise a Heterogeneous WSN.

Objective: To address this issue, we present an Enhanced Weighted Spatial Correlation Model for Heterogeneous sensor nodes in WSNs.

Methods: The mathematical framework considers the spatial coordinates of sensor nodes, the distances between the sensor nodes, and their sensing coverage. Furthermore, the correlation coefficient is calculated in terms of overlapping areas for randomly deployed nodes. Performance of the correlation model is evaluated and analyzed in terms of event distortion function. In addition to this, a macro and micro-zone concept is introduced, wherein sensor information is weighted for better event estimation at the sink node. Moreover, dynamic weighing of nodes like Inverse, Shepard's and Gaussian distance weighing algorithms are simulated and analyzed for minimal event distortion. Over and above, the system performance is evaluated for different approaches considering reporting nodes with and without clustering of sensor nodes for macro and microzone concept.

Simulation results for the Enhanced Weighted Spatial Correlation Model developed are obtained using MATLAB software.

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RESEARCH ARTICLE

An Enhanced Spatial Correlation Framework for Heterogenous Wireless Sensor Networks

Sunayana Jadhav[1,*] and Rohin Daruwala[1]

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Abstract: ***Background*:** Event detection and monitoring applications involve highly populated sensor nodes in Wireless Sensor Networks (WSNs). Dense deployment of nodes leads to correlated sensor observations in the spatial and temporal domain. Most of the previous works focused on constant sensing radii for spatially correlated sensor observations. However, in real time scenario, the sensor nodes may have variable sensing coverage areas, which comprise a Heterogeneous WSN.

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***Methods*:** The mathematical framework considers the spatial coordinates of sensor nodes, the distances between the sensor nodes, and their sensing coverage. Furthermore, the correlation coefficient is calculated in terms of overlapping areas for randomly deployed nodes. Performance of the correlation model is evaluated and analyzed in terms of event distortion function. In addition to this, a macro and micro-zone concept is introduced, wherein sensor information is weighted for better event estimation at the sink node. Moreover, dynamic weighing of nodes like Inverse, Shepard's and Gaussian distance weighing algorithms are simulated and analyzed for minimal event distortion. Over and above, the system performance is evaluated for different approaches considering reporting nodes with and without clustering of sensor nodes for macro and micro-zone concept.

Simulation results for the Enhanced Weighted Spatial Correlation Model developed are obtained using MATLAB software.

***Results*:** The comparative study shows an improved system performance in terms of minimal distortion obtained for non-clustered nodes; thereby reducing the computational complexity of cluster formation. Furthermore, the dynamic weighing algorithms outperform the existing fixed weighing algorithms for the correlation model with the lowest distortion function.

***Conclusion*:** Moreover, in the above algorithms, the event distortion gradually decreases and later becomes constant with the increase in the number of representative nodes. Hence, it illustrates that minimal distortion can be achieved by activating lesser number of representative nodes, thereby preserving the energy of other sensor nodes and increasing the lifetime of WSNs.

Keywords: Wireless sensor networks, heterogeneous nodes, spatial correlation, weighted spatial correlation, event distortion function, MATLAB.

1. INTRODUCTION

Wireless sensor networks comprise of sensor nodes mainly deployed for the detection and monitoring of events like landslides, forest fires, earthquakes, tsunamis, *etc.* A study [1] suggested loss of life if immediate action is not taken. For such emergencies, appropriate measures need to be implemented. WSNs are an upcoming technology for the detection and prediction of such events [2]. Sensor nodes sense the event and report the data to the sink node. Sink nodes may be directly connected to the user *via* wired networks or through satellite networks. Internet of Things (IOT) is an emerging technological development promising to offer

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A Chatbot as a First Responder for Panic Attack

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***Abstract*— Mental Health continues to be a neglected aspect in modern society. The stressful and hectic lifestyles we lead today barely account for the physical and mental repercussions. Issues such as Generalized Anxiety Disorder (GAD) and Panic Disorder are highly common in India today, and often go undiagnosed and untreated. This is an extremely dangerous and unhealthy result of the fast-paced lifestyle young Indians lead. Panic attacks are one such example of a mental health emergency which is not often talked about. People tend to experience symptoms like chest pain, shortness of breath and occasionally, back pains; all of which can be very frightening and easily associated in the mind with some serious health issue like a cardiac arrest. Further, it is difficult for people around the user to even understand what they are going through, let alone help them.**

A Chatbot can be described as an interface which uses machine learning to simulate human-like conversations. Its purpose is to replicate human conversation as closely as possible. We aim to distinguish the symptoms of a panic attack from a more serious problem using our bot. Making use of Grounding and other basic CBT Techniques, we intend to demonstrate how a chatbot can guide a person experiencing a panic attack out of a state of spiraling. We designed a chatbot which acts as a first-responder for panic attacks among other mental health related emergencies. Our system can identify symptoms of a panic attack and provide first-aid like guidance and assistance to alleviate symptoms. Provided further assistance and responses necessary to ensure that the user has had a satisfactory experience.

Keywords*— *ChatBot, Panic attack, Mental Health, Deep Learning, Convolutional Neural Network

I. INTRODUCTION

The way we react to situations, the way we think of, the way we feel, directly or indirectly depends on our mental health. Our emotional and psychological behaviour represents our mental health. Good mental health help us to handle stress and bad situations with ease. It also helps us to make healthy choices. This way mental health is extremely important throughout our life. There have been researches and developments happened on mental health issue such as panic attack. Studies shows that there is thin line between panic attack and coronary heart disease. Many times symptoms of panic attack overlap the symptoms of heart disease and this makes it difficult to recognize whether it is panic attack or heart attack [1].

In recent years, it is very important for the companies to keep a track of mental health of employees Invent of smartphones proposes a new version such as chatbot, through which employees are able to keep their mental wellness on their own. This kind of chatbot motivates user to use it on daily basis or repeated use.

Factors contribute to the problems related to mental health are:

- Biological elements, such as genes or brain chemicals
- Life experiences, such as distress, suffering or grief
- Family history of mental health issues

Mental health problems are common but need to handle with care. People with mental health problems can get better and many recover for the most part, and even completely.

The machine has been embedded knowledge to identify the sentences and making a decision itself as response to answer a question. The use of chatbots in the general field of mental health is abundant. Examples can be seen where they are experimentally used to treat depression and similar issues. However, this still remains a relatively new field where research is continuously done. Studies have systematically shown that while they cannot be used as replacements for medical intervention, chatbots can certainly act as a quick and efficient tool in providing mental healthcare assistance [2].

The arrangement of the remaining part of this paper as follows: Section II provides the proposed system where we discuss the dataset preparation, Training model, Bot functionality and Neural Network in detail. Section III showcases the results to support the approach, and finally, Section IV concludes the work and discusses its future scope.

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10_Light weight cryptography for security in IoT devices by Ms. Shraddha Gosawi

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LIGHTWEIGHT CRYPTOGRAPHY FOR SECURITY IN IOT DEVICES

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Abstract **- Over the last few years there has been vast development in IOT technology.this technology made people life style much easy and intresting through various innovations by finding solution to day to day problems.todays,scenerio of security development is widely more protectable and important in daily life style.In IOT applications,security plays important role because data that has transferred is always become secure if any of the unauthorized access getting in it,they can affected personal injury as well as damage of security development.**

Index Terms – IOT,lightweight,cryptography and Sensor

1. INTRODUCTION

Entire business world is connected to security.The supply and need of the market in the various country has drastically increased over the last few year and it is very important to provide customers with best security.In the future,large amount of lightweight devices going to be connected with each other.It is important to secure entire system in order to ensure to be relied on as truthful.Crptography is well-developed,secure information and communication technique derived from stimulated concept and set-up of rule based calculation called algorithms.Transformation of messages will be in various ways,so that its is hard enough to decipher.these algorithms are used for verification to protect data privacy,web browsing on the internet without any risk,secret communications such as credit card transcations,email etc.Latest estimation in IOT,devices are connected in cloud platform.i.e many of industrial Iot applications.Thus,the insurance of privacy and data protection is struggling at the moment to be solved.

Generally,IOT devices targeted to simple data processing.i.e mobile apps,void control devices,smart TV sets etc.therefore,capcities are often small.Internal system allocated with less amounts of battery,Random access memory(RAM),low rates of data etc.Because of this reason IOT devices are unable to allocate considerable memory and processing energy just for security allocation.that is when introducing lightweight cryptography.This version expects to execute which has less amount of computational complexity giving high robustness against security attacks meanwhile.

The evolution of cloud computing over the years is very uncommon. There are certain things to cloud data for extending cryptography. Cryptography now becomes a huge part of IT department. Various day-to-day activities are carried on it for security purpose. The benefits of cloud computing are being realized by more companies and organizations every day as it is very much secure . Cloud computing gives the clients a virtual computing infrastructure on which they can store data and run many applications. But the main motive of cloud computing is that stored the secure messages of clients. There are many other approaches to extending cryptography to cloud data. Many companies choose this system to encrypt data prior to uploading it to the cloud altogether.

2. MOTIVATION

Necessity is the mother of invention.This led to vast development in the field of technology.Many innovative ideas and inventions had initiated in the advancement of human lifestyle. Things now work much easier than before and this process is going on. When it comes to cryptography there is development but still there are many complications. with cryptography data will be hacked by anywhere, it is difficult to the hackers and searching exact location of it. The cryptography expose critical infrastructure to weak and easy and it is mainly weak and hidden cryptography. Public main attention to exposed leads to brand erosion to customers. This new modern environm requires organizations to pay attention to know how cryptograph being implemented and managed throughout the whole enterpri This motivated us to work on the innovative IOT based cryptogra which helps client to find the data easily and don't need to th about data protection.

3. LITERATURE REVIEW

Purposes[1] the primary focus was to examine the importance and uses of lightweight cryptography in security of IOT devices.Now,a days,the majority of humans are increasingly to secure the data on the online platform because it consumed less time and less memory as it is itse named as lightweight cryptography as the peoples data hack easily so the encrypt the message and to overcome this problem,we introduced the lightweight cryptography in IOT devices for assuming it will help the people very much to keep their data secure.thus,this literature reaches were performed using webpages.A lightweight cryptography based on the internet of things(IOT) was presented,which includes ultrasonic sensors,ESP32 micro controller and a LCD screen & a keyboard and a webpage.wireless connection is required for an sensors following that the ESP32 will connect so,after the connection the messages will display on LCD screen automatically.To achieve confidentiality,the data and nodes are encrypted throughly,traditional cryptographic primitives are not directly applicable to I0T devices as it involves very poor resources. Lightweight cryptography should be applied efficient encryption in IOT.lightweight symmetric and asymmetric algorithm should be design for IOT systems.I the future,in IOT data security and authentication is big concerns so number of technique are proposed in which hybrid models of encryption and authentication algorithms are made but this cause increase in the memory requirement on the devices.As a result ,the proposed model is more competitive than alternatives[2].

Author proposes that the survey with a goal of finding the best suitable solution for IOT security.It is very difficult to find one clear approach which will fit all kinds of application of IOT. So,we all know that the various kinds of devices are connected in IOT networks. Some devices can afford to have a heavyweight and a high security method, but most of the devices are resource constrained. They need a security solution which acts fast and mainly it need to less complex and versatile[3].

Author proposes that the cloud based IOT architecture is a structure which is used for specification of networks physical components its different performance principle and procedures. As the data will secure by the help of cloud server. the cloud server or we can say IOT it has different layers which face many attacks like active and passive

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11_Comparative Analysis of Naïve Bayes, Decision Tree, and XG-Boost for Crop Recommendation System by Mr. Anil Hingmire

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Comparative Analysis Of Naive Bayes, Decision Tree And XG-Boost For Crop Recommendation System

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Abstract-

The need for increasing crop production is a significant challenge for farmers. This is due to a combination of factors, including climate change, soil degradation, and limited access to resources and technology. All of these factors can lead to decreased yields and, in turn, reduced income for farmers. To meet this challenge, farmers must develop new methods of production that are resilient, cost-effective, and sustainable. This will require a holistic approach, involving technological and agricultural advances, as well as improved access to resources, investments, and training. Crop cultivation anywhere in the world depends on the climate, seasons and various factors like soil properties. However, the process of increasing the production of crops depends on various factors, including mainly on temperature. Our proposed method utilises Machine Learning Procedures with the end goal that it proposes the appropriate crops dependent on the Temperature, humidity ,potassium, nitrogen, rainfall ph,phosphorus. This kind of framework, subsequently helps to reduce the losses and misfortunes looked by the farmers brought about by establishing the probability of bad harvests and furthermore it gives the information on the OCcasional characterization of yields what harvest is reasonable for which season. There are several machine learning algorithms available are used in this system., including KNN, Decision Tree, and To recommend the crop, Random Forest, Naive Bayes and XG-Boost are used.

Keywords—Naive Bayes, Decision Tree, XG-Boost, Machine Learning, Crop Recommendation System.

I INTRODUCTION

There is no doubt that the major source of income in rural India is agriculture and its allied industries. Moreover, agriculture contributes a lot to the country (GDP). The country is fortunate to have such a large agricultural sector. This may be one of the possible reasons for the higher suicide rate among marginal farmers in India. For farmers, this study offers a practical and easy-to-use yield forecasting system.

The proposed system provides connectivity to farmers through mobile or online applications. User location can be determined using GPS. The user enters a location and a soil type. Machine learning algorithms help select the most profitable crop lists or forecasts. Some machine learning techniques are used to predict crop yields, including Support Vector Machines (SVM), Decision Trees (DT), XG Boost, Gaussian Naive Bayes, Random Forest (RF), and K Nearest Neighbors (KNN).

Among them, Random Forest showed the best results with 90% accuracy, while Naive Bayes showed 99%.

Agriculture in India is vital to the soci)-economic structure of the country. For a country where nearly 58% of the population works in agriculture, the inability of farmers to

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12_Heatmap Analysis of Webpages by Mrs. Anagha Patil

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Heatmap Analysis of Webpages

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Abstract

These days, as everything has gone online and virtual, we use websites on a regular basis in our daily lives. However, in order to match user needs, the question of how website admins would learn what the user wants emerges. So, using techniques like mouse clicking, this project captures information about user activity on a web page, and then using the appropriate technology, it converts the data into meaningful and insightful heatmaps. Its main goal is to make websites more user-friendly by providing web administrators with valuable information about users' activities.

Keywords

Heatmap, Statistics, User Experience, User Interface, Web Tracking, Websocket.

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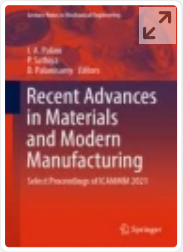

Recent Advances in Materials and Modern Manufacturing, pp 683–689

Knowledge-Based Engineering Approach to Select Standard Parts and Design Automation for Flange Coupling

Umeshchandra Mane, Raju Bhosle & Jeet Patil

Conference paper | First Online: 27 May 2022

952 Accesses

Part of the Lecture Notes in Mechanical Engineering book series (LNME)

Abstract

Computer Aided Design software is widely used in the product development phase. It helps in reducing design time with high level of accuracy. Generally, cost of product development and manufacturing is identified in design phase, so it is important to focus on the design phase to reduce the total cost of the product. Use of standard parts readily available in the market saves manufacturing

efforts and cost associated with the same. So, it is beneficial to use such standard parts in the new design of the product. Another important point in the design phase is that any mistakes done by the designer can lead to high losses associated with design, manufacturing, and operational phases. Most of the industries rely on expert's knowledge to avoid such losses. To avoid these losses and to make the use of standard parts, this paper proposes a knowledge-based design automation-based approach for selecting standard components in new design of the product. Developed system uses application programming interface to automate the modeling activities and to capture the design knowledge. The system is developed in CATIA software by using visual basic application.

Keywords

Knowledge-based engineering

Design automation **Coupling**

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14_Design & Analysis of independent suspension system of FSAE Vehicle by Mr. Sanjay Lohar

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Recent Advances in Manufacturing Modelling and Optimization pp 439–452

Design and Analysis of Independent Suspension System of a FSAE Vehicle

Sanjay Lohar, Vaishnavi Patil, Sahil Save & Rakeshkumar Thakur

Conference paper | First Online: 22 April 2022

461 Accesses

Part of the Lecture Notes in Mechanical Engineering book series (LNME)

Abstract

In Formula Society of Automotive Engineers (FSAE) the design of suspension system is one of the most important area on which performance of vehicle depends. Present study proposes the procedure in designing a double wishbone independent suspension system for FSAE cars. This paper details the procedure utilized for design and analysis of mechanical systems which can be utilized within the FSAE vehicle norms. Suspension geometry is specified on basis of FSAE guidelines, packaging constraints and desired performance parameters. Forces are calculated based on weight of vehicle and weight transfer while riding. Suspension

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15_Improved Generalized Regression Neural Network for Target Localization in Wireless Personal Communications by Dr. Sagar Tambe

Wireless Personal Communications
https://doi.org/10.1007/s11277-022-09627-9

Improved Generalized Regression Neural Network for Target Localization

Satish R. Jondhale[1] · Manoj A. Wakchaure[2] · Balasaheb S. Agarkar[3] · Sagar B. Tambe[4]

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Abstract

Knowledge of location is of utmost importance in many indoor Location-Based Services (LBS). Although traditional technique such as trilateration involving the use of received signal strengths (RSS's) is quite popular and simple to use for wireless sensor network (WSN) based target localization, the location estimates obtained using it are not accurate and reliable. The reason behind this is the highly fluctuating nature of RSS's due to dynamic RF environment and non-linear system dynamics. If the dataset is sparse, the concept of centroid is very useful to estimate fairly closer approximation to the underlying relationship in the given dataset. The GRNN architecture is well known for mapping any nonlinear relationship between input and output. To address the problems with the RSS based target localization and tracking (L&T) using WSN for indoor environment, a novel range free Centroid Generalized Regression Neural Network (C-GRNN) algorithm is presented in this paper. The proposed C-GRNN algorithm is formed by combining the advantages of both centroid and GRNN. In order to realize the dynamicity in given RF environment, the variance in the RSSI measurements is varied from 3 to 6 dBm. During simulation experiments, although the variance in the RSSI measurements is doubled, the average RMSE and average localization error are increased by only approximately 28.31%, and 22.28% respectively. This rise in localization errors with the proposed C-GRNN architecture is very less as compared to the trilateration as well as GRNN based technique.

Keywords Location-based services (LBS) · Received signal strength (RSS) · Wireless sensor network (WSN) · Trilateration · Centroid · Generalized regression neural network (GRNN) · Localization and tracking (L&T)

1 Introduction

Today sensor network is a basic building block in applications involving smart sensing and ubiquitous computing, and has plenty of localization and tracking (L&T) based applications [1–3]. The heavy deployment sensor nodes can scan, sense the useful physical

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16_Crop Disease Prediction using Deep Learning by Mr. Anil Hingmire

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Crop Disease Prediction using Deep Learning

Aniket Rathod [1], Niwant Salunke [2], Mayur Shinde [3], Prof.Anil Hingmire [4]

[1,2,3,4] *Department of Computer Engineering, VidyaVardhini's College of Engineering and Technology, Mumbai University,Mumbai.*

Abstract *— Agriculture forms the backbone of the Indian economy. It contributes significantly to our nation's GDP and is a major source of livelihood for rural families. Farmers play a pivotal role in shaping the future of the country. Unfortunately, the agricultural industry has been plagued by several problems due to which farmers in our country daily face a lot of hardships. The two major problems which hinders the economic progress of farmers are as follows: They are not able to detect disease in crops grown at farm This leads to heavy loss due to crop damage. The other obstacle is they are not able to sell their crops at the right price due to middlemen intervention. To solve the above two problems, we propose a solution to create a website where a model built using deep learning (image classification) algorithm helps to predict if the crop is healthy or carrying a particular disease. The website also has a portal where farmers can login and post pictures of crops grown in their farm. Vendors can login and purchase best quality crops from any farmer online from the comfort of their homes. The idea was to create a website which serves as a one stop solution to all agricultural problems.*

I. INTRODUCTION

Farmers are not able to detect disease at an early stage in the crops grown at farm. This leads to heavy loss due to crop damage. This paper proposes a solution to identify disease in crops using deep learning (image classification algorithm). Image classification is a technique that is used to classify or predict the class of a specific object in an image.

Convolutional neural network (CNN) is used for building the model. A Convolutional Neural Network (ConvNet/CNN) is a Deep Learning algorithm which can take in an input image, assign importance (learnable weights and biases) to various aspects/objects in the image and be able to differentiate one from the other. Several data preprocessing techniques such as Data augmentation, Caching and prefetching, Resizing and rescaling are applied on dataset to improve its performance during training. The main advantage of CNN compared to its predecessors is that it automatically detects the important features without any human supervision. Automatic feature extraction is the main advantage of Convolutional neural network. For example, given many pictures of cats and dogs it learns distinctive features for each class by itself. CNN is also computationally efficient.

II. LITERATURE REVIEW

Amrita Tulshan and Natasha Raul used KNN classifier to predict 5 different diseases in crops namely Early blight, Mosaic virus, Down Mildew, White Fly, Leaf Miner. [1] This paper aims to predict the emergence of pests and diseases of cotton based on short-term memory network (LSM). First, the problem of the emergence of pests and diseases was classified as a predictor of time series. LSTM was then adopted to resolve the issue. LSTM is a special type of continuous neutral network (RNN), which introduces a gateway approach to prevent a missing or exploding gradient problem. It has been shown to be effective in solving a time series problem and can deal with the long-term problem of dependence, as stated in many books.

Experimental results showed that LSTM performed well in predicting the emergence of pests and diseases in cotton fields, and produced results.The area under the Curve (AUC) is 0.97. The paper also confirmed that climatic factors have a strong influence on the emergence of pests and diseases, and that the LSTM network has great potential in solving the long-term dependence problem.[2]

Umair Ayub and Syed Atif Moqurrab analyzed extensively the data mining dividers in different feature sets to predict the damage done to the grass. The categories we used are: DT, RF, NN GNB, SVM and KNN. RF and GNB performed better than other binary data separators, and NN and RF performed better than other original data filters. We also designed composite models by combining

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17_Breast Cancer Classification using Deep Learning by Mrs. Smita Jawale

ADIVA REVIEW JOURNAL

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Breast Cancer Classification using Deep learning

Siddhi Dabholkar[1], Pranjali Deshmukh[2], Rahul Chormare[3], Prof. Smita Jawale[4]

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Abstract —Breast cancer is one of the most common diseases affecting the lives of many women around the world. Early detection of cancer is very important because when the disease is diagnosed early, the chances of treatment and recovery increase. Unfortunately,

Lack of awareness and resources about breast cancer, as well as other issues of female reproductive health, continue worldwide. Thus, statistics show a dramatic increase in the number of women with breast cancer over the years. Breast cancer is on the rise, both in the country and in India's largest city. The 2018 Breast Cancer Survey report recorded 1,62,468 newly registered cases and 87,090 reported deaths.

Patience becomes more difficult in the advanced stages of your development, and more than half of Indian women experience the side effects of stage 3 and 4 breast impairment. Survival of back cancer in malnourished women accounted for 60% of Indian women, compared to 80% in the U.S.

INTRODUCTION

Breast cancer is categorized into two type, namely, Benign and Malignant. Benign tumor is usually harmless, on the other hand a malignant tumor that results in uncontrolled growth of cancerous tissue. Clinical tests, diagnostic tools that include mammography are a variety of techniques used to diagnose breast cancer. Breast cancer is not a disease of the individual but a combination of diseases. Therefore, its acquisition is a challenging task. Usually, women are less likely to recognize the presence of breast cancer or tumor on their own in the early stages, when it can still be cured. Eventually, the tumor grows into a malignant growth, which can exacerbate problems. Women often self-diagnose and find the presence of lumps or masses that suggest cancerous growths. An important reason for the low rate of breast cancer survival in women in the nation stems from their lack of awareness among the population and low levels of initial screening and diagnostic levels. In Histopathology, a biopsy is a diagnostic procedure that can determine if the affected area has cancer or not. Diagnosis by pathologists is usually performed by visual inspection of histopathological images under a microscope known as the gold standard confirmation of the diagnosis. tumors and cancer subtypes.Recently, Convolutional Neural Networks (CNNs) have become the preferred deep learning techniques used for the diagnosis and diagnosis of various diseases using x-ray, CT-scan and histopathological images from those reports. This paper proposes a breast cancer screening solution using an image classification algorithm for deep learning. Convolutional Neural Networks are a class of Deep Neural networks that can detect and distinguish certain features in images and are widely used in visual image analysis. Convolutional Neural Network (ConvNet / CNN) is a deep learning algorithm that can capture the embedded image, provide readable weights and bias in various aspects of the image and is able to distinguish one aspect from another. Images uploaded to the CNN model are processed in advance using several image processing techniques such as data enhancement, resizing and re-scaling. CNN's biggest advantage compared to its predecessor is that it automatically detects important features without being monitored.

LITERATURE REVIEW

Sunny, Jean & Rane, Nikita & Canada, Rucha & Devi, Sulochana. in their paper "Breast Cancer Classification and Predictability Using Mechanical Learning" using ML algorithms to differentiate breast cancer tumors. [1] This paper introduces comparisons of six machine learning algorithms (ML): Naive Bayes (NB), Random Forest (RT), Artificial Neural Networks (ANN), Decision Tree (DT), Close Neighbor (KNN) and Support Vector Machine (SVM) in the Wisconsin Diagnostic Breast Cancer (WDBC) database extracted from a digital MRI scan. In order to use these ML algorithms, the database was divided into the training phase and the testing phase. Among these, the algorithm that provides the best results will be used as a backend for the website and the model will then classify cancer as dangerous or dangerous. The study begins by collecting a BCCD database (small blood cell detection database) containing 116 volunteer data with 9 attributes and WBCD database data comprising 699 volunteer data and 11 attributes. It then pre-analyzes the WBCD database data provided and finds information containing 683 volunteers with nine attributes and that is why the index indicates whether the volunteer has a malignant tumor or not. It accurately predicts and diagnoses breast cancer early even if the size of the tumor is small in the insane and painless ways that use data mining algorithms.

[2] Reddy, Anji and Soni, Badal and K., Sudheer in their paper "Breast Cancer Awareness by Improving Machine Learning." introduced a new way to diagnose breast cancer using machine learning techniques. The authors performed an experimental analysis in the database to evaluate the performance. The proposed method has produced more accurate and efficient results compared to the available methods. This paper is a new approach - Deep Neural Network With Support Value (DNNS) was introduced to produce better quality images and streamline other applications. The authors propose a new algorithm and mathematical formulas to evaluate efficiency and effectiveness. The proposed DNNS operating system is divided into three sections. In the pre-processing phase, input cytology images are first processed to remove the noise. This process is completed using an effective filtering method. In the second phase of methodology, entropy, geometric and literary elements are extracted from the analyzed images. Finally, the third stage separates the breast tumor from the extracted images. This was accomplished using an obscure collection based on Histo-sigmoid based fuzzy clustering.

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18_Deep Video Surveillance-Anomaly Event Detection by Mrs. Smita Jawale

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Deep Video Surveillance -Anomaly Event Detection

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Prof. Smita Jawale
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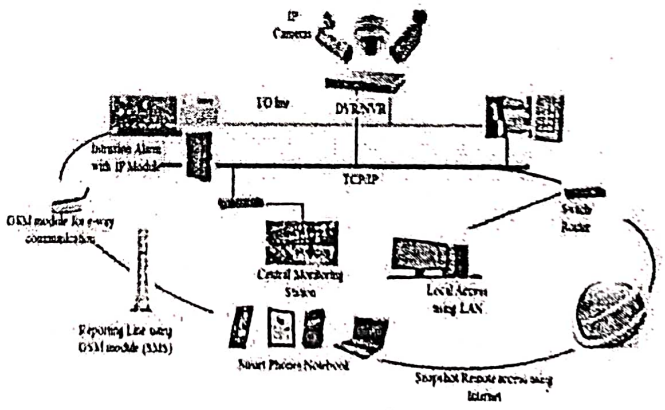
ABSTRACT

Surveillance videos are capable of capturing many real-life anomalies. In this report, we propose to find out the anomaly by exploiting both normal and anomalous videos. To avoid annotating anomalous segments or clips in the training video, which is very time consuming, we propose to learn anomalies through the deep classification framework of many cases by leveraging the videos for weakly labeled formation, i.e., label the figure (abnormal or normal) at the video level instead of the clip level. In our approach, we consider normal and abnormal videos as pockets and video segments as cases in multi-instance learning (MIL) and automatically learn the predictive deep anomaly ranking model. high anomaly scores for anomalous video segments. Furthermore, we introduce sparsity and time-smoothing constraints in the rank loss function to better locate the anomaly during learning.

INTRODUCTION

Most of the public places uses CCTV camera, eg. street, intersection, bank, shopping mall, etc. to enhance safety. The supervision capacity of law agents is behind in keeping up. The result is a disproportionation b tween the usage of cameras and the ratio of cameras to screen . One of the essential tasks of a CCTV camera is to detect unusual events. In general, abnormal events occur infrequently compared with normal activities. Hence, in order to minimize the extra labor efforts and labor period, the development of algorithms for automatic video anomaly detection is in need.



The aim is to promptly flag deviations from normal patterns and determine how long the anomaly is occurring. Thus, this detection technique can be viewed as raw video comprehension, which filters outliers from normal samples. Algorithms should be developed to detect a specific event that contains anomaly is the step that can be taken for detecting a specific anomaly containing event. It is clear that such solutions cannot be generalized, so they have only very limited practical use.

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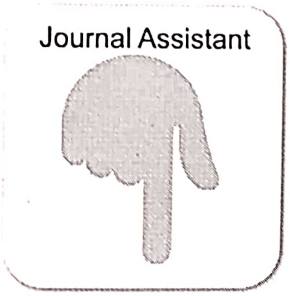

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COMP Engg.

19_IPL Prediction Using Machine Learning by Dr. Archana Ekbote

IPL Prediction Using Machine Learning

Abhineet Menon, Dhruv Khator, Dhru Prajapati, Archana Ekbote

Abstract

Cricket is amongst the most popular sports in the world. Indian Premier League, more commonly known as IPL is the biggest domestic cricket league in the world. It generates a lot of revenue along with excitement among fans. Many bookers, bettors, and fans like to predict the outcome of a particular match which changes with every ball. This project studies and compares different Machine Learning techniques that can be applied to predict the outcome of a match. Features like team strength and individual strength of a player are also included along with conventional features like toss, home ground, weather and pitch conditions that are taken into account for predicting the result. Machine Learning algorithms such as Naïve Bayes, Random Forest Classifier, Logistic Regression, XGBoost, AdaBoost, and Decision Tree are selected to determine the predictive model with highest accuracy.

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IPL Prediction Using Machine Learning

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Abstract

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Keywords

AdaBoost, Decision Tree, Indian Premier League, Machine Learning, Naïve Bayes, Logistic Regression, Random Forest Classifier, XGBoost

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20_EavesDrop by Mr. Sainath Patil

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EavesDrop

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Abstract

Interactive Live streaming is the process of transferring real-time data over the internet. The data can be of type audio, video or any common data type. Interactive live streaming is an important feature of applications and platforms in which the actions of the audience affect the content of the communication. Simultaneously, Podcasting is one of the types of contents that people are attracted to. The idea of podcasting includes recording the audio or video file and uploading it to a platform where people can access it. Now, with the thought of mixing these two, the idea of an interactive podcast was born. We analyze that low delay is a restriction for Web Interactive Streaming. Interactive communication over the internet with the restrictions of real-time boundaries requires a framework that will allow the development of the proposed project. Real Time Communication (RTC) has wide-industry uses. RTC is the standard and it also increases the browsing model which allows access to live streaming systems which consist of social media, television, chatting applications, as well as the communication media. Users are allowed to read comments, write comments, record the sessions/audio/video, and edit audio/videowhich is done within a Cloud Infrastructure which also provides services of quality. The development of the application is the most important part where using different technologies a system can stream audio and video data over the internet, handle a number of users who can make audio rooms to discuss a topic among themselves, where several people can hear them, and they also have a chance to add value to the conversation with their inputs.

Keywords

Cloud, interactive, live-streaming, podcasting, Real-Time Communication, time-critical.

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21_Language Interpreter and Speaker by Mr. Sainath Patil

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Language Interpreter and Speaker

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Abstract

Language Interpreter and Speaker is a device for identifying the language of the written image text and then converting the same text to speech format. This device would surely be useful for blind and visually impaired people. Language identification (LI) is the method in which we identify the natural language of the given content. It is the process of categorizing a document on the basis of its language. In this generation, we are heading towards a phase where computers would be capable of doing all things that humans can do. Recognition of language used is the initial requirement before reading or learning. To start with any of the tasks, humans first try to understand the task and then process the task. Similarly, for language identification, the machine needs to learn the language and once learning is complete, it should be able to recognize the language. The project is divided into three parts. Initially, the handwritten image text would be converted to normal text. In the second part, the language would be identified from the converted text and last, the text would be converted to audio format. This paper discusses the implementation of this idea, gives an approach to problems and challenges that we came across, and some solutions.

Keywords

AlexNet, CNN (Convolution Neural Network), gTTS (google-text-to-speech), Image Processing

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22_IoT-based Smart Water Musical Fountain by Mr. Yogesh Pingle

IoT-based Smart Water Musical Fountain

Mr. Shyamsundar Magar[1], Mr. Yogesh Pingle[2] and Dr. Vaishali Khairnar[3]

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Abstract: *Water fountains have been utilized for multifunctional entertainment events such as laser displays. Designing such water fountains is an excellent chance for multidisciplinary learners. The physical construction and control mechanism of a fountain with water-jet dancing effects, as well as lighting, is complex to design. It discusses the use of indoor fountains in educational institutions as well as hospitals to target various types of audience to make them happy and in turn reduce their stress.*

Methodologies like IoT and Machine Learning techniques are employed to construct such a smart fountain. The suggested algorithm identifies mood by capturing audience emotions and facial expressions (Fountain Viewer). Based on their emotions, musical instruments along with classical music ragas have been selected from the playlist. For diverse mood-based circumstances, smart fountain is designed in such a manner so that solenoid activity and light systems create distinct water jet dance patterns and light glowing patterns.
Body and mind reaction with music therapy is a new field for the healing process. The challenge involved here is to determine which ragas to listen to and for how much duration. To address the specific raga with notes and swaras, feature extraction techniques from digital signal processing are used. To classify the kind of raga for a specific ailment, machine learning methods are applied. The categorization of ragas is carried out using several classifier methods.
The MHRISCNN Algorithm (Mind Healing Raga Instrument Selection Convolution Neural Network) is presented, which should choose a certain Raga and instrument based on the person's mood at the moment. It has been discovered that those who stay near the fountain, benefit from good music vibrations. This assists in reducing stress, which enhances health.

Keywords: **IoT, Music Therapy, Machine Learning, MHRISCNN**

1. INTRODUCTION

Fountains were originally intended to provide water for drinking, bathing, and cleaning purposes to citizens. In the late nineteenth century, the execution of a fountain took a new turn. People began building unique fountains that, when utilized in a certain way, could be used to embellish towns, parks, celebrate persons, ethnic celebrations, and provide entertainment [2].

A novel idea for ethnic beautifying has emerged; a smart music fountain [3] that contributes to the auspiciousness of the event.

Fountains were primarily aesthetic by the 1900s as a result of ubiquitous, accessible indoor plumbing. During this period, gravity was replaced as the primary driver of water straight from the fountain [1] by electric, mechanical water pumps. These were the forerunners of modern fountains, able to recycle water and shoot water high into the air.

Fountains may now be seen in parks, squares, private houses, and commercial structures. They have been used for decoration, pleasure, or entertainment [4]. With advancements in technology, fountains today can be synchronized to music and colored lights, and have the spray automatically adjusted remotely with a press of a button.

Music is a part of all living beings and it has a significant impact on their life. Humans listen to music to reduce stress in their day-to-day life. Classical music [12], at its core, provides positive feedback to the body, and as a result, it has been proven that classical music helps relieve stress.

Music therapy for humans [11] is a new phrase that was coined. This also helps to lessen their chronic conditions. Ragas, which are based on timings, are used in classical

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23_Modelling of Material Removal Rate in Micro-EDM of Inconel 600 Using Dimensional Analysis by Dr. Umeshchandra Mane

Modelling of Material Removal Rate in Micro-EDM of Inconel 600 Using Dimensional Analysis

Raju Bhosle, Umeshchandra Mane, Jeet Patil, and Balaji Dabade

Abstract In the present study, a semi-empirical model is developed for predicting the material removal rate in micro-EDM using dimensional analysis. The model developed is based on thermo-physical properties of Inconel 600 alloy material such as electrical conductivity, thermal conductivity, density, specific heat, and melting point. For this study, four effective parameters namely voltage, capacitance, EDM feed-rate, and pulse on-time are varied and drilled micro holes using tungsten carbide tool electrode. The adequacy of model is verified by finding the mean error, root mean square error and average error. The predictability of the model with experimental results is observed more than 94% using dimensional analysis.

Keywords Micro electrical discharge machining · Micro-holes · Inconel 600 alloy · Material removal rate · Dimensional analysis

1 Introduction

Micro electrical discharge machining (Micro-EDM) is one of the most recently developed micro-machining technologies and predominantly used to produce miniature components and micro-features. It has many advantages like negligible contact forces, minimal mechanical stresses, chatter, and vibrations, which is due to no direct

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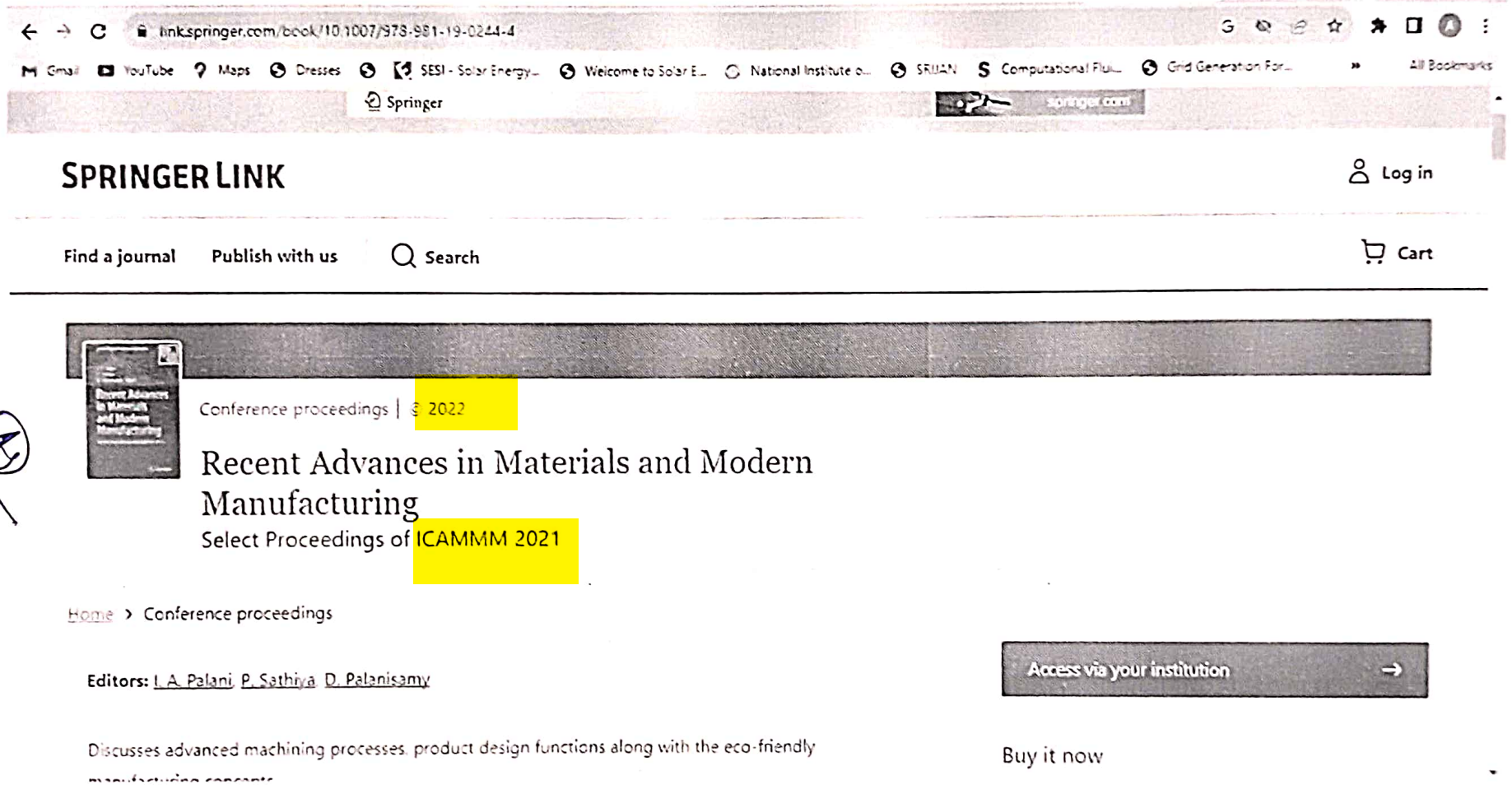

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24_Artificial Intelligence for Prediction of Performance and Emission Parameters of CI Engine Using Bio-Fuel by Mr. Ganesh Wahile

Artificial Intelligence for Prediction of Performance and Emission Parameters of CI Engine Using Bio-Fuel

Ajay V. Kolhe[1,a)], Prateek D. Malwe[2, b)], and Ganesh S. Wahile[3, c)]

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Abstract. The objective of this work is to find the performance and emission parameter of different blends of Karanja biodiesel with diesel and compare these parameters with pure diesel. This study investigates the potential of Karanja oil as a source of biodiesel. The objective of this work is to find the performance and emission parameters of 10 %, 20 %, 30 %, 40 %, and 50 % of blends with biodiesel and compared various parameters with diesel. The results showed that Brake Thermal Efficiency (BTE) decreases with an increase in the percent of biodiesel and Brake Specific Fuel Consumption (BSFC) decreases with an increase in the percent of biodiesel. Hydrocarbon (HC) and carbon monoxide (CO) emission reduces with an increase in blend percent whereas Nitrous oxide (NOx) emission increases with an increase in blend percent. Neural networks obviate the need to use complex mathematically explicit formulas, computer models, and impractical and costly physical models. In this work we use Neurosolution software for prediction of performance and emission parameters, separate models were developed for performance parameters as well as emission parameters. To train network, load, blend percentage, calorific value, the viscosity of fuel & air-fuel ratio was used as input value whereas engine performance parameters like brake thermal efficiency, brake specific fuel consumption & exhaust gas temperature were used as output value for performance model and engine exhaust emission such as NOx, CO, and HC values were used as the output parameters for emission model. Artificial Neural Network (ANN) results showed that there is a good correlation between the ANN predicted values and the experimental values for various engine performance and exhaust emission parameters. It is observed that the ANN model can predict the engine BTE, BSFC with a correlation coefficient of about 0.998435668, 0.990616392, and 0.993346689 respectively for performance model and emission model CO, HC and NOx predict with a correlation coefficient of 0.986098699, 0.991243454 & 0.9855593.

NOMENCLATURE

BTE	Brake Thermal Efficiency	C_p	Specific heat at constant pressure	HS	Hybrid System
BSFC	Brake Specific Fuel Consumption	C_v	Specific heat at constant volume	IP	Indicated Power, kW
HC	Hydrocarbon	D	Diameter of cylinder	M_f	Mass of fuel in the cylinder
CO	Carbon monoxide	DI	Direct Injection	MSE	Mean Square Error
NOx	Oxides of Nitrogen, ppm	C_v	Specific heat at constant volume	N	Speed (RPM)
ANN	Artificial Neural Network	FL	Fuzzy Logic	PME	Pongamia Methyl Ester
CI	Compression-Ignition	GA	Genetic Algorithms	R	Coefficient of Correlation

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Ajay V. Kolhe, Prateek D. Malwe, and Ganesh S. Wahile

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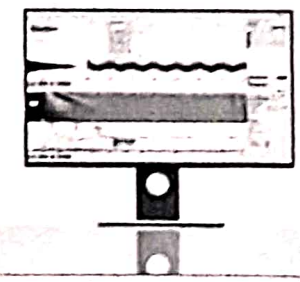
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25_Latent Heat Storage System by Using Phase Change Materials and Their Applications by Mr. Ganesh Wahile, Dr. Uday Aswalekar

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Latent heat storage system by using phase change materials and their application

Ganesh S. Wahile [a], Prateek D. Malwe [b,*], Uday Aswalekar [a]

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ABSTRACT

Due to the rapid exploitation of fossil fuels, energy sources are becoming nonrenewable, and there is a need to develop other technologies to provide a clean supply of energy. The heat is stored in the thermal storage unit utilizing phase change materials in one of two ways: sensible heat or latent heat. When the temperature of phase change materials rises, energy stored in the perceptible form in the materials rises as well. While latent heat is stored during phase change of materials during the charging process and retrieved during phase change discharging at a virtually constant temperature during the discharging process. Latent heat has a large capacity to store a large amount of thermal energy per unit space. The use of phase change material (PCM) can be found in a variety of fields, including:

- Improving the efficiency of photovoltaic cell.
- Thermal storage of solar energy.
- Waste heat recovery.
- Engine cooling.
- Building cooling to store energy during peak time and retrieving during requirement.

The main drawback of PCM is its low thermal conductivity, which can be increased by incorporating fins and adding nanoparticles (to enhance heat transfer) in PCM. Our task in this study was to evaluate literature and develop applications for PCM, as well as to reduce PCM charging and discharging by boosting the rate of heat transfer.
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Selection and peer-review under responsibility of the scientific committee of the International Conference on Smart and Sustainable Developments in Materials, Manufacturing and Energy Engineering

1. Introduction

The rapid transformation in the global economy has resulted in a daily increase in energy demand. Conformist fuels such as gasoline, diesel, and coal energy, on the other hand, are limited in terms of their use, as well as their impact on the global environment, as they emit hazardous gases and have a direct impact on human existence. By utilizing waste heat energy, solar energy, and other non-conventional energy sources, thermal energy storage has become a significant aspect of reducing the strain on fossil fuels and creating an environmentally friendly atmosphere. The thermal energy unit can be stored in PCM in two ways: latent heat energy storage and sensible heat energy storage. While storing energy in latent heat requires less space than storing energy in a sensible form, storing energy in sensible form requires more space (Fig. 1). Because phase change materials store more energy in a smaller volume, it is one of the most important advantages of phase change materials to store energy in both sensible and latent heat form. Advanced and novel materials for renewable energy sources are being investigated by researchers. The energy is stored in a proper form so that it can be withdrawn and used to its full potential. It bridged the gap between energy demand and supply and improved the system's performance. Because of the abundant solar energy supply during the day, energy waste during the day must be stored and used as needed, such as at night, to meet the demand. Lin et al. [1] discussed that thermal energy has gotten a lot of attention and has progressed quickly.

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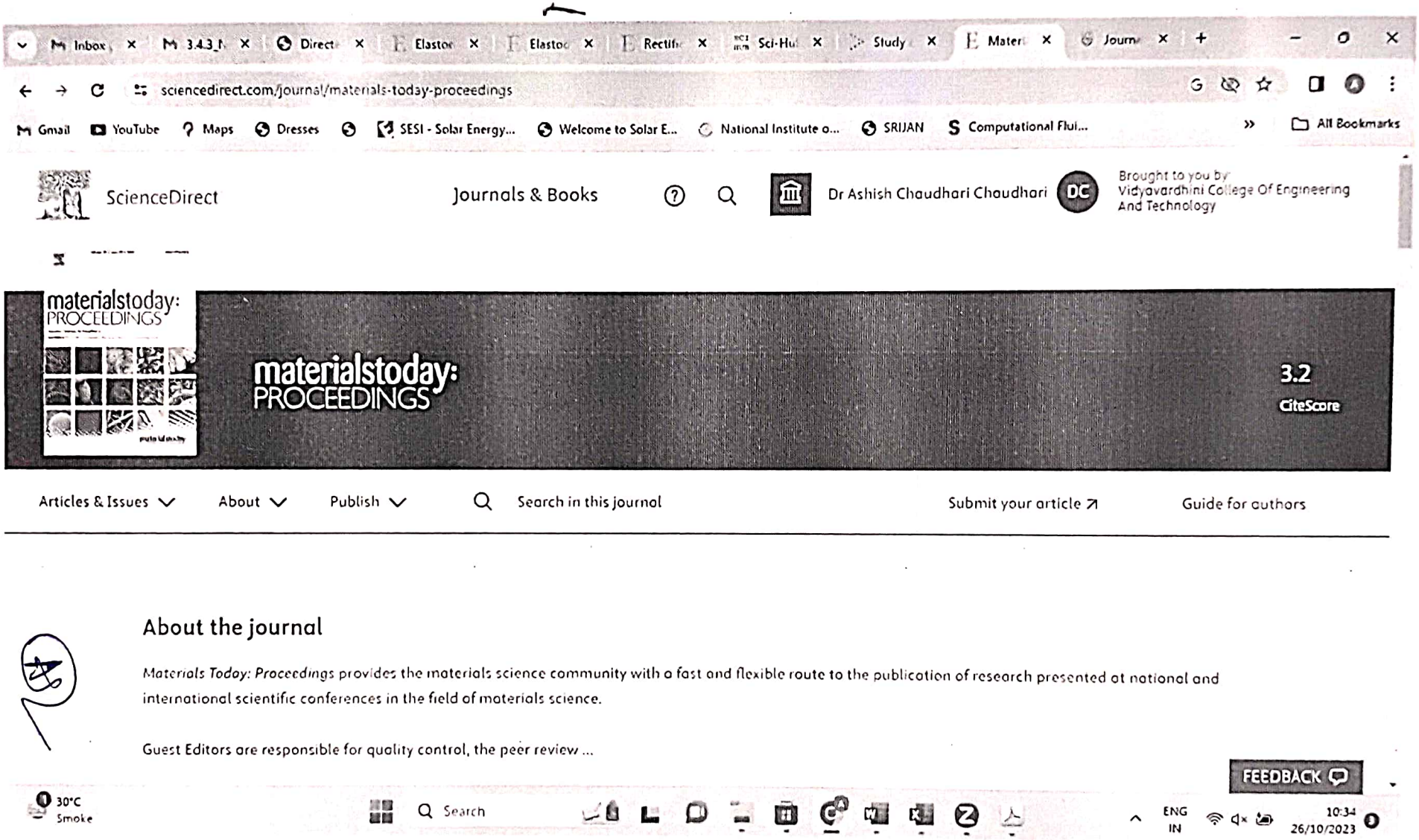

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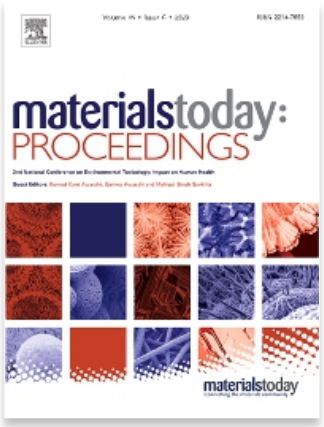

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26_An Integrative Approach for Analysis of Nonlinear Electrical Circuits Using-Polynomial B-Spline Expansion and B-Spline Krawczyk Operator by Dr. Deepak Gawali

Original Paper | Published: 03 December 2021

An Integrative Approach for Analysis of Nonlinear Electrical Circuits Using-Polynomial B-Spline Expansion and B-Spline Krawczyk Operator

D. D. Gawali, A. Zidna & P. S. V. Nataraj

International Journal of Applied and Computational Mathematics **8**, Article number: 1 (2022)

44 Accesses | **8** Citations | Metrics

Abstract

This paper addresses the problem of finding a set of all direct current (DC) operating points of a nonlinear circuit, which is a crucial step in its development and requires the solution of a nonlinear system of polynomial equations. We propose a novel algorithm for finding the set of all solutions of nonlinear electrical circuits, which are modeled as systems of n polynomial equations contained in an n dimensional box. The proposed algorithm is based on the following techniques: (i) B-Spline expansion to obtain a polynomial B-Spline form of the original polynomial in power form; (ii) B-Spline Krawczyk contractor for domain pruning. To avoid the repeated evaluation of function value the algorithm suggested uses B-Spline coefficients to find the value of Krawczyk operator and the computation of derivative of polynomial function. We solved three circuit analysis problems using the proposed algorithm and compared the performance of proposed algorithm with INTLAB-based solver and found that the former is more efficient in terms of computation time and number of iterations.

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27_Constrained global optimization of multivariate polynomials using polynomial B-spline form and B-spline consistency prune approach by Dr. Deepak Gawali

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CONSTRAINED GLOBAL OPTIMIZATION OF MULTIVARIATE POLYNOMIALS USING POLYNOMIAL B-SPLINE FORM AND B-SPLINE CONSISTENCY PRUNE APPROACH

DEEPAK D. GAWALI[1,*], BHAGYESH V. PATIL[2], AHMED ZIDNA[3] AND P. S. V. NATARAJ[4]

Abstract. In this paper, we propose basic and improved algorithms based on polynomial B-spline form for constrained global optimization of multivariate polynomial functions. The proposed algorithms are based on a branch-and-bound framework. In improved algorithm we introduce several new ingredients, such as B-spline box consistency and B-spline hull consistency algorithm to prune the search regions and make the search more efficient. The performance of the basic and improved algorithm is tested and compared on set of test problems. The results of the tests show the superiority of the improved algorithm over the basic algorithm in terms of the chosen performance metrics for 7 out-off 11 test problems. We compare optimal value of global minimum obtained using the proposed algorithms with CENSO, GloptiPoly and several state-of-the-art NLP solvers, on set of 11 test problems. The results of the tests show the superiority of the proposed algorithm and CENSO solver (open source solver for global optimization of B-spline constrained problem) in that it always captures the global minimum to the user-specified accuracy.

Mathematics Subject Classification. 90-08.

Received June 7, 2021. Accepted November 30, 2021.

1. INTRODUCTION

Generally constrained global optimization of nonlinear programming problems (NLP) is the study of how to find the best (optimum) solution to a problem. The constrained global optimization of NLPs is stated as follows.

$$\min_{x \in \mathbf{x}} f(x) \tag{1.1}$$

$$\text{s.t. } g_i(x) \leq 0, \quad i = 1, 2, \ldots, p, \tag{1.2}$$

$$h_j(x) = 0, \quad j = 1, 2, \ldots, q. \tag{1.3}$$

Keywords. Polynomial B-spline, global optimization, polynomial optimization, constrained optimization.

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The journal enjoys international stature, and it is also listed in UGC-CARE List, Category I. It reaches out to decision-makers in the CRIP sector, policymakers, consultants, and research, education & training institutes.

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Prediction of Building Construction Cost Using Variable Selection

Viren B. Chandanshive[1] and A. R. Kambekar[2]

Abstract : Estimating construction costs with a greater degree of precision early in the construction process is a critical factor in the construction industry. The aim of this research is to provide a cost estimation model applying Multiple Linear Regression (MLR) analysis to forecast the cost of building construction projects in India. For the development of the regression model, a total of 78 data sets of building construction projects were collected from the Mumbai region, India. The most significant eleven cost variables were applied as independent variables where as construction cost performs the role of the dependent variable. The enter, backward and forward methods were applied to build and develop the MLR models. The results obtained from the Enter method model show a stronger correlation test, with a value of 0.973 for the coefficient of correlation (R). The linear relationship between expected and actual costs was also defined by the coefficient of determination (R2), which was 94.6 percent. The Enter method revealed that the prediction is superior to that of the other two methods of regression analysis. With sophisticated statistical techniques, the designed regression model can quickly understand complex and broad data, improving the quality and consistency of decision-making. This study contributes to the Indian construction industry and delivers an effective concept about the project cost prediction modeling which will be helpful to the investors.

Keywords : *Building Construction Cost, Multiple Linear Regression (MLR); Estimation; Early-stage; Prediction.*

INTRODUCTION

Since only a small amount of knowledge about drawings and design is available early in the construction process, construction cost estimation performs an important role in investors' decision-making (Cho, H. G., et al., 2013; Badawy, M.2020; Kim, G. et.al., 2013) The method of providing a construction cost estimate for a project is difficult because it requires a large number of cost factors that must be accurately calculated based on sufficient research, prior experience, and investigation. Due to the paucity of data and information, the prediction of the construction cost with a higher level of precision becomes a very critical job for the quantity surveyor (Al-Zwainy, F. M. S., et al., 2013) The imprecise cost prediction may lead the project's success in to failure (Badawy, M., 2020).

Using multiple linear regression analysis, this research aims to create and utilize a cost estimation model that can estimate the construction cost of residential building projects at an early stage. Typically, structural elements, brick masonry, finishing works, and other factors have had a greater effect on the construction cost of projects. The construction industry in Mumbai and its surrounding regions in India, provided data for 78 residential building construction projects for this research. The statistical approach and regression analysis have been applied to develop Multiple Linear Regression (MLR) cost prediction models. The proposed MLR model consists of a total of eleven input design parameters, which can be easily identified with the help of architectural drawing and limited design data at the early stage while the construction cost performs the role of output parameter (Arafa, M., and Alqedra, M. (2011).

The subsequent segments present review of the literature, summary of the multiple regression analysis methods, research methodology, development of regression models, and discussion of results. The final segment completes and concludes the study.

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LITERATURE REVIEW

The statistical approach regression analysis has several applications in numerous areas of civil engineering for prediction as well as estimation rationale. Some of the critical works of regression analysis are mentioned in this section.

Estimating the cost prediction of public-school building by MLR method was utilized successfully in Jordan (Al-Momani, A. H. 1996). Data of over 125 school projects were collected for a tenure of ten years. The resulting inferences were drawn based on the review of the developed model: the total cost exceeds the budget by 30% by the time the project is completed, and a shift in order results in an 8.03 percent cost overrun. Similarly, for the prediction of school building a comparison between MLR and Artificial Neural Network (ANN) model was employed in Korea (Cho, H. G., et al., 2013; Badawy, M.2020; Kim, G. et.al., 2013). Out of 96 data which were collected over the period from 2004 to 2007, 76 were utilized to build the model and the outstanding 20 were applied for evaluating the regression model with the ANN model. The ANN model had a better forecasting capacity concerning average error rate and standard distribution, according to the study. Similarly, for the United Kingdom area, estimation of the school building was done using a comparison of MLR, ANN, and Support Vector Machine (SVM) (Kim, G. H., et al., 2013). Total data of 217 were collected over four years. ANN model was found to outperform the Regression and SVM model. The MLR model was applied to estimate the construction costs for typical and sustainable college buildings located in North America (Alshamrani, O. S., (2017). The model was developed based on factors like cost per square feet of structure for steel and concrete, building area, number of floors, and height of the structure. The developed model was validated against true site data and had an accuracy rate of 94.3% (Alshamrani, O. S., (2017).

Besides, the MLR model is also applied for early cost assessment of residential schemes in Iraq (Alshemosi, A. M. B. and Alsaad, H. S. H. 2017). Ten influential parameters which are experience of the estimator, market status economic stability, the accuracy of bidding documents, site condition and a total area of a residential building, height of the residential building, project location, type of residential building, estimating method were utilized for developing the MLR model. The developed MLR model had an accuracy of 91.76% with MAPE of 8.248% and a coefficient of regression of 95.74%. A regression model was established for the region of Canada for assessing the cost of construction for small-scale residential buildings (Alshibani, A. et al., 2018). The factors included for developing the regression model were area, number of storey, structure, envelope, and floor to floor height of the structure. The value of the coefficient of regression was 85.3% for the developed model and the further validation of this developed model with real-time data showed 90.66% accuracy with the real on-site data. Project cost estimation of building using MLR was developed in the United Kingdom (Lowe, D. J., Emsley, M. W., and Harding, A. 2006). Over 286 data sets were collected for developing the regression model. Five variables emerged in every six models produced, indicating their impact in model development: Gross Internal Floor Area (GIFA), function, length, mechanical installations, and piling, out of the forty-one factors listed. The log of cost backward model was the best regression model created, with a coefficient of determination R2 of 0.661 and a MAPE of 19.3 percent (Lowe, D. J. et al., 2006). The model was validated with past data which were not used to train the model and showed remarking results with MAPE of 25%. To overcome technical insufficiency for predicting the project cost a regression model was developed in Singapore (Chan, S. L., and Park, M. 2005). The established model took into account factors such as high technical skills, contractor's specialized skills, contractor's experience, owners' intensity of construction sophistication, and contractor's financial management capacity, among 59 total factors (Al-Zwainy, F. M. S. et al., 2013). The regression value for the model was 62%.

Using MLR, a construction productivity model was developed using 100 data sets in Iraq (Al-Zwainy, F. M. S. et al., 2013). With a coefficient of regression of 90.6 percent and a typical precision percentage of 96.3 percent, the MLR model built, had a higher proficiency for finishing works (Al-Zwainy, F. M. S., and Hadhal, N. T., 2013). The regression model was created in India to estimate the project's construction cost and length (Thomas, N., and Thomas, A. V. 2017).

Cost of construction and duration of 51 real-time site data were collected for developing the model. Factors used for developing the model were actual periods (days), area (sq.ft.) estimated cost (Rs.), and estimated period (days) (Boye, P. et al., 2017). The developed model had a regression value of 96.8%. Estimation of the housing unit price (HPU) for one and the two-bedded room was conducted in Ghana (Boye, P. et al., 2017). The factors included for estimation of prices were intercept, cement, sand, iron rods, roofing, paint, and wood, and the data for the same was collected over the past fifteen years before the study (Ganiyu, B. O., and Zubairu, I. K. 2010). The developed MLR model showed price variation of 1.27% and 2.02% for one bedded and two-bedded houses respectively from the original known HPU. With major set backs of longer duration for completing the project leading to escalating the cost of the project, an MLR model was developed for cost estimation of a public building for the country of Nigeria (Ganiyu, B. O., and Zubairu, I. K. 2010).

Approximation of residential buildings was done in Egypt using a hybrid approach between ANN and MLR model (Badawy, M., 2020). Data of 174 residential projects were collected across the country. The parameters for the study included: number of floors, the area of the floor, the type of external finishing, and the type of internal finishing, which had a further sub-section of factors under each head Badawy, M., 2020). Multiple linear regression was used to derive the recommended cross breed model from the artificial neural network and the regression analysis models. The hybrid model's MAPE was 10.64 percent, which was lower than both the ANN and MLR models. For construction cost estimation, a comparison between the Regression model, ANN model, and Case-Based Reasoning (CBR) was completed in Korea (Kim, G. H. et al., 2004). Around 530 data sets were collected for developing the model. It was found that NN performed the best but the CBR model had better estimating value in consideration to long-term estimation. Likewise, a similar model was generated to compare construction cost estimation between ANN, Regression, and Time Series analysis for the country of Egypt (Elfahham, Y., 2019). Based on the Construction Cost Index (CCI) a factor that is widely used for estimation of the project cost was formulated to develop the ANN, MLR, and Time Series mode. The Vector auto regression time series produced the finest outcomes, with a typical absolute error of 3.5 for ANN 8.3 and a Regression model of 17.5.

Apart from the estimated cost of construction projects, the MLR technique is also employed for predicting the material that would be consumed for the framework of the shear wall structure in the country of China (Wu, Z., and Chen, X., 2015). The MLR model is also being used in Saudi Arabia (Al-Zwainy, F. M. S. et al., 2013). for early cost estimation of road projects, as well as in China (Xia, C. Y., (2014). for road construction costs. MLR has also been successfully implemented for estimation of infra-projects like bridge construction in India (Garkal K. et al., 2019) early cost prediction for road tunneling in Greece (Petroutsatou, C. et al., 2006). and in Iraq, MLR techniques were successfully used to estimate the expense of erecting communication towers (Al-Zwainy, F. M. S., and Hadhal, N. T., 2013). Regarding seven dominating factors like involving Security Conditions, Tower Types, Experience of Contractor, Foundation Types, Tower High, Main Cable and Site Area, the model developed in SPSS was performed with a proficiency of 90.1% with MAPE of 9.891% and value of R as 98.6% (Al-Zwainy, F. M. S, and Hadhal, N. T., 2013). From the context presented, it is evident that the MLR can be deployed for a vast variety of estimation project works in civil engineering. It is evident from the literature study that the MLR method of analysis for predicting the early estimation cost for different sorts of works related to civil engineering and other engineering works can be successfully implemented.

REGRESSION ANALYSIS

Regression analysis (RA) is a most commonly used statistical methodin civil engineering projects. (Montgomery D. C. et al., 2021) (Rawlings, J. O. et al. 2001) for analyzing and modeling the relationship between variables. It is one of the best illustrative techniques and broadly utilized in cost estimation for various civil engineering projects.

The function in a regression analysis consists of a contingent variable and one or additional individual variables, while in a multiple regression analysis, the function is comprised of two or more independent variables that describe the difference in target value

along with the functional equation (Cho, H. G. et al., 2013). In multiple regression, to predict a dependent or response variable γ based on a presumed linear relationship with several independent or predictor variables χ_1, χ_2.....χ_k, the multiple linear regression model can be expressed by Equation 1 (Carbno, C., 2007).

$$\gamma = \beta_0 + \beta_1 x_1 + \beta_2 \chi_2 + \ldots\ldots\ldots\ldots + \beta_k \chi_k + \varepsilon \quad \text{Equation 1}$$

where;

γ = the value of the dependent variable
β_0 = the regression constant
β_1 = the partial regression coefficient for independent variable 1
β_2 = the partial regression coefficient for independent variable 2
β_κ = the partial regression coefficient for independent variable k
κ = the number of independent variables

In multiple linear regression analysis, y indicates the dependent relative (or analysis) variable that is linearly related to k independent variables χ_1, χ_2, ...χ_κ within the parameters β_1, β_2,.....β_κ. The response variable and partial regression coefficient of an independent variable β_i denotes the increase in the value of y that would result from a one-unit increase in that independent variable if all other variables remained constant (Carbno, C., 2007).

A multiple regression model's partial regression coefficients and regression constants are undetermined populace values. These values are determined in almost all investigations by using sample data, which is expressed by Equation 2 (Carbno, C., 2007).

$$\gamma = b_0 + b_1\chi_1 + b_2\chi_2 + b_3\chi_3 + \ldots\ldots\ldots + b_\kappa\chi_\kappa \quad \text{Equation 2}$$

where;

γ = the predicted value of y
b_0 = the estimate of the regression constant
b_1 = the estimate of regression coefficient 1
b_2 = the estimate of regression coefficient 2
b_3 = the estimate of regression coefficient 3
b_κ = the estimate of regression coefficient k
κ = the number of independent variables

METHODOLOGY

There are three main sections to the methodology used in this analysis. The first section focuses on defining the main factors that influence the cost estimation of building projects at an early stage. The second section deals with the development of a cost estimation model based on multiple linear regression. The third part concerns the comparative study of the developed regression models for estimating the construction cost. To verify the best MLR model, a model validation analysis is also conducted. This investigation's approach is illustrated in *Figure 1*.

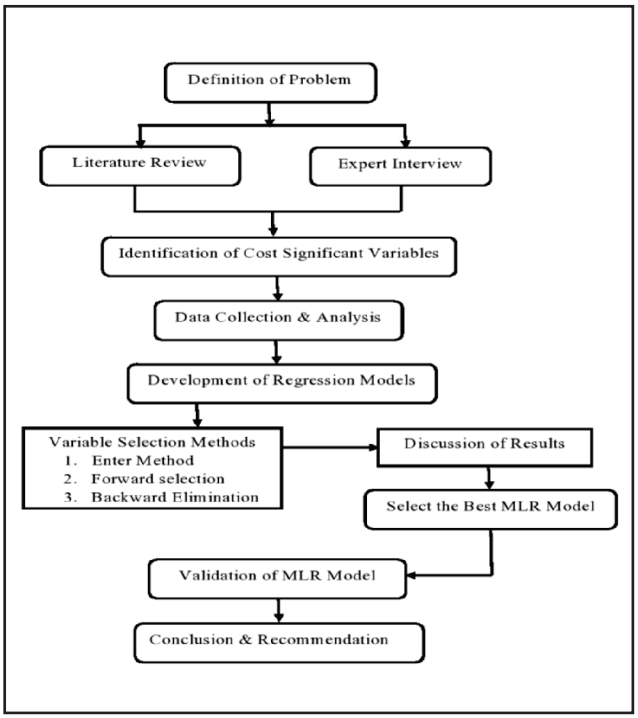

Figure 1: The Research Methodology

Definition of Problem

Using multiple linear regression models, this research aims to establish a model to estimate the construction cost of building construction projects at the preliminary stage.

Identification of Design Variables (Dependent-Independent variables)

Identification and selection of very significant components having a greater influence on building construction cost are important to build a multiple linear regression model (Carbno, C. 2007). The literature study of this research attempts to find the highly significant cost factors from the earlier associated research. The expert interviews are also conducted with civil engineering companies, architectural firms and structural design professionals from the Indian construction industry to identify the most significant parameters. The most important cost

variables are utilized as design independent variables while the construction cost is the dependent variable for the development of regression models. For this research, a total of six structural elements cost components and other such parameters are considered which are having a major impact on construction cost. The foundation, columns, ground floors, beams, slab, shear, elevator walls, and other structural cost variables are usually used in the structural skeleton Arafa, M., and Alqedra, M., (2011). and the masonry, plastering, and flooring work variables are the most appropriate for the Indian construction industry. A total of 11 crucial cost-effective independent variables of building construction projects were defined based on this assessment and the literature review, to measure the construction cost of building projects at the preliminary phase.

Data Gathering and Interpretation

In this research, a total of 78 building construction project's database and requisite critical documents were collected from the various parties involved in the construction industry like civil engineering companies, architectural firms, contractors, builders, real estate developers and structural designers which are in Mumbai and its nearby regions in India. The database includes information related to all 11 independent variables and construction cost of a bungalow, small and medium scaled apartment projects. For the collection of data, recently constructed projects were selected and some of them had a schedule of completion between 2018-2020. Irregular type of building data is generally averted through the assortment of data because the development of regression models requires only a similar type of data for its analysis and better prediction (Arafa, M. and Alqedra, M., 2011).

Table 1 lists the details of all 11 input (independent) and output (dependent) variables, as well as their minimum and maximum ranges. *Table 2* illustrates the descriptive statistics of the data, that was obtained.

Table 1: Input and Output Design Parameters

Variables	Unit	Type	Range	Variable Type
Ground Floor Area	m^2	Numerical	55.46 - 1409.86 (m^2)	Independent variables
Typical Floor Area	m^2	Numerical	0 - 1801.21 (m^2)	
No. of Floors	Nos.	Numerical	1 - 15 Nos.	
Structural Parking Area	m^2	Numerical	0 – 571.66 (m^2)	
Quantity of Elevator Wall	m^3	Numerical	0 – 374.61 (m^3)	
Quantity of Exterior Wall	m^3	Numerical	24.45 – 842.94 (m^3)	
Quantity of Exterior Plaster	m^2	Numerical	59.68 – 2001.83 (m^3)	
Area of Flooring	m^2	Numerical	95.37 - 11491.71 (m^2)	
No. of Columns	Nos.	Numerical	14 – 138 (Nos.)	
Types of foundation	➢ Isolated footing = 1 ➢ Isolated and combined footing = 2 ➢ Raft foundation = 3	Nominal	-	
No. of householders	Nos.	Numerical	1 – 129 (Nos.)	
Construction Cost	Indian Rupees Rs. /-	Numerical	14,66,277 – 21,79,59,593 (Rs.)	Dependent variable

Table 2: Descriptive Statistics of Collected Database

Variables	Mean	Standard Deviation	N
Construction Cost	26885681.53	30370643.56	78
Ground Floor Area	348.97	308.51	78
Typical Floor Area	343.22	342.08	78
Structural Parking Area	125.12	116.99	78
Quantity of Flooring	1933.22	2048.24	78
No of Floors	5.58	2.71	78
Quantity of Elevator Wall	34.39	56.16	78
Quantity of Exterior Wall	208.84	149.69	78
Quantity of External Plaster	498.55	354.25	78
No. of Columns	36.79	21.72	78
Types of Foundation	1.60	0.71	78
No. of Households	24.65	23.06	78

Development of Multiple Linear Regression Model

In this research, the IBM® SPSS® Statistics version 26 software is utilized to build a predictive multiple linear regression model. Using a user-friendly interface, SPSS Statistics software can analyze and understand large and complex data, as well as solve complex business and analysis problems.

For this study, three different variable selection methods are adopted for the development of regression models. First, the Enter regression modeling technique is applied which is most adapted to build a multiple linear regression model. In this technique, all independent variables versus the dependable variable, which is the target cost are selected and hence it builds only one model for the prediction purpose. Second, the Forward selection method is applied, in which a step wise selection of variables is carried out sequentially into the model. The sequence of independent variables depends upon the largest positive or negative correlation with the dependent variable. Third, the Backward Elimination method is applied in which all variables are inserted into the equation and then consecutively eliminated according to their lowest partial correlation with the dependent variable. The Forward Selection and Backward Elimination methods select sets of independent variables versus the dependable variable, resulting in various prediction models.

DISCUSSION OF RESULTS

In this research, three input variable selection methods of regression analysis were applied to develop the cost prediction models. A total of twelve multiple linear regression models were developed. The Enter method allows stepwise regression by allowing all independent variables to be entered into a regression in blocks. The summary of the overall model fit by using Enter method is shown in *Table 1*. The coefficient of correlation R, which is the association between the actual cost and the predicted cost, is 0.973. The overall measure of association power, the coefficient of determination R-Square, is 94.6 %, suggesting that the established model is more accurate.

Table 3: Summary of Overall Model Fit (Enter Method)

Model	R	R Square	Adjusted R square	Std. error of the estimate	Change statistics					Durbin-Watson
					R square change	F change	df1	df2	Sig. f change	
1	0.973	0.946	0.937	7604426.112	0.946	105.654	11	66	0.000	2.237

a. **Predictors:** (Constant), No. of Households, Types of Foundation, Typical Floor Area, No of Floors, Quantity of Elevator Wall, No. of Columns, Structural Parking Area, Quantity of Exterior Wall, Gro und Floor Area, Quantity of Flooring, Quantity of External Plaster

b. **Dependent Variable:** Construction Cost

Table 4: Summary of MLR Model (Forward Selection Method)

Model	R	R Square	Adjusted R square	Std. error of the estimate	Change Statistics					Durbin-Watson
					R square change	F change	df1	df2	Sig. f change	
1	0.940[a]	0.883	0.881	10462166.53	0.883	572.867	1	76	0	
2	0.961[b]	0.923	0.921	8514487.802	0.041	39.747	1	75	0	
3	0.965[c]	0.931	0.928	8153030.019	0.007	7.798	1	74	0.007	
4	0.967[d]	0.935	0.932	7934227.328	0.005	5.138	1	73	0.026	
5	0.970[e]	0.941	0.937	7649683.439	0.005	6.532	1	72	0.013	2.051

a. **Predictors:** (Constant), Quantity of Flooring
b. **Predictors:** (Constant), Quantity of Flooring, Quantity of Elevator Wall
c. **Predictors:** (Constant), Quantity of Flooring, Quantity of Elevator Wall, No of Floors
d. **Predictors:** (Constant), Quantity of Flooring, Quantity of Elevator Wall, No of Floors, Structural Parking Area
e. **Predictors:** (Constant), Quantity of Flooring, Quantity of Elevator Wall, No of Floors, Structural Parking Area, Ground Floor Area
f. **Dependent Variable:** Construction Cost

The adjusted R-square is an attempt to approximate the R-squared for the population with a more reliable value. The adjusted R-square 0.937 is also very close to R-square. Besides, the standard error of the estimation and change statistics of the calculations are shown in Table 1. According to the statistics test for auto-correction, the Durbin-Watsonstatistic is 2.237, indicating the negative auto correlation.

Total five different models were developed by using the Forward selection method. Each predictor is entered individually, commencing with the one with the maximum correlation to the dependent variable. The selection of all predictors and summary of overall model fit for all five models is shown in Table 4. Model no. five has the coefficient of correlation R as 0.970 along with 94.1% accuracy. The Durbin-Watsonstatistic is also in its range criteria and the error criteria are also low.

Backward elimination is the inverse of Forward elimination, in which all independent variables are first inserted into the equation and then removed one by one if they do not participate in the regression equation. Stepwise selection involves calculating the contribution of each predictor variable, and Table 4 summarizes the overall model fit for all six models. Model no. one, two, and three have the coefficient of correlation R as 0.973 along with 94.6% accuracy.

The results have shown that model 1 from Enter method, model five from Forward selection, and model one, two and three from Backward elimination methods perform with higher accuracy and better prediction. But the developed MLR model 1 through Enter method, revealed that the prediction is superior to that of the other two methods of regression analysis. Table 6 represents the unstandardized coefficients, which include standard errors and Beta standardized coefficients, as well as the t-value and 2 tailed p-values utilized in analyzing the null hypothesis of the MLR model developed using the Enter method.

When evaluating the regression approach, the adjusted R-Square (R2) value shows the percentage change ability in the cost that can be enlightened by the model's parameter. The p-values reflect the degree of significance of the various parameters. The respective slope coefficients of independent variables such as Structural Parking Area, Quantity of Flooring, No. of Floors, and Quantity of Elevator Wall indicate the significance level from a statistical perspective, as per the T-test (at P-values P 0.05). The independent variables, Ground Floor Area, Typical Floor Area, Quantity of Exterior Wall, Total Quantity of Exterior Plaster, Number of Columns, Types of Foundation, and Number of Households had no significant effect on the established MLR model, according to the T-test. The coefficients in the regression equation used to predict the dependent variable from the independent

variables are known as the unstandardized coefficients (B). The regression equation can be developed using the values of unstandardized coefficients. The statistical correlation amongst the forecaster variables and the rejoinder variable, as well as the MLR Model's regression coefficients values, are shown in Equation 3.

Predicted Cost (Y) = (-3240380.954 + 19341.482 X1 + 16812.419 X2 – -95555.203 X3 + 7852.491 X4 + 1886244.704 X5 + 177597.659 X6 + 25809.604 X7 – 20223.414 X8 -37984.207X9– 1754841.352 X10 + 269390.040 X11) Equation3

The null hypothesis that the coefficient/parameter is zero was evaluated using the t-value and two-tailed p-value. According to the two-tailed test, coefficients with p-values less than alpha are statistically relevant. The coefficient for Ground Floor Area (0.196) is not statistically relevant at the 0.05 mark since the p-value is greater than 0.05. Ground Floor Area (0.196), Typical Floor Area (0.189), Quantity of Exterior Wall (0.127), Quantity of External Plaster (-0.236), No. of Columns (-0.027), Types of Foundation (-0.041), and No. of Households (0.205) are not statistically important at the 0.05 level, because the p-value is greater than 0.05.The coefficients for Structural Parking Area (-0.368), Quantity of Flooring (0.530), Number of Floors (0.169), and Quantity of Elevator Wall (0.328) were statistically important because the p-value was less than 0.05. Figure 2 and Figure 3 show that the basic of the histogram of the standardized residuals is following the normal distribution, and the base of the standardized regression P - P figure is in a straight line, indicating that the regression equation is relevant, respectively (Wu, Z. and Chen, X., 2015).

Table 5: Summary of MLR Model (Backward Elimination Method)

Model	R	R Square	Adjusted R square	Std. error of the estimate	Change statistics					Durbin-Watson
					R square change	F change	df1	df2	Sig. f change	
1	0.973[a]	0.946	0.937	7604426.112	0.946	105.654	11	66	0.000	
2	0.973[b]	0.946	0.938	7551749.331	0.000	0.075	1	66	0.785	
3	0.973[c]	0.946	0.939	7506062.455	0.000	0.180	1	67	0.673	
4	0.972[d]	0.945	0.939	7507074.605	-0.001	1.019	1	68	0.316	
5	0.972[e]	0.944	0.939	7530084.320	-0.001	1.430	1	69	0.236	
6	0.971[f]	0.943	0.938	7571223.564	-0.001	1.778	1	70	0.187	2.200

a. Predictors: (Constant), No. of Households, Types of Foundation, Typical Floor Area, No of Floors, Quantity of Elevator Wall, No. of Columns, Structural Parking Area, Quantity of Exterior Wall, Ground Floor Area, Quantity of Flooring, Quantity of External Plaster.

b. Predictors: (Constant), No. of Households, Types of Foundation, Typical Floor Area, No of Floors, Quantity of Elevator Wall, Structural Parking Area, Quantity of Exterior Wall, Ground Floor Area, Quantity of Flooring, Quantity of External Plaster.

c. Predictors: (Constant), No. of Households, Types of Foundation, Typical Floor Area, No of Floors, Quantity of Elevator Wall, Structural Parking Area, Ground Floor Area, Quantity of Flooring, Quantity of External Plaster.

d. Predictors: (Constant), No. of Households, Types of Foundation, Typical Floor Area, No of Floors, Quantity of Elevator Wall, Structural Parking Area, Quantity of Flooring, Quantity of External Plaster.

e. Predictors: (Constant), No. of Households, Types of Foundation, Typical Floor Area, No of Floors, Quantity of Elevator Wall, Structural Parking Area, Quantity of Flooring.

f. Predictors: (Constant), No. of Households, Typical Floor Area, No of Floors, Quantity of Elevator Wall, Structural Parking Area, Quantity of Flooring.

g. Dependent Variable: Construction Cost.

Table 6: Unstandardized Coefficients Enter Method

Model		Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.	95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error				Lower Bound	Zero-order Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	-3240380.954	4393454.250		-0.738	0.463	-12012195.386	5531433.478					
	Ground Floor Area	19341.482	18657.005	0.196	1.037	0.304	-17908.430	56591.394	0.804	0.127	0.030	0.023	44.115
	Typical Floor Area	16812.419	14695.393	0.189	1.144	0.257	-12527.881	46152.718	0.789	0.139	0.033	0.030	33.650
	Structural Parking Area	-95555.203	32056.920	-0.368	-2.981	0.004	-159558.908	-31551.498	0.850	-0.344	-0.085	0.053	18.727
	Quantity of Flooring	7852.491	2934.806	0.530	2.676	0.009	1992.962	13712.019	0.940	0.313	0.076	0.021	48.115
	No of Floors	1886244.704	783906.260	0.169	2.406	0.019	321125.358	3451364.050	0.723	0.284	0.069	0.166	6.028
	Quantity of Elevator Wall	177597.659	52064.487	0.328	3.411	0.001	73647.557	281547.761	0.883	0.387	0.097	0.088	11.383
	Quantity of Exterior Wall	25809.604	61223.155	0.127	0.422	0.675	-96426.369	148045.578	0.864	0.052	0.012	0.009	111.832
	Quantity of External Plaster	-20223.414	27694.167	-0.236	-0.730	0.468	-75516.602	35069.775	0.857	-0.090	-0.021	0.008	128.157
	No. of Columns	-37984.207	138716.506	-0.027	-0.274	0.785	-314940.648	238972.234	0.854	-0.034	-0.008	0.083	12.091
	Types of Foundation	-1754841.352	1509190.447	-0.041	-1.163	0.249	-4768037.301	1258354.597	0.388	-0.142	-0.033	0.656	1.523
	No. of Households	269390.040	137207.370	0.205	1.963	0.054	-4553.314	543333.394	0.848	0.235	0.056	0.075	13.335

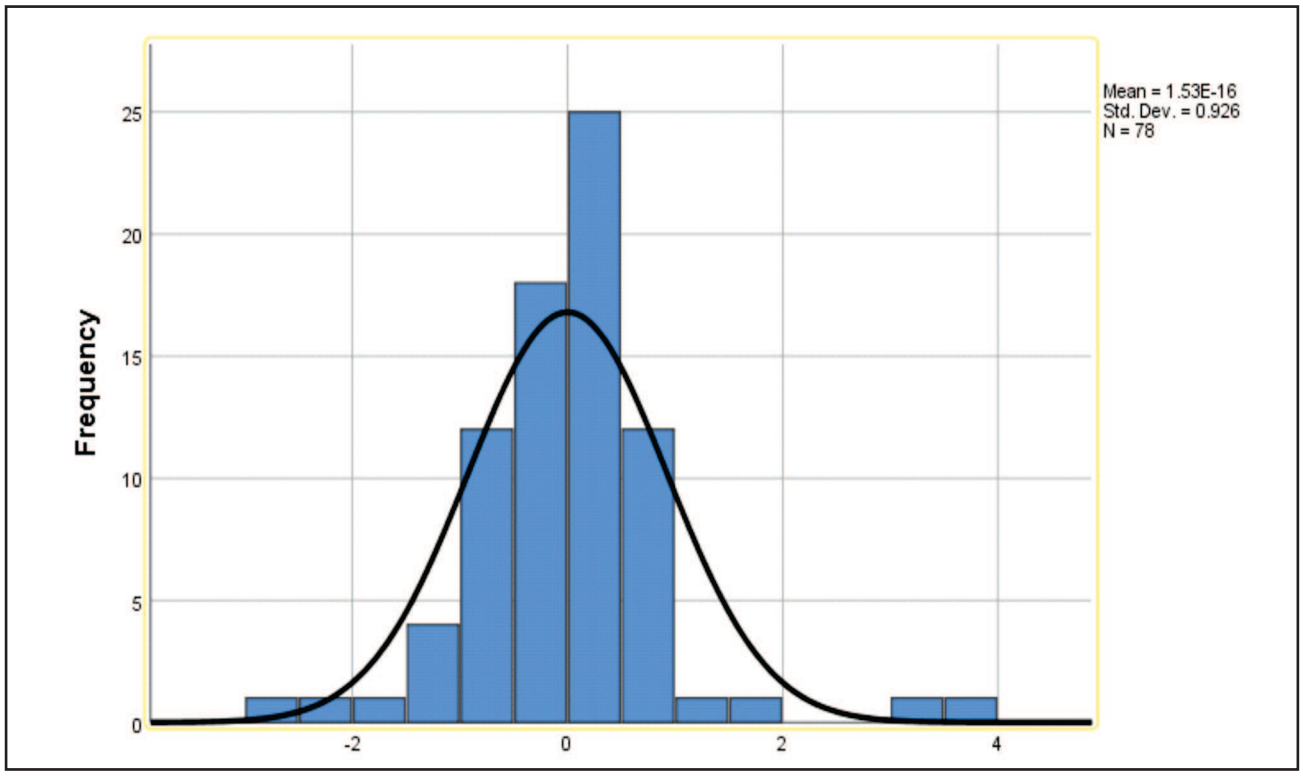

Figure 2: Standardized Residuals Histogram

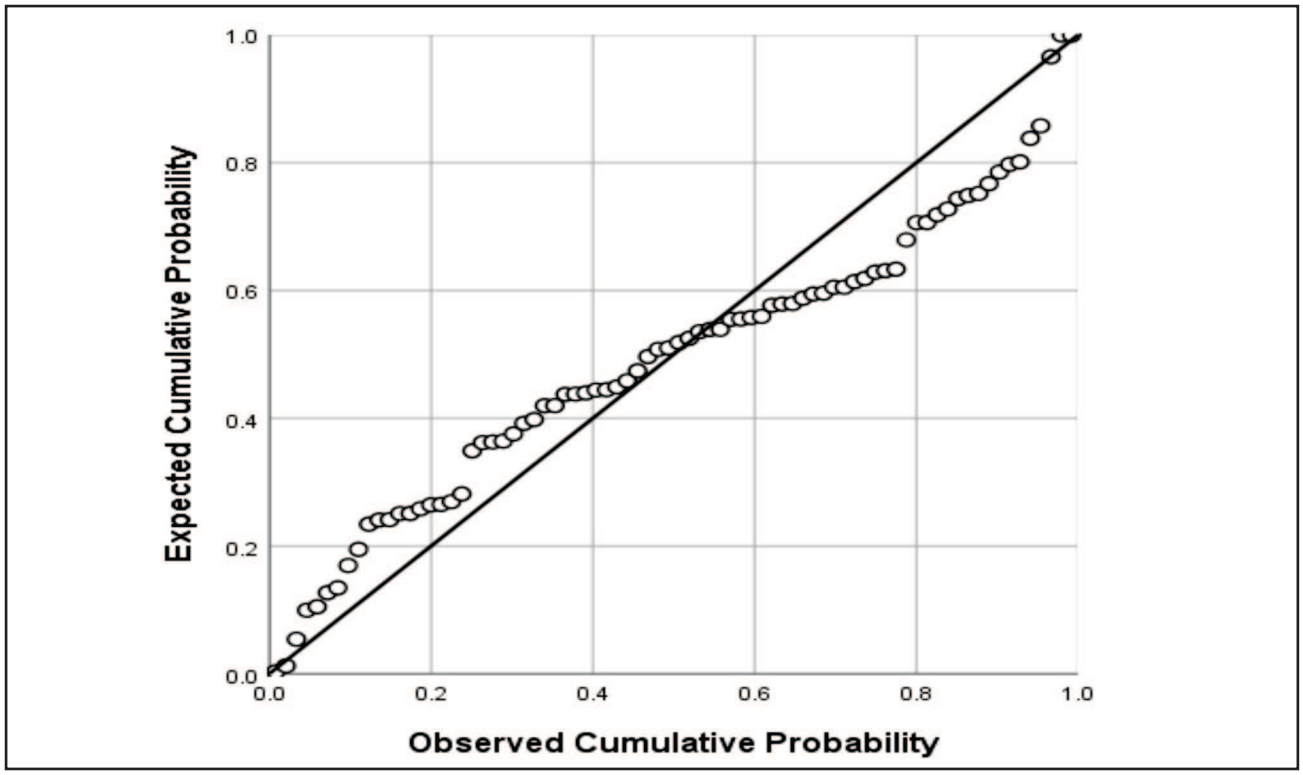

Figure 3: Standard P-P Plot for the Regression Standardized Residual

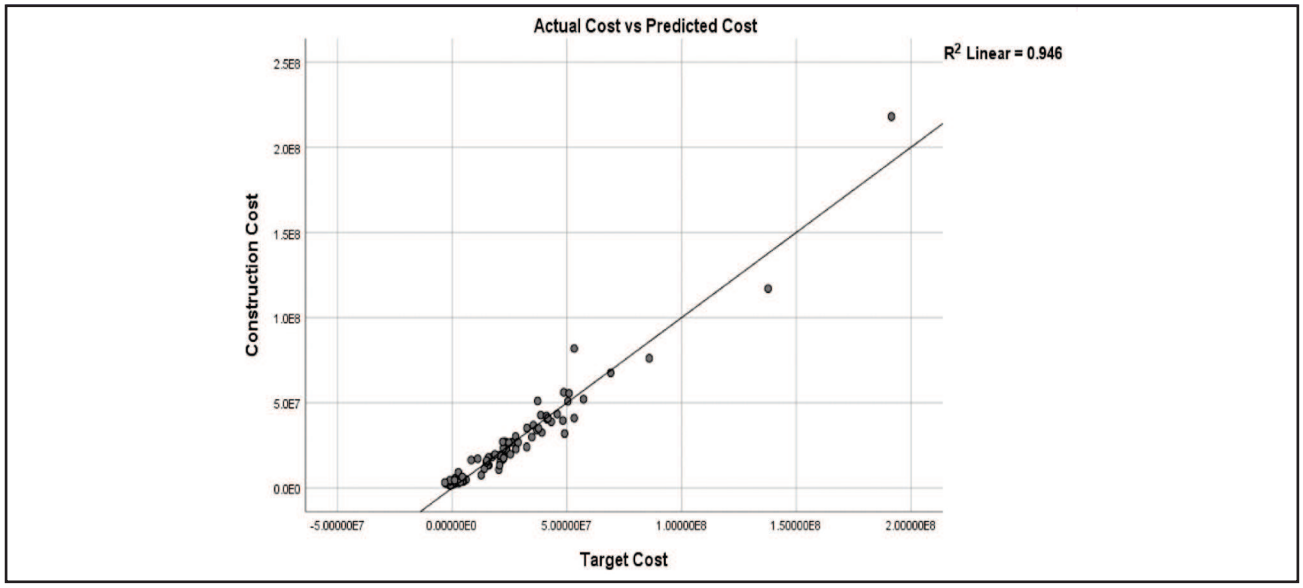

Figure 4: Validation MLR Model – Enter Method

Table 7: Verification Results of the Regression Model

Case No.	Construction Costs	Predicted Costs	Residual	Std. Residual
1	35110233	32567374	2542858.692	0.334
2	22358493	23333472	-974979.384	-0.128
3	13283316	15971342	-2688026.070	-0.353
4	26897339	26150366	746972.352	0.098
5	13309435	15395819	-2086383.681	-0.274
6	56122101	48620317	7501783.856	0.987
7	2835054	2685186	149867.411	0.020
8	22115691	23184232	-1068541.530	-0.141
9	55533616	50931590	4602026.472	0.605
10	29891217	34681494	-4790276.738	-0.630
11	16538135	21892144	-5354009.630	-0.704
12	4827580	6026023	-1198442.698	-0.158
13	3829008	4890487	-1061479.379	-0.140
14	11324146	13991352	-2667206.015	-0.351
15	4617449	4263203	354245.601	0.047
16	3730752	3053340	677411.979	0.089
17	36838454	35364958	1473495.550	0.194
18	15138448	14947190	191257.747	0.025
19	5678036	1283002	4395034.364	0.578
20	22560724	23717443	-1156719.205	-0.152
Mean (%) Std. Residual				**-0.2703**
Standard deviation Std. Residual				**0.39767236**

Table 8: Analysis of Variance

Model (Enter Method)	Sum of Squares	df	Mean Square	F-Ratio	p-Value
Regression	6.7E+16	11	6.10967E+15	105.654	0.000
Residual	3.8E+15	66	5.78273E+13		
Total	7.1E+16	77			

VALIDATION OF MLR MODEL

For cost estimation, a total of twelve different multiple linear regression models were constructed using three different variable selection methods. The regression analysis model's average error rate and standard distribution were -0.2703 and 0.3976, respectively, as shown in Table 7. Based on this, it was discovered that the Enter method's estimation is superior to the other two regression analysis methods. A residual is the variation between the observed and predicted significances (y) of the dependent variable (y). The determination coefficient (R2) signifies the percent of the data that is nearest to the line of best fit to the regression model. Figure 4 displays the plot fit of Real construction cost versus Expected construction cost, which provides the Residual plot.

Table 8 represents the error criteria of the developed MLR model. The squared variations between the expected value of Y and the mean of Y are expressed by the number of squares. The sum of square errorduring regression is 6.7E+16 and for residual, it is 3.8E+15. There are 12 determinants in all, including the intercept, giving the model 12-1=11 degrees of freedom (DF). The residual degrees of freedom are 77 – 11 = 66, which is the DF number minus the DF model. The mean squares are determined by dividing the number of squares by their respective degree of freedom. As a result, the Regression's sum of squares is (6.7E+16) / 11 = (6.10967E+15), and the Residual's is (3.8E+15) / 66 = (5.78273E+13). The Mean Square Regression (6.10967E+15) is divided by the Mean Square Residual (5.78273E+13) to get F=105.654. This F value has a very small p-value associated with it (0.0000).

CONCLUSION

The various applications of regression analysis as well as artificial intelligence techniques in the estimation of a project's construction cost were explored in this research. The most critical cost factors that affect the project cost are described based on a literature review and expert interview, as well as advice from different real estate agencies. Three distinct variable selection approaches were used in this study to build regression models to predict project cost earlier in the construction process. About seventy eight cases from Mumbai and its nearby region were used for the development of both models.

The results have shown that model 1 from Enter method, model five from Forward selection, and model one, two and three from Backward elimination methods perform with higher accuracy and better prediction. The developed MLR model 1 Enter method revealed that the prediction is superior to the other two methods of regression analysis. The results show that the MLR Model Enter method has a stronger correlation test, with a value of 0.973 for the coefficient of correlation. The positive value indicates that a dependent variable (actual cost) and an independent variable have a strong relationship. Further, with a coefficient of determination of 0.946, the linear relationship between xi and y will explain 94.6 percent of the total variance of the independent variable to the actual cost (y). The remaining 5.4 percent of the overall difference in y is unaccounted for. The coefficient of determination, which was 94.6 percent in this study, was used to characterize the linear relationship between predicted and observed costs. This means that the model is extremely homogeneous with actual observations.

Over the past ten decades, regression methods have been commonly used for cost estimation and have a precise mathematical context. Regression methods are utilized to observe the outcome of different parameters on the project cost in order to estimate it. The dexterity in which regression methods grasp the relationships between the cost and the variables evaluated is their greatest power.

Such cost prediction models provide a general idea about the budget of the project, hence better decisions can be made. This research implies a significant role in both finance and construction management. It also has the ability to rapidly understand enormous amounts of complex data using advanced statistical methods that enhance decision-making precision and efficiency. Finally, this research contributes to the Indian construction industry and delivers an effective

concept about the project cost prediction modeling which will be helpful to the investors.

Name of Supporting Funds Organization

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Conflict of Interest

On behalf of all authors, the corresponding author states that there is no conflict of interest.

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29_Experimental Performance of Glass based Synthetic Dye Sensitized Solar Cell by Ashish J Chaudhari

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Experimental performance of glass based synthetic dye sensitized solar cell

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ABSTRACT

Owing to the depletion of fossil energy sources, the research concentrates over accretion of power from nonconventional sources of energy. The growth rate of utilizing of abundantly available solar energy lead research in area of solar cell which is cost effective, higher performance, long life. The technology of die sensitized solar cell has been explored with synthetic dye and electrolytes. The die sensitized solar cell has been manufactured in house with fully automatic special purpose machine in order to achieve accuracy of dye application, heating, electrolyte bath etc. Titanium Dioxide (TiO_2) being tested as dye for the solar cell. The electrolytic solution which is mixture of pure iodine ethylene glycol and potassium iodide. The graphite-based powder as catalyst being used as liquid conductor. The performance of this die sensitized solar cell being observed with exhaustive experimentations. The performance criteria include varying light intensity throughout the day, varying current densities, varying tilting angles of cell. It was found that the cell is producing output of 30 to 122 mV with current density of 3.85 to 6.33 mA/cm^2. The efficiency of cell range between 0.07 and 0.36%. This output is much lower in comparison to that of photo-voltaic cell. But owing to numerous advantages such as window, design glass over building as solar cell panel will make the difference with that of PV cell.
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1. Introduction

The global energy scenario since few decades shows substantial growth in consumption of the energy. The world energy outlook [1] reported the energy consumption was 12.7 TW in 1998 and predicted increase of 32.9 TW by next 50 years. Most of this energy demand is being fulfilled by fossil fuels such as coal, oil, nuclear energy etc. There is huge decrease in the fossil fuel reserves owing to increase in demand. Additionally, the environmental degradation and pollution caused due to greenhouse gases adversely affect climate changes with use of traditional fuels. Hence the energy resources which are inexpensive and environment friendly are to be explored and utilized. Solar energy is one such type of energy resource, which are the most abundantly available alternate sources being explored. Some of the renewable sources are solar energy, wind energy, geothermal energy, biomass energy and hydrogen energy.

Singh et al., proposed innovative technique of utilizing the solar energy for saline and dirty water purification to fresh drinking water using passive solar still and nanofluids solar stills [2]. The author developed the single basin passive and active solar distillers with novel desalting stills, passive solar still with double slope top cover, the technology of evacuated tube solar collector (ETC) assisted desalting units, thermosiphon ETC solar desalting units improves incident flux for extracting maximum solar radiations and hence improvement of performance [3–7]. Singh and Samsher proposes the evacuated annulus tube collector (EATC) for solar desaltification. This will further improves the performance over ETC. The thermosyphon EATC solar desaltification performance was compared with the ETC system and analyze the most smarter, economic with maximum yield system [8]. Samsher et al., highlights upon the advantages of active solar stills over passive one in terms of daily yield of water [9,10]. The active solar stills with nanofluids further improved the performance by way of reduction

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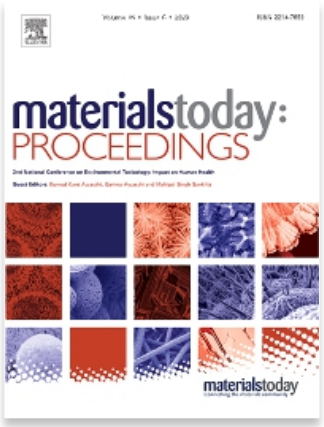

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30_Investigation of Performance Parameters Affecting the Efficiency of Solar Water Heater: A Review by Mr.Swapnil Mane

Investigation of Performance Parameters Affecting the Efficiency of Solar Water Heater: A Review

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ABSTRACT

The need for installation of Solar Water heater is increasing in society because of several factors such as rapid urbanization, government interventions, low cost of installations, and environment-friendly application acting as a direct replacement to fossil fuels. During the past few years, the research and development associated with the technological enhancement of the utilization of solar energy have increased exponentially. However, there are various challenges involved in the selection of proper solar technology to provide a high-performance energy harvesting application for domestic water heating requirements. There is a wide literature available on various performance parameters required to develop an efficient Solar Water Heating System. This paper investigates a state-of-the-art review of the performance parameters affecting the efficiency of Solar Water Heaters by component-wise analysis of parameters divided broadly into the design, operational and external parameters. The technological advancements in solar water heaters are classified based on performance parameters and the paper summarizes the possibility of combining different performance parameters to achieve more efficient and cost-effective solar water heaters for the society as future scope of the review for researchers working in the similar domain.

Keywords:
Solar Water Heating System, Performance parameters, Solar Efficiency, Flat Plate Collector, Evacuated Tube Collector, Phase Change Materials, Nanoparticles

1. Introduction

Global climate change has resulted to hunt for non-conventional energy sources in place of conventional fossil fuel-based energy sources. As per the Indian context and with the government favoring the use of renewable energy, the utilization of solar energy has increased by leaps and bounds. Solar technologies can be grouped into two broad domains, Solar Photovoltaic (SPV) which generates electricity, Solar Thermal (ST) which produces heat directly from the energy of the Sun and new technology which involves both generations of electricity and process heat which is Solar Photovoltaic and Thermal (SPV/T). All these choices have their advantages and disadvantages touted in the literature. To achieve higher solar contribution by selecting the best solar technology, one has to study the dominant factor responsible for altering the efficiency of the system [1]. Even though Solar energy is available in abundance, the technology required to harness the power of the Sun is costly.

The residential sector has an 80% share of Solar Water Heating (SWH) systems, the commercial sector which includes hotels, hospitals, others have 6%, 3%, 5% respectively and the industrial sector contains a 6% share of SWH systems. The percentage of share data shows that the residential sector is

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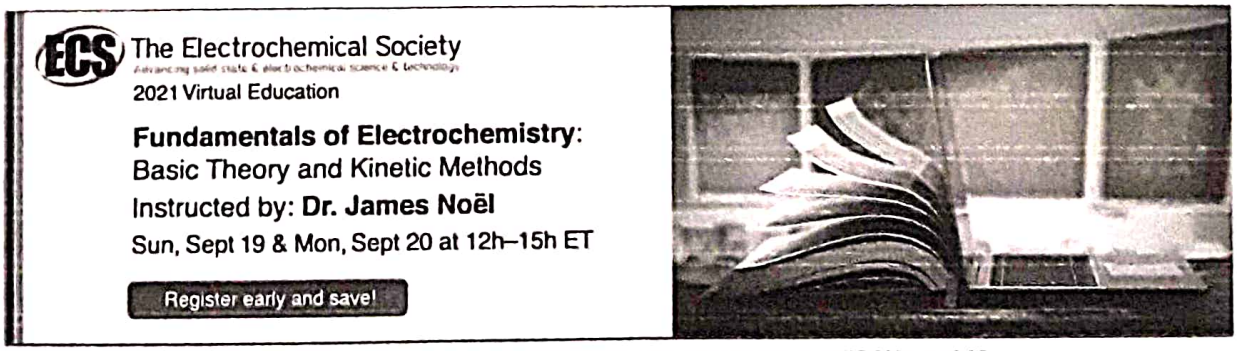

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Optimization of Power and Torque with lower Exhaust Noise for FSAE Vehicle

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Abstract. The exhaust noise is considered to contribute disturbance to large extent in any vehicle. The sound wave cancellation device is used for better noise attenuation without much compromise on engine efficiency. This paper aims to design an advanced muffler which gives considerably lower back pressure in exhaust system line, thereby optimizing the power and torque of an engine. Study includes close monitoring of parameters such as power, torque, and transmission loss within the given boundary conditions. The limiting condition laid by Formula Society of Automotive Engineer (FSAE) is satisfied using Ricardo Wave Build software.

1. Introduction

Engine is the main power source of automotive vehicle and it requires some device to reduce the continuous generated noise emitted by a vehicle. Muffler is an important component in the combustion engine as it plays a vital role in exhaust system of the vehicle. Its basic function is to reduce noise generated by the flowing burnt gases in the exhaust pipe and hence they can be considered as an acoustic noise reducer. The dampening of the pulsation in the exhaust gases are slowly allowed to expand in the muffler. Acoustic noise reduction is mostly achieved by introducing series of baffle which performs the obstruction to the sound pressure waves [1,2]. This design of baffles harmonically cancels the sound waves. This method proved to have significant noise quieting but principally due to increase in the back pressure of the gases in the exhaust system results in reduction of overall efficiency of the system. This compound path of gases in exhaust line is the major area of study. Also, effect on length variation of exhaust line on noise transmission loss needs to be observed.

Performance of engine system is characterized by analyzing its behavior with respect to speed and load parameters as discussed in [3]. Fuel consumption, exhaust noise, emissions, etc. could be considered in muffler design for optimization of torque and power. Mufflers are designed with various configurations, like Baffle type muffler which consist of baffle plates in the path of gas thereby creating obstruction to the natural flow. The main purpose of this muffler is to avoid straight path of gas and potentially reduce the noise, but power loss is very high. Whereas the principle of wave cancellation type of muffler is cancellation of flowing gas waves. This is designed to split the exhaust gases in number of paths. The overlap of crests and troughs of the flowing gas waves is used to calculate the length of path travelled, the process significantly reduces the noise level but only one frequency is attenuated. Resonance type muffler when connected to the exhaust line, due to Helmholtz principle the resistance to the gas flow is minimum hence compensation of engine power is reduced. Absorber type muffler uses sound absorbing material. This material absorbs sound of any frequencies. Backpressure due to this muffler is comparatively low but not very capable of noise reduction for range of frequencies. Resonance and absorber type muffler gives advantage of both mufflers resulting high noise attenuation with lower backpressure.

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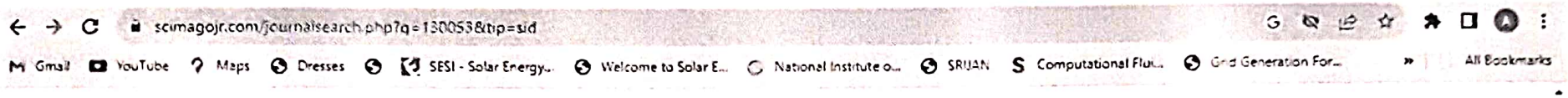

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32_Waste heat recovery from exhaust gas of an engine by using a phase change material by Mr. Ganesh Wahile

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Waste heat recovery from exhaust gas of an engine by using a phase change material

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ABSTRACT

An increase in the economic rapid development worldwide creates a problem of shortage of energy and hence conservation of energy is the need of an hour. A recent survey shows that a considerable amount of energy is released in the form of waste heat from internal combustion engines which creates another issue of air pollution. According to the study, the conversion rate of energy supplied to an engine into useful power output that is mechanical work is around 30–40%. It means that the exhaust gases contribute to about 33% and engine cooling capacity about 30% to that of the energy supplied which results in an increase in entropy and other serious environmental problems. Indeed more and more energy should be converted into useful work. The present work consists of thermal energy storage from the exhaust gas of twin-cylinder four-stroke diesel engines with the help of sodium nitrate being used as the Phase Change Materials (PCM) and the energy available in exhaust gas without Phase Change Materials. The test of fuel used as diesel for both with and without PCM. The exhaust gases from the twin-cylinder four-stroke diesel engine without PCM contain 45.1% energy transferred to the atmosphere. The exhaust gases with a thermal energy storage system exchanging of heat to the PCM. The PCM stored thermal energy 5.5% of total energy from the exhaust during the charging process and reduced emission control by reducing energy transferred to the atmosphere form 45.1% to 39.5%. The thermal energy from the PCM discharged and used to generation of steam which can be used for different applications. The process without PCM gives more harmful gases and hazardous to humans and the environment, but the system with PCM gives minimum exhaust gas temperature which is minimum harmful to humans and the environment. The utilization of waste heat and its recovery reduces the fuel required to run the engine and lesser emission of greenhouse gases to the environment.
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1. Introduction

The high capacity diesel engines which run most commonly on the road energy requirement in India has increased more rapidly due to its economic and industrial growth. There are various energy sources available in nature; however, they create some uncertainty about their uses and thus, effective utilization of all the energy sustainable resources need to be done. One such energy resource is high capacity diesel engines which run most commonly on roads [1]. A recent study shows that in the case of an internal combustion engine, the heat carried away by the cooling water and exhaust gases is around 30% to that of the total input energy is supplied to run the internal combustion engine. This waste heat energy should be conserved through waste heat recovery systems. The combustion of fuel in the engine generates waste heat. The energy conservation of this waste heat may result in the saving of fuel. Nowadays, a modern technique of waste heat recovery from the engine exhaust is to store the heat in the form of thermal energy storage which later on can be used for numerous applications [2].

Out of the energy storage, the latent heat storage contributes more to store the energy in the thermal energy storage. It is because of its heat storage properties at constant temperature and the ability to ensure high energy storage density factor [3].

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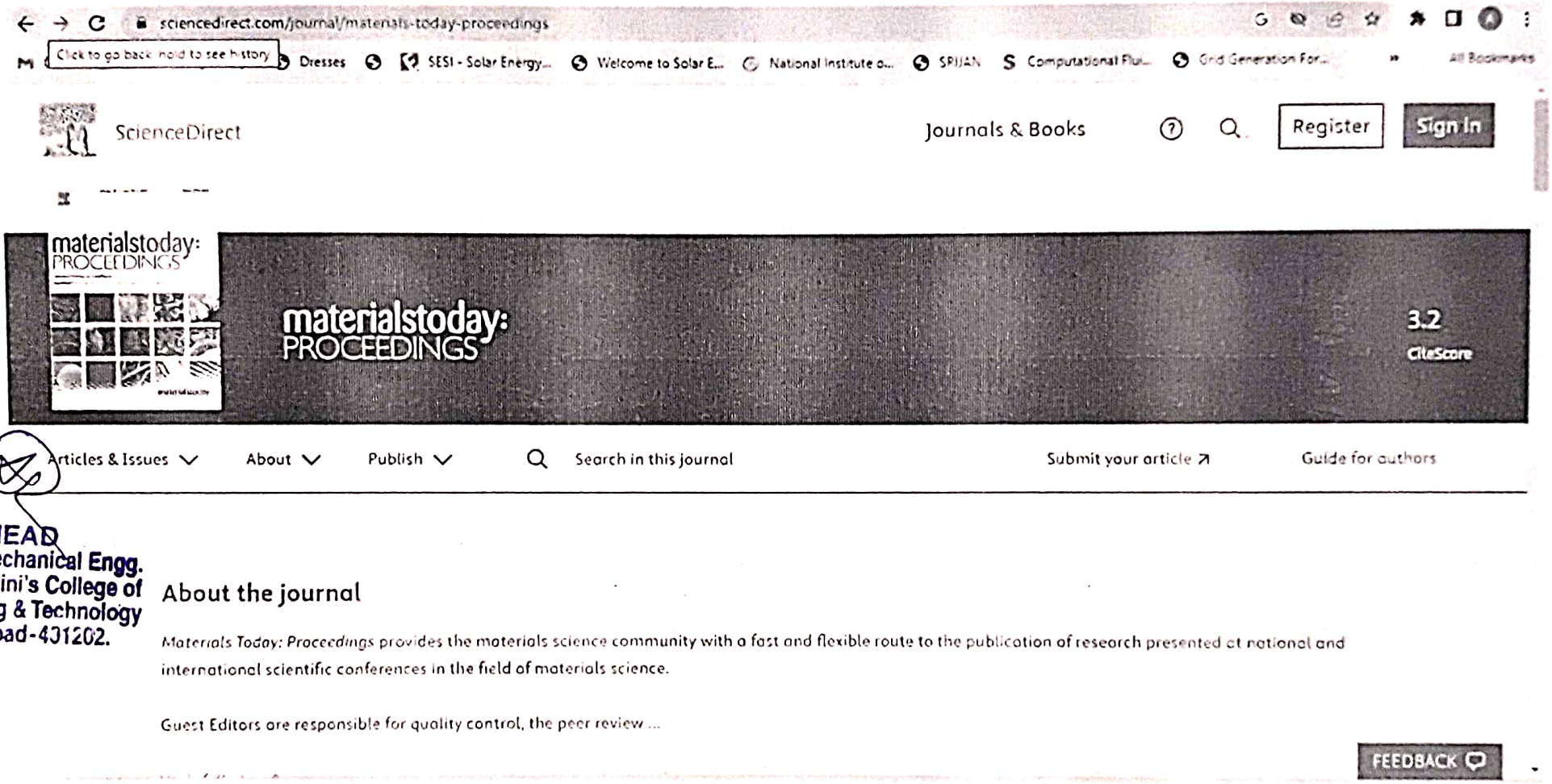

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33_Enhancing Uplink/Downlink Performance of Massive MIMO System Using Time-Shifted Pilot signal Transmission with Pilot Hopping (TSPTPH) by Mrs. Amrita Ruperee

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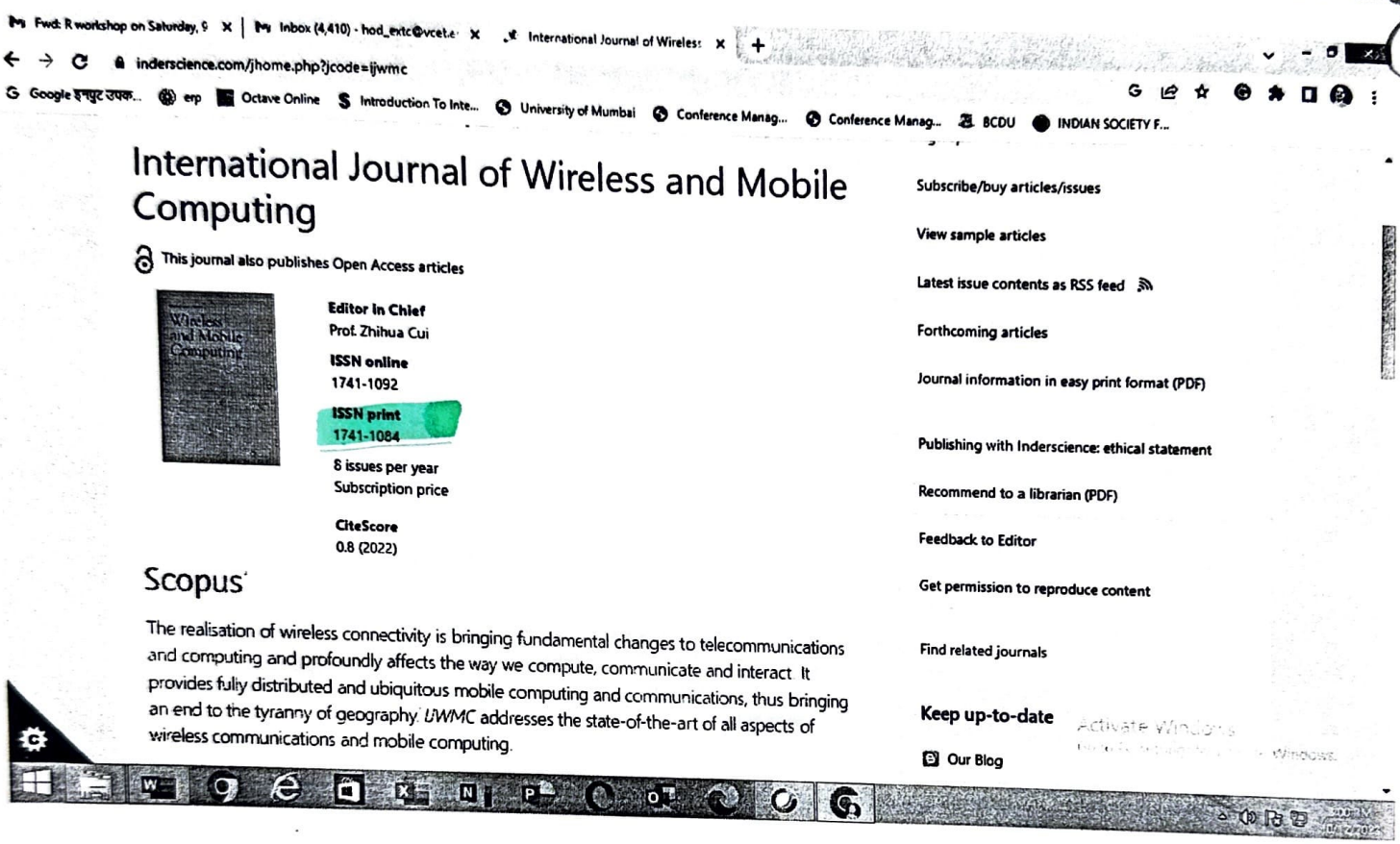

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Enhancing uplink/downlink performance of massive MIMO system using time-shifted pilot signal transmission with pilot hopping

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Abstract: In Massive Multiple Input Multiple Output (MIMO) system, pilot signals are reused to accommodate exponential rise in user density. This contaminates the channel estimation for the intended user and affects the system performance. In the proposed Time-Shifted Pilot signal Transmission with Pilot Hopping (TSPTPH) system, pilot signal transmission is overlapped with downlink data transmission and pilot signal hopping is performed in each coherence interval. Hopping is achieved by switching user to a new pilot signal, this results in random change in interfering users. This changes the large-scale fading coefficient β, which is a function of radial distance between base station and user and thus improves the system performance. Proposed system enhances the uplink and downlink signal to interference plus noise ratio and data rate by estimating the channel with minimum mean square error estimation and reduces the uplink signal to noise ratio for data transmission for normalised spectral efficiency with rising number of antennas at the base station.

Keywords: channel estimation; pilot hopping; large-scale fading; pilot contamination; pilot sequence; small scale fading; transmission slot.

Reference to this paper should be made as follows: Ruperee, A. and Nema, S. (2020) 'Enhancing uplink/downlink performance of massive MIMO system using time-shifted pilot signal transmission with pilot hopping', *Int. J. Wireless and Mobile Computing*, Vol. 19, No. 2, pp.138–153.

Biographical notes: Amrita Ruperee received her bachelor's degree in Electronics Engineering from Govt. College of Engineering, Ujjain, MP, India in 1991, MTech in Digital Communication from MANIT in 2000, Bhopal, MP, India and completed PhD in the area of Wireless Communication from SNDT University, Mumbai, India. With more than 25 years of teaching experience, she is currently working as an Associate Professor in Department of Electronics and Telecommunication Engineering at Vidyavardhini's College of Engineering and Technology, Vasai, Mumbai, India. Her research areas include mobile communication, wireless networks and wireless sensor network.

Shikha Nema received Bachelor of Engineering in Electronics, MTech in Digital Communication and PhD from MANIT, Bhopal, MP, India in 1994, 2004 and 2010 respectively. With more than 16 years of teaching and 4 years of industrial experience, she is currently working as Professor & Head, Electronics & Communication Engineering at Usha Mittal Institute of Technology, Mumbai, India. Her research areas include wireless communication and optical communication. She has more than 50 publications to her credit at national and international level in reputed conferences and journals.

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1 Introduction

Wireless communication expanse is rising exponentially for the last 20 years. To meet the requirements of increased number of users, available frequency spectrum is reused in the neighbouring cells. This causes inter-cell interference, and thus constrains the quality of service provided to the users. Interference and fading are the two main challenges that must be given consideration while designing the wireless communication system. Fading restricts the coverage area and reliability of communication link while interference limits the re-usability of spectral resources such as time, frequency and codes. Introduction of Multiple Input and Multiple Output (MIMO) technology in cellular systems not only improves the data rate but also provides link reliability. In MIMO system, multiple transmitter/receiver antennas are used to transmit multiple data streams in parallel, which is referred to as spatial multiplexing. Though

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34_Prediction of Coronavirus Covid 19 cases using Linear Regression and Support Vector Machine byMr. Yogesh Pingle, Mrs. Puja Kadam

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Prediction of Coronavirus Covid-19 cases using Linear Regression and Support Vector Machine

Likhesh Kolhe[1], Yogesh Pingle[2] and Puja Kadam[3], Dr.Vishal Jain[4]
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Abstract—Numerous viruses like H1N1 Influenza in 2009 and Severe Acute Respiratory Syndrome coronavirus (SARS-CoV) in 2003 are documented. Recently, MERS-CoV Middle East Respiratory system detected in Saudi Arabia in 2012.Now, a novel coronavirus was discovered in December 2019. It causes a number of pneumonia cases in China. It started spreading briskly, resulting in widespread throughout China, shadowed by an increasing number of cases in other countries all over the world. In February 2020, the WHO named it as COVID-19, which stands for coronavirus disease 2019. It took almost three months to reach the first ten thousand confirmed cases, and only in next 12 days it reaches to the next 1 lac cases, a sign that the speed of transmission is increasing. As a case study we have considered India for the evaluation of results of prediction. In India, as of March 27, 2020, according to the Ministry of Health & Family Welfare (MoHFW), a total of 724 COVID-19 cases are reported in 27 states/union territories. The death rate of the virus has fluctuated and since it is a new virus without a vaccine yet, it is difficult to confirm its behavior. The Government of India is taking all required steps to make sure that the country is ready to face the challenge and hazard posed by the increasing pandemic of COVID-19. In this situation, it is very important to predict the number of cases in future which will help the government to take necessary actions. In this research, we have designed a new system based on Linear Regression and Support Vector Machine that accurately predict the number of COVID-19cases in the forthcoming days, if precautions to prevent it are not followed. It is also observed that for the first 4-5 days predicted data is almost matched with an increase in the number of cases in India.

Keywords— *Pandemic, COVID-19, prediction, linear regression, support vector machine.*

1. INTRODUCTION

From the reports of the World Health Organization (WHO), viral diseases persist to arise and exemplify a critical concern to society wellbeing. Past 20 years, several epidemics like the severe acute respiratory syndrome coronavirus (SARS-CoV) in 2003, and H1N1 influenza in 2009 and the Middle East respiratory syndrome coronavirus (MERS-CoV) in 2012 were documented.

The first case of coronavirus was reported to the WHO on December 31, 2019.It was detected at Wuhan, China, and then the disease started spreading and brought a present day scenario of pandemic. WHO announced the disease's name as "COVID-19", which is an abbreviation of "Coronavirus Disease 2019", on February 11, 2020.This coronavirus appears to be very infectious and has rapidly scattered worldwide. On February 28, 2020, WHO mentioned the risk of COVID-19 to be extremely high-level. WHO declared COVID-19 a pandemicon

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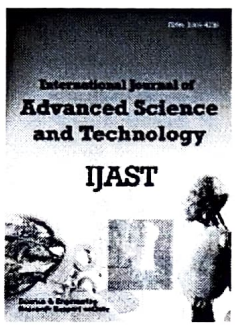

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Resolving the Interference in 5G Millimeter WaveThrough Scheduling Technique In EstimatedChannel

Jyoti Dange

Dr. R.P. Singh

Dr. Vikas Gupta

Keywords: Mimo ,Millimeter Wave Scheudling Interferencece

ABSTRACT

In this paper we describe the designing of MIMO(Multiple input and multiple output) system along with scheduling technology which schedule the beam depending on SINR ratio keeping it different from other scheduling techniques like RR and PF techniques. This paper describe the effect of scheduling to compare different parameter for the dynamic resource allocation.Now a days communication industry increasing spontaneously In this late century, use of mobile and cellular services are very common .In the proposed method of SINR scheduling technique signals are scheduled according to their signal to noise plus interference ratio. We tried to develop the effective scheduling technique that support the QPSK and implementing lower complexity into MIMO estimated channel. We resolve the inter cell interference between the base station and destination which causes a large effect system capacity. Intercellular interference become more problematic with the decrease in cell size

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35_Resolving the Interference in 5G Millimeter WaveThrough Scheduling Technique In Estimated Channel by Dr.Vikas Gupta

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Resolving the Interference in 5G Millimeter WaveThrough Scheduling Technique In EstimatedChannel

Jyoti Dange

Dr. R.P. Singh

Dr. Vikas Gupta

Keywords: Mimo ,Millimeter Wave Scheudling Interferencece

ABSTRACT

In this paper we describe the designing of MIMO(Multiple input and multiple output) system along with scheduling technology which schedule the beam depending on SINR ratio keeping it different from other scheduling techniques like RR and PF techniques. This paper describe the effect of scheduling to compare different parameter for the dynamic resource allocation.Now a days communication industry increasing spontaneously In this late century, use of mobile and cellular services are very common .In the proposed method of SINR scheduling technique signals are

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Jyoti Dange[1], Dr. R.P. Singh[2], DrVikas Gupta[3]
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Abstract—**In this paper we describe the designing of MIMO(Multiple input and multiple output) system along with scheduling technology which schedule the beam depending on SINR ratio keeping it different from other scheduling techniques like RR and PF techniques. This paper describe the effect of scheduling to compare different parameter for the dynamic resource allocation.Now a days communication industry increasing spontaneously In this late century, use of mobile and cellular services are very common .In the proposed method of SINR scheduling technique signals are scheduled according to their signal to noise plus interference ratio. We tried to develop the effective scheduling technique that support the QPSK and implementing lower complexity into MIMO estimated channel. We resolve the inter cell interference between the base station and destination which causes a large effect system capacity. Intercellular interference become more problematic with the decrease in cell size**

Keywords—Mimo ,Millimeter Wave Scheudling Interferencece

I. INTRODUCTION

Incremental improvement in existing communication industry can not sustain a excess of use in application and service of future wireless communication. Most recent two research technology like using a small cell and millimeter wave communication are viral in recent technological world. we are living in the rising time of wireless research .Not only the technological innovation in this field increased but also the service provided by wireless technology have skilled the enormous boom.

The study of wireless communication integrated itself into a redundant industry for example intelligent transport system wireless power transfer ,cyber security system. In the circumstances of cellular communication ,extensive research, effort and standardization activities towards the 5G mobile system result to equip the mobile operator with the guidelines the dimension rules for the resource planning and design of network implementation producing a effective next generation mobile communication. Tremendous increase in he data traffic result in an unsupported incremental improvement in the communication industry. With The increase in the requirement of data ,no of connected devices and per link data rate requirement is also growing exponentially. Number of devices connected in the 5G system are increased extensively due to the variety of applications and services planned in the system.

Millimeter wave systems offer very high data rates on account of enormous data transfer limits ,anyway encounters from the poor link budget .Diverse examinations improving the signal strength is accounted for . Use of directional antenna guarantees better transport if LOS communication corresponds between transmitter and receiver the other elective arrangement is Multi Input Multi Output (MIMO) beam forming that uses the channel measurement to co-ordinate in this manner improving the multiplexing gain and beam forming gain

As of late, the advances in the silicon technologies have propelled broad research and industrial activities in wireless system in millimeter wave frequency range (30 -300GHZ)At millimeter wave frequencies ,bigger bandwidth is accessible and it can possibly support multi GBPS data rates. One of the most popular band is a unlicensed 60 GHZ band and several standards are in development , wireless personal/ local area network WPAN[08],WLAN[9] Ever increasing demand of high data rate service tends to innovate a communication industry. To achieve this we need to characterize a system performance through the following parameter.

A. *Cell edge rate*

It is worst case data rate that can be received . The target 5G cell edge data rate range from the 1000MBPS to 1 GBPS".

B. *Peak physical data rate*

It is a maximum data rate at a fix time.

C. *Latency*

Providing a ultra low latency is one of the important characteristics of 5G communication . It can be defined as end to end time required to data transfer. For 4G it is 10 to 20 ms. The future wireless technology like two way gamming ,tactile internet and virtual reality

D. *Reliability*

Another major characteristics is reliability. 5G system provide ultra reliable communication .In Nutshell, it provide a communication aim at the facilitating end to end successful communication of about 99.99%

E. *Massive connect*

In addition to supporting service , characterized by high data rate ,reliability, low latency one of the low complexity and low power .The advantage of this connectivity is increasing no of the devices wide area coverage and deep indoor penetration ex smart metering consist of large no of sensor to collect the data.

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Ringing artifacts in wavelet based image fusion: Analysis, measurement and remedies

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ABSTRACT

In this paper, we investigate an issue of the ringing artifacts inherent to wavelet based image fusion. A thorough analysis of the ringing phenomenon, by experimenting with different types of images and different wavelet families, with varying lengths of filters and varying levels of decomposition is performed to obtain deeper insights of the ringing artifacts. It is experimentally shown that wavelet based fusion results in the modification of the intra- and inter-scale dependencies, with the inter-scale dependency being the dominating factor causing the ringing artifacts. Also, these ringing artifacts are localized in the Fourier domain. Subsequently, a quantitative measure using structural dissimilarity is proposed to measure the ringing artifacts due to wavelet based fusion. Two possible solutions to compensate for the ringing artifacts are then proposed. In the first strategy, a filtering based method is proposed to reduce these ringing artifacts. It takes advantage of the localized nature of the ringing artifacts. Furthermore, the intra- and inter-scale dependencies are modeled using order-zero entropy. A second strategy using the inter-scale dependency is then proposed to reduce the ringing artifacts. Experimental results show that both these methods are able to reduce the ringing artifacts significantly and have further scope for improvement. Another critical finding of this work is selection of the wavelet filter and its levels of decomposition for the process of fusion.

1. Introduction

Representation and understanding of an entity being studied can be improved significantly by fusion of multiple data sources. Image fusion aims to improve perceptual quality, not only for computer vision applications but also for the human visual system. Multiple input images having relevant and complimentary information are fused to achieve an output image with increased information content as compared to each of the input images. Wavelet based multi-resolution analysis is a crucial tool which can be used in image fusion problems. Decomposing the input image using the wavelet transform provides the flexibility of handling image features at various scales. Also, wavelet based analysis and synthesis is computationally efficient. However, it has a few limitations like artifact generation in the output image. The problem of compensation of unwanted artifacts in the general multi-resolution wavelet framework has been handled by very few researchers.

Fig. 1 shows an example of a fusion of visible and Near Infrared (NIR) images with a traditional mean-max wavelet based fusion. One can see the fused image produces sharp details of the foreground as well as of the distant mountains. At the same time, one can see spurious variations (marked with red ovals) of colors and shading at strong boundaries. These spurious variations are termed as *ringing artifacts* [1]. Fig. 2 shows another example of multi-exposure image fusion. The fused result is obtained by the weight map based wavelet fusion mechanism proposed by Malik et al. [2]. Even in a sophisticated algorithm like this, one can see the presence of the ringing artifacts.

Similar artifacts were observed when we tested for different wavelet based fusion algorithms. No matter how good the fusion mechanism is, these ringing artifacts are inherent to wavelet based fusion [1]. Very few efforts have been made in the literature to analyze such a critical issue. Few researchers [4–9] have indicated the presence of such artifacts in the fused images. Li et al. [10] and Fang et al. [11] have used sparse representation of the data for improved quality in remote sensing image fusion. However, apart from the work of Dippel et al. [1] and Fattal [12], not many insights are available in the literature on the analysis of the ringing artifacts in wavelet based fusion. Apart from indicating possible causes of the ringing artifacts, no further course of action is provided by Dippel et al. [1] and Fattal [12]. This opens up new opportunities to seek further insights and improve wavelet based fusion.

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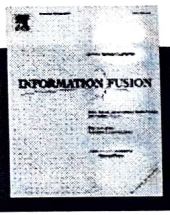

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Effect of vertical location of the spark plug on the performance of a raw biogas-fueled variable compression ratio spark ignition engine

Ashish J Chaudhari[1], Santosh K Hotta[1], Niranjan Sahoo[1,2] and Vinayak Kulkarni[1,2]

Abstract

The present experimental investigations deal with the spark plug location and its effect on the performance and emission of a 100% raw biogas-fueled variable compression ratio engine. Different measurements of performance, combustion, and emission parameters are used to analyze the effect of four spark locations protruded inside the clearance volume (viz. 0, 2, 5, and 10 mm). The protrusion of the spark plug by 2 mm is observed to be optimum for compression ratios 8, 9, and 10. For this optimum spark plug location, engine efficiency and fuel economy are found to be higher. Faster combustion, in this particular case, has led to early and higher peak cylinder pressure and burnt gas temperature. Lower emissions of hydrocarbons and carbon monoxide have verified the optimality of 2 mm protrusion location of the spark plug for all the compression ratios. Thus, present investigations recommend minor protrusion of the spark plug to assist the combustion process, to enhance the performance and lowering the emission of a biogas-fueled engine.

Keywords

Spark ignition engine, spark plug location, variable compression ratio, raw biogas, optimum performance, alternative fuels

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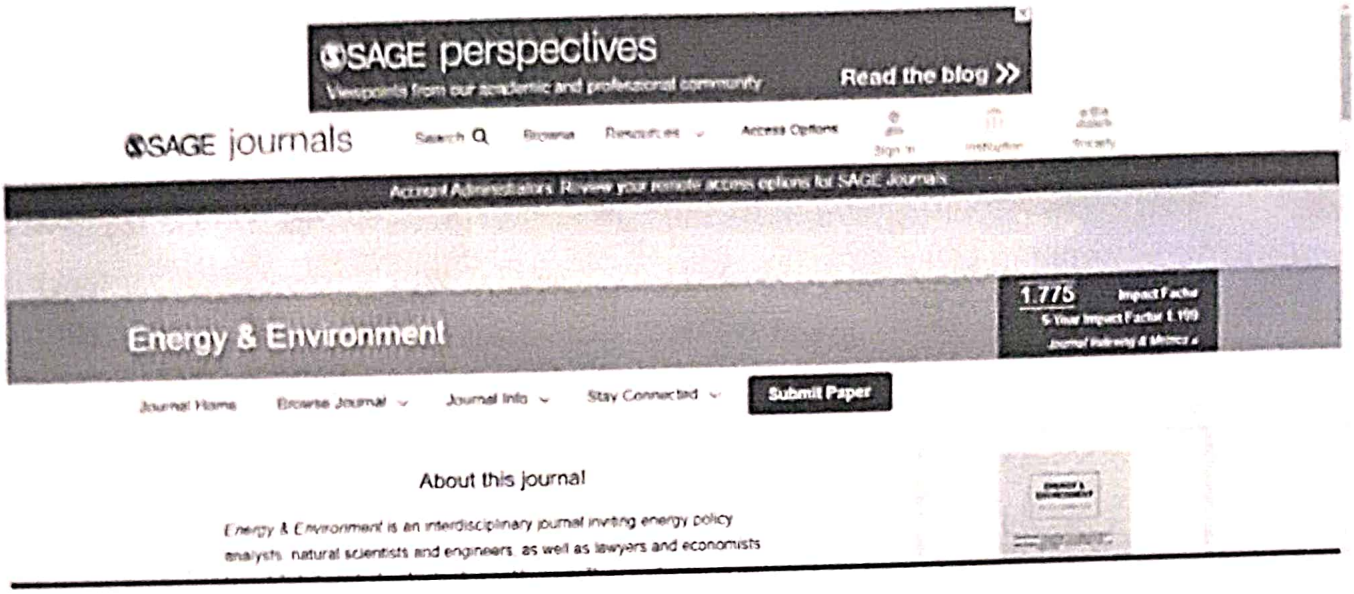

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38_Combined Impact of Compression Ratio and Re-circulated Exhaust Gas on the Performance of a Biogas Fueled Spark Ignition Engine. by Mr.Ashish J. Chaudhari

Journal of Renewable and Sustainable Energy

Combined impact of compression ratio and re-circulated exhaust gas on the performance of a biogas fueled spark ignition engine

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ABSTRACT

The usage of biogas as a potential fuel in a spark ignition (SI) engine is the theme for the present study. The exhaust gas recirculation (EGR) is a significant technique for improving the performance of the SI engine. Thus, the novelty of the experimental investigations lies in implementing the EGR technique for emission control of the biogas-fueled engine. The raw biogas (52% methane and 47% carbon dioxide), obtained from a biogas digester (using cow dung as the source), was the engine fuel for a four stroke, water cooled, variable compression ratio SI engine set-up. Here, the engine performance and emission related parameters were measured. When operated in the raw biogas mode at an optimum spark timing of 45 °CA before the top dead center, the engine produced maximum torques of 11 N m, 14 N m, and 16 N m for compression ratios 8, 9, and 10, respectively. The effect of different EGR rates on the emission control was also investigated. The net heat release rate without EGR was found to be 22.623J/°CA at 368 °CA, which further reduced to 14.233 J/°CA at 386 °CA for EGR10. Moreover, it was clearly evident that low EGR rates (below 10%) were effective in reducing NO_X significantly, with minor compromise in power and brake specific fuel consumption. But the emissions of hydrocarbon and carbon monoxide were found to be higher with the increase in EGR. The operation of the engine with medium or heavy EGR rates resulted in issues related to intense pressure fluctuations and large cycle-to-cycle variation in performance. Thus, the present investigations recommend the use of low EGR (below 10%) in a biogas-based engine for lower NO_X emission and better fuel efficiency.

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I. INTRODUCTION

The critical issues of fossil fuel depletion and environmental protection prompt researchers around the globe to explore alternatives to petroleum based fuels (Ramalingam *et al.*, 2018 and Dhinesh *et al.*, 2018). Liquid fuels (i.e., alcohols and vegetable oils) and gaseous fuels (hydrogen, biogas, producer gas, etc.) are promising renewable energy sources. Among them, gaseous fuels are more suitable for internal combustion (IC) engines because of their wider range of flammability limits, higher hydrocarbon (HC) ratio, and capability to form homogeneous mixtures (Al-Baghdadi, 2004 and Porpatham *et al.*, 2013). Very low levels of pollutant emission were reported for spark ignition (SI) and compression ignition (CI) engines using gaseous fuels. Biogas is one such renewable fuel and attractive source of energy produced from anaerobic digestion of organic matter (Hotta *et al.*, 2019a and Maroušek *et al.*, 2018). It consists of approximately 50%–70% methane (CH_4), 25%–50% carbon dioxide (CO_2), 1%–5% hydrogen (H_2), 0.3%–3% nitrogen (N_2), and other impurities, notably hydrogen sulfide (H_2S). In some cases, it is composed of 60% CH_4 and 40% CO_2 (Crookes, 2006 and Huang and Crookes, 1998). Since the auto-ignition temperature of biogas is comparatively higher than that of gasoline, it can resist knocking which is desirable in the SI engine (Porpatham *et al.*, 2007, 2012, and 2013). Due to the higher antiknock index, a biogas fueled SI engine can sustain higher compression ratios (CRs) than gasoline-fueled engines. Further, it enhances their thermal efficiency and reduces fuel consumption (Porpatham *et al.*, 2007). However, the better suitability of spark ignition engines to high-octane fuels can be harnessed only if special attention is paid to accommodate a gaseous fuel. Such a

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DESIGN AND DEVELOPMENT OF AUTOMATIC LUBRICATION SYSTEM FOR BEARINGS AND GEARBOX

39_Design and development of automatic lubrication system for bearing and gearbox by Dr.Ashish Chaudhari

[1]Siddhesh Penkar, [2]Parth Rathod, [3]Hardik Churi, [4]Prathmesh Chaudhari, [5]Dr. Ashish Chaudhari

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Abstract: Automatic lubrication system has marked appreciable progress in almost all mass production industries throughout the world. This study has been undertaken to provide automatic lubrication system to worm gearbox and sprag bearing of spool used to wind steel wire. This system was developed for TATA Steel Wire Division Boisar to reduce their downtime and boost the production activities. We have developed a low cost automatic centralized system for bearings and gear box. Low cost in the sense that a timer is used to re lubricate the system at specific time intervals. This system gives safety part to worker and minimizes manpower required for lubrication. This system also saves the lubrication, labor wages and keeps the system in proper working parameters as per the proposed design. The actual lubrication system was proposed to the plant with cost of entire system along with maintenance and operation cost. Further improvements in the system required is development of a software system which will effectively monitor the entire system and will ensure the leakage problems to ensure smooth operation. This proposed system will operate in closed loop and feedback from sensors will avoid sudden breakdown during operation. Although any problem in existing system will not cease the production of plant.

Index Terms **– Sprag bearing, worm gearbox, timer**

I. INTRODUCTION

Oil Recirculation Systems are not only used to pump oil to bearings or gears to lubricate them but also to purge them of wear debris and, if necessary, to remove heat introduced into the oil by power losses due to friction. However, the majority of recirculation oil systems are nearly always custom designed to suit the application. Reservoir, pumps, filters, oil coolers, reservoir heating, pressure control and instrumentation are selected depending on the duty and the viscosity of the lubricant required to be pumped.

Too much lubrication can destroy bearing and too little lubrication is also harmful, so automatic lubrication system is a boon for highly automated industries. The motivation of this study came in our mind when we were intern in TATA STEEL and we were placed in the maintenance department to analyze the maintenance procedure of their industry and suggest the required changes to reduce downtime for machines used in wire drawing section. We observed that the machine would operate for 24x7 and would be shut for maintenance for nearly 8 hours in whole month. So, we realize that the downtime was increasing due to improper lubrication as it was done by the unskilled worker and it would lead to frequent shutdown as bearings and gearbox would get over heated. So, we decided to atomize the lubrication process and we were in search of that process that will have low initial cost and higher outcomes. So, we decided to develop an oil circulating system which would be low cost and easy to maintain as well as operate This paper covers the entire methodology to develop a cost-effective oil circulating system. This system is truly customized as per customer requirement and made to suitable for a range of oil viscosities from 100cst to 320cst. So that this system will be integrated with any other system and designed in such a way that if manufacturer wants to expand the current system t would be possible for him to do so. Different systems of lubrication system were studied, and we concluded to oil circulating system based on customer requirement and budget. The need for automatic lubrication system in machines that operate 24x7 was evaluated in this report and cost saving in the expensive system that is available in market today is done. The correct amount of lubricant required for bearings and gear box was evaluated so that saving in cost of lubrication can be done. Our aim is to reduce unnecessary loss of lubricant and provide metered quantity of lubricant. This reduces the cost of maintenance and downtime for each machine.

This is necessary for each industry which operates 24x7 and for the machine which is in constant load. This makes the industry to operate at ease and reduce overheating problems in gear box especially when worm gear box with higher reduction ratio is used.

This system was implemented in industry as the wear out contaminants present in gear box that would remain for at least period of 10 months needs to be filtered. So, to develop a cost-effective automatic lubrication system for the industry which will be able to operate in any environmental conditions to maintain suitable property of lubricant is the aim of our study.

1.1 Lubricant Selection

For this we referred we referred gearbox manual and based upon the heat generated in gearbox same lubricant was used even for sprag bearing. Thus, most suited lubricant SAE 320 in terms of viscosity and cooling requirements was selected.

1.2 Data and Sources of Data

For this study we collected data from PSG design data book and lubrication tribology book

Equations

Heat generated = (1- theoretical efficiency of gear box) (Power required for gearbox operation)

$= (1-\eta_{th})$ (P

Heat Dissipated = (Temperature of sump - Surrounding Temperature) (Heat carried by oil)

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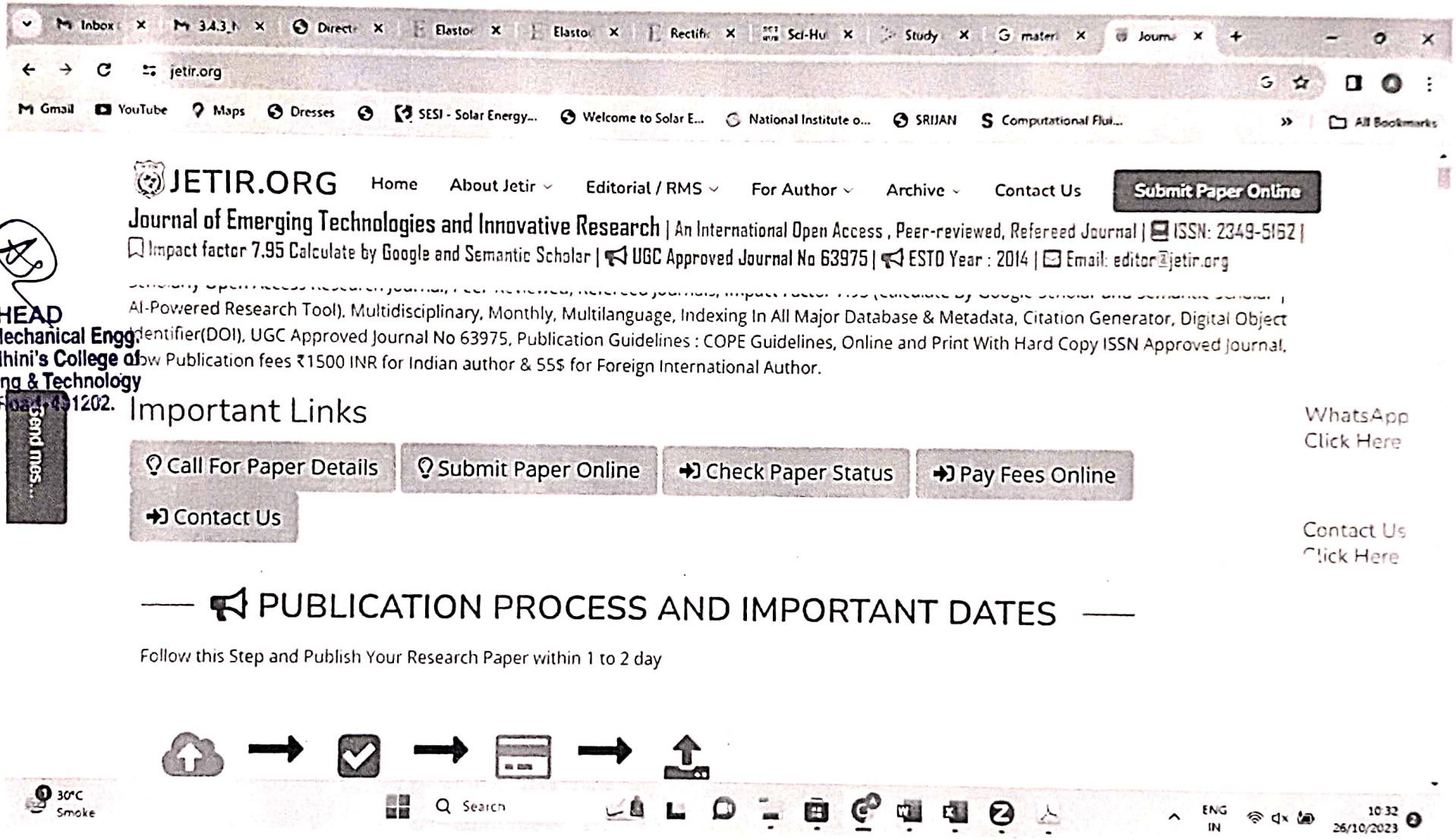

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40_Tri-variate copula modeling for spatially correlated observations in wireless sensor networks by Mrs. Sunayana Jadhav

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Tri-Variate Copula Modeling for Spatially Correlated Observations in Wireless Sensor Networks

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Abstract —Correlated Observations arise in Wireless Sensor Networks (WSNs) comprising of crowded sensor nodes monitoring a common physical phenomenon. Correlation exists both in spatial and time domain, numerous models have addressed linear dependency in sensor observations. However, Copulas model both linear as well as non-linear dependency in spatial domain. In this paper we have proposed a fusion model for generalized case using Copulas and evaluated it for a tri-variate case. A 3D Copula model previously introduced is computed and analyzed based on Neyman-Pearson framework. Gaussian and Student-t Copulas demonstrate a superior performance for spatially correlated observations as compared to Chair-Varshney rule for independent observations.

Index Terms—Wireless sensor networks, distributed detection, spatial correlation, copula, fusion, Tri-variate.

I. Introduction

Wireless Sensor Networks is composed of randomly deployed sensor nodes and the main aim lies in detection of events. Events like landslides, forest fires, earthquakes, tsunamis, etc. [1] may cause damage to human lives if not detected accurately. WSNs can be implemented for continuous monitoring and detection of such events, but scenarios in this case require high density of sensor nodes. Detection, parameter estimation or tracking are the main tasks in applications of WSNs. The main aim of any sensing system is detection of event. For example, in the cases of environmental monitoring, it is of interest to first detect the location of forest fire, before determining the extent of fire spread. For systems observing rare events such as surveillance systems, detection of event is always necessary.

Detection of such events, result into correlated observations in space and as well as time domain. A survey on decentralized detection by authors in [2] illustrated that dependent randomization requires larger co-ordination between sensors. Such co-ordination can be carried off-line and no additional online communication is required. Authors in [3] started preliminary work on distributed detection with fusion as an active research area. The goal was to design a theoretical framework for detection with distributed sensors due to disadvantages of centralized scheme. Wherein for Centralized scheme computational complexity of the Fusion Center increa[illegible] tremendously. Also most of the previous analys[illegible] carried out for statistically independent observations. Given the hypothesis, Likelihood Ratio Test (LRT) for local sensor decision rules under the Bayesian and Neyman Pearson criterion is proved in [4]. When assumption of conditional independence does not hold problems tend to be more complex. This is illustrated in [5] where authors designed a distributed detection system and studied the effect of correlated noise on system performance. Assuming local sensors have same operating point and symmetric distribution, signal detection is done. Detection of known signal in additive Gaussian and Laplacian noise is considered but, the observations resulted into performance loss. Thus distributed detection with conditionally dependent observations is known to be a stimulating problem. Towards this end design of fusion rules using correlated decisions has been considered. A new approach is discussed taking into account spatial correlation and constraining the local sensors to be binary quantizers. This problem is analyzed in [6] and they proposed a novel method to fuse correlated sensor decisions obtained by binary quantization. Proposed work used Neyman Pearson framework based on Copula theory to construct joint density of sensor observations. Use of Gaussian and Student-t copulas is also discussed. However authors in this paper focused on two sensor design analysis. In [7] event detection problem is considered, where sensors are designed as uniform multilevel quantizers. Analysis is done for two sensor case using copula theory for fusion of data. Also extension for N sensor case is done which illustrates evaluating N dimensional integrals thereby increasing computational processing. In [8] Copula based models are suggested for spatial interpolation to analyze traffic flow from remote microwave sensors. Results of copula-based models are compared with three kriging methods. Results illustrate that for complex traffic conditions Copula-based models are more effective and are also insensitive to the effects of temporal changes. Further a tri-variate model is developed in [9] using R-vine decomposition. But the model evaluated and analyzed multivariate copulas using a cascade of bivariate copulas.

Hence considering above limitations we tried to develop a framework for independent as well as dependent observations using Copulas. And also have formulated a mathematical framework using Log-Likelihood Ratio test for fusion statistics of sensor

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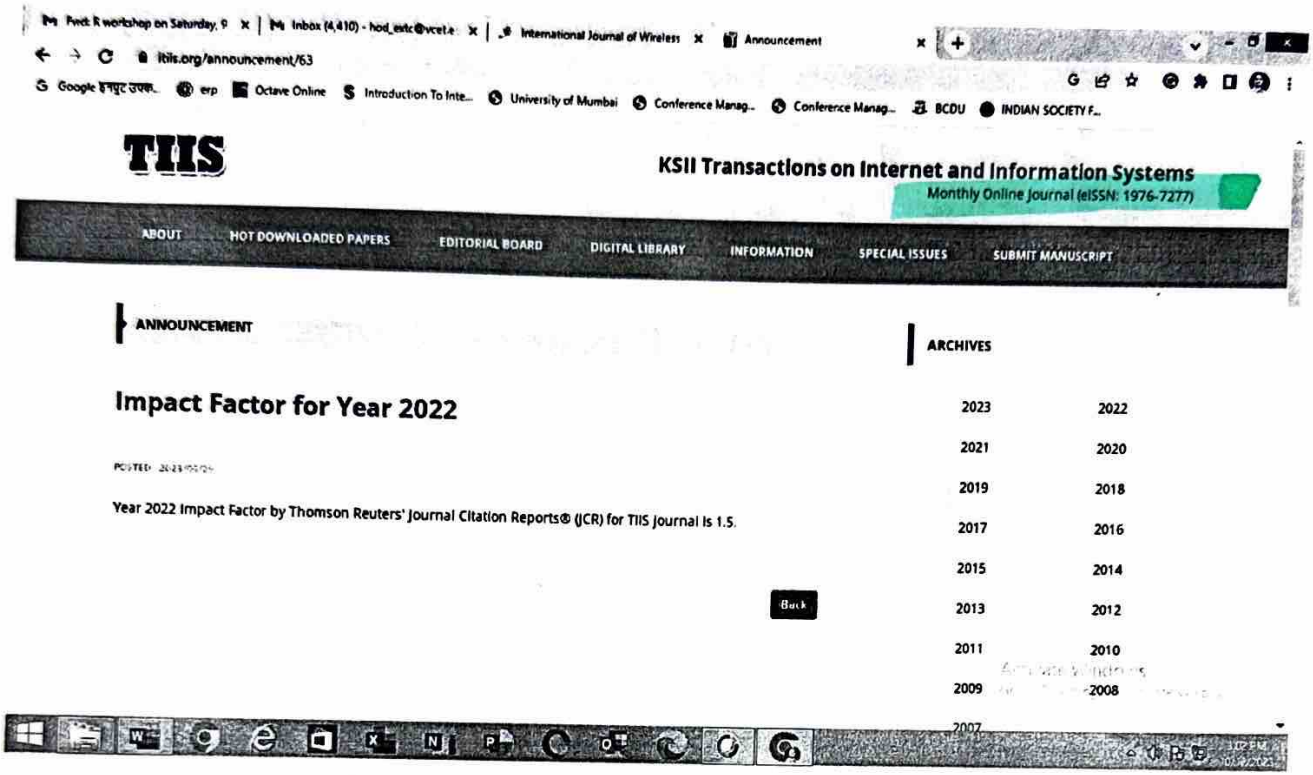

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41_Time Shifted Pilot Signal Transmission With Pilot Hopping To Improve The Uplink Performance of Massive MIMO System for NGN by Mrs. Amrita Ruperee

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Time Shifted Pilot Signal Transmission With Pilot Hopping To Improve The Uplink Performance of Massive MIMO System For Next Generation Network

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Abstract

The paucity of pilot signals in Massive MIMO system is a vital issue. To accommodate substantial number of users, pilot signals are reused. This leads to interference, resulting in pilot contamination and degrades channel estimation at the Base Station (BS). Hence, mitigation of pilot contamination is exigency in Massive MIMO system. The proposed Time Shifted Pilot Signal Transmission with Pilot signal Hopping (TSPTPH), addresses the pilot contamination issue by transmitting pilot signals in non-overlapping time interval with hopping of pilot signals in each transmission slot. Hopping is carried by switching user to new a pilot signal in each transmission slot, resulting in random change of interfering users. This contributes to the change in channel coefficient, which leads to improved channel estimation at the BS and therefore enhances the efficiency of Massive MIMO system. In this system, Uplink Signal Power to Interference plus Noise Power Ratio (SINR) and data-rate are calculated for pilot signal reuse factor 1 and 3, by estimating the channel with Least Square estimation. The proposed system also reduces the uplink Signal power for data transmission of each User Equipment for normalized spectral efficiency with rising number of antennas at the BS and thus improves battery life.

Keywords: Channel estimation, Hopping, Pilot contamination, Pilot signal, Signal Power to Interference plus Noise Power Ratio.

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42_A B-spline Global Optimization Algorithm for Optimal Power Flow Problem by Mr. Deepak Gawali

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A B-Spline Global Optimization Algorithm for Optimal Power Flow Problem

Deepak D. Gawali, Bhagyesh V. Patil, Ahmed Zidna & Paluri S. V. Nataraj

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Abstract

This paper addresses a nonconvex optimal power flow problem (OPF). Specifically, a *new B-spline approach* in the context of OPF problem is introduced. The applicability of this new approach is shown on a real-world 3-bus power system. The numerical results obtained with this new approach for this problem a 3-bus system reveal a satisfactory improvement in terms of optimality when compared against traditional interior-point method based MATPOWER toolbox. Similarly, the results are also found to be satisfactory with respect to the global optimization solvers like BARON and GloptiPoly.

Keywords

Polynomial B-spline **Global optimization**

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43_Predictive Maintenance For Hydraulic System by Mr.Vishal Pande

Predictive Maintenance For Hydraulic System

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ABSTRACT—Production losses in the industry are a serious issue which must be reduced to a minimum level. The continuous working of production lines, sometimes, is hindered due to several factors. All productions lines consist of moving parts and hence the wear and tear of parts is inevitable in any industry. While there is no scope of eliminating the mechanical parts, we certainly can monitor the status of these parts and take the necessary action from time to time. This step ensures that the loss is minimized since it introduces a window to take the required action without any long term hindrance. There is not a fixed method to implement the monitoring of parts (for ex. valves, sensors etc.), the user is free to choose a suitable method for carrying out the monitoring. One such method is predictive maintenance: it is the maintenance of plant equipment by using various algorithms and analysis technique. It is essentially the alert maintenance system. The system consist of microcontroller [11] model will help to determine the most probable time of machine or system equipment failure. The algorithm will analyze the data and take the assigned action which could be just alert or shutting system down to avoid risk equipment of damage to other equipment of plant. The data abstraction and data recording is the first and important step of the whole system. Second is the analysis based on the data given and third step will be the action according to the input data. The process will be repeated after a fixed interval of time to get more precise result for the plant.

Keywords—monitering, analysis, microcontroller, algorithm, data abstraction

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I. INTRODUCTION

Most of the present systems shutdown immediately when a system failure occurs, this leads to some serious drawbacks in the flexibility of the system which mainly includes: High maintenance costs, Limited equipment life, Increased downtime and deteriorating production quality. Thus, there is a need of having a predictive maintenance technique inbuilt in a system which helps overcome these downsides.A study was made by M. S. Lande, P. M. Sirsat and R. S. Tupkar [2] to familiarize maintenance personnel with the basic information necessary for servicing and repairing of DT40 CNC Milling Machine. Also Jeffrey K Jone & James White discussed about predictive maintenance method and apparatus for use with heating ventilation, air-conditioning and/or refrigeration (HVACR) system [3].The program developed by Jeffry Jone uses the data entered by maintenance officer and gives the prediction about any failure of the system using graphs, tables and prediction commentary. Hong Bae Jun & Dimitris Kritsis introduced the research issues on closed-loop product lifecycle management (PLM) [4]. The main objective of the research was to provide right information in the right context at the right time to the consumer of the product. During this research several problems were explored and requirements for resolving them were addressed. Hence, the main aim of predictive maintenance is to predict when equipment failure might occur. Anticipation of future failure allows maintenance to be planned before the failure occurs. Many studies and researches based on predictive maintenance system were published and were useful during project completion.

This paper is categorized as follows. The working and construction of theidea is introduced in Section II. The illustration of a model based on the idea is described in Section III. Section IV highlights the future work followed by concluding remarks in Section V.

II. CONSTRUCTION AND WORKING

Hydraulic systems are widely used in industries for different applications. One such application is the power pack machine [16]. It has an oil tank and cylinders. Thus the process parameters in this case are pressure and temperature and level of oil in the tank. Any system in the world has its life. After a certain time period, the machine parts start to degrade and hence errors occur. Now, these minor errors after a point result into machine failure. Thus Predictive Maintenance can prevent this machine failure. This is done by measuring various parameters in real time, analyzing them and accordingly performing the required set of actions. The sensors used to capture data will be placed at different points.

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44_GSM andGPS Vehicle Antitheft Tracking System by Mr.Vishal Pande

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GSM & GPS Vehicle Antitheft Tracking System

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ABSTRACT— A vehicle tracking system is an electronic device installed in a vehicle to enable the owner or a third party to track the vehicle's location. This design of vehicle tracking system that works using GPS and GSM technology, which be the cheapest source of vehicle by using Global Positioning System (GPS) and Global System for mobile communication. The purpose of this project is to find the vehicle where it is and owner can stop that particular vehicle by sending a command signal .The entire system is hidden inside the vehicle. A button is provided inside the vehicle where owner need to press it within 60 second of starting the vehicle, else a text message is send to the owner and if no decision is taken by the owner then vehicle automatically turns off by the microcontroller within 15 minutes. And also we can track the live location of the vehicle using a Android App named as Antitheft.
This design will continuously monitor a moving vehicle and report the status of the vehicle on demand. For doing so an ATMega328 microcontroller is interfaced serially to a GSM Modem and GPS Receiver. A GPS modem will continuously give the data i.e the latitude and longitude indicating the position of the vehicle.
Keywords—GSM & GPS Modem, Android App

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I. INTRODUCTION

In the 21st century, there is a need to give your vehicle an excellent protection with the only reliable anti-theft device. Vehicle Electronic control unit ensures the Best guarantee to protect your bike from different kinds of theft cases all over the world.. It is a vehicle security device that offers excellent protection to your vehicle. A vehicle with Electronic control unit security system helps the user to lock and unlock engine by the pressing a button and relay tripping. Mainly two types of Electronic control unit are used in Auto industry -Automatic Electronic control unit and Manual Electronic control unit that ensures smoother and secured operation. Again this system could not prove to provide complete security and accessibility of the vehicle in case of theft. So a more developed system was needed to be implemented

The main concept in this design is introducing the mobile communications into the embedded system. The vehicle thief takes only a few minutes to deactivate the security system. Furthermore, nobody will pay an attention when the bike alarm goes off. Based on these reasons, it is proposed that a GSM-based vehicle anti-theft system development is designed and developed to improve the performance of the current vehicle security system. Somehow if there is another way of transmitting the alarm to the vehicle owner that is not limited to the audible and line of sight, the system can be upgraded.

SMS is a good choice of the communication to replace the conventional alarm and an android app is very effective to know your current live location on Google map, because it can be done and does not require much cost. Although most of people know GPS can provide more security for the vehicle but the main reason people does not apply it because the cost. Advance vehicle security system is too expensive and not yet implemented. Cost for the circuit is too high. Besides that, the payment is taken . The main objective of this project is to design, construct and test a GSM-based vehicle anti-theft system that can be used to track the performance of vehicle security system.

II. CONSTRUCTION AND WORKING

Currently almost all the people own vehicles, theft is happening on parking and sometimes driving insecurity places. The safety of vehicles is extremely essential for public vehicles. Vehicle tracking and locking system installed in the vehicle, to track the place and locking engine motor. The place of the vehicle is identified using GPS modem whereas when the theft ignites the vehicle, message is send to the user by using GSM modem. After identified vehicle theft User sends a message to the microcontroller, then microcontroller issue the control signal to stop the engine motor. A button is provided inside the vehicle where owner need to press it within 60 second of starting the vehicle, else a text message is send to the owner and if no decision is taken by the owner then vehicle automatically turns

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AUTOMATIC CONTROLLING OF ELECTRONIC DEVICES AND POWER CONSUMPTION ANALYSIS USING IoT

45_Automatic Controlling of Electronic Devices and Power Consumption Analysis using IoT by Mr. Vikrant Agaskar

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Abstract *– The electronic devices are left on by employees most of the time after working hours. This leads to wastage in current which eventually gives a huge amount of Electric bill . So here we have : An Automatic System where all the electronics devices are controlled remotely.*

As we know, the electricity usage is increasing day by day. Consumer comes to know about the consumption of electricity in his house after a month.

Till then he is unaware of it. After receiving the electricity bill user gets worried. Hence to reduce the wastage of energy ,money as well as use the electricity efficiently, this device has been designed. The device notifies the user about his home electricity usages by sending alerts, statistics, graphs, etc. which will lead to energy saving. This device uses concept of IOT (Internet of Things) i.e. connecting the devices to the internet and transferring data collected by them to storage server. The user can then read and decide his actions and act accordingly.

The aim of this project is to help user to monitor the electricity consumed by its device and if the device is malfunctioning it will ultimately consume large amount of energy, and this can be detected and user would be informed about the device consuming more power.

Index Terms *– Internet of Things (IOT)*

I. INTRODUCTION

The usage of electricity is increasing day by day. User may come to know about the electricity consumption of his house after a month. Till then he is not aware about the consumption. After receiving the electricity bill user starts worrying. In-order for reducing the wastage of energy and money as well as to use electricity efficiently, this system has been designed. User is notified by the system about his electricity usages by sending alerts, etc. which tends to be energy saving. This device uses concept of IoT i.e. connecting the devices to the internet and transferring data collected by them to storage server. The user can then read and decide his actions and act accordingly. Aiming to help user monitor the energy consumed by the device and if the device is malfunctioning it will ultimately consumes a huge amount of energy, and this can be detected and user would be notified about the malfunctioning of that particular device.

II. RELATED WORK

There are some similar devices developed prior to this paper. They include smart meter and meter plug. Following gives the detail idea about both of them.

A. Smart Meter

Smart meter gives the energy consumption of a customer and provides information about it to the supplier company. Smart meters gives the reading of real-time consumption of energy information that contains the values of voltage, phase angle and the frequency and securely transmits that data to supplier company. Bidirectional communication of it provides the capability to collect data regarding the electricity. A smart meter system includes a smart meter, communication infrastructure, and control devices[3]. Smart meters can operate control commands not only remotely but also locally. All electronic devices and home appliances can be controlled by Smart Meter. They can also collect diagnostic information about the distribution grid, home appliances, and can communicate with other meters in their reach[3]. They bill the customer according to their usage excluding power consumed by storage devices. The collected data from smart meters contains a unique meter identifier, data timestamp and the values of electricity consumption. Electricity supply can be cut or reconnected remotely.

B. Meter Plug

The meter plug is placed in between the socket and device which gives the power consumption of the device is at that time. It gives power consumption during a connected session, and calculate kilowatts and dollars per day, week, month or year[7].

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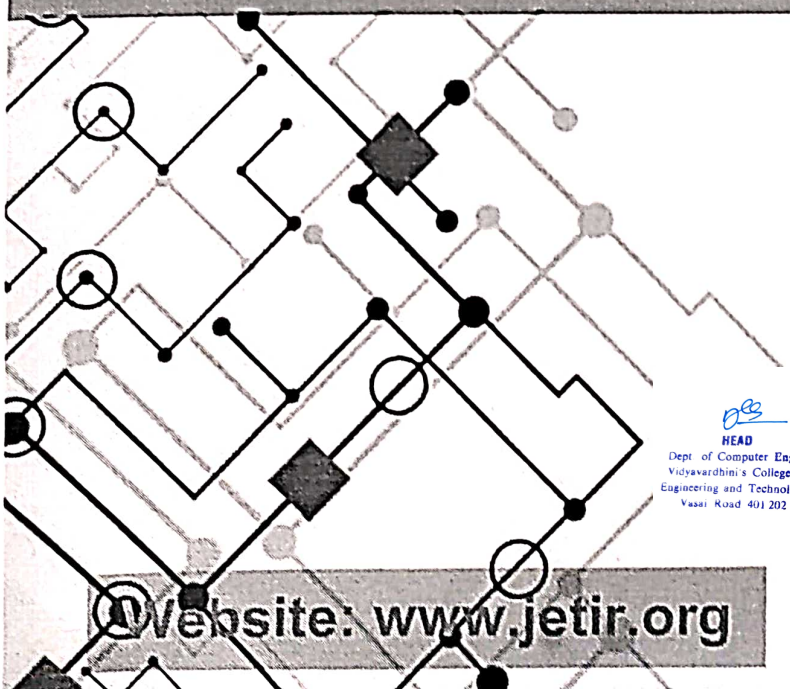

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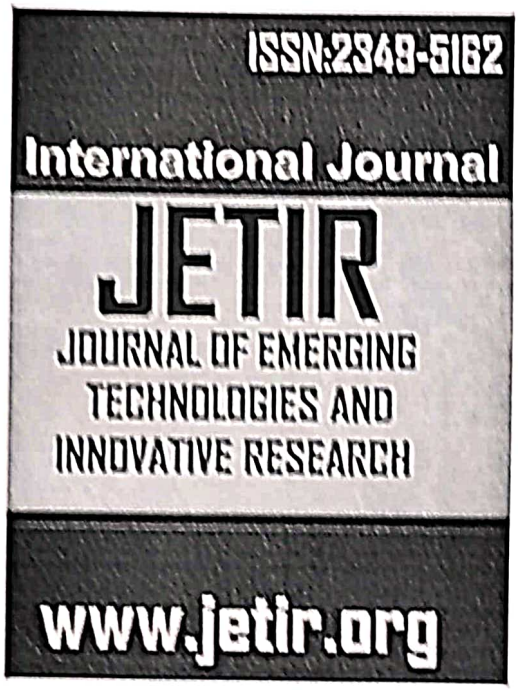

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46_Supply Bus Tracking Under Breakdown Condition by Mr. Anil Hingmire

Supply Bus Tracking Under Breakdown Condition

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Abstract: In this quick life, everybody is in rush to achieve their goals. For this situation hanging tight for the transports isn't solid. Individuals who depend on the open transport their real concern is to know the ongoing area of the transport for which they are hanging tight for and the time it will take to achieve their transport stop. This data helps individuals in settling on better voyaging choices. This paper gives the significant difficulties in the open transport framework and examine different ways to deal with shrewdly oversee it. Current position of the transport is procured by incorporating GPS gadget on the transport and arranges of the transport are sent by either GPRS administration given by GSM systems or SMS or RFID. GPS gadget is empowered on the GPS beacon and this data is sent to brought together control unit or legitimately at the transport quits utilizing RF beneficiaries. This framework is additionally incorporated with the recorded normal paces of each section. This is done to improve the exactness by including the elements like volume of track, intersections in each portion, day and time of day. Individuals can follow data utilizing LEDs at transport stops, SMS, web application or Android application. GPS directions of the transport when sent to the brought together server where different landing time estimation calculations are connected utilizing authentic speed designs.

Index Terms - GPS, SMS, Android, ETA, GPRS, Google maps

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1. Introduction

The Vehicle tracking system is a total security and fleet management solution. It is a technology to determine the location of a vehicle using different methods like GPS and other navigation system operating via satellite and ground-based systems. The focus of this project is to assist the supply bus to reach the bus which broke down enroute. This system includes modern software components that helps to track and locate the broken-down buses and aid them in order to minimize the delay for the passengers. Database and Software are used to give the location that is the coordinates of each visiting point that is saved in the database, which can be later displayed in a screen using Google maps. However, to view the location the vehicle has travelled the user has to connect themselves to the web server. Vehicle Security is an essential worry for all vehicle proprietors. Proprietors just as scientists are continually searching for new and overhauled vehicle security frameworks. For the modernization of innovation, it is presently conceivable to follow and intently screen vehicle progressively just as to check the historical backdrop of vehicles developments. One must be grateful to Vehicle Following Framework that has caused immensely to keep up the security of the vehicle by following its exercises at normal time interim. The system uses Global Positioning System [GPS], to send information about the location of the vehicle that is to be monitored and then send the latitude and longitude to the monitoring centre through satellite. At the monitoring centre different software is used to display the vehicle on the Google map. This is how our system tracks automobiles in real time. Due to real-time tracking facility, vehicle tracking systems have become increasingly popular among owners of vehicles as they are able to monitor their vehicle continuously. Monitoring center Software helps the vehicle owner with a view of the vehicle location on an electronic map. The user can use any browser to connect to the server and monitor the targeted vehicle on Google Map. Thus, it saves the user from the hassle of calling the driver to know the vehicles location as it is now possible to track vehicle online. A vehicle tracking system combines the installation of an electronic device in a vehicle with purpose-designed software to allow the owner to monitor the vehicle, collecting data in the process from the device and deliver it to the base of operation. Urban public transportation companies are an increasingly common user of tracking systems, particularly in large cities.

2. Existing Works

2.1 K-Means Algorithm

K-Means is a standout amongst the easiest unsupervised learning figuring to make bunches in the instructive list. The procedure to orchestrate given enlightening file into given number of packs (k gatherings) is direct. It was first proposed by Stuart Lloyd in 1957. K-means clustering is a procedure for vector quantization, at first from banner setting up, that is notable for gathering examination in data mining. k-means gathering expects to allocate recognitions into k bundles in which each observation has a spot with the pack with the nearest mean. It is the most generally perceived figuring uses an iterative refinement procedure. It is in like manner implied as Lloyd's figuring, particularly in the product building system.

There are 2 steps in k-means algorithm:

Assignment step: Dole out every perception to the group whose mean has the least squared Euclidean separation, this is instinctively the "closest" mean. (Numerically, this implies parcelling the perceptions as indicated by the Voronoi outline created by the methods).

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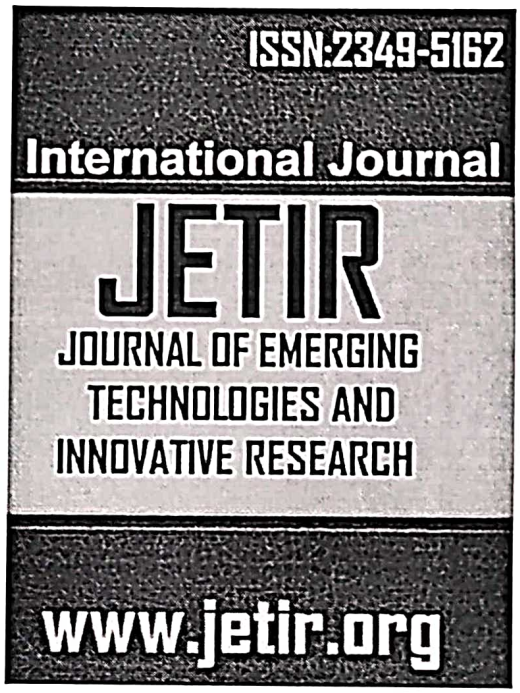

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47_Machine Learning in Video Surveillance for Fall Detection by Mrs. Sangita Chaudhari

MACHINE LEARNING IN VIDEO SURVEILLANCE FOR FALL DETECTION

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Abstract : Falls are the leading cause of injury and death in elderly individuals. Unfortunately, fall detectors are typically based on wearable devices, and the elderly often forget to wear them. We can reduce the impact of fall consequences, if human fall has been detected instantly and proper medical facility is provided. Our detector combines algorithms (background subtraction) as input to a machine learning algorithm with high detection accuracy. Tests conducted on the different fall videos .We present here unique video data set which will be very useful for the community to test the fall detection.This video data set contains different falls and normal daily activities acquired in realistic conditions.The use of computer vision systems offers a solution to analyze people behavior and detect events and different falls.It is also based on the combination of motion history image and the shape of human in variation in the dataset.It provides the results on video sequences of daily activities and falls.

Keywords **– Fall detection,Video Sequence for fall detection,Machine Learning ,Artificial Intelligent ,Deep Learning.**

1 INTRODUCTION

One of the greatest danger for old people living alone are the falls. Almost 62% of injury-related hospitalizations for seniors are the result of falls [1]. And the gravity of the situation can increase if the person can not call for help. Usually, wearable fall detectors like accelerometers [2, 3], gyroscopes [4] or help the buttons [5] are used to detect falls. But seniors often forget to wear them, and a help button is useless if the person is unconscious after the fall for long period of time. Moreover, these sensors need a battery regularly replaced or recharged for adequate functioning. Therefore, a new and promising solution for fall detection is the use of computer vision, as no sensors need to be worn along with this technology.To overcome these limitations, we use a computer vision system which doesn't require that the person wears anything.

1.1 RELATED WORK

One of the greatest danger for old people living alone are the falls. Almost 62% of injury-related hospitalizations for seniors are the result of falls [1]. And the gravity of the situation can increase if the person can not call for help. Usually, wearable fall detectors like accelerometers [2, 3], gyroscopes [4] or help the buttons [5] are used to detect falls. But seniors often forget to wear them, and a help button is useless if the person is unconscious after the fall for long period of time. Moreover, these sensors need a battery regularly replaced or recharged for adequate functioning. Therefore, a new and promising solution for fall detection is the use of computer vision, as no sensors need to be worn along with this technology.To overcome these limitations, we use a computer vision system which doesn't require that the person wears anything.

1.2 SYSTEM OVERVIEW

1. Motion History Image (MHI): Our method is based on the fact that the motion is large when a fall occurs. So, the first step of the system is to detect large motion of the person on the video dataset using the Motion History Image of the person.

2.Change in the Human Shape: When a motion is detected, we analyze the shape of the person in the video sequence(dataset). During a fall, the human shape changes and, at the end of the fall, the person is generally on the ground with few and or small body movements. A change in the human shape can discriminate if the large motion detected is normal (e.g.: the person walks or sits) or abnormal (e.g.: the person falls,forward or backward).

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48_Automated Data Entry using OCR byMrs.SangitaChaudhari

AUTOMATED DATA ENTRY USING OCR

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Abstract: Forms serve as the most widely used asset to collect information. Different institutions and organizations use forms to collect information from the other end. In earlier times, paper forms remained the elementary method to collect information. With the passage of time, the mode of collecting information evolved gradually. Currently the data from the users are collected online with the help of various applications and online tools. But still a huge chunk of information is still offline in the paper forms and needs to be transferred online for various purposes. With the idea of storing data in digital form, manually entering the data into the database was the only prevalent method and it consumed a lot of human effort and time. The intention was to transfer the data online with minimum manual work and therefore Optical Character Recognition (OCR) came into the picture. The central idea is that the data from the paper forms which needs to be stored online will be scanned with a device and the digital data from the forms will get converted to machine suitable format (strings) with the help of OCR and image processing techniques. The purpose behind writing this paper is to present the idea of how data entry process can be made easy with help of automated techniques.

Keywords: OCR, data entry, fields, database

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INTRODUCTION

Filling out forms is one of the oldest and widely used methods for collecting information in different fields from the applicant. Automating the scanning process of large volume of office data such as cheques, aadhar card forms, driving license forms, new account opening forms, can escalate the office productivity as well as reduce time consumption. With the recent advances in technology, the manual filling of data is widely replaced by computerized data. Almost all the forms and data are submitted online. Also there is a deep requirement that the information collected offline using form filling should be available online for faster access in near future. Data available online can also be easily manipulated. Automation is basically demanded in places such as in income tax offices, banks, post office, municipal department, colleges, university, where large amount of data is to be manipulated. This problem is very recent as there is a rapid emergence of data collection offline. Many researchers are working over this issue and have developed numerous algorithms. Forms that estimate form data and handwritten data automatically are usually more error prone. It is always beneficial to first convey to the system about the form from which data is to be extracted. That is why, handwritten data extraction system which is form specific is more accurate and will extract data with lesser errors. Moreover, it has been observed that in offices the forms that are being distributed are static, which means the fields do not change rapidly over time. So, it is again a good idea to go for a handwritten data extraction system which is form specific.

In majority of the offices data entry is still offline. They are collected over sheet of paper and then typed back into computer manually. Automating this process with the help of computer vision may include several steps. One of the major tasks is extracting the handwritten data from the application form. The extracted data can be used for many purposes for example archiving and documenting. The extracted data can also be given to optical character recognition engine to convert it to corresponding Unicode number. This will help organize data and may improvise data processing.

Recognizing relative locations of information within form is another important process. Some papers suggest that by recognizing lines using Histogram techniques to estimate the location of data, but this may fail if the lines are hiding behind a content occupying several lines at front. This process can be improved if the form format is known. Template matching can be used for analyzing the relative position of data fields and then estimating the location of handwritten data, this will improve the probability of finding required data accurately, reducing false positive results.

Another commonly found element in an application form is straight lines. So their extraction is very important. Straight lines are often found around data to be extracted. Straight line detection problem is often found when we are designing a system where data to be extracted is in a completely unknown form format or there is a very huge skewness or rotation is involved. This problem can be reduced if form format is already known and the user is instructed to perform scanning operation in a controlled environment. This kind of setup will not only improve the accuracy but also increase the flexibility to involve not only the handwritten text data but also signatures, fingerprints, color photographs and so on to be entered into database.

Selection of appropriate feature recognition method is the most important aspect for data extraction from form images. Several methods for feature recognition have been proposed till date.

2. STUDIED SYSTEMS

2.1 A handwritten data extraction system based on common patterns like lines bounding the filled data

Here the system rigorously searches for straight lines in both horizontal and vertical direction and then decides area bounding handwritten data. This approach has limitation over the type of form that it can recognize. The entered data must be inside bounding rectangle, forms having straight lines or no lines can be difficult for this system to recognize. Though this method has good flexibility over handling scaling and skew, but it may consume more time as it requires running a CPU intensive operation like line detection using Hough line transform.

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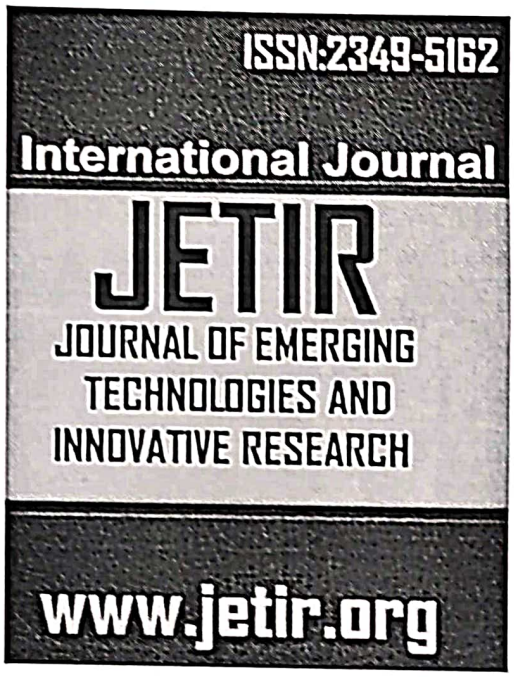

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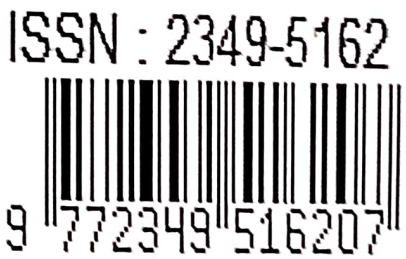

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49_Question Paper Generator by Mrs. Sangita Chaudhari

QUESTION PAPER GENERATOR

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Abstract: Information and intelligence are two vital columns on which development of humankind rise and knowledge has significant impact on operating of society. Student assessment is a crucial part of teaching and is done through the process of examinations and preparation of exam question papers has consistently been a matter of interest. Present-day technologies assist the teacher to stock the questions in a computer databases but the problem which emerges is how the present day technologies would also assist the teachers to automatically create the variety sets of questions without worrying about the quality of the question paper generated. Hence there appears a requirement to have a system which will automatically create the question paper from teacher entered description within few seconds. Our proposed system follows a crowdsourcing model which allows a group of contributors to contribute questions which ensures a database consisting of a wide range of quality questions.

Keywords – Crowdsourcing model

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1. INTRODUCTION

In today's current ambitious world, an examination plays a crucial role in checking the academic development of students and the era of information technology is now substituted by productive application of the technology. So producing utility from knowledge is crucial for development of society into an "Information Society". For various examinations conducted in a year in any academic course, teachers need to create variation of question papers as per the University guidelines and assessment requirements. It is very difficult for the teachers to cover all features of the course outcomes and evade duplication of questions in the succeeding exams. There is no systematic procedure and hence the quality of the question paper relies entirely on an individual teacher's experience and proficiency. At times, this entire element may degrade standard of the question paper. As per research, a quality question paper is a real combination of questions supervised by varied criteria such as difficulty level, distribution of marks across the question paper in form of paper pattern and the type of examinations. We aim to generate a quality question paper in order to assess the capabilities of students satisfactorily.

2. LITERATURE REVIEW

The system implemented in [2] facilitates automatic generation of question paper from semantically tagged question repository. The system would be useful for institutes, publishers and test paper setters who have a huge repository of tagged questions and need to frequently generate question paper with ease. The system uses exhaustively tagged question repository as an input to the system. User will be asked to enter the values for each tag in the form of lower and upper bounds. The search engine extracts questions from question repository based on the specifications entered by the user. A well tagged question repository contains questions with four tags: topic (content), question type, cognitive level, and difficulty level. We are using Bloom's taxonomy for cognitive level. The problem here will be that if whether the question in the database if faulty or do not conform to the subject maybe a problem. Also, no new question being added in the database, i.e. less variety in the question database.

The system implemented in [3] deals with the gathering, sorting, and administration of a large amount of questions about different levels of toughness from scientific as well as non-scientific subjects related to various classes. The system uses Shuffling algorithm. The main part of the shuffling algorithms is to provide randomization phenomena in question paper generation system, thus different sets of question paper could be generated with less chances of repetition and duplication. But shuffling algortihm doesn't completely remove repetition. The current systems do not provide the facilities to provide unit-wise marks, various cognitive level and difficulty level marks as a constraint to generate the paper.

3. PROPOSED SYSTEM

Our proposed system follows a crowdsourcing model which means a group of people is responsible for building the questionnaire database of our system. We have split the entire question paper generation process into three phases.

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50_IoT Based Retail Stock Management by Mr. Sunil Katkar

IOT BASED RETAIL STOCK MANAGEMENT

A Smart Shelf

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Abstract: In present time, IoT is a concept that is used everywhere and every time. Mostly in western countries, IoT is a concept which is used in day to day life for applications such as home automation. In India, most of the businesses are based locally as small-scale businesses which are mainly manufacturing and retailing units. But there is very less interaction of technology and small-scale entrepreneur. For a manufacturing unit and retailer, supply and demand is a big issue to manage. Sometimes, there is demand for a product but no sufficient supply of product and sometime there is sufficient supply of a product but there is no demand. Similarly, for a retailer continuously checking for stocks is a challenging task. In this project, we propose that IoT can be used to perform tasks like checking that which product is in demand, which product has no demand, which product has ample quantity, which product has insufficient quantity, so that retailer can get a clear idea which product to order and which not before the stocks run out.

Index Terms - Internet of Things (IoT), Sensor, Shelf.

1. INTRODUCTION

Today, internet plays a major role in every field. Internet is a network where many devices and networks are interconnected. Today, in this time we can't even imagine the world without internet. It has the power of making everything possible. In this era, we will find no person who has never used internet in his/her lifespan. Internet has the power to connect two persons living at two ends of world with each other. This power of internet has brought the whole world connected at one point. If we see the statistics, after the introduction of internet to common person and in corporate world, the world has changed tremendously. There are several revolutionary changes brought into businesses after emergence of internet in businesses. Also, with the common man, now with power of internet in his/her hand, he/she can now connect with each and every one intended and can do any operations be it related to money transfer, communication, file sharing, etc. within some seconds and with minimum cost. Thus, Internet plays a major role in each and everything that is happening over the globe, across countries and across continents.

The concept of a network of devices was discussed as early as in 1982, where at Carnegie Mellon university they invented modified coke vending machine. It was the first Internet connected appliance. It was able to report whether the stock of coke cans is full or not and whether the cans are cold or not. Doesn't this sound amazing? Yes, it is. Like such we can also imagine two cars driving on a road, these two cars cannot see each other but they are coming towards each other. By the time, the respective drivers will recognize the threat this two cars will hot each other. Instead of this to happen if these two cars can communicate with each other and tell each other when they will cross each other, so that either they both will decrease their speeds or will change their routes. This would be a miracle. But this is possible with IoT which stands for Internet of Things.

IoT (Internet of Things) plays an important role in this changing technology-based world. IoT is a collection of devices, electrical appliances connected with sensors to each other for exchanging data. As we discussed earlier, IoT is a field which can change the way we live our everyday lives. IoT can change the pace of life with help of Automation, Artificial Intelligence and Machine learning.

Therefore, there are several advances made in this field. An IoT based system takes input from various sensors sends it to cloud storage, analyses the data and gives output which can be accessed on any device from anywhere. In our project, we are using IoT for a retail store management which will help the retailer to monitor and manage the stock in his shop.

2. EXISTING SOLUTION

Currently, in every retail store/supermarket the employee of the store manually checks all the product stock – like how much stock is left on shelf, how much stock is available in inventory. After checking the inventory, the retailer places his order for particular product to any supplier of his choice. After the order is placed, it takes many days to receive the order at retail store. This whole process takes almost a week to complete and if there is high demand for that particular product, at that time there will be guaranteed loss of retailer. Also, this will affect retailer's business revenue if this happens more often.

The other available solution is RFID tags.[2] RFID tags are placed on the product which are scanned by RFID readers while billing. According to working of RFID tags and its readers, the circuit for every individual product needs to be feeded. When the product is scanned, its quantity is deducted from total quantity. But this also does not allow the retailer to monitor his stocks in advance. Also, this is an expensive as well as complicated solution as RFID tags need to be placed on every product to be billed.

3. PROPOSED SOLUTION

The proposed system is to build an IoT based system that will help the retailers/store managers to efficiently monitor and manage the stocks for their store. The purpose of this system is to maximize the revenue of retail store by integrating the IoT

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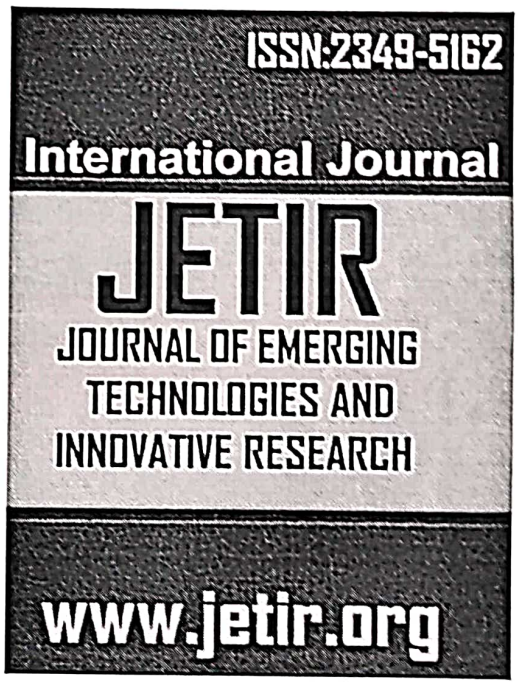

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51_Tweet Summarization: A new approach by Mr. Sunil Katkar

TWEET SUMMARIZATION: A NEW APPROACH

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Abstract: The utilization of online networking is expanding step by step. It has turned into an imperative mechanism for getting data about current happenings around the globe. Among different online networking stages, with millions of clients, twitter is a standout amongst the most prominent social networking site. Throughout the years sentiment analysis is being performed on twitter to comprehend what tweets that are posted mean. The motivation behind this paper is to overview different tweet division and synopsis strategies and the significance of Particle Swarm Optimization (PSO) algorithm for tweet summarization [1][2].

Keywords: Tweet Summary, Segmentation, Particle Swarm Optimization

1. INTRODUCTION

Web based life is a stage/innovation that can be utilized for making and sharing different data, which can be gotten to from any side of the world. It is a standout amongst the best doable route through which advertising should be possible, current issues can be known additionally it tends to be utilized to know the point of view of various individuals about a progressing issue far and wide. Throughout the years social networking sites have advanced, one of which is twitter. Utilization of twitter has become immense through the decade. It has been proficiently serving the clients for collaboration what's more, data sharing.

Numeral tweets are posted on twitter on everyday basis, which are analyzed by sentiment analysis to draw outline of feelings communicated by the user on an issue. The problem with sentiment analysis is that there are millions of users with alterations in opinion to test [4]. There are additionally reasonable tests to sentiment analysis. It might happen that somebody tweets something that may not be applicable to other people, for this situation summary comes into picture and assumes a huge job. For this different methods have been created by specialists throughout the years [3], some of which are talked about in later module 2.

For providing users with better outcomes tweets are outlined as well as they are first segmented. Segmentation helps in monitoring semantic significance of tweet. Tweets are divided (i.e isolated into parts) utilizing different strategies are likewise talked about in module 2.

There are various clustering algorithms available. One such ideal clustering algorithm is the Particle Swarm Optimization (PSO) Algorithm. This paper further reviews how PSO can be utilized for clustering. It also depicts how it is superior to other clustering algorithms in module 3. Module 4 is the Examination table for the literature overview done. The last module V finishes up the review with end pursued by the references.

2. RESEARCH METHODOLOGY

A considerable amount of Tweets are posted on twitter on everyday schedule. On a large number of the occasions it happens that an individual may tweet something unessential, and due to this, understanding what the user intends to state becomes very difficult. For this reason, summarization and segmentation are utilized. The reasons for these are to draw an outline from the tweets posted by the user and mime his/her feelings. Segmentation is division of tweets into significant sentences and picking up their implications [5] while, summarization clusters a group of comparable tweets and draws a rundown from these groups and gives it to the user.

Various summarization and segmentation methods have been developed by scientists over the years few of which perform both segmentation and summarization together on a tweet [7] or some either of the one. The different methods for summarization incorporate various clustering algorithms like K-means, ACO, and so forth. A few of these strategies are also used for graph formations of a cluster for similar tweets [3]. Different segmentation methodologies use frameworks like the Hybrid-seg framework for segmentation. Tweets are fragmented thinking about a few components like the grammatical features, etymology, and so forth. These portions are then looked for locally as well as globally, for which they make utilization of lexicons like the word-net. Following are a few papers which deliberate a portion of these systems [4][5][6].

2.1 A Graph Based Clustering Technique for Tweet Summarization [1].

Twitter is a prominent person to person communication site used by millions to share information. A user can find tweets related to any event; however it winds up evidently troublesome for the user to examine all of the tweets. This paper

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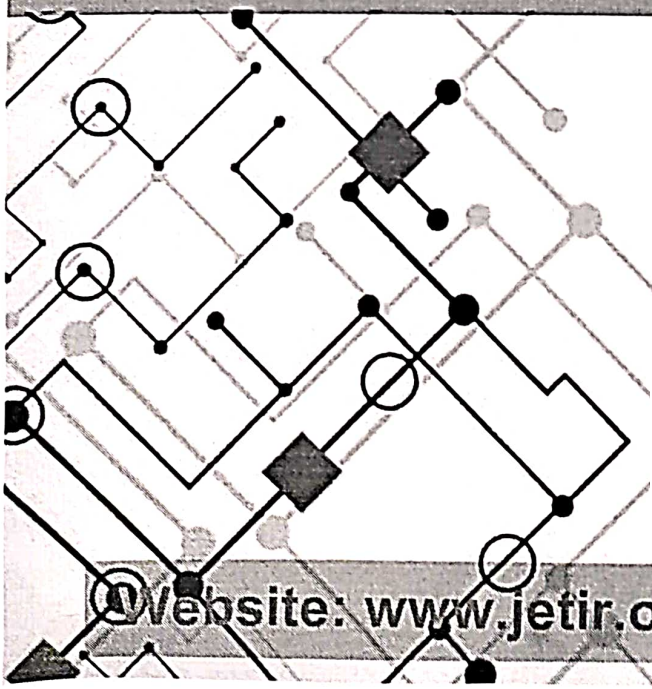

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52_Decentralized Crowd Funding Application using Blockchain by Mrs. Sweety Rupani

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DECENTRALIZED CROWD FUNDING APPLICATION USING EHTEREUM BLOCKCHAIN.

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Abstract: Crowdfunding is the use of small amount of capital from a large number of individuals that provides funding to a business venture, for an entrepreneurship or for any social as well as medical causes. Crowdfunding is already a rage in the western countries and is now gaining immense popularity in India. In our project we propose a paradigm for developing crowdfunding using a decentralized Ethereum blockchain. The project caters us with the functionalities of a primitive level crowdfunding platform coupled with the potential advantages of blockchain technology.

Keywords – Crowdfunding, Blockchain, Donations, Transparency.

1 INTRODUCTION

Crowdfunding is the practice where in a crowd of people invest meagre amounts which would culminate to a large amount of capital to fund for a particular cause or sponsor a specific venture. Crowdfunding makes use of networking through social media platforms like Facebook, Telegram, Instagram, Twitter and other crowdfunding websites to attract a huge and diverse crowd of entrepreneurs, investors and common folk who aspire to serve, contribute and invest in a particular campaign. The person or organization who initiates a cause(campaign) or the entity who is in need of certain amount of funds is termed as a campaigner. Apart from the campaigner's relatives, friends and immediate family members, crowdfunding provides a wider reach and an easier access to people across the globe to donate. Many crowdfunding projects give out rewards in terms of monetary gains or finished products. Contributors may get to participate in the release or successful deployment of a new product or receive a valuable return for their investment. For instance, the maker of an innovative watch may decide to gift free samples to a limited group of investors. The donors of the campaign may receive a certain percentage of the total campaign amount provided that the campaign is successful.
Gamers invest in new video games and obtain a copy of the new releases. In the present scenario Kickstarter is one of the most popular and notable crowdfunding platforms present till date: since its inception in 2009, more than 135,000 projects have been successfully funded on the crowdfunding site, with more than $3.5 billion dollars pledged across all Kickstarter projects. Indiegogo started as a crowdfunding site initially focused exclusively on raising money for independent films, but began accepting projects from any category a year after its launch in 2007.

1.1 PROBLEMS IN EXISTING SYSTEM

There are innumerable successful platforms like Milaap, Ketto, Indigogo etc. which have provided an innovative technique to collect funds. But these companies require users to trust the third party and furthermore there is no clear transparency and the cost of these services are quite high. One of the root problems of the conventional crowdfunding platforms is their dependencies on third party and lack of transparency in their transactions. With the help Blockchain Technology, we aim to eliminate the need of a third untrusted party by providing immutable transactions. The project highly focuses on providing transparency. The problem with the established crowdfunding companies is that they are centralized bodies, charging high fees and also influencing the projects. Crowdfunding based on Blockchain Technology is set to be a game changer because as it will decentralize the funding model from the likes of Kickstarter and other companies as well as lower additional costs.

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53_Genetic Syndrome Identification: An image Processing Approach by Mrs. Archana Ekbote

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Genetic Syndrome Identification: An Image Processing Approach

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ABSTRACT

Genetic syndromes often cause intellectual disability and facial dysmorphism. These dysmorphic facial characteristics provide distinct information which can be used in the identification of various syndromes. However, identification of dysmorphism using a computer is complex since it involves scientifically measuring the facial features and correlating with pathological proportions. Here we describe our work on image-based screening for dysmorphic children which uses the basic concept of symmetry and geometry of the human face. Frontal face images are used to facilitate syndrome identification. Various facial landmarks are selected, different angles and distances are computed for normal and affected face images. It was observed that Support Vector Machine with Radial Basis Function kernel (SVM-RBF), Linear Discriminant Classifier (LDC), and Quadratic Discriminant Classifier (QDC) are suitable to classify the faces and bucket them in dysmorphic and non-dysmorphic categories. Maximum classification accuracy achieved is 89.19% by Linear Discriminant Classifier.

KEYWORDS

Classifier; Facial and anatomical landmark; Feature extraction; Syndrome

1. INTRODUCTION

Genetic syndromes cause abnormalities in internal body organs as well as in the facial appearance of an individual. Generally, abnormalities are related to the heart, blood vessel, denture, kidney, face, etc. Typical abnormalities related to face are long face, large prominent ears, broad forehead, short nose with a broad lip, wide mouth, etc. [1]. Facial features are prominent discriminating factors in identifying a person with the syndrome. Typical known syndromes affecting facial features are Fragile X syndrome, Williams Syndrome, Prader–Willi syndrome, Down syndrome, Mucopolysaccharidosis III, Cornelia de Lange Syndrome, Cri-du-chat Syndrome, Smith-Lemli-Opitz Syndrome, etc. [1]. Some of these syndromes can be diagnosed before birth (prenatally) or after birth (postnatally). Prenatal tests involve some risk to mother and foetus. They are very uncommon. Diagnosis after birth is generally based initially on physical signs of the syndrome and delayed development which includes delay in speech and language skills, motor skills like walking, running, etc. To support the diagnosis, chromosomal test and genetic test are performed which are costly and time-consuming [2]. Healthcare infrastructure in rural India is severely resource constrained. Constraints are in terms of both physical resources and medical skills. Early detection of dysmorphism in children is one such unaddressed issue arising out of these concerns. Early screening could possibly help these children to lead a reasonably better quality of life. In this simulation-based experimental study, a simple non-invasive method is proposed to identify the syndrome at a low cost. This algorithm has a potential to be a diagnostic tool after further experimentation and study. At this stage, the present work may not be used directly in human health diagnostics and patient management.

Algorithms to work on face images are available but are mainly for recognition of faces and Content-Based Image Retrieval (CBIR). Typical work on face recognition is based on faces with various angles [3], Facial Action Coding System (FACS) and Local Binary Pattern (LBP) [4], low-rank sparse representation [5]. In Ref. [3], the algorithm is based on the combination of Approximate Dynamic Programming (ADP) called Action-Dependent Heuristic Dynamic Programming (ADHDP) and Particle Swarm Optimization (PSO). This method is used to recognize faces with various angles. In Ref. [4], facial expression recognition is based on FACS and "Uniform" LBP to represent facial expression from coarse to fine. In Ref. [5], Low-Rank Sparse Representation-Based Classification (LRSRC) method was used for robust face recognition. In Ref. [6], authors proposed a method for automatic localization of facial landmarks for expressive images. In Ref. [7], facial landmark detection method was proposed by authors for different head poses and occlusion. This work proposes different measurements on face

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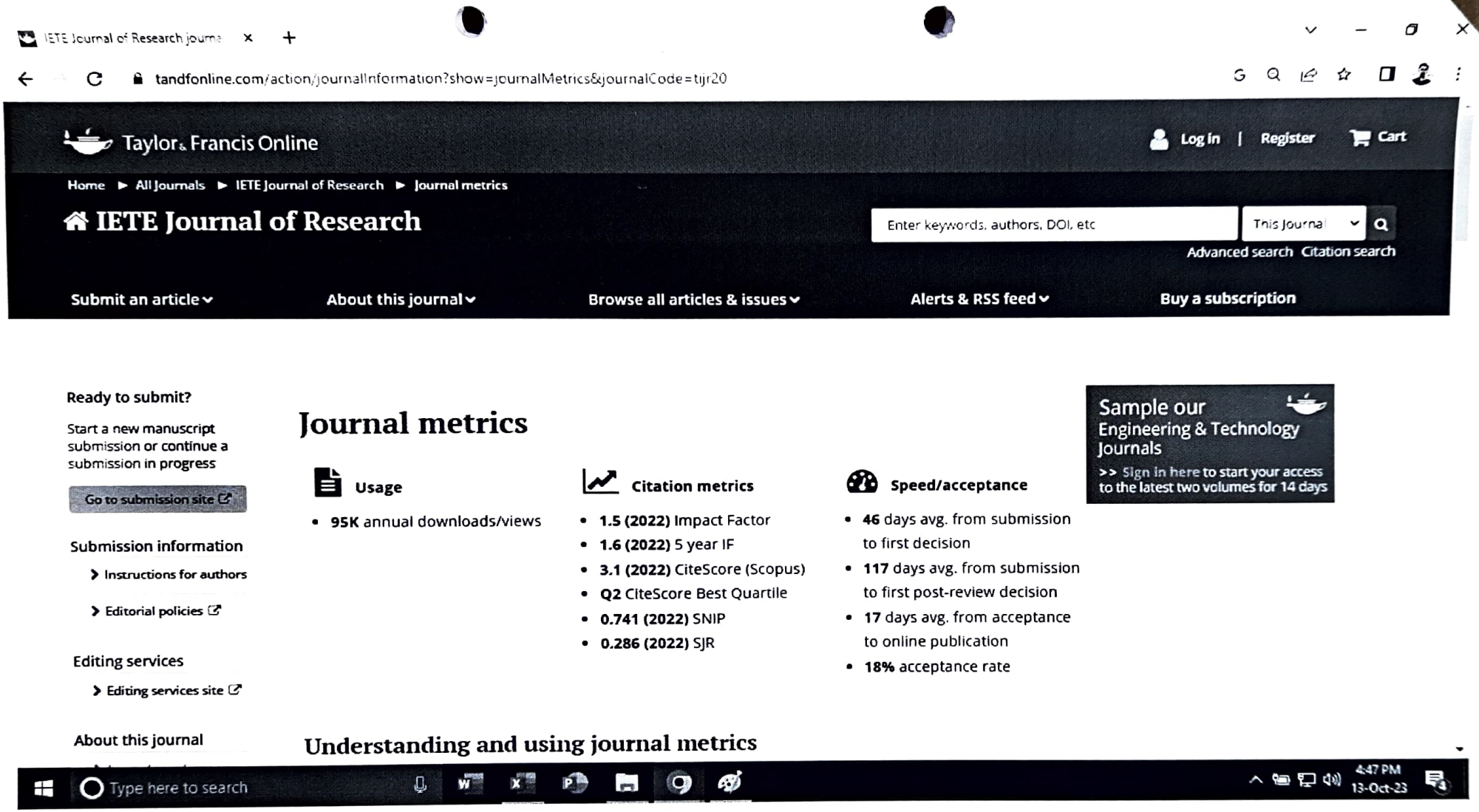

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54_Estimation of Building Construction Cost Using Artificial Neural Networks by Mr. Viren Chandanshive

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Estimation of Building Construction Cost Using Artificial Neural Networks

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ABSTRACT

The cost estimation of the building construction projects at initial stages with a higher degree of accuracy plays a vital role in the success of every construction project. Based on the survey and feedback of the design professionals and construction contractors, a dataset of 78 building construction projects was obtained from a mega urban city Mumbai (India) and geographically nearby region. The most influential design parameters of the structural cost of buildings (Indian National Rupees: INR) were identified and assigned as an input and the total structural skeleton cost (INR) signifies the output of the neural network models. This research paper aims to develop a multilayer feed forward neural network model trained along with a backpropagation algorithm for the prediction of building construction cost (INR). The early stopping and Bayesian regularization approaches are implemented for the better generalization competency of neural networks as well as to avoid the overfitting. It has been observed during the construction cost prediction that the Bayesian regularization approach performance level is better than early stopping. The results obtained from the trained neural network model shows that it was able to predict the cost of building construction projects at the early stage of the construction. This study contributes to construction management and provides the idea about the entire financial budget that will be helpful for the property owners and financial investors in decision making and also to manage their investment in the volatile construction industry.

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