Criterion 3- Research, Innovations and Extension

3.3- Research Publications and Awards

3.3.1 - Number of research papers published per teacher in the Journals as notified on UGC CARE list during the last five years

AY: 2022-23

Sr. No.	Documents	Count	Page No.
Number of Research Papers published in the Journals			
1.	Electronics and Telecommunication Engineering	12	2
2.	Mechanical Engineering	9	16
3.	Computer Engineering	9	27
4.	Information Technology	12	37
5.	Applied Science and General Engineering	8	48
	Total	**50**	

AY: 2021-22

Sr. No.	Documents	Count	Page No.
Number of Research Papers published in the Journals			
1.	Electronics and Telecommunication Engineering	6	58
2.	Mechanical Engineering	1	64
3.	Computer Engineering	6	66
4.	Information Technology	5	73
5.	Applied Science and General Engineering	2	78
	Total	**20**	

AY: 2020-21

Sr. No.	Documents	Count	Page No.
Number of Research Papers published in the Journals			
1.	Electronics and Telecommunication Engineering	16	81
2.	Mechanical Engineering	8	97
3.	Computer Engineering	17	112
4.	Information Technology	1	129
5.	Applied Science and General Engineering	2	130
	Total	**44**	

AY: 2019-20

Sr. No.	Documents	Count	Page No.
Number of Research Papers published in the Journals			
1.	Electronics and Telecommunication Engineering	23	on page 133
2.	Mechanical Engineering	3	149
3.	Computer Engineering	7	153
4.	Information Technology	4	161
5.	Applied Science and General Engineering	7	165
	Total	**44**	

AY: 2018-19

Sr. No.	Documents	Count	Page No.
Number of Research Papers published in the Journals			
1.	Electronics and Telecommunication Engineering	9	173
2.	Mechanical Engineering	1	183
3.	Computer Engineering	2	184
4.	Information Technology	1	186
5.	Applied Science and General Engineering	3	188
	Total	**16**	

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

Year	2022-23	2021-22	2020-21	2019-20	2018-19
Number	50	20	44	44	16
Total	174				

Formula:

$$\frac{\text{Total number of research papers in the Journals notified on UGC CARE}}{\text{Number of full time teachers during the last five years (without repeat count)}}$$

= 174 / 100

= 1.74

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Research Publications
A.Y. 2022-23

Journal of Positive School Psychology http://journalppw.com
2022, Vol. 6, No. 7, 5586-5597

Study And Analysis Of Online And Hybrid Mode Learning Of An Engineering Course Conducted During COVID-19 Pandemic

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Abstract—A completely new situation emerged during COVID-19 pandemic for the engineering institutes in India. Various ad hoc strategies were used as per the understanding, suitability, and availability of resources for conduct courses in online mode. There was no prior experience of the same. Along with online mode of learning, hybrid mode was also adopted when institutes started reopening. It will be useful if these experiences are shared with both student and teacher's perspective. This paper gives study and analysis of online and hybrid mode learning based on instructor's observations and students' feedback and perception about these experiences. A framework for teaching and learning in hybrid mode is suggested for conduct of the courses based on the analysis.

Keywords—COVID-19, online learning, face-to-face learning, hybrid mode.

1 Introduction

The higher education sector especially the technical education in India has become very competitive due to mushrooming of institutes. COVID-19 pandemic added more challenges for these institutes and forced them to go online in March 2020. It was a totally a new situation for all the stakeholders of this sector involving students, faculty, support staff, management, society, service providers, government, policy makers, employers etc. Especially for teachers & students it seemed to be difficult to adapt to in initial period. In the past two years it was either complete or partial lockdowns in India. During this period the higher education institutes in India adapted to online mode of teaching. When the situation started easing out after vaccination in July 2021, the institutes started face-to-face teaching learning along with online mode which will be termed as hybrid mode in this paper.

The experiences of both teachers & students will be useful to plan for future activities and improve the learning experiences of students. The hybrid mode of teaching-learning need to be studied from the various perspectives. It is necessary because the current situation may continue for some time where all the students may not be able to report for face-to-face learning for some time. In addition, the advantages both online and face-to-face mode can be exploited to create more opportunities for students. This experience will also be useful to offer quality education at affordable cost.

There are different learning modes or models which need to be discussed here and the terminologies related to that need to be cleared. It is because, these terminologies are defined in literature in different ways and context

Face-to-face learning: It is traditional way of learning where both student and instructor will be physically present all the time during the conduct of the course.

Distance Learning: In this mode the students and teachers are at remote locations. The students are provided learning material (text, audio, video etc.) which they use for self-study. Some doubt clearing sessions are organized for the students.

Online mode: In this mode the student and teacher are at remote locations. If the student learns by attending live lectures, it is called synchronously online learning and if the student

Not secure | cims-journal.com/index.php/CN/article/view/885
hent... Gmail

Computer Integrated Manufacturing Systems

DSP BASED PORTABLE ECG MONITORING SYSTEM

Surekha K S

PDF

Keywords: ECG, Compression, DSP, Acquisition.

Published
2023-04-30

Abstract

An electrocardiogram (ECG) gives important information to doctors to analyse heart related abnormalities such as arrhythmias or monitor drug effects. For an ambulatory system, there is a requirement for continuous monitoring. Hence, the data generated is huge and needs huge storage space. As the data is huge, it needs to be compressed before transmission. The compression of data is carried out using a suitable compression methodology. In this work, a real time DSP based portable ECG monitoring system is developed to acquire the ECG signal in real time. The acquired data is compressed before transmission. This helps with efficient storage management. The system helps monitor ECG signals in real time and is useful to doctors for diagnosis.

How to Cite

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RESEARCH ARTICLE

IOT-HML: A hybrid machine learning technique for IoT enabled industrial monitoring and control system

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Summary

Industrial 4.0 makes manufacturers more vulnerable to current challenges and makes it easier to adapt to market changes. It is essential to focus on monitoring and controlling the production system before complex accidents occur. To overcome above research gaps, we shift to industrial 4.0, which combine IoT and mechanism learning for industrial monitor and manage. Here, we propose a hybrid machine learning technique for IoT enabled industrial monitoring and control system (IoT-HML). The main goal of the research is to overcome the issues of information security and control systems by developing a hybrid machine learning technique. Compared to the existing AODV protocol, the proposed C-IWO based routing protocol outperformed efficiently in terms of 19.2% average delay, 12.7% average energy consumption, 10.26% average throughput, 3.8% average delivery ratio, and 16.33% average loss ratio, respectively. In addition, the accuracy 98.5%, sensitivity 97.3%, specificity 98.2%, precision 98.35%, recall 98.32%, and *F*-measure 97.49% of proposed CP-LNN technique is very high compare to obtainable state-of-art classifiers.

KEYWORDS

cluster head (CH), clustering, hybrid machine learning, industrial 4.0, IoT enabled industrial

1 | INTRODUCTION

In the future, with the advent of Industry 4.0, computers will be able to interact and make decisions without human intervention. The combination of web physics system, the Internet of Systems (IoS) and Internet of Things (IoT) allows Business 4.0 to become a better industry. The manufacturing industry is busy converting goods, materials or products into new products. Plants, mills, or factories that produce products for general consumption are often owned by manufacturers. Machinery and tools are often used in the manufacturing process. This includes food, chemicals, textiles, machinery, and equipment.[1] It contains all the refined metals and minerals extracted from the ores. This includes wood, timber, and wood products. Production is the production of materials using labor, machinery, equipment, chemical or biological processing or work. This is the essence of the second sector of the economy. The term can cover a wide range of person behavior, from handicraft to high-tech, but it is also often used for manufacturing mean, in which raw materials are converted into large-scale finished goods. Such products are available to other manufacturers of other complex products.[2] The IoT model, first introduced by Kevin Ashton in 1998, has paying attention a lot of notice in education and manufacturing. By incorporating mobile adapters into short gadgets and everyday distances, IoT allows a new dimension of communication between people and objects, giving a whole original measurement to the world of in sequence and communiqué.[3]

There is no doubt that this has a huge impact on many aspects of daily life and the behavior of potential users. From a private consumer perspective, the most obvious outcome of IoT is employment and the domestic sector.[4] In this regard, appropriate living conditions, smart homes, offices, hygiene and modern training are just a few examples of the situation in which a new model will play an important role in the future. Similarly, from the point of view of business customers, very clear results can be equated with areas such as automation, industrial construction, logistics, business process management, and intelligent transportation of people and goods.[5] Many scientific endeavors in the manufacturing sector reflect such an

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Research Article

Accelerating AI-Based Battery Management System's SOC and SOH on FPGA

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Lithium battery-based electric vehicles (EVs) are gaining global popularity as an alternative to combat the adverse environmental impacts caused by the utilization of fossil fuels. State of charge (SOC) and state of health (SOH) are vital parameters that assess the battery's remaining charge and overall health. Precise monitoring of SOC and SOH is critical for effectively operating the battery management system (BMS) in a lithium battery. This article presents an experimental study for the artificial intelligence (AI)-based data-driven prediction of lithium battery parameters SOC and SOH with the help of deep learning algorithms such as Long Short-Term Memory (LSTM) and bidirectional LSTM (BiLSTM). We utilized various gradient descent optimization algorithms with adaptive and constant learning rates with other default parameters. Compared between various gradient descent algorithms, the selection of the optimal one depends on mean absolute error (MAE) and root mean squared error (RMSE) accuracy. We developed an LSTM and BiLSTM model with four hidden layers with 128 LSTM or BiLSTM units per hidden layer that use Panasonic 18650PF Li-ion dataset released by NASA to predict SOC and SOH. Our experimental results advise that the selection of the optimal gradient descent algorithm impacts the model's accuracy. The article also addresses the problem of overfitting in the LSTM/BiLSTM model. BiLSTM is the best choice to improve the model's performance but increase the cost. We trained the model with various combinations of parameters and tabulated the accuracies in terms of MAE and RMSE. This optimal LSTM model can predict the SOC of the lithium battery with MAE more minor than 0.0179%, RMSE 0.0227% in the training phase, MAE smaller than 0.695%, and RMSE 0.947% in the testing phase over a 25°C dataset. The BiLSTM can predict the SOC of the 18650PF lithium battery cell with MAE smaller than 0.012% for training and 0.016% for testing. Similarly, using the Adam optimization algorithm, RMSE for training and testing is 0.326% and 0.454% over a 25°C dataset, respectively. BiLSTM with an adaptive learning rate can improve performance. To provide an alternative solution to high power consuming processors such as central processing unit (CPU) and graphics processing unit (GPU), we implemented the model on field programmable gate Aarray (FPGA) PYNQ Z2 hardware device. The LSTM model using FPGA performs better.

1. Introduction

Using fossil fuels has resulted in adverse environmental impacts such as air pollution and global warming, leading to increased health issues and other socioeconomic impacts worldwide [1]. Most countries are signing international agreements and implementing national policies to combat this environmental impact. Recently, there has been a significant focus on EVs powered by lithium batteries, owing to the constraints associated with fossil fuels [2, 3]. To encourage the acceptance of EVs in the country, the central government of India announced several promotional measures in the previous ten years, including tax incentives for EV owners and public EV charging infrastructure development [4, 5].

Real-time monitoring of lithium battery parameters is crucial for the safety and optimum performance of the battery. This can be performed by accurately estimating SOC

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A novel approach for grounding resistance estimation

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ABSTRACT

Grounding is crucial to achieving equipment and personnel protection. This paper presents input-output pair-based modeling using the response surface method and artificial neural network to predict earth resistance for novel factors associated with grounding. The effect of various types of cone- shaped earth electrodes, charcoal size, and industrial waste metal fibers on earth resistance is investigated for the first time. The experimental trials are carried out in a scaled down manner. Artificial neural network and response surface method are used as investigatory tool for parametric variation. Artificial neural network model predicts earth resistance with more accuracy as compared to response surface method. These methods are found to be very effective in prediction of earth resistance of grounding system which is complex in nature.

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2. INTRODUCTION

Grounding is used to keep people and instruments safe. Low earth resistance is required for good grounding. The grounding electrode and the soil conditions around it are critical. Natural and man-made changes have had an impact on the factors influencing grounding resistance. Seasonal patterns are shifting, and their impact on grounding is palpable. The population is growing, and so is the rate of concretization. Because of changes in soil, grounding methodology has changed dramatically. Automation necessitates a lower grounding resistance. As a result of these developments, the grounding approach, and many components of grounding, from construction to commissioning, must be reexamined. Different strategies for achieving lower earth resistance are the subject of a research. The primary function of grounding is to provide path of low electrical resistance. Ground electrode and soil conditions around ground electrode are the major contributors to lower grounding resistance which have been extensively studied [1].

Various subfactors of these to reduce grounding resistance have been tried by many researchers. Electrode's parameters like material, depth in soil, shape and parallel connection have been altered to lower grounding resistance [2]–[7]. Contact between soil and electrode structure aids in lowering grounding resistance. Since a long time, various methods have been used to alter soil resistivity [8]–[11]. As soil improvers, a variety of materials have been introduced. These materials are classified into two types: organic and inorganic. An organic enhancement material is typically made of natural materials, whereas a chemical product is made of inorganic materials. Natural materials have seen an increase in demand in recent past. This is due to the abundance of raw materials which are inexpensive. In the early 1980s, Jones [12] proposed bentonite rods as a soil improver. In his experiment, Bentonite rods were field tested against driven rods at

Performance Analysis of a Novel Optimal Antenna Selection Algorithm for Large MIMO

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Abstract

LTE MIMO is capable of providing some major enhancements in spectral efficiency and performance along with adding complexity to the system. One way to make sure that the sent data has reached the receiver end is to increase the number of antennas between them. But when the quantities of antennas are increased, there is increase in the probability that deep fading is experienced by at least some antennas. This results in giving out some undesirable outcomes which affects the overall efficiency of the MIMO system. To handle these issues, a reliable technique has been presented that involves selection of antenna subset. The proposed technique incorporates combination of SBO and PSO for antenna selection. The maximum channel capacity of the channel has been considered as the objective function for selecting optimal antennas. The comparison of the proposed approach's performance and the existing approaches' performance is done in terms of BER, energy efficiency, spectral efficiency and optimal transmit power.

Introduction

In bandwidth constrained wireless systems, the multiple input multiple output communication has been considered as an important technology as it can utilize all the merits of multiple antennas without any additional spectrum for drastically increasing the capacity (Hua 2017). When MIMO systems are deployed, there are few critical factors such as growing complexity in signal processing and high cost of multiple analog chains (like analog to digital converter at the end of the receiver end, mixers and low noise amplifiers) (Yuan 2017). Also, there is an increase in possibility that at least few of the antennas go through deep fading as there is an increase in quantity of antennas (Eskandari et al. 2018). For handling these critical issues, many strategies involving selection of antenna subset have been proposed by many researchers. The main concept of selection of antenna is to utilize certain quantity of analog chains that are adaptively switched to a subset of the available antennas which is capable of minimizing the quantity of radio frequency chains needed, also maintaining the selection with diversity gains. MIMO is considered as one of the most prospective technologies as it is capable of enhancing the spectral efficiency which in return enhances the transmission reliability and security (Krishna 2015). Base station, antenna arrays with a few hundred components, serving many tens of thousands of active nodes simultaneously and frequency resources are used by massive MIMO systems (Choi et al. 2018). In traditional MIMO system, many antennas on both ends provide more reliable high speed connections utilizing wireless channel diversity. By utilizing hundreds of antennas that use advances in parallel digital signal processing and high speed electronics, massive MIMO focuses on further improving the high speed connections. For transmitting signal energy into smaller areas, additional antennas are used (Zhai et al. 2017). When the proposed approach is combined with the simultaneous scheduling of multiple user nodes, the results provide better performance in terms of energy efficiency. But so as to guarantee communication, every antenna has to be connected to a radio frequency chain that will increase the expensive cost and energy consumption of hardware implementation. This has attracted a lot of researchers' interest towards the antenna selection approach. Many antenna selection algorithms and conditions have been presented in the last decade for traditional small scale MIMO (Yuan et al. 2017). Most of these approaches have concentrated on the selection criteria based on capacity. Studies and extension on some of these approaches have been performed for the massive MIMO systems. But, in the sense of maximum capacity, none of these algorithms for antenna selection for massive MIMO are optimal. Because of increase in quantity of antenna subsets, the optimal traditional small scale MIMO approach such as exhaustive search approach becomes ineffective for massive MIMO system (Zhai et al. 2018). Though there are many advantages for MIMO system, adaptation of them in real time wireless system has been a very slow process. The main reason for this slow adaptation is the more efforts required by MIMO in terms of hardware necessity (Dong et al. 2011). Though the elements of antenna are cheap, the receiver side antenna elements need a complete RF chain that includes an analog to digital converter, frequency down converter and a low noise amplifier which further add to the complexity of hardware requirements. Optimal Antenna subset selection is a reliable method that deals with the problems on hardware complexity (Bana et al. 2019). Therefore an optimal approach for antenna selection that is faster than the traditional approach is very much needed for the massive MIMO antenna selection systems. There are several nature inspired techniques for optimization were developed. Which include: Particle Swarm Optimization (PSO), Gravitational Search Algorithm (GSA), Genetic Algorithm (GA), Evolutionary Algorithm (EA), Deferential Evolution (DE), Ant Colony Optimization (ACO), Biogeographic Based Optimization (BBO), Firefly Algorithm (FA), and Bat Algorithm (BA). The common aim of these algorithms is to find the best quality solutions and boost the efficiency of the convergence. In do so, an inspired version of nature should be fitted with discovery and extraction in ensure that maximum global finding is achieved. Ultimately, the goal of all variants inspired by nature is to combine discovery and exploitation capabilities capable of searching for the best optimal global solution in the quest space.

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Design of an Optimal Fractional Complex Order PID Controller for Buck Converter

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***Abstract*—Dynamic and robust controllers are the inherent requirement of power electronic converters, which are subjected to dynamic variations and nonlinearities. The effectiveness of fractional order controllers in non-linear system control has been well-established by studies in the past few decades. Various forms of fractional order controllers have been used in power-electronic control. Recent research indicates that complex order controllers, extensions of fractional controllers, are more robust against uncertainties and non-linearities than their integer and fractional order counterparts. Though complex order controllers have been employed in various nonlinear plants, they have not been extensively tested on power electronic applications. Also, the design and tuning of the controller is difficult. This paper investigates the effectiveness of a complex order PID controller on a typical power electronic DC-DC buck converter for the first time. Two types of complex order controllers of the form $PI^{a+ib}D^{c}$ and $PI^{a+ib}D^{c+id}$ were designed for a power electronic buck converter. The complex order controllers were implemented in Simulink and the optimal tuning of the complex order controller parameters for various performance indices was performed using different optimization algorithms. The Cohort Intelligence algorithm was found to give the most optimal results. Both the complex controllers showed more robustness towards uncertainties than the linear and fractional PID controllers. The $PI^{a+ib}D^{c}$ controller gave the smoothest and fastest response under non-linearities. The dynamic performance of the complex order controller is the best and can be expected to be useful for more power electronic applications.**

Keywords*—Fractional order PID controllers; Complex order PID controllers; Buck converters; Performance indices; Optimization; Cohort Intelligence.

I. Introduction

Power Electronic DC-DC converters use switching power devices for power conditioning and conversion [1]. Buck converters are DC-DC converters used in a wide range of applications from switch mode power supplies to renewable energy applications [2]–[4]. These systems have inherent non-linearities due to switching actions, load variations, magnetic saturation etc. [5]. They experience input fluctuations, and load variations exist due to the large packaging densities of onboard chips [6]. Therefore, there is a requirement for robust and stable controllers which give better ripple reduction, disturbance rejection and fast transient response [7]. Conventional power electronic control methods are PI/PID, sliding mode, H_{∞}, optimal control, predictive control, fuzzy and artificial neural network-based control etc. [8]–[10]. The PID controller is undeniably the most dominant in the industry due to its simplicity of design and ease of auto-tuning process [11]. PID controllers have been used to control DC-DC converters for different applications [5], [12]–[14]. However, the limitations of the PID controller response to uncertainties and parametric variations make them ill−suited for non-linear control applications [15].

In recent years, considerable research has been conducted on the advantages of fractional order (FO) controllers for power electronic control. The fractional controller uses fractional order derivatives and integrals and is the general form of an integer order controller. Hence fractional counterparts of the linear controllers, such as the FO integrator/differentiator, FOPID, FO sliding mode, FO lead/lag compensator etc., have been designed [16]. The main advantage of fractional order controllers is their robustness and flexibility in control. Fractional order PID controllers (FOPID), proposed by Podlubny, have the general form $PI^{x}D^{y}$, where x and y are non-integer orders [17]. FOPID controllers are very robust against parameter variations and uncertainties and performed better than the conventional PID controllers [18]–[23]. At the same time, designing and tuning the fractional order parameters is challenging. Analytical methods are time-consuming and difficult; hence, numerical methods using optimization techniques have become popular for tuning. This involves optimising an objective function such as a performance index or parameters like the overshoot, rise time, gain margin, phase margin etc., chosen according to the design requirements [24]. Various algorithms have been developed for constrained and unconstrained optimization and used for optimal tuning [25], [26].

Fractional orders have been extended to the complex order,

Road Segmentation in High-Resolution Images Using Deep Residual Networks

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Abstract-Automatic road detection from remote sensing images is a vital application for traffic management, urban planning, and disaster management. The presence of occlusions like shadows of buildings, trees, and flyovers in high-resolution images and miss-classifications in databases create obstacles in the road detection task. Therefore, an automatic road detection system is required to detect roads in the presence of occlusions. This paper presents a deep convolutional neural network to address the problem of road detection, consisting of an encoder-decoder architecture. The architecture contains a U-Network with residual blocks. U-Network allows the transfer of low-level features to the high-level, helping the network to learn low-level details. Residual blocks help maintain the network's training performance, which may deteriorate due to a deep network. The encoder and decoder structures generate a feature map and classify pixels into road and non-road classes, respectively. Experimentation was performed on the Massachusetts road dataset. The results showed that the proposed model gave better accuracy than current state-of-the-art methods.

Keywords-U-network;residual block; encoder; decoder

I. INTRODUCTION

Remote Sensing (RS) is one of the most essential applications. It is related to the analysis and identification of features by measuring the physical parameters of an object at some distance with the help of electromagnetic radiation. Target discrimination is possible using different characteristics of sensors such as temporal, spatial, and spectral [1]. Due to the improvements in RS technology, high-resolution images with adequate spectral and temporal information are available for different applications such as disaster management, water source, land utilization, marine, glacier monitoring, urban city planning, etc. These high-resolution images are considered a primary database for automatic road extraction methods.

Automatic road detection from remotely sensed images is an essential task for many applications such as urban planning, geographic information systems, map updates, and automatic vehicle navigation [2]. Various methods to address the problem of road detection have been presented, but it is still a challenging task due to the presence of occlusions, building shadows, and complex backgrounds in high-resolution images. These noise elements result in a false and discontinuous segmentation of roads. Manual road detection is time-consuming, complex, and involves human interpretation. Artificial intelligence and deep learning have made automatic road detection more efficient and accurate than manual methods. Road detection methods are of two types: road detection and centerline extraction [3]. The main objective of a road detection system is to detect road pixels from RS images, while centerline extraction locates the skeleton of a road using mathematical morphological operations. The RS characteristics of the roads depend on weather conditions and sensors. Road features are classified into geometric, functional, topological, and contextual [4]. Geometric features are continuous and include the length-to-width ratio of roads, where the width is always narrower than the length. Functional features constitute connectivity in different areas. Characteristics of road intersections and continuity in length without interruption are called topological features. Contextual features include the shadows of trees, buildings, and flyovers. Some road detection methods used multiple features to improve the segmentation accuracy. But it is complex to identify all the features due to occluded high-resolution images.

Figure 1 shows a general block diagram of road extraction from remote sensing images. Several road datasets are available, including high-resolution satellite images with two classes: roads and non-roads [4]. The Massachusetts road dataset [5] has 1124 VHR images with 1500×1500 resolution. As a model's performance depends on the data quality, the preprocessing step ensures that the model receives correct data in a suitable format. The filtering technique helps to remove unwanted data from the image. Thresholding and binarization methods are used for grayscale conversion and normalization. The extraction of road features helps to produce different road aspects (geometric, radiometric, and contextual). In the classification technique, each pixel in an image is categorized in the road or non-road class. Various supervised or unsupervised methods are used for classification. Model accuracy can be evaluated using precision, recall, and IoU score. The segmented map represents the output of the model containing only the road pixels of the image.

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Review Article

Cyber security threats in IoT: A review

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Abstract. The Internet of Things (IoT) is the most secure platform for making human existence easier and more comfortable. IoT has made a big contribution to a variety of software programs. The rapid proliferation of smart devices, as well as their trust in data transfer and the use of Wi-Fi mechanics, has increased their vulnerability to cyber-attacks. As a result, the cost of cybercrime is rising every day. As a result, investigating IoT security threats and possible countermeasures can assist researchers in creating acceptable ways to deal with a variety of stressful scenarios in cybercrime research. The IoT framework, as well as IoT architecture, protocols, and technology, are all covered in this assessment research. Various protection issues at each tier, as well as correction strategies, are also detailed. In addition, this article discusses the use of IoT forensics in cybercrime investigations in a variety of areas, including cybercrime research, Artificial intelligence, system learning, cloud computing, fog computing, and blockchain technology all play a role in this discussion. Finally, some open research on challenging situations in IoT is detailed to enhance cybercrime investigations, providing a cutting-edge course for future research.

Keywords: Internet of Things, cyber-attacks, artificial intelligence, cybercrime research, cyber security

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1. Introduction

The Internet of Things (IoT) is a network of devices or things with various sorts of sensors, smart technology, and software. The Internet of Things was first proposed by Kevin Aston in 1999, and has grown significantly in recent years to become one of the most well-known technologies of this century. The technological aspect of a smart city is contemplated with the help of IBM, the main proponent of the smart city concept. The smart city is a high-tech, networked, and instrumented environment. The term instrumented approach refers to the ability to obtain a large amount of information about city life and virtual infrastructure in real-time via connected devices, measuring sensors, and private systems. The period linked demonstrates the ability to combine data on virtual platforms and share it with a variety of virtual metropolis offers. The term refers to the processing of data with the use of superior analytics, modeling, optimization, and visualization services to make the best conclusion. The IoT is depicted in Fig. 1 as a technological confluence.

The IoT estimated to have a big impact on cutting-edge public-sector goals, from remote healthcare to better green resource management in power grids. Many IoT devices on the market today, however, have several vulnerabilities that have been revealed by cyber security experts and are easily exploitable by hostile actors. In addition to these flaws, increasing IoT adoption and implementation risks endangering user's security, safety, and privacy, as

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CYBER SECURITY THREATS DETECTION AND PROTECTION USING MACHINE LEARNING TECHNIQUES IN IOT

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ABSTRACT

Recently, technology has enhanced itself to the 4th Industrial Revolution, with the Internet of Things (IoT), Edge computing, Computer safety, and along with Cyber-attacks are rapidly evolving. The quick proliferation of Internet of Things (IoT) devices and web in many shapes produces more data, posing cyber security risks. Detection and protection of cybersecurity threats is a significant concern in IoT. Machine Learning (ML) methods are widely regarded as one of the most promising solutions to address cyber security threats and provide security. Machine Learning (ML) methods are crucial in various cyber security applications. This study examines the literature on Cyber security threat detection and protection in IoT such as detection of spam, malware and intrusion over the previous ten years using machine-learning methods. The scope of Systematic Literature Review includes an in depth examination of the majority of ML trending methods in cyber security threat detection and protection in IoT. In recent years, increased Machine Learning techniques are used to solve four major cyber security issues namely identification of Intrusion, Android malware, Spam and Malware.

Keywords: *Cyber security, Threat Detection, Security Risks, Machine Learning, IOT*

1. INTRODUCTION

Internet of Things (IoT) devices and its usages are getting tremendously important in modern life. These devices found almost everywhere, including homes, workplaces, commercial complexes, educational institutes, airports, and many other areas and they provide safe and on-demand services. IoT devices make it easier for stakeholders to collaborate and understand business requisites& results. In addition to that, IoT analysis and processing of data improves industrial infrastructure productiveness and efficacy. IoT systems implement helpful technological advances in many fields. Several companies and dealers take up principles for the protection of connected device from malicious attacks. More privacy and safety concerns are report; when more devices are, connect with private networks and internet. The rigidity of the safety proneness corresponding with these devices are report by a number of real-world examples [1].

Although IoT provides excellent flexibility and scalability, its large size may indicate a safety disaster. The hazard to the individual and the network, global infrastructure's cyber security increases as per the number of devices a person connect. All devices are rapidly evolving over the global IoT network; however, they are prune to assaults and regard as weak areas. Hence, cyber security framework of the IoT verifies whether the mechanisms used securely and kept up well.

The IoT has created huge differences in end-users daily lives as a nascent technology and transformation. Individuals are carrying on their livings, studies and works in an IoT network, utilizing smart environments (at houses and in cities), e-Health, and transportation systems. For organisations or institutions, futuristic automation and industrial production, knowledge exchange and data management, smart, self-modifying mechanisms are getting increasingly desired [2]. IoT may cooperate along Wireless Sensor Networks, Radio Frequency

back

Hybrid Meta-Heuristic Algorithms Based Optimal Antenna Selection for Large Scale MIMO in LTE Network

Rajashree A. Patil, P. Kavipriya, and B. P. Patil

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Abstract

MIMO is a type of antenna technology which utilizes multiple antennas to separate signals traveling in various paths as a result of reflections, etc., to be separated and their ability utilized to enhance the throughput of data and the signal to noise ratio which in return enhances the performance of the system. For providing enhanced signal performance and enhanced data rates, MIMO is utilized within LTE. When the quantities of antennas are increased, there is increase in the probability that deep fading is experienced by at least some antennas, which affects the overall efficiency of the MIMO system. To handle these issues, a reliable technique has been presented that involves selection of antenna subset. The proposed technique incorporates combination of SBO and PSO for antenna selection. Antenna selection's main concept is to utilize a bounded quantity of analog chains that are adaptively switched to subset of the available antennas capable of preserving the selection diversity gains and also can minimize the quantity of radio frequency chains needed. The maximum channel capacity of the channel has been considered as the objective function for selecting optimal antennas. The comparison of the proposed approach's performance and the existing approaches' performance is done. From the simulation result, it has been shown that the presented approach's performance has been better than the performance of the existing approaches in terms of BER, energy efficiency, spectral efficiency and optimal transmit power.

Keywords: Large scale MIMO ▪ LTE ▪ optimal antenna selection ▪ satin bowerbird optimization algorithm ▪ particle swarm optimization ▪ channel capacity

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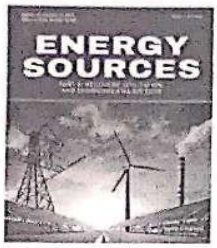

Energy Sources, Part A: Recovery, Utilization, and Environmental Effects

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Oscillating flow heat transfer: a comprehensive review

Mahmadrafik Choudhari, Bajirao S. Gawali & Jitendra D. Patil

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HEAT TRANSFER ANALYSIS OF PIN FIN HEAT SINK (PFHS) WITH AND WITHOUT SPLITTER

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Abstract

Present work is based on the numerical analysis of pin fin heat sink using splitters. Splitters were provided on fins and the optimum angle is determined using CFD analysis. The splitter with fins arrangement for heat sink are the extended surfaces that are extending from an object to enhance the rate of overall heat transfer within the exposed surfaces by accelerating the rate of convection. Under the present investigation, attempts have been made to maximize the heat removal through heat sink by varying the angle of splitter in a 'pin fin heat sink with splitter' and using staggered orientation of fins. The results of numerical investigation prove that maximum heat transfer coefficient is observed at 35° splitter angle. The maximum heat transfer was found out for the configuration of splitters inclined at 35 degree angle with the direction of inlet air with heat transfer coefficient value of 318 W/m2 K using air velocity as 8 m/s.

Keywords: Pin fin heat sink, Heat transfer, Splitter, Inline fins, Staggered fins, orientation of fins, convection

1. Introduction

Fluid flow and heat transfer analysis of Pin fin heat sink (PFHS) with splitter staggered orientation at varying angles and subsequent experimental validation of optimum configuration. To design a pin fin heat sink with optimum angle of splitter which gives maximum heat flow and reasonable pressure drop thereby increasing the efficiency of heat emission from the equipment in which heat sink is being brought into use. The air cooled heat sinks were famous in the initial period of heat transfer enhancement

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Ungraded tyre performance analysis for Indian road conditions

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Global Technical Regulations

ABSTRACT

The safety of tyres is an integral part of an ideal vehicle. Along with the safety, the tyres' emissions are also a concern nowadays. In this article impact of various factors that directly or indirectly impact tyre performance is explored and tested a set of tyres to analyze factors like rolling resistance, minimum breaking energy, endurance, durability, and strength by conducting three tests specified according to the Bureau of Indian Standards and UN Global Technical Regulation. The test outcomes were used to identify the exclusions present in Indian Standards if any, and changes were recommended to align them better with the global standards. As per the tests performed, we reached to the conclusion that we can test the tyres with a higher load threshold, as the value of breaking energy calculated as per IS 15633 was half the value calculated according to UN GTR.
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1. Introduction

Rubber is at the heart of the automobile's functioning and performance [1], it is the only means of contact between the surface and the vehicle. Tyre performance is affected by tyre drag force, friction, and other factors [2], as well as tyre wear, tyre pressure, tyre noise, tyre operation, and functionality. The automobile manufacturers are concerned about a variety of losses. It's on its way to maximizing its fuel economy. The dynamic efficiency of a road vehicle is mostly determined by the properties of tyre. Tyres are used to transmit the torque to the wheel which is generated by the power train of vehicle system. The tyre is maintaining the vehicle's point of contact through its lane, and its characteristics are critical to the car's complex behavior [3].

Tyres are necessary to perform four main functions. The crucial function of any passenger car tyre is to facilitate the interface in between the automobile and the road surface. Another function of a tyre is to support vehicle load. Vehicle load results in deflection of the tyre therefore tyres internal air pressure balances its average contact area pressure. Therefore higher loads needs larger contact area that is more amount of deflection and thus maximum the tyre internal pressure. Larger tyres are used where larger contact area is desirable. The tyres are facilitating the desired friction to the vehicle while starting, stopping and while taking the turn. It maintains firm grip between the road surface and tyres. The tyres behave like suspension system that is spring and dampers by absorbing huge impacts and road irregularities under various operating conditions [7,8].

Tyres are classified in multiple categories but mainly, they are classified according to the construction of ply cords. The ply cords are maintained at 90° to the tread radially from each bead to next bead. To add stability and strength to the tyre two or more than two belts are applied diagonally in the region of tread. The other type of tyre is known as bias ply tyres where all the cords of body ply are set at the angles smaller than 90° with the centerline of tread, extending from each bead to next bead over the carcass [6].

Factors such as load, pressure, tread depth, temperature and construction affect the performance of tyres. The operating parameters like load on the tyre, which affects the size of the contact patch, tread stiffness, and carcass stiffness, varies widely because of the load transfer during braking and acceleration. Pressure affects tyres as a decrease in inflation pressure often has a similar effect on the tyre properties as an increase in the vertical load of the tyre, thus, changing the size of the contact patch. A decrease in tread depth results in an increased tread stiffness, in addition

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Investigations on tube in tube metal foam heat exchanger

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Abstract

The heat transfer equipments with higher heat transfer ability are needed in several industrial applications. With conventional methods, size of the device increases and it becomes bulky. With the use of metal foam, it is possible to attain large ratios of surface to volume. Therefore, using metal foam in heat exchanging devices is crucial. The main reason behind the use of metal foam over conventional method is its weight-saving and impact-absorbing structures. Insertion of metal foam in heat exchangers for various applications can lead to greater effectiveness and heat transfer enhancement. It has been observed that very few researchers have participated in the area of double tube heat exchangers (DTHE) having annular spaces filled with metal foam. The present work deals

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Implementing Combinative Distance Base Assessment (CODAS) for Selection of Natural Fibre for Long Lasting Composites

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Keywords: Natural Fibre, Composites, CODAS, MOORA, MCDM

Abstract. Eco-friendly materials are being developed as population change into more aware of the coincidental damage subordinated by synthetic materials. Research investigators have spoken a strong appetite to develop materials capable of replacing synthetic materials. As a result, there has been an increase in exigency for natural fibre-based composites in commercial applications in recent years. Natural fibres are long-lasting materials found in nature that have advantages like renewability, biodegradability, lightweight, high specific characteristics and low cost. To meet client needs in a timely manner, Within the framework of the product design process, the selection of materials should be finished, according to the concurrent engineering strategy. Due to competing requirements, Inappropriate material choice frequently causes untimely failures, which causes large losses. To deal with this objective, selection process of natural fibre for long lasting composites becomes significant. Hence, correct decision-making tool ought to be used. This paper focuses on selection of natural fibre by using CODAS technique. This technique plays a significant role in sensible managing. Since the selection of natural fibre among eight alternatives and six criteria, it was observed that Basalt is best natural for long lasting composites followed by flax and Kenaf respectively when compared with multi-objective optimization and ratio analysis (MOORA) technique.

Introduction

Many things are manufactured from plastics in today's world due to their advantageous features, such as lightweight, robustness, and long-term durability, as well as their low cost compared to other accessible materials. Synthetic plastics, on the other hand, are a significant environmental danger because of these qualities [1,2]. The tremendous increase in the production of plastic garbage has had a significant impact on life on Earth, resulting in lot of issues such as soil leaching, landfill accumulations, rise in greenhouse gas (GHG), and the endangerment of aquatic ecosystems, among other things. As a result, they have been correctly identified as a global environmental danger [3]. Scientists have issued warnings regarding the hazards of non-renewable and non-biodegradable plastics as well as their significant contribution to environmental pollution.

The properties of the most produced plastics such as low biodegradability, persistence, and irreversibility, in addition to their incorrect use and disposal, plastic trash has grown significantly in both terrestrial and marine ecosystems worldwide, endangering human safety and health. As a result, plastics have been labelled as a planetary boundary hazard [4,5]. The COVID 19 pandemic influenced the environment. Environmental quality has improved in certain places of the world because of the lockdown limitations imposed during the outbreak. In contrast to popular belief, the study conducted by one the researcher found an overall improvement in environmental standards for the four important metro cities Mumbai, Chennai Kolkata, and Delhi in contrast to the same months the year prior [6].

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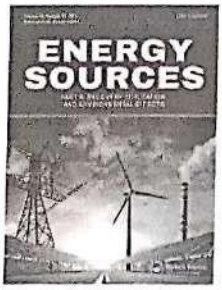

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Experimental investigation of rectangular mini channel array as an effective tool for energy efficient cooling of electronic gadgets

Jitendra D Patil, B S Gawali, Umesh Awasarmol, Girish Kapse & Shivam R Patil

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Review

Comprehensive review of environmental factors influencing the performance of photovoltaic panels: Concern over emissions at various phases throughout the lifecycle☆

Laxmikant D. Jathar [a], S. Ganesan [b], Umesh Awasarmol [a], Keval Nikam [c], Kiran Shahapurkar [d], Manzoore Elahi M. Soudagar [e,f], H. Fayaz [g], A.S. El-Shafay [h,i], M.A. Kalam [j], Salwa Bouadila [k], Sara Baddadi [k], Vineet Tirth [l,m], Abdul Sattar Nizami [n,o], Su Shiung Lam [p,q], Mohammad Rehan [n,*]

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Solar photovoltaic
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Clean energy
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Life cycle assessment

ABSTRACT

Recently, solar photovoltaic (PV) technology has shown tremendous growth among all renewable energy sectors. The attractiveness of a PV system depends deeply of the module and it is primarily determined by its performance. The quantity of electricity and power generated by a PV cell is contingent upon a number of parameters that can be intrinsic to the PV system itself, external or environmental. Thus, to improve the PV panel performance and lifetime, it is crucial to recognize the main parameters that directly influence the module during its operational lifetime. Among these parameters there are numerous factors that positively impact a PV system including the temperature of the solar panel, humidity, wind speed, amount of light, altitude and barometric pressure. On the other hand, the module can be exposed to simultaneous environmental stresses such as dust accumulation, shading and pollution factors. All these factors can gradually decrease the performance of the PV panel. This review not only provides the factors impacting PV panel's performance but also discusses the degradation and failure parameters that can usually affect the PV technology. The major points include: 1) Total quantity of energy extracted from a photovoltaic module is impacted on a daily, quarterly, seasonal, and yearly scale by the amount of dust formed on the surface of the module. 2) Climatic conditions as high temperatures and relative humidity affect the operation of solar cells by more than 70% and lead to a considerable decrease in solar cells efficiency. 3) The PV module current can be affected by soft shading while the voltage does not vary. In the

☆ This paper has been recommended for acceptance by Dr. Jörg Rinklebe.

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A comprehensive study of research and development in concentrating solar cookers (CSCs): Design considerations, recent advancements, and economics

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Parabolic concentrators
Economic analysis

ABSTRACT

Cooking is known to be one of the most energy-intensive sectors, with an estimated energy consumption of about 30–40% of global energy consumption, with a significant share in developing and underdeveloped countries. Traditional cooking, mainly based on biomass and fossil fuels, is one of the main sources of particulate matter (PM) emissions in household buildings, which is an important risk factor for lung cancer. Due to the negative impact on the environment and the waste of energy by traditional cooking systems, innovative and environmentally friendly cooking technologies are becoming more and more popular. Solar energy, as a renewable resource, is best suited for integration into cookers. Several researchers have studied solar cooking technologies to improve their performance and support their use worldwide. Among various solar cooking technologies, concentrating solar cookers (CSCs) have recently attracted much attention, especially in large-scale cooking, due to their special characteristics of generating high temperatures and significantly reducing cooking time. This study has focused on CSCs including parabolic through solar cookers (PTSCs), parabolic dish solar cookers (PDSCs), and Fresnel lens solar cookers (FLSCs), and describes their various aspects, including their operating principles, design considerations, thermal operation, and test procedures, while recent progress in the research and evolvement of these cookers are comprehensively discussed, taking into account their economic aspects. The major drawback of CSCs remains their high initial cost, especially when thermal energy storage (TES) is integrated. However, overcoming the limitations and realizing the great advantages of CSCs to replace them with other cooking methods can make their use more successful and improve their possibility to become commercial worldwide.

1. Introduction

Cooking is used by people all over the world to satisfy their daily needs. The energy which is required for cooking enumerated for 36 % of total primary energy consumption worldwide (Herez et al., 2018a). Hence, the use of solar energy in household cooking is becoming a viable solution for sustainable development in the face of population growth, economic growth, and environmental problems. According to a recent study, the world's fossil fuel reserves will be exhausted by 2088 (Ahmed et al., 2020b). Cooking is an essential method by which humans prepare their food to survive, with a large portion of allocated energy demand in several countries with a still high dependence on carbon-based resources including firewood, biomass, and fossil fuels (Ahmed et al., 2020). In metropolitan areas, cooking appliances powered by fossil-based fuels including gas and grid electricity are the most common types. In rural regions, cooking is done with firewood, electricity, or other fuel. This status results in deforestation, scarcity of firewood, and increased fuel costs (Ahmed et al., 2022). In the long term, therefore, generations will have to deal with a variety of problems such as air pollution, energy shortages, and natural disasters. In addition, household air pollution caused by the burning of biomass leads to respiratory diseases, which are

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Synthesis of new suspension mechanisms for two-wheeler vehicles

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ABSTRACT

Now-a-days, because of easy usage and affordability to general population, two-wheeler had become very much popular over four-wheeled vehicles. They are easy to carry everywhere and on varied terrain where other four-wheeler fails. Two-wheeler has a variety of segments like bicycles, dicycles, motorcycles, scooters, and mopeds. Also, required international mandate for electric mobility dictates makeover of two-wheeler segment. Wide acceptability of two-wheeler mobility depends upon rider's comfort and effortless driving which mainly depends on the vital performance of suspension system, stability, terrain adaptability and ultimately in its design. This study uses 'Creative design theory' to generate varieties of mechanisms applicable to suspension system for two-wheeler. Initially, in this paper, we have studied the available suspension mechanisms and generated an atlas of suspension mechanisms for 4, 5, 6 and 7 bar linkage kinematic chains with one and two degrees of freedom. We have generated 33 innovative suspension mechanisms. Out of these mechanisms, we can filter out existing ones to find the novel mechanisms.
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1. Introduction

The suspension system either in two-wheeler or four-wheeler has always been a part of study and research. The suspension system provides an assistance not only in handling and safety but also in comfort level of the rider, preventing him/her from vibrations and bumps on varied terrains. The main parts in the suspension system of a two-wheeler are front suspension (shock absorber having piston-cylinder) and rear suspension (having shock absorber with spring). That's why, the front suspension is mostly found as telescopic forks only and the rear suspension has single or double shock absorber with oil as a damping medium. A new modification in the rear suspension structure is done by introducing only one shock absorber instead of two to improve its efficiency and aesthetics. The oil is used as a damping medium to enhance the smoothness of operation and get better rider's comfort and experience. It also avoids the relative motion between unsprung and sprung mass of a vehicle. The telescopic fork can be conventional (slider down and tube up) or upside down (slider up and tube down). For high torsional stiffness and better performance of vehicle, upside down telescopic fork is widely being used.

Based on H.S. Yan's Creative design theory [1], Zang [2] has successfully designed 31 different types of mechanisms for flapping wing mechanism of micro aerial vehicle model. Present work, based on the same idea, focuses on creative suspension mechanisms and designs 33 new types of suspension mechanisms for two-wheelers.

2. Study and analysis of current motorcycle suspension.

While riding a two-wheeler, the agility and stability become critically essential features. The analysis of Duolever front motor suspension having 8 bar linkages gives good performance and control over riding, steering and reduction in vibrations. This study has used mechanism regeneration method influenced by H.S. Yan's Creative design theory [1].

Based on already existing suspension mechanism, present study has focused on design and development of new 8 bar linkages mechanisms for independent suspension [4].

This Fig. 1 shows planar 8 bar linkage suspension mechanism with 8 links and 10 kinematic joints. The links in this suspension are as follows:

Fixed link (link 1) = K_f.
Moving link (link 2) = K_w.
Shock absorber having cylinder (link 3, K_y) and piston (link 4, K_i).

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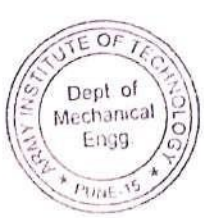

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AERODYNAMIC PERFORMANCE ENHANCEMENT OF WIND TURBINE BLADE USING CAVITY

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ABSTRACT

This paper presents the results of a study of flowing fluid over an airfoil having round cavities of various shapes and sizes on its suction surface on 3 distinct chord wise positions. To understand, a CFD study is performed to evaluate ratio of coefficient of lift to coefficient of drag at angle of attack of 17°. The trailing edge cavity outperformed the other cavities in terms of lift to drag ratio.

KEYWORDS: Attacking angle, Drag force, Lift force, Coefficient of lift and drag, Ratio of lift to drag

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Original Article

INTRODUCTION

Wind energy has been harvested for hundreds of years. Wind turbines are wind power devices that are now used to generate electricity. The way that wind turbines work is simple. Wind energy propels two or three propeller-like blades around a rotor. The main shaft is connected to the rotor, which drives a generator to generate power. The kinetic energy of the wind is converted to mechanical energy by wind turbines. A generator converts this energy to electricity. A horizontal axis wind turbine (HAWT) is one which has its shaft parallel to the surface of the earth. In a vertical axis wind turbine (VAWT), the shaft is perpendicular to the ground. Rotor designs of these two configurations are different, each with a unique set of benefits [1]. The major development of the VAWT was affected due to a poor tip speed ratio and rotor speed control difficulties. Vertical turbines development has also been hampered by difficulties in starting [2]. VAWT also requires no additional wind-facing mechanism, and on-ground installation of large generating equipment is possible. Therefore VAWT won't be totally disregarded in future development. To make use of these benefits, a novel V-shaped VAWT rotor design is currently being researched [3]. The increased rotor control provided by pitch and yaw control is responsible for the HAWT's popularity. Thus, HAWT has taken over as the most popular design arrangement. It is preferable to have high rotor efficiency. $P=0.5AV^3$ represents the energy (P) carried by flowing air. The air speed reduction over the turbine directly relates to the amount of energy captured. One hundred percent extraction would indicate zero final velocity. It is difficult to achieve the zero-flow situation. There is widespread acceptance of this idea [4, 5]. The power coefficient Cp is commonly used, with the Betz limit being Cp = 0.593 [6].Efficiency losses can be avoided by selecting airfoils with a high lift to drag ratio and unique tip designs [4, 6]. Aerodynamics has now become its own field due to its rigorous mathematical analysis. Several more sophisticated hypotheses have evolved to describe how lift force is generated and predicted. The combined impact of pressure and skin friction induced by the flow of air across the airfoil surface is known as aerodynamic force [7].Aerodynamic performance is essential for effective

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Numerical Analysis and Parametric Optimization of a Static Wavy Flag for Heat Transfer Enhancement

By Swadesh Suman & Sanjay Mahadev Gaikwad

Abstract- This work investigates the effect of different parameters of a static wavy flag vortex generator on the heat transfer in a rectangular channel using Computational Fluid Dynamics (CFD) analysis. This work encompasses optimizing several parameters of a flag such as flag height from the surface, position in the channel, number of triangular shapes in a flag, and rectangular surface area of the flag. Post analysis results exhibit encouraging results with average Nusselt number in flag height (FH) optimization exceeding that in no flag condition by 41.84%, 47.79%, 54.68% for Re 8236, 12354, and 18344, respectively whereas further position optimization of FH optimized flag exceeds average Nusselt number in no flag condition by 46.86%, 70.68% and 87.26% for the corresponding Re. With significantly less practical application of flags for heat transfer enhancement in industry, this work aims to establish flags as an effective heat transfer enhancement device and demonstrate that with the right optimized parameters, a significant increase of heat transfer in the channel can be achieved.

Keywords: convective heat transfer, heat transfer enhancement, turbulence, vortex generator.

GJRE-A Classification: DDC Code: 621.4022 LCC Code: TJ260

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3. Department of Computer Engineering (A.Y.2022-23)

Best Shot Selection using Convolutional Neural Networks

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Mobile phone cameras have small camera sensor size as compared to professional cameras, capture less light at a time and capture everything in focus. Also, it is very common for novice photographers to miss the best shot. These days' companies use multiple camera systems to solve these problems, which in turn increase the complexity and the costs of deploying these systems. This paper presents an android based mobile phone camera application that takes help from the work done in segmentation networks to capture portrait images and it also trics to capture the best possible photograph using traditional image processing and convolutional neural networks. Our system is performing better in terms of Mean IOU than existing available systems. Results showed that our model is simple and cost effective. This model is easily embeddable in upcoming mobile phones as a best-shot selection feature.

Keywords: Computational Photography, Image Processing, U-Net, Image Aesthetic Score.

1. INTRODUCTION

In recent years, convolutional neural networks have outperformed the state of the art in many visual recognition tasks as mentioned in (Girshick, Donahue, Darrell, and Malik, 2014). While these networks have existed for a long time, their success was limited due to the lack of computational resources and training data. As per (Krizhevsky, Sutskever, and Hinton, 2012), since 2012 when the first neural network outperformed all other approaches at the ImageNet competition, there has been a burst in the places they are used. Neural networks have outperformed all the traditional image recognition techniques in almost all tasks. Generally, smartphone cameras have very small sensor size compared to the professional cameras, capture everything "in focus" both the background and the foreground of the image are sharp. So mobile companies used approaches like stereo photography for computing depth using multiple cameras or they use time of flight sensors in the mobile phones for computing depth. The disadvantage of these approaches is that this technology is available only for mobile phones with particular hardware. Also installing multiple cameras and specialized hardware for clicking images with the bokeh effect is kind of overkill.

In this paper, we have used an encoder-decoder based neural network for human segmentation from images which can then be utilized to blur the background. We also propose a pipeline which chooses the best photograph out of a burst of photographs, thus enabling the camera user to never miss those precious moments. This method uses intrinsic parameters of the camera at the time of the shoot and image features to quantify images.

2. RELATED WORK

Multi-camera systems have been developed to compute depth from images using stereo imagery. The depth can be used to compute the synthetic depth of field. These options require you to have multiple cameras thus the devices are more expensive. Other approaches include using a camera lens with dual-pixel technology. The light captures from the two pixels is like capturing images from two different perspectives which can be used to compute depth and then apply the blur effect. This is an amazing solution which can create amazing effects, but these methods

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A Novel Digital Mark CP-ABE Access Control Scheme for Public Secure Efficient Cloud Storage Technique

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Submitted: 03/11/2022 **Revised:** 13/01/2023 **Accepted:** 02/02/2023

Abstract: Daily data outsourcing by cloud users has led to enormous amounts of data being stored in cloud servers. The cloud service provider (CSP) may choose to change the data, which causes a problem with data integrity. The information saved on a cloud server is illegally accessed by unauthorised users. This study suggests a novel approach to cloud storage for big data access control utilising CP-ABE Access Control Scheme, in which the proxy server updates ciphertext as well as secret key upon revocation instead of the data owner and user. Using an algorithm and a key, encryption transforms readable text into unintelligible form. According to the simulation results, the proposed technique performs better in terms of accuracy, precision, F-Score, AUC, and recall when compared to state-of-the- art method. The proposed method achieved 98% accuracy, 85% precision, 74% recall, a 63% F-1 score, and an AUC of 70%.

Keywords: *Cloud server, Cloud service provider, cloud storage scheme, proxy server, Encryption.*

1. Introduction

The next-generation of distributed/utility computing has been described as cloud computing. It is described as a model for providing simple, on-demand network access to a shared, configurable pool of computing resources that can be swiftly provisioned as well as released with little management work or service provider involvement [1]. According to National Institute of Standards and Technology (NIST), there are five key criteria, 3 service methods and four deployment types that characterise CC [2]. Private, public, community, and hybrid cloud deployment types are available. These days, the cloud computing paradigm may provide any type of service imaginable, including online services, social networking, telephony, and computational resources for high performance computing applications. Users may also find cloud storage in data centres beneficial for remotely storing and accessing their data from any location at any time with no additional hassle. Security is the main issue with cloud data storage. The cloud device's constant data transmission and reception make it susceptible to a numberof attacks. As a result, cloud servers and resources face a greater threat. IDS is integrated into cloud networks tomonitor traffic and find malicious activity [3].

2. Related Works

Although there has been a lot of research on deep learning, the authors credit the following papers as having had a big influence on this particular study. After land, sea, and air, the cyberspace is regarded as a realm worth exploring and researching [4]. The intermittent rise in cybercrimes and cybercriminals is primarily to blame for this [5]. The development of technology and the Internet has caused an increase in cybercrimes. The most often reported crime, according to Ref. [6], cybercrime is expected to cost $6 trillion in damages globally. According to information security timelines and statistics, cybercrime accounts for 81.7% of attack reasons. Microsoft has also discovered that an attacker may stay on a network unnoticed for an average of 146 days [7]. This demonstrates that network domains, which make up a significant portion of the cyberspace, are where cybercrime attacks are most common. Additionally, cybercrime can take many various forms, and an adversary may employ a variety of methods. Work [8] has categorised cybercrime using the following methods: credit card fraud, phishing, bots, DDoS, virus

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Optimization of Alternative Network Paths in congested SDN Using Genetic Algorithm

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Computer network and Communication over such networks become integral part of human life from the very beginning of twenty first century. From the very first radio communication in the beginning of 19th Century to the latest wireless and Software Defined Network (SDN) communication over the satellite and local allied computer networks, caused increase in more and more traffic over the computer network. Internet was not only provided over the copper, fiber optics cables, but rather it becomes a commercial service sector over the low earth orbit satellites across the globe. Majority of the contents flowing over such networks are either academic, research, corporate data bases like banking, finance, IT services, social media, and also specially of the entertainment industry. Every small to large organization in corporate and research and development organization faced problems of computer network congestion over the time. As the demand for more data access is required hence the congestion over the network started to increase. Every nation and individual organization has their own policy to control domestic network traffic as bandwidth is limited and commercial aspects are involved. Various algorithms have focused to regulate network, but very few algorithms exist which focuses on providing alternative paths for better network traffic management. This paper focuses on using modern Genetic Algorithms like Ants colony optimization to first identify congestions over the network and then using such insights to find alternative paths through mutation and cross over. The proposed solution was executed, and generated result comparatively proved that use of Genetic Algorithm has helped to find alternative paths more effectively over the SDN.

Keywords: Software Defined Network, Wireless Network, Genetic Algorithm, Mutation, Cross Over, Throughput measurement, Link Weight Computation, Scheduling Algorithms, Local Area Network

1. INTRODUCTION

Network of computers begin with the development of Computer Local Area Network (LAN). From the very early stages of Defense Advance Research Project Agency (DARPA) experiments, it is found that, more and more options of heterogeneous networks are emerging along with different types of Operating Systems, Software's, Hardware's and protocols are added in the expanding local and global networks. In all such terrestrial transmission, sharing of the network bandwidth resource becomes the key factor. Now the era of Wired, Wireless network and Software Defined Network (SDN) is emerging across the globe. Various organizations, be it academic, research, corporate, IT services, Social media networks, or entertainment industry, all of them are employing the SDN based network systems in order to have better control over the network bandwidth. This is because resources are limited and demand is higher and it involves commercial aspect. Various researchers tried to control the network bandwidth using different algorithms. Especially with the SDN based system, very few attempts were made with different algorithms. SDN's are backbone of any organization which is relying on if for better network management. Over the time, bottlenecks have appeared over the SDN [(Rankothge, 2017), (FarB, 2017)]. SDN's are primarily used to act as a strategic control solution where software is used as a medium to control data flow as per the provided business logic. The administrator has got ability to control and define the traffic over every switch across the network. But, such arrangements are not dynamic and periodic human interventions are needed to regulate the data flow. Very common issues observed in SDN are like, use of Open-flow protocol attempts to completely centralized packet

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PREDICTING THE BEHAVIOR OF ONLINE BUYING INSURANCE INTENTION WITH THE ASSOCIATION OF TECHNOLOGICAL ACCEPTANCE MODEL

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1. Introduction:

Everything in our world is changing quickly. India's insurance sector is no exception, and to satisfy modern digital demands, insurers are increasingly offering online insurance to policy purchasers (Hamisah Haji Hasan & Prof. Samsudin A. Rahim, 2008). Customers have found things to be much simpler now that internet insurance policies are available (Lwin & Nu, 2018). With only a few clicks on their smart device, they can browse and purchase insurance coverage online (Raval & Bhatt, (2021).)There is no denying that purchasing insurance online offers many advantages to policyholders. Utilizing the power of the Internet, purchasing insurance online is a cutting-edge and current method (Dasgupta & Sengupta, 2002). It serves as an alternative to buying insurance in the conventional offline manner. You may acquire or renewa policy as an online policyholder without going to the insurance provider's local branch office (Hasyim & Helmi, 2017).

Additionally, you may obtain coverage on your behalf without contacting your neighborhood insurance agent. From the convenience of your own home, you can easily find the best insurance policies online and buy them. People from many walks choose online insurance coverage (Warrick & Stinson, 2009). They will find it simple to comprehend the many components of internet insurance coverage before making a purchase. They can make wise decisions thanks to their knowledge and understanding of these regulations (Fletcher &

Performance Analysis of Existing Storage and Processing Systems (Survey Paper)

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Abstract:
Enhancing the effectiveness and scalability of present-day computer systems requires performance study and enhancement of existing storage and processing hardware, soft- ware and their connections between them in order to effectively utilize them. The performance analysis methodologies, strategies, and case studies as they pertain to storage and processing devices are covered in great detail in this survey report. The objective is to comprehend the variables affecting system performance, detect performance bottlenecks, and suggest efficient optimization tech- niques. An overview of the significance of performance analysis in the present-day technological landscape introduces the paper. It draws attention to how quickly data must be processed, how much data must be stored, and how effectively resources must be used. The necessity to overcome these obstacles and realize the full potential of storage and processing devices served as the impetus for this survey. In-depth analysis of the various perfor- mance measures for assessing storage and processing systems is provided in the survey report. IOPS (Input/output Operations Per Second) and other important metrics are explained in detail. The importance of workload characterization and comparison as important methods for performance analysis are also covered in the paper. Bench-marking enables systematic comparison and as- sessment of various devices or configurations, whereas workload characterization includes understanding the nature of the jobs and data patterns that the system processes. The performance analysis techniques are carefully analyzed. Simulators are one of these approaches; they offer a controlled and virtual environment for assessing system performance. Researchers may simulate various workloads and evaluate the behavior of storage and processing devices under different situations using simulators like MQ-Sim and Gem5. The significance of precise as well as realistic simulations is emphasized in the paper in order to produce outcomes in performance analysis that can be trusted. The study also includes case studies that highlight how performance analysis methods are applied in real-world situations. These case studies address a variety of topics, including machine learning, scientific computing, data analytics, and database management systems. The issue statement, the approach used, and the out- comes are all thoroughly examined in each case study. For system architects and developers looking to optimize storage and processing devices in their respective sectors, these insights provide invaluable lessons. In conclusion, this survey report serves as a comprehensive guide to the field of performance analysis and improvement for existing storage and processing

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Automated Virtual Attendance Using Image Recognition Techniques (Review Paper)

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Abstract:
Conducting routine attendance is a very essential and obligatory task for smooth functioning of day-to-day administration. It may normally become a laborious and redundant activity, even pushing itself to inaccuracies. The rather old and traditional approach of making roll calls to determine whether the student is present or not proves itself to be a statute of many limitations since it is very strenuous to call names and maintain the records especially when the ratio of students to faculty is not good. Every organisation has its way of ensuring efficient measures for the attendance of present students to confirm highest accuracy and utmost precision. Some organisations use a document-oriented approach whereas others have implemented many digital and virtual methods such as biometric fingerprinting techniques, face identification techniques, card swapping techniques, etc.

However, these methods prove to be a hindrance as it subjects the attendees to wait in a time-consuming and tardy queue. There are multiple situations of adversity which may arise such as, consider when the student fails to bring his identity card, then he will not be able to mark his attendance, even though he is physically present. In this model, we have proposed a framework which aims at automating the process of conducting attendance of students.

In this paper we will be using an SVM classifier for taking attendance of a large audience and will be evaluating its performance.

Keywords: Face Recognition, Face Detection, Image Capture, KNN, SVM, Haar.
DOI: 10.24297/j.cims.2023.6.12

1. Introduction

The proposed methodology is designed to apply the features of current face detection algorithms[12].As the time is passing and research is going on there has been a lot of changes in face recognition algorithms and the other steps that are involved are face detection, feature extraction[7]. Firstly, we need to capture the image for recognition and for that we will use multiple cameras to cover the entire area[11]. The input for the system will be the images that were captured by the camera that we installed[18].Due to the movement of the students or

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Web Interface for Distributed Transaction System

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Abstract:
This research delves deep into the saga pattern, which proves to be an effective approach for managing local se- quential transactions across distributed microservices. However, the problem of isolation lacking in the saga pattern can result in incorrect commits on databases due to unfinished transactions. To address this issue and further enhance existing solutions like transaction management protocols (e.g., two-phase commit), this study introduces innovative enhancements, namely quota cache and commit-sync service. These enhancements enable specific operations between database layers, effectively preventing invalid or incomplete commitments on the main databases. An experi- mental test was conducted to evaluate and check the effectiveness and performance of a microservices-based e-commerce system, revealing that this novel approach successfully handled both regular scenarios and exceptions, addressing isolation concerns. In the event of service failures, compensation transactions were executed to undo adjustments made solely within the caching layer. After ensuring all processes were correctly completed, the alterations were committed back into the database. Although promising results were observed, further investigation is required for optimization before widespread adoption as an industry- standard approach.
Keywords: microservices, distributed transaction, two-phase commit, SAGA.
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1. Introduction

When building a website using a microservice architecture, it is crucial to implement distributed transaction patterns to ensure smooth and efficient transaction handling across the system[1]. However, migrating an application from a monolith to a microservice architecture is an intricate undertaking that demands substantial time, effort, and careful consideration. It is a multifaceted process that is prone to errors, making it imperative to employ appropriate tools that facilitate and guide the decomposition process [2][3]. And hence to build a robust E-commerce website, leveraging Microservices de- veloped with NodeJS in the backend is highly recommended REST APIs will facilitate seamless connection between these Microservices. Proper event handling, including buy- ing, completion, and failure scenarios, requires the utilization of message queue middleware. while effective transaction management across multiple services necessitates the use of Orchestration approach of SAGA pattern [4][5].These message queues, coupled with a

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Deep Learning Model for Abstractive Automatic Text Summarization in Hindi

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Abstract:
Text summarization is a process in which long texts are compressed and condensed into smaller summaries. Only the crux ideas of the document are fetched from the main document and included in the final piece, which is cohesive. As the amount of data is soaring exponentially. The need for a tool that summarizes text specifically for Indian languages is also pertinent. Using a variety of techniques, we strive to construct both extractive and abstractive approaches for text summarization of Hindi text in this research. The abstractive method is based on seq-to-seq networks and the attention model. A summary of all Indian regional languages cannot be generalized by a single approach. This is so that each language may be treated separately because every language has unique linguistic characteristics.

Keywords: Recurrent Neural Network, long short-Term Memory, Term Frequency, Inverse Document Frequency, Word Embedding, Word Vector, Continuous Bag of words.
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1. Introduction

Overview

Text summarising methods may be roughly divided into two parts, extractive summarization and abstractive summarization, based on the methodologies utilised. The technique of text summarization by extractive method includes words and phrases into the newly formed summary after selecting them from the source text or documents. The text' s key ideas serve as the foundation for the summary. To find the necessary phrases and sentences, extractive techniques use statistical factors including position of sentence, numerical data, grammatical subjects like nouns, topic token frequency, normalized sentence length, etc.

2. Objectives

- To design a method for summarizing Hindi text that can summarize a single document using certain Extractive and Abstractive techniques which include seq-2-seq [10] model, Page Ranking Algorithm.

Movie Recommendation Using Clustering and Nearest Neighbour

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Due to the abundance of items available and online information, a user cannot easily choose which product is ideal for him. A recommender system assists users in finding what is best for them. A recommender system uses information about a user's activity. It uses it to suggest movies to users based on their individual interests. This paper provides an overview of a recommender system that uses the K-means and KNN algorithm. Without wasting time exploring, both algorithms rapidly and effectively recommend movies to customers based on their likes. There are many uses for recommender systems worldwide. K-means algorithm is used to get beyond some of the restrictions of content-based and collaborative work. The K-means algorithm creates clusters of individuals with similar interests, and KNN, which includes nearest neighbors, recommends movies to each group. This is used in well-known fields like books, news, music, videos, and movies, among others. These search engines allow users to find movies of their choice. K-mean, KNN, and hybrid algorithms have been covered in this study. K-means algorithm results based on metrics like "average Genre Rating" and "User Movie Rating". The RMSE feature has been used to KNN algorithm. A hybrid algorithm combines the two algorithms mentioned above. K-means is given an input, and the output of this method serves as the input for the KNN algorithm, which is more accurate than both K-means and KNN

Keywords: Hybrid recommendation, knn, kmeans, collaborative filtering.

1. INTRODUCTION

In today's world, internet has provided users with too much of choices of their interest. It is important to match the users with the most appropriate choice of their interest and help in making decisions. Recommender engines provides user with information of their personal interest from a huge pool of data. It provides personalized recommendations according to users taste to user and enhancing user satisfaction. It has broadened its area from E-commerce to network security by providing personalized services to its consumers. Recommender system generates recommendations to users. The users may accept or may not accept their commendations according to their choice. It provides users with personalized recommendations by information filtering. Some examples of recommender systems are books in amazon.com, movies in MovieLens, music by last.Fm which provides items to the user's with their interest of area. Movie recommender sys- tem recommends movies to user according to the information provided by the user of his personaltaste. There were many recommender systems which were used in the past such as content-based, collaborative filtering and hybrid approach. In content based filtering makes recommendations for users based on factors for movies including genre, director, description, actors, etc. The idea behind this kind of suggestion system is that if a user enjoyed a certain film or television pro- gramme, he or she could enjoy a film or programme similar to it. In collaborative filtering pairs individuals with similar interests and makes suggestions based on what they like. For ex. Samand Robin are two users; Sam enjoys movies A, B, C, and D, whereas Robin prefers films C and
D. Movies A and B would be suggested to Robin since Sam and Robin both enjoy C and D. Metadata is not used in collaborative filtering to generate suggestions.
There are some limitations of recommender system such as Manually selecting k is one of the

A Comparative Analysis of Deep Learning based Vehicle Detection Approaches

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Numerous traffic-related problems arise as a result of the exponential growth in the number of vehicles on the road. Vehicle detection is important in many smart transportation applications, including transportation planning, transportation management, traffic signal automation, and autonomous driving. Many researchers have spent a lot of time and effort on it over the last few decades, and they have achieved a lot. In this paper, we compared the performances of major deep learning models: Faster RCNN, YOLOv3, YOLOv4, YOLOv5, and SSD for vehicle detection with variable image size using two different vehicle detection datasets: Highway dataset and MIOTCD. The datasets that are most commonly used in this domain are also analyzed and reviewed. Additionally, we have emphasized the opportunities and challenges in this domain for the future.

Keywords: Vehicle Detection, Deep Learning,YOLO, SSD, Faster RCNN.

1. INTRODUCTION

In a country like India, the number of road vehicles is growing all the time, causing different traffic issues such as traffic congestion and management. Vehicle detection is the heart of a smart transportation system and smart traffic management systems, which play an essential role in addressing typical traffic problems. Some of the relevant use-cases for vehicle detection in ITS is shown in Figure 1. Today, computer vision and deep learning techniques are becoming more and more important in all areas of real-world applications, including vehicle detection, due to its active, robust, and dynamic characteristics. Vehicle detection is a method of locating vehicles in an image and classifying them into different categories, such as cars, buses, trucks, and so on. Bounding boxes are drawn around the vehicles present in the image, with the predicted vehicle class and confidence score associated with each bounding box. Figure 2 shows an example of multiple vehicle detection in an image.

Many intrusive (loop detector, magnetic sensor, vibration sensor, etc.) and non-intrusive sensors (acoustic, LIDAR, RADAR, thermal camera, ground camera, UAV camera, etc.) (Klein, Gibson, and Mills, 2006) are used for data collection in vehicle detection by various researchers.Based on diverse environmental and structural conditions, these sensors have numerous advantages and disadvantages (Singhal and Prasad, 2022). Vehicle detection from images/videos is more accurate, but its performance suffers as a result of complex environmental conditions such as lightning and weather. The effectiveness of deep learning-based vehicle detection has improved in terms of accuracy and detection speed due to recent advancements in computer vision, deep learning, sensing, and Graphical Processing Units (GPUs).

The main objectives of this paper are as follows:

—Understand the existing vehicle detection techniques.
—A comparison of popular deep-learning models for vehicle detection (Faster RCNN, YOLOv3, YOLOv4, YOLOv5, and SSD) on the basis of detection precision (P), recall (R) and mean-average precision (mAP).
—Two different vehicle detection datasets are used to compare deep-learning-based vehicle detection models.
—We experimented with various hyperparameters to assess the effectiveness of deep-learning models.

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Group Activity Recognition Based on Interaction Contextual Information in Videos Using Machine Learning

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This paper is about recognizing multiple person actions occurring in videos, including individual actions, interactions, and group activities. In an environment, multiple people perform group actions such as walking in groups and talking by facing each other. The model develops by retrieving individual person action from video sequences by representing interactive contextual features among multiple people. The novelty of the proposed framework is the development of interactive action context descriptors (IAC) and classifying group activities using Machine Learning. Each individual person and other nearby people's relative action score are encoded by IAC in the video frame. Individual person action descriptors are important clues for recognition of multiple person activity by developing interaction context. An action retrieval technique was formulated based on KNN for individual action classification scores. This model also introduces Fully Connected Conditional Random Field (FCCRF) to learn interaction context information among multiple people. FCCRF regularizes activity categorization by the spatial-temporal model. This paper also presents threshold processing to improve the performance of context descriptors. The experimental results compared to state-of-the-art approaches and demonstrated improvement in performance for group activity recognition.

Keywords: Activity recognition, interaction context, KNN, SVM, FCCRF.

1. INTRODUCTION

In recent years human activity recognition has received great practical importance in different application areas example, surveillance, sports analytic, etc. Many research works emphases on single or human to human action recognition. However human activities not only depend on single person action but also on interaction information among all the people in the scenario. In some complex scenarios such as unrestrictive dynamic cluttered scenes, discrepancies in viewpoint and illumination, variability in people appearance class recognition of action is unfeasible without considering interaction context information among people.

In the computer vision group activity, recognition is an important and challenging task. In (Ryoo and Aggarwal, 2008) hierarchical recognition algorithm proposed for the recognition of high-level group activities. As these group activities such as walking together in one direction, taking together with facing each other, queuing in a back-to-back as shown in Figure.1. Since these activities are coexisted by multiple people, and hence it is difficult to classify them based on

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Prediction of Market Trends using Machine Learning

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Forecasting about Indian market has always been interesting and topic of discussion among analyst and researchers. With the arrival of machine learning and artificial intelligence the race is now becoming the competition with best algorithms to be used and give investors more profit. In past years prediction was only based on experience and daily headlines of business newspapers but now it depends on various international, national and political economic factors and the sentiments and reaction of people over the issues. With the growing power of social media, the game in market over this also changed now with the help of sentiment analysis over social media we can determine the mood of investors over the news. In the present scenarios you can divide two categories for the prediction strategies one is the time series analysis of stocks and the second is artificial intelligence property over the market. AI property contains multi-layer perception, SVM, naive Bayes , back propagation,CNN,LSTM, RNN etc during this we have a tendency to came with plan of combination of each. Within the paper we have conjointly covers the assorted challenges that are encountered while building prediction models. This whole module focuses on use of statistical analysis and conjointly development of the sentimental analysis and to get better results. The LSTM has the advantage of analyzing relationship between time series knowledge through memory functions. The performance of the system is improved by combine efforts of time-series and sentiments with the LSTM prediction model.

Keywords: lstm, time-series , recurrent neural network.

1. INTRODUCTION

Stock market has provided a platform for investors to deploy their resources in Indian industries in exchange of their equities. Indian equity market development got pace in the initial phase of liberalization. Volatility is one of the characteristic factors in stock market which makes it speculative and provided a room for predicting its future trend. And volatility itself is influenced by trading volume and new information or sentiments regarding that stock. volatility is a key parameter used in many financial applications so, it is important to estimate volatility in stock market. The most important role of any investor in stock market is to analyze its movement and to make an precise prediction to have profit on his investment. The amount of people which invest over stocks increased, especially after the start of bull market and loss of jobs in covid 19. Even the single investors are important part to the development of Indian markets. With the ease of investing through brokers apps and good internet facilities both the things have changed unexpectedly investing and expressing thoughts which affects the stocks. Therefore, we are using digital data and news feed (as they are constant source) of any major indexes like NIFTY50, SENSEX, etc. to construct the outcome model and test the co-relation between media attention(sentiments) and trading volume in predicting their trends.Some important definition for market understanding are as follows:

(1) **Buy :** To take a position by buying shares of a company.
(2) **Sell :** To sell the shares you currently own.
(3) **Bid :** When a trader in the market makes an order to buy shares.

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In-depth analysis of dynamic degree load balancing technique in public cloud for heterogeneous cloudlets

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ABSTRACT

Load balancing is one of the challenges of the distributed computing worldview. With the enormous development in clients and their interest for different administrations on the distributed computing stage, compelling or productive asset usage in the cloud climate has turned into an urgent concern. Load balancing is critical to keeping cloud computing running smoothly. This study examines the research using four scheduling algorithms: dynamic degree balance CPU based (D2B_CPU), dynamic degree balanced membership based (D2B_Membership), dynamic degree memory balanced allocation (D2MBA) and hybrid dynamic degree balance (HDDB) algorithm. Central processing unit (CPU) utilisation, bandwidth utilisation, and memory utilisation are used as performance measures to verify the performance of these algorithms. The CloudSim simulation programme was used to simulate these algorithms. The primary goal of this work is to aid in the future construction of new algorithms by researching the behaviour of various existing algorithms.

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1. INTRODUCTION

Load balancing is a procedure for conveying responsibility among numerous hubs in a specific climate, guaranteeing that no hub in the framework is over-burden or inactive at some random time [1]. A good load balancing algorithm ensures that each node in the system accomplishes roughly the same amount of work. The load balancing calculation's goal is to plan occupations that are shipped off the cloud space to empty assets, working on generally speaking reaction time and expanding asset usage [2]. Because we cannot forecast the number of requests issued per second in a cloud environment, load balancing has become one of the most important challenges in cloud computing. The cloud's ever-changing behaviour is responsible for the unpredictability. Load balancing in the cloud is primarily concerned with dynamically assigning load among nodes in order to meet user needs and maximise resource efficiency by distributing the total available load over multiple nodes [3], [4].

Load balancing seeks to improve user satisfaction. Because the number of users and their demands are growing by the day, the clouds should deliver services to clients that meet their highest expectations [5]. A good or ideal load balancing algorithm ensures that available resources are used efficiently and that no node is overloaded or underloaded. Load balancing enables for scalability, reduces bottlenecks, and speeds up response times [6]. Many load balancing methods have been created in order to schedule the load among

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Sarcasm detection of tweets without #sarcasm: data science approach

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ABSTRACT

Identifying sarcasm present in the text could be a challenging work. In sarcasm, a negative word can flip the polarity of a positive sentence. Sentences can be classified as sarcastic or non-sarcastic. It is easier to identify sarcasm using facial expression or tonal weight rather detecting from plain text. Thus, sarcasm detection using natural language processing is major challenge without giving away any specific context or clue such as #sarcasm present in a tweet. Therefore, research tries to solve this classification problem using various optimized models. Proposed model, analyzes whether a given tweet, is sarcastic or not without the presnece of hashtag sarcasm or any kind of specific context present in text. To achieve better results, we used different machine learning classification methodology along with deep learning embedding techniques. Our optimized model uses a stacking technique which combines the result of logistic regression and long short-term memory (LSTM) recurrent neural net feed to light gradient boosting technique which generates better result as compare to existing machine learning and neural network algorithm. The key difference of our research work is sarcasm detection done without #sarcasm which has not been much explored earlierby any researcher. The metrics used for evolution is F1-score and confusion matrix.

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1. INTRODUCTION

Beginning of the internet gave a new vision to the world by changing the way people around the world interact. Now, people started expressing their feeling in front of other people to whom they even don't know. Also, people gather the opinion of each-others feeling, for a particular thing. It may be noted that for humans, it is easy to understand the opinion of other people. However, for a machine, it is very difficult to understand what people are says and how they feel. Sentiment analysis helps machine to analyze the written sentence and classifies it as a positive, negative, or neutral. Sentiment analysis gathers and recognizes attitudes and opinions depicted by users in social media toward a definitive topic. Research on sentiment analysis made machines capable of detecting whether a sentence is positive, negative, or neutral with a good accuracy depending upon the dataset. However it is very difficult to findthe exact sentiment, when the present sentence is layered with sarcasm, thus making it extremely difficult to find out whether the sentence is said in sarcastic manner or not [1].

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Sarcasm Detection on Tweets: Ensemble Approach

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In the era of web 2.0 social media data is getting generated at huge amount of value to different organizations. Twitter is one of the platforms where different communities express their opinion on social media platform. These different opinion leads to tremendous amount of information to work on such as opinion mining, sentiment analysis, sarcasm detection on various social media platform. Sentiment analysis is a natural language processing where author find contextual meaning of text to identify the sentiment of people on digital platform. Sentiment analysis is study of people's behaviour. Now a day's people use sarcasm in many forms to convey their feelings and opinion on many social media platforms. Which influence the people mind with different aspect. Therefore, Sarcasm detection which is sub branch of sentiment analysis becomes a challenging job. Our research is broadly classified in three parts. First part is focusing on preprocessing of data. Second part is training models for sarcasm detection. Lastly ensemble approach is used for focusing on sarcasm detection of tweets where different machine learning model and neural network models are stacked for better predication. For better predication more emphasis is given on data preprocessing. In NLP data preprocessing is key factor. Along with preprocessing selecting appropriate ML or DL models are also important. Author did selection of models after rigorous study. To enhance the result of classification author have used ensemble model such as staking. Proposed model is inputted with training dataset of tweeter which approximately divided into 70% into training and 30% into testing dataset. Ensemble model is trained on cleaned dataset and proposed model is generating an acceptable accuracy which can classify the sarcastic tweets accurately.

Keywords: Sarcasm Detection, Social Media, Hashtag, Machine Learning, Deep Learning, Data Science, Ensemble Approach.

1. INTRODUCTION

Natural Language Processing in big data is one of prominent and upcoming area in data science and analytic. Now a day's huge amount of data is getting generated from various internet sources. Internet has given birth to volume and variety of data. Everyday petabytes of data is generated from single social media websites such as Facebook, Instagram, twitter etc. This huge amount of data is also called as voluminous data. Five V's given birth to data science and analytic are "volume", " variety", "velocity", "veracity", "value". Earlier, discussed volume means huge amount of data getting generated from different platforms. Data gathered is present in different formats such as structured, unstructured and semi structured data. Twitter is one the source where huge amount of data is getting generated. Twitter is micro blogging platform through which people express their views, emotions and perspective on various domains such as politics, news, people, bollywood etc. Sarcasm is twisted sentiment expressed as negative for positive thoughts and vice versa. Sarcasm is used intentionally to mock someone using sophisticated language. Sarcasm is found in various input format such as voice (tonal modulations), images, videos and text (A. and R., 2019). Our research is based on sarcasm detection using natural language processing. Our model woks on text input only. Detecting sarcasm from text is very challenging task. Identifying sarcasm from audio is comparatively easy as machine or person can identify the tonal stress, modulation of speech and predict the mood of a person. Machine can easily identify the emotion of person by connecting the different emotions from voice tonal quality. As well as identifying emotion or sentiment from video is also simple. Frame by frame capturing helps the model to find the facial expression of object present in video. Therefore, capturing emotions from video frame again is not challenging task. If model take input as audio

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Movie Recommendation Using Clustering and Nearest Neighbour

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Due to the abundance of items available and online information, a user cannot easily choose which product is ideal for him. A recommender system assists users in finding what is best for them. A recommender system uses information about a user's activity. It uses it to suggest movies to users based on their individual interests. This paper provides an overview of a recommender system that uses the K-means and KNN algorithm. Without wasting time exploring, both algorithms rapidly and effectively recommend movies to customers based on their likes. There are many uses for recommender systems worldwide. K-means algorithm is used to get beyond some of the restrictions of content-based and collaborative work. The K-means algorithm creates clusters of individuals with similar interests, and KNN, which includes nearest neighbors, recommends movies to each group. This is used in well-known fields like books, news, music, videos, and movies, among others. These search engines allow users to find movies of their choice. K-mean, KNN, and hybrid algorithms have been covered in this study. K-means algorithm results based on metrics like "average Genre Rating" and "User Movie Rating". The RMSE feature has been used to KNN algorithm. A hybrid algorithm combines the two algorithms mentioned above. K-means is given an input, and the output of this method serves as the input for the KNN algorithm, which is more accurate than both K-means and KNN

Keywords: Hybrid recommendation, knn, kmeans, collaborative filtering.

1. INTRODUCTION

In today's world, internet has provided users with too much of choices of their interest. It is important to match the users with the most appropriate choice of their interest and help in making decisions. Recommender engines provides user with information of their personal interest from a huge pool of data. It provides personalized recommendations according to users taste to user and enhancing user satisfaction. It has broadened its area from E-commerce to network security by providing personalized services to its consumers. Recommender system generates recommendations to users. The users may accept or may not accept their commendations according to their choice. It provides users with personalized recommendations by information filtering. Some examples of recommender systems are books in amazon.com, movies in MovieLens, music by last.Fm which provides items to the user's with their interest of area. Movie recommender system recommends movies to user according to the information provided by the user of his personal taste. There were many recommender systems which were used in the past such as content-based, collaborative filtering and hybrid approach. In content based filtering makes recommendations for users based on factors for movies including genre, director, description, actors, etc. The idea behind this kind of suggestion system is that if a user enjoyed a certain film or television programme, he or she could enjoy a film or programme similar to it. In collaborative filtering pairs individuals with similar interests and makes suggestions based on what they like. For ex. Sam and Robin are two users; Sam enjoys movies A, B, C, and D, whereas Robin prefers films C and D. Movies A and B would be suggested to Robin since Sam and Robin both enjoy C and D. Metadata is not used in collaborative filtering to generate suggestions.
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Constraint and Descriptor Based Image Retrieval through Sketches with Data Retrieval using Reversible Data Hiding

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Abstract: An image retrieval system includes image retrieval through sketches. Sketches act as an outline for any object with few details. "Sketch-Based Image Retrieval (SBIR)" is universally recognized as an extension of image retrieval by such rough sketching that concentrates on the main features of the object. SBIR has become an effective and popular image mining search technique as the demand for multimedia technology has grown. Due to the less precise depiction in sketches, comparing such sketches to real colorful and meaningful images becomes extremely difficult. As a solution to the captioned matter, the proposed approach incorporates Histogram Line Relationship (HLR) descriptors to facilitate constraint-based image retrieval. After pre-processing, the descriptor describes the visual features of an image. Here edge length-based constraints make SBIR powerful enough to select strong shaping edges. This approach is further enhanced to include data retrieval and is referred to as "Sketch-Based Image and Data Retrieval (SBIDR)" which even makes it more functional. Throughout image processing, the data embedding and extraction procedure are carried out using the Reversible Data Hiding (RDH) technique with an invariant grayscale version. The proposed method employs a hybrid model of image retrieval and data retrieval system with the addition of constraints and grayscale invariance. This models produce efficient outcomes in terms of retrieval.

Keywords: *Image retrieval, Descriptor, Data retrieval, Edge extraction, Sketch-based, Grayscale, Invariance, feature extraction.*

1. Introduction

The extensive use of the internet and the growing demand for storage, multimedia data such as audio, video, and photos has prompted an evolution in multimedia retrieval systems. As a result, image retrieval has become a prominent tool for image processing in this era, and it is referred as widely used as a way of exploring images from huge databases. The text-based search was the very first phase in the evolution of image retrieval; this annotation-based technique searches the database based on the surrounding text of an image. As string matching processes are less time-consuming, this manual or automatic text annotation of images works perfectly. However, there are restrictions on how each image's contents are represented in the text. It may be impossible to constantly express image content in text or word, as image annotation for image retrieval is not always accurate.

Due to various changes in the retrieval mechanism, such as querying by image content, content-based search has evolved as an alternative to text-based search and is now widely used around the world. Instead of depending on "metadata," content-based search focuses on the internal content of images, hence it is referred to as "Content-Based Image Retrieval (CBIR)". Hereby removing text annotation from visual content, querying through it becomes easier.

Internal features, or low-level picture features including colour, texture, shape, and spatial locations, are used to characterize CBIR. A feature database is a set of target picture feature vectors in which multidimensional feature vectors are generated based on the feature description. The similarity measure is used to calculate the distance between the target picture's feature vector in the vector database and the query image vector. Ultimately, image retrieval is accomplished through the use of an indexing technique.

Following that, a freehand sketch query is introduced, which is not a replacement for CBIR but can be used as an add-on. Sketch-Based Image Retrieval (SBIR) is an emerging trend in image search technologies nowadays. SBIR evolved and dramatically enhanced in the field of Image Processing, inspired by the well-known phrase "A picture is worth a thousand words". Because pictures are more expressive than keywords, queries are provided as sketches to search for real images with in repository. In every sense, the freehand sketches enhance image searches. With this in mind, an extensive study is being conducted on SBIR and its applicability in law enforcement, military, and criminal justice investigations where a drop in operational quality may result in a crucial loss. SBIR, in addition to the CBIR, is a strong search tool that can be utilized as a supplement to text-based search. Pre-processing, followed by edge extraction descriptor generation, contour detection, constraint satisfaction, and perhaps other operations, helps this method succeed.

Grayscale invariance is critical when utilising sketches to search

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Behavior of Dynamic Routing Protocol for Disaster Area Scenario

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This work proposes a reinforcement learning-based dynamic routing protocol that is well suited to disaster-prone areas. Effective disaster management is always required to save the lives of those stuck in crisis situations, however when disaster strikes, the rescue team's infrastructural support is no longer available. In such a setting, ad-hoc networks can readily deploy. The disaster area mobility concept is used to communicate between citizens and rescue teams. A dynamic routing system is also required to deal with high node mobility and frequent link failure in a network. The quality of communication among parties involved in preserving people's lives is judged using performance parameters such as latency and energy. In this research, three distinct reinforcement learning models are used to evaluate routing protocols.

Keywords: Q Routing, CQ, DRQ, CDRQ, Disaster Area, Mobility Model.

1. INTRODUCTION

Effective disaster management is crucial for the survival of those caught in dangerous situations. The communication network's lifetime must be adequate to effectively complete a catastrophe operation. When a disaster happens, however, the rescue squad's infrastructural support is no longer accessible. Ad hoc networks are more typically utilised in instances where establishing an infrastructure network is impractical due to a lack of time or an emergency situation, such as on the battlefield, in the military, or in catastrophe scenarios (Chawhan, 2021)

The movement of nodes and their unique patterns within the network are specified by a mobility model (SHARMA, 2021) The random waypoint mobility model describes how nodes in a network move at random. Nodes in the Manhattan mobility paradigm, like automobiles, move along predetermined trajectories. To model group behaviour, the Reference Point Group Mobility Model (RPGM) is utilized, with each node following the path set by the group leader. Initially, all nodes are dispersed randomly across a single reference point and obey the group leader's commands.

1.1 Disaster Area Mobility Model

All rescue members are separated into groups in post-disaster scenarios, and communication and coordination between rescue members is maintained. The disaster area mobility model is more particular, as it divides the disaster area scenario into distinct zones, such as the IL, CCS, PWT, APP and TOC [Figure 1].

The space is separated into groups, each of which is categorized according to the room separation. This model is also based on the access and exit locations for patients and rescuers in a disaster zone.

The following is a breakdown of the paper's structure: Section 2 introduces the topic and issue of static non-adaptive routing, as well as several dynamic routing design solutions. In section 3, the research technique used in the suggested method is described in depth. The results of a

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Sarcasm Detection on Text for Political Domain— An Explainable Approach

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Abstract: In the era of social media, a large volume of data is generated by applications such as the industrial internet of things, IoT, Facebook, Twitter, and individual usage. Artificial intelligence and big data tools plays an important role in devising mechanisms for handling this vast volume of data as per the required usage of data to form important information from this unstructured data. When the data is publicly available on the internet and social media, it is imperative to treat the data carefully to respect the sentiments of the individuals. In this paper, the authors have attempted to solve three problems for treating the data using AI and data science tools, weighted statistical methods, and explainability of sarcastic comments. The first objective of this research study is sarcasm detection, and the next objective is to apply it to a domain-specific political Reddit dataset. Moreover, the last is to predict sarcastic words using counterfactual explainability. The textare extracted from the self-annotated Reddit corpus dataset containing 533 million comments written in English language, where 1.3 million comments are sarcastic. The sarcasm detection based model uses a weighted average approach and deep learning models to extract information and provide the required output in terms of content classification. Identifying sarcasm from a sentence is very challenging when the sentence has content that flips the polarity of positive sentiment into negative sentiment. This cumbersome task can be achieved with artificial intelligenceand machine learningalgorithms that train the machine and assist in classifying the required content from the sentences to keep the social media posts acceptable to society. There should be a mechanism to determine the extent to which the model's prediction could be relied upon. Therefore, the explination of the prediction is essential. We studied the methods and developed a model for detecting sarcasm and explaining the prediction. Therefore, the sarcasm detection model with explainability assists in identifying the sarcasmfrom the reddit post and its sentiment score to classify given textcorrectly. The F1-score of 75.75% for sarcasm and 80% for the explainability model proves the robustness of the proposed model.

Keywords: Domain Tweets; Sarcasm; Social Media; Artificial Intelligence; Machine Learning; Deep Learning; Big Data; Explainable AI

I. Introduction

In today's web 2.0, people face many challenges because of technological advancements in different sectors, such as social media platforms, the stock market, the industrial internet of things, and e-commerce. These platforms generate a lot of data every second in decentralized world. This is leading technology from web 2.0 to web 3.0. Many technologies are being used, such as Artificial Intelligence(AI) research, Blockchain, and industrial internet of things(IIOT) sensor data applications. In this era of big data, people need to tackle the five v's—volume, velocity, variety, veracity, and value. Our research deals with all v's. such as dataset we are referring reddit platform where volume of data with greater velocity generated every second with variety and varacity of data present. As problem statement defines author tries to detect a sarcasm from text which is adding value for particular domain. Therefore we use various tools and technologies such as AI which is combination of ML and DL algorithms is helping us deal with volume, velocity, veracity, variety, and value.

The different application generates a variety of data in terms of processing capability. E.g., IIOT, data is generated from different sensors used in different applications. So, in IIOT challenging task is to deal with a variety of data and the volume present. Many applications, such as health care using internet of things(IOT) [1], also incorporate artificial intelligence and data science to provide efficient solutions and security to predict in advance to solve intradisciplinary problems. Whereas in applications such as natural language processing in big data where many social sites generate the bulk amount of data with variety and veracity. In such situations, Deep Learning (DL) and Machine Learning (ML) algorithms play an important role. The big data and data science approach is used in this research to work on data volume, variety, and veracity to deliver value to the end user. Therefore, AI plays a vital role in predicting the correct outcome for better value. In addition to this Explainable AI is playing an important role to prove end users how machine-predicted results are correct

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2D Face Emotion Recognition and Prediction Using Labelled Selective Transfer Machine and CNN Transfer Learning Techniques for Unbalanced Datasets

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Abstract: Emotion recognition and prediction using facial expressions is one of the most challenging activities in the computing arena. The most traditional approaches largely depend on pre-processing and feature extraction techniques. This paper factually represents the implementation and evaluation of learning algorithms like LSTM and different CNNs for recognition and predicting emotions of 2D facial expressions based on recognition rate, learning time as well as effect of unbalanced datasets. The proposed system has targeted two datasets CK+ and JAFFE for two different techniques, where LSTM includes histogram equalisation and LBP as pre-processing and feature extraction techniques respectively. A transfer learning technique is explored using Dense Net and VGG-19 algorithm. The recognition rate with Dense Net was 96.64% and 97.45% respectively on the CK+ and JAFFE datasets. LSTM also showed 98.43% of recognition rate on JAFFE where as 72.63% on CK+ dataset.

Keywords: *Face Emotion Recognition, LBP, LSTM, CNN, Transfer learning, Dense Net, VGG-19.*

1. Introduction

Face is an authoritative biometric aspect of humans, and to contribute to the research, face emotion prediction has fully-fledged a lot of interest from researchers in the computer vision, pattern recognition, and machine learning areas. Emotional face, or nonverbal communication, [1], [2], [3], is intercepted and interpreted in an assortment of contexts, straddling biology, neuroscience, commercial, website testing, sociology, security, computer science, psychology and plenty of others. Different models for emotion classification have been defined by emotion theorists and psychologists, ranging from commonly revealed basic emotions to customarily distinctive complicated emotions [4]. The most dominated facial expression research in psychology have been: Ekman's basic set of emotions [5], and Russell's circumflex model of affect [6]. Russell's circumflex model in figure 1 illustrates the emotions in four quadrants as intense, pleasant, mild and unpleasant.

Despite decades of research in Human Computer Interaction (HCI), many questions remain unanswered as to what should be the most relevant indications and expressions to be evaluated for meaning encoding of communications. The problem persists because it is critical to generalise classifiers to unknown subjects that differ in actions and facial structures such as brows, wrinkles due to ageing can miss or offer false expressions, and so on [7], [8]. Enough training data for individual classifiers is a potential solution that is not always available or feasible. Non-accurate computation, spontaneous affective behaviour, lighting variation due to head movements, registration techniques cause registration faults, and accessories or camera movements may cause occlusions are the other challenges in involuntary emotion recognition. Emotion classification always has been a measure concern, and it is handled using a variety of traditional and innovative techniques.

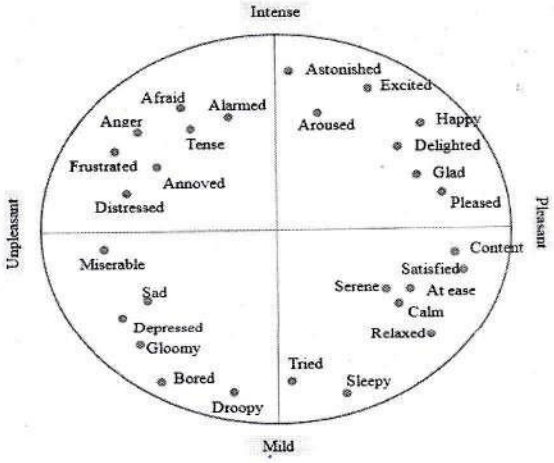

Fig. 1. Human Emotions in Russell's Circumflex Model

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Lane detection techniques for self-driving vehicle: comprehensive review

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Abstract
According to WHO, 1.35 million people, every year are cut short in road accidents, most of them caused due to human misconduct and ignorance. To improve safety over the roads, road perception and lane detection play a crucial part in avoiding accidents. Lane Detection is a constitution for various Advanced Driver Assisting System (ADAS) like Lane Keeping Assisting System (LKAS) and Lane Departure Warning System (LDWS). It also enables fully assistive and autonomous navigation in self-driving vehicles. Therefore, it has been an effective field of research for the past few decades, but various milestones are yet to be achieved. The problem has encountered various challenging scenarios due to the past limitations of resources and technologies. In this paper, we reviewed the different approaches based on image processing and computer vision that have revolutionized the lane detection problem. This paper also summarizes the different benchmark data sets for lane detection, evaluation criteria. We implemented Lane detection system using Unet and Segnet model and applied it on Tusimple dataset. The Unet performance is better as compared to Segnet model. We also compare the detection performance and running time of various methods, and conclude with some current challenges and future trends for deep learning-based lane marking detection algorithm. Finally, we compare various researcher's approaches with their performances. This paper concluded with the challenges to predict accurate lanes under different scenarios.

Keywords Autonomous driving · Lane detection · Deep learning · Advanced driver assisting system · Lane keeping assisting system · Lane departure warning system

1 Introduction

Advanced driver assisting systems (ADASs) are developed to reduce road accidents by assisting the driver. Lane detection is an essential module of ADAS that provides navigational assistance to the driver. A lane departure warning (LDW) system alerts a driver

Arti, Dishant Pawar and Prashant Singh are contributed equally to this work.

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FOCUS

Assessment of diabetic retinopathy progression using CNN from ocular thermal images

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Abstract
Diabetes frequently causes diabetic retinopathy (DR) that causes retinal damage and vision impairment. If it is not detected in time, blindness could follow. Unfortunately, there is currently no known treatment for DR; it can only be prevented. The probability of vision loss can be significantly reduced with early confirmation and management of DR. The human assessment of DR Ocular thermal imaging by clinicians is time-consuming, intense, costly, and error-prone in comparison to machine diagnostic technologies. Deep learning (DL) has quickly become amongst of the most well-liked techniques for raising performance, especially when it comes to the classification and assessment of medical images. Convolutional neural networks, or CNNs, are increasingly used as a DL technique for analyzing medical photographs, and apparently work pretty well. Eye gazes are used to record the ocular thermogram, comprising straight, upward, and downward glances for the left as well as right eyes, correspondingly. The ocular surface temperature diminishes by 0.010 C/year after midlife. Dilation tests have been performed to measure the shift in ocular surface temperature (OST) as a result of dilatation in either eyes that are normal and in both eyes that have DR. This study sought to explore this possibility because ocular thermography is rarely used to identify diabetic retinopathy. Ocular thermographs have been used on controls of various ages and genders to characterize OST that is then coordinated with the pattern of OST in DR patients.

Keywords Diabetic retinopathy · Diabetes mellitus · Deep learning · Convolutional neural network · Ocular thermal images · Ocular surface temperature

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1 Introduction

Diabetes is an illness that causes a rise in blood sugar levels due to a shortage of insulin (Taylor and Batey 2012). It affects more than 425 million humans globally (International Diabetes Federation 2023). Diabetes has a negative impact on the eye, heart, brains, and kidneys (Taylor and Batey 2012; International Diabetes Federation 2023). Diabetic Retinopathy (DR) is a diabetic disorder in which the retina's blood capillaries swell and may leak blood (American Academy of Ophthalmology 2023). When DR approaches a severe stage, vision loss may result. 2.6% of global blindness is brought on by DR. People with diabetes whom have had the illness for a prolonged time are much more likely to develop DR. For diabetics to identify and treat DR early on and prevent blindness, routine retinal examination is essential (Harper and Keeffe 2012). The emergence of various types of abnormalities indicates the presence of DR by a retina scan. Hemorrhages (HM)

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Fibre cement boards, an alternative to brick walls FREE

Rushikesh Patil; Mridula Chandola ✉; Swati Kulkarni

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REVIEW ON STRUCTURAL STRENGTH ASSESSMENT OF EXISTING BRIDGES

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ABSTRACT: The present study provides a critical overview of the state-of-the-art existing reliability assessment of reinforced concrete bridges. The techniques were classified broadly as Inspection and maintenance, Assessment of condition, posting of bridges, rating of existing bridges, load testing and structural health monitoring. The study revealed various techniques and helpful information that could be employed for superior forecasting of the effective service life of degrading RC bridges as well as in predicting the optimum time for periodic inspection and creating maintenance strategies for continued service life of the bridges. This structural assessment guideline can be applied to all kind of existing bridge structures for all type of structural material (concrete, steel, timber, masonry, composite material). Experience based quantitative assessment of deterioration effects and other damage through visual inspection is carried out where as Serviceability based quantitative assessment of safety and reliability is carried out using refined model-based monitoring of static and dynamic test data.

KEYWORDS: Retroffitting, Structural Health Monitoring, Destructive and Non-Destructive testing.

1 INTRODUCTION

Bridges are considered as the key element in the present scenario of transportation system as they control the capacity of the traffic system. If the bridge fails, the system fails, hence it is utmost essential to strike balance between capacity and cost without compromising on safety. Reinforced concrete bridges constructed prior to 1971 have been designed with little or no ductility considerations and are particularly vulnerable to damage when exposed to a moderate earthquake. A bridge engineer has to keep in mind the future traffic volume, the heavier cost of construction and thereafter periodic or routine maintenance while working on bridge project.[4] Strength must always be of utmost importance, but at the same time measures should be taken to prevent

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Artificial cells is now not an unrealistic goal -A state-of-the-art-review

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Abstract:
The development of artificial cells is the research field which has been progressive in the past and in the present expanding rapidly. Artificial cell it is a cell-like system consist of a lipid-bilayer which separates its inner aqueous environment to the outer aqueous environment. In this field there is a emphasizes on the construction of models which are cell-like created by synthesizing a genome and installing it into a recipient cytoplasm. It has a biomimetic structure. We are going to summarize a few vital aspects of the artificial cells which will be based construction, advantage and applications and the enzymatic reactions. Our content will be much relatable to the current or the present scenario of artificial cells.

Keywords: Hemoperfusion; Enzyme therapy; Cell therapy; Gene therapy; Artificial cells; Synthetic biology; Biophysics; Synthetic cells; Liposomes

1. Introduction

In the recent past, we have witnessed a rapid growth of interest in the field commonly known as synthetic biology and to be more specific the main concern remains the construction of cell-like bodies [1-2].
"Substitutes for natural cells" is the ultimate goal for developing artificial cells. Artificial cells can be defined cell-like structures; biological cell imitators which can be engineered materials perform specific functions, mimic important properties of cells, such as shapes, morphology etc. It is a'Biological or chemical structures which consist of a set of reacting molecules and whose structure is just similar to a cell and similar in functions too, are called as "artificial cells" or "synthetic cells" or "protocells".' Artificial cell was designed to understand a particular process in a cell, for example protein synthesis. It also helps in designing any biochemical reaction which is either difficult to understand in a complex cellular environment like functioning of membrane proteins. Hybrid design is mixing of non- lipid compartments in the midst of non-biological components [3-4]. Here, in this review paper we will be referring to cell-resembling systems also recognized as synthetic cells (SCs) which are put together from genetic materials such as DNA, RNA, and ribosomes, etc. within liposomes. In the areas of formation and role, the synthetic cells will be alike to that of biological cells. High potential is involved in the making of these artificial cells for fundamental and applied science and so our interest is towards this topic that is "semi-synthetic" approach [5-7].
The establishment or the making up of living SCs is a demanding goal which requires stepwise process to get it achieved [8]. As of now the constructed SCs resemble the living cells at most externally and have structure like a cell and also perform life-like operations. It is tough to achieve the chemical manufacture of all synthetic cells. Present-day SCs are found to be resembling to self-determinant bioreactors, reduced to micrometer size or in simple words, they are more likely said to be machine-like than the organism-like [9].
This can't be considered as a gloomy scenario because the present SCs which are under the trial are of great use in many aspects and it also helps us gain an extensive study of scientific technological insight. The synthetic cells are beneficial replicas of earliest blocks, the parents of earliest biological cells. While looking at the similarity with machines in terms of programmability, modularity, orthogonality, etc. the synthetic cells are good research materials. The existing technology will surely contribute to the advancement of SCs.
Now it is of utmost importance that this field now experiences growth with the help of automation and conceptual framework. It is very certain to say that research on artificial cells is a wide and speedily growing field.

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Water Level Monitoring and Analysis using IoT-Based System

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Keywords: Water, Level, Monitoring, Analysis, IoT-Based, System..

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ABSTRACT: Water source is essential and a significant element in rural and ranch creation and is a key of our personal satisfaction too. Checking water level of a water source, for example, water tank or borewell and so on, assumes a critical part in horticultural. For instance in the event that a water level dips under the limit level for siphoning in a borewell, the siphon engine might get harmed because of dry running. In such case checking water level and controlling the water siphon in like manner becomes vital assignment. There are numerous different circumstances where water level observing is a significant errand. It very well might be utilized to safeguard water or to concentrate on the water use of a water source. This paper proposes a model framework plan, execution and portrayal of expected devices and advances to foster Internet of Things (IoT) based water level observing framework which can be carried out in future savvy towns in India.

1. INTRODUCTION

Towns in India will before long be changing to brilliant towns as Government of India carries Smart Village drive to the country. The savvy town drive will advance computerized consideration which will empower the improved admittance to administrations through Information Technology (IT) empowered stages. Consequently the Internet of Things (IoT) plays a significant part to play in Smart Village in India. In IoT empowered Smart Village each actual item, a thing, will be associated with the Internet and empower clients to monitor its status and to remotely control it.

This will assist clients with getting to administrations given by such items as and when required. IoT can be utilized in s shop town to foster Smart Agriculture, Smart Dairy, Smart Schools, Smart Healthcare and Smart Grid arrangements. IoT in farming can be utilized for better administration of assets utilized in crop creation. Water is one of the significant substances utilized in crop creation.

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On graphic elementary lifts of graphic matroids

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ABSTRACT

An elementary lift of a binary matroid M that arises from a binary coextension of M can easily be obtained by applying the splitting operation on M. This operation on a graphic matroid may not produce a graphic matroid. We give a method to determine the forbidden minors for the class of graphic matroids M such that the splitting of M by any set of k elements is again a graphic matroid. Using this method, we obtain such minors for $k = 2, 3, 4$. One may compute such minors for $k \geq 5$. As a consequence, we obtain the forbidden minors for the class of graphic matroids whose all elementary lifts obtained via binary coextensions are also graphic. There are six such graphic minors.

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1. Introduction

For undefined notions and terminology, we refer to Oxley [14]. For a matroid M, let $E(M)$ denote its ground set. Denote by $M(G)$ the circuit matroid of a graph G. Given two matroids M and N, if there is a matroid Q such that $N = Q \setminus X$ and $M = Q/X$ for some $X \subset E(Q)$, then M is a *quotient* of N while N is a *lift* of M. If $|X| = 1$, then M is *an elementary quotient* of N while N is *an elementary lift* of M. In this case, Q is a single-element extension of N and a single-element coextension of M. An elementary lift of a graphic matroid is also called a lifted-graphic matroid [20].

Lifted-graphic matroids play an important role in the matroid minors project; see [10,11]. This class of matroids is minor-closed and is well studied in [4,5,7,8,20]. Chen and Geelen [5] proved that there exist infinitely many pairwise non-isomorphic excluded minors for the class of lifted-graphic matroids. Frank and Mayhew [8] proved that, for a positive integer r, there are only a finite number of excluded minors of rank r for the class of lifted-graphic matroids.

In the above definition of elementary lift, if the coextension Q of M is a *binary* matroid, then we say that N is an elementary lift of M via binary coextension. In this case, both M and N are binary as the class of binary matroids is minor-closed. In this paper, we consider only such lifts. We observe that such a lift N of a binary matroid M can be obtained by applying the splitting operation on M.

Fleischner [9] introduced the splitting with respect to a pair of edges of a graph and used it to study some properties of Eulerian graphs. Raghunathan et al. [15] extended this operation to binary matroids, and Shikare et al. [17] defined it for a general set of elements as follows.

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ON CONDITIONAL CONNECTIVITY OF THE CARTESIAN PRODUCT OF CYCLES

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Abstract

The conditional h-vertex (h-edge) connectivity of a connected graph H of minimum degree $k > h$ is the size of a smallest vertex (edge) set F of H such that $H - F$ is a disconnected graph of minimum degree at least h. Let G be the Cartesian product of $r \geq 1$ cycles, each of length at least four and let h be an integer such that $0 \leq h \leq 2r-2$. In this paper, we determine the conditional h-vertex-connectivity and the conditional h-edge-connectivity of the graph G. We prove that both these connectivities are equal to $(2r-h)a_h^r$, where a_h^r is the number of vertices of a smallest h-regular subgraph of G.

Keywords: fault tolerance, hypercube, conditional connectivity, cut, Cartesian product.

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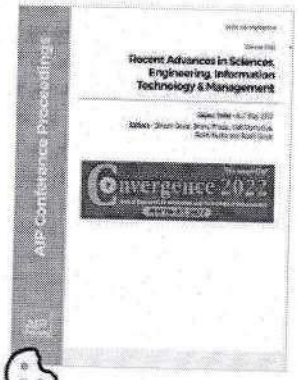

RESEARCH ARTICLE | JUNE 15 2023

A new approach to share a secret message using stirling transform

Vitthal Digambarrao Hivrale

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AIP Conference Proceedings 2782, 020084 (2023)
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Share Tools

Nowadays, everyone is looking for solutions to send messages in a secure manner. There are two ways to do that-either one delivers the message himself/herself to the receiver or one wraps the

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Studying the Variability of the Gap Developed in A Bolted Nozzle Flange via ANSYS on Varying Boundary Conditions

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ABSTRACT

This study has been conducted to understand the dependence of parameters like temperature and preload on the displacement between the mid nozzle and lower nozzle of a bolted nozzle flange. This bolted nozzle flange is based on NASA's rocket Saturn V. A bolted nozzle flange has to endure extreme temperatures and forces as it serves as a high pressure vessel with heated and accelerated rocket propulsion fuel flowing through it. This makes the study of the said gap imperative so as to minimize fuel and energy leakages. Finite Element Analysis (FEA) was performed and it was observed that varying force due to regeneration channels impacts the displacement between the mid nozzle and lower nozzle of a bolted nozzle flange the most, while changing other factors like bolt preload, friction, temperature and pressure did not cause significant changes to the interfacial displacement, as proved by the change factor provided for each parameter.

KEYWORDS: Finite Element Analysis, ANSYS, Bolted Nozzle Flange

1. INTRODUCTION

Bolted nozzle flanges find an extensive use in aerospace manufacturing- in particular the Saturn V rocket. The vastness of practical applications of a bolted nozzle flange make it a highly researched topic. Studies conducted by Yuan Li and Hehui Wang [1], lay the framework for the basic understanding of the working of these flanges. Similarly, research led by AkliNechache and Abdel-Hakim Bouzid [I2] provide meaningful insight into the phenomenon of creep. A detailed review published by Vishwanath V. H, S. J. Sanjay and V. B. Math [III] analyses the bolted nozzle flange as a high pressure vessel system. This paper too aims to further this field of research by providing data as to how different parameters impact the aforementioned gap.

2. DEVELOPMENT OF MODEL

The diagram below (Fig 1a & b) shows attempts to emulate the bolted nozzle flange used in rockets such as the Saturn V. The mid nozzle and lower nozzle are connected to each other with 200 bolts, however, in an attempt to study the real world effects on each bolt, the

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MULTISCALE BSBL COMPRESSED SENSING-BASED ECG SIGNAL COMPRESSION WITH ENCODING FOR TELEMEDICINE

K. S. Surekha ✉, B. P. Patil, Ranjeet Kumar and Davinder Pal Sharma

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Tools Share

Abstract

An electrocardiogram (ECG) signal is an important diagnostic tool for cardiologists to detect the abnormality. In continuous monitoring, an ambulatory huge amount of ECG data is involved. This leads to high storage requirements and transmission costs. Hence, to reduce the storage and transmission cost, there is a requirement for an efficient compression or coding technique. One of the most promising compression techniques is Compressive Sensing (CS) which makes efficient compression of signals. By this methodology, a signal can easily be reconstructed if it has a sparse representation. This paper presents the Block Sparse Bayesian Learning (BSBL)-based multiscale compressed sensing (MCS) method for the compression of ECG signals. The main focus of the proposed technique is to achieve a reconstructed signal with less error and more energy efficiency. The ECG signal is sparsely represented by wavelet transform. MIT-BIH Arrhythmia database is used for testing purposes. The Huffman technique is used for encoding and decoding. The signal recovery is appropriate up to 75% of compression. The quality of the signal is ascertained using the standard performance measures such as signal-to-noise ratio (SNR) and Percent root mean square difference (PRD). The quality of the reconstructed ECG signal is also validated through the visual method. This method is most suitable for telemedicine applications.

Keywords: Compressed sensing • ECG • BSBL • compression • PRD • telemedicine

STATISTICAL ANALYSIS OF ELECTRODE-ELECTROLYTE-SEPARATOR TO IMPROVE EFFECTIVENESSOF SUPERCAPACITOR

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ABSTRACT:

The supercapacitor is a booming technology whose popularity is increasing as the number of electric vehicles are increasing. The supercapacitor is a technology which will be a supporting pillar for electric vehicles and hydrogen vehicles to take the market. Supercapacitors will reduce stress on the main energy storage device thereby increasing their life and bettering performance. In the supercapacitor electrode, electrolyte and separators are the main parts. The effect of electrode, electrolytes, and separators have been extensively studiedseparately in the past, but their combined effect has not been studied. Each of the three parts has one important parameter which contributes the maximum in capacitance of supercapacitor. These parameters are taken into consideration and their individual and interaction effect on capacitance of supercapacitor is being studied in this paper. A statistical model has been used for analysis. The generated statistical model has been validated at a few points and error is within 5%. This statistical model can be utilized by researchers and manufacturers in due course.

KEYWORDS

Capacitance, Electrode, Separator, Electrode, Separator

1. INTRODUCTION

A capacitor is an electrical storage device which has its electrical field separated by an insulator. The thing which makes supercapacitors "super" is their increased capacity for store large amount of energy which can be pushed in or flushed out very quickly. Today everyone wants to harness the electrical energy and for making that possible, it is crucial to have a good storage device [1]. Batteries have good storage capacity but their charging time is more as compared to supercapacitor and in today fast-moving world it is essential to have a storage device which can charge electrical energy just not fast but very fast [3]. Supercapacitors are used in hybrid vehicles, starter, uninterrupted power supplies, ships etc. They are also used in many sectors like space, defense, agriculture and communications [4][15]. There are various optimization and statistical techniques like artificial bee colony optimization, Ant colony optimization and genetic optimization which are incorporated for modeling of supercapacitor [5]. In this research full factorial sampling plan has been chosen with 3 factors and 2 level analysis. Capacitance is selected as an output parameter for optimization.

The popularity of supercapacitors is increasing day by day which improves in this device a very essential and important task. The electrode of a supercapacitor is where all the charges are stored. The various carbons used

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CAR POLLUTION MONITORING SYSTEM USING IOT

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Abstract: *The pollution level has been rising over time because of factors like the increase in population, increased vehicle use, industrialization. An increase in pollution leads to health problems, global warming, reduced quality of life, and many more. This creates the need for proper monitoring of the surroundings and appropriate actions to be taken accordingly. This project majorly focuses on the issues regarding PUC as people don't have to visit for the Pollution checking of their vehicles as here data will be directed collected from individual vehicles using the Internet of Things (IoT) technology through different sensor's which we'll be installing at the exhaust of cars and will record the data in a database. This data is stored in the cloud and is accessible from anywhere in the world by the designated authorities The data is displayed using a dashboard that will show real-time pollution values. Data collected from the different sensors will be sent to the authorities to take necessary action on the pollution level. If it goes higher than the threshold then the message will be displayed on the screen as pollution exceeded the upper limit. By this, both the user and concerned authority will be able to take measures to protect the environment against air pollution due to vehicles.*

Keywords: **Internet of Things, Car pollution monitoring system, PUC, Toll booth, RTO , Gas sensor**

1. INTRODUCTION

Air pollution is the most prominent problems in the world, precisely in an increased amount in urban areas. Air pollution is degradation of air by various pollutants produced in the environment [1]. The main contributors for air pollution are gases like carbon dioxide and carbon monoxide. It has been seen that humans get significantly influenced due to air pollution where there is no framework to monitor it [2]. According to the World Health Organization (WHO) [3], more than four million deaths are recorded every year due to diseases like respiratory and cardiac, caused due to air pollution. Air pollution is one among the top contributors leading to global climate change causing many anomalies within the temperature pattern and affects crop production. These days, a lot of vehicles are used for transportation, especially in the urban areas. The vehicles are responsible for the emission of carbon monoxide in air approx.50 percent. The general public health has adverse effects due to the pollution from cars and buses running on the roads of metropolitan cities. Emission of carbon monoxide can be responsible for chronic diseases and increase the risk of cancer [4]. With growing concerns such as these, there is a need of effective monitoring of air for getting it under inspection and controlling it. Controlling and limiting air pollution can be achieved by monitoring the Air Quality Index (AQI) by using the appropriate sensors [5]. The primary objective is to make

applied system innovation

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Optimal Fractional PID Controller for Buck Converter Using Cohort Intelligent Algorithm

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Abstract: The control of power converters is difficult due to their non-linear nature and, hence, the quest for smart and efficient controllers is continuous and ongoing. Fractional-order controllers have demonstrated superior performance in power electronic systems in recent years. However, it is a challenge to attain optimal parameters of the fractional-order controller for such types of systems. This article describes the optimal design of a fractional order PID (FOPID) controller for a buck converter using the cohort intelligence (CI) optimization approach. The CI is an artificial intelligence-based socio-inspired meta-heuristic algorithm, which has been inspired by the behavior of a group of candidates called a cohort. The FOPID controller parameters are designed for the minimization of various performance indices, with more emphasis on the integral squared error (ISE) performance index. The FOPID controller shows faster transient and dynamic response characteristics in comparison to the conventional PID controller. Comparison of the proposed method with different optimization techniques like the GA, PSO, ABC, and SA shows good results in lesser computational time. Hence the CI method can be effectively used for the optimal tuning of FOPID controllers, as it gives comparable results to other optimization algorithms at a much faster rate. Such controllers can be optimized for multiple objectives and used in the control of various power converters giving rise to more efficient systems catering to the Industry 4.0 standards.

Keywords: fractional calculus; fractional order PID controllers; power electronics; DC-DC converters; meta-heuristics; cohort intelligence algorithm; Industry 4.0

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1. Introduction

Power electronic system control is a very crucial and challenging task which has attracted the attention of researchers in the past few decades. Power electronic DC–DC converters are very versatile and can be used for voltage regulation in a wide range of applications. Such converters work in different modes of operation, which introduce non-linearities and are influenced by input and parametric variations [1,2]. The challenge is to design robust and stable controllers which also satisfy the transient response and frequency response specifications with good tracking accuracy [3]. Extensive research has been completed in the quest for improved and more robust controllers for such converters. Such systems are usually controlled using the conventional proportional integral (PI)/proportional integral derivative (PID) control, H_∞, sliding mode, predictive control, non-linear methods such as fuzzy and intelligent control, etc. [3–5].

PID controllers are widely used in the industry for the control of power electronic converters which are used in various applications like speed control of DC and AC motor drives, switched mode power supplies, renewable energy applications, etc. [6,7]. These controllers act on the error between the set point value and the controlled parameters, and do not require internal state measurements and, hence, require lesser sensors. They are easy to tune, have an easier control law to implement, and, hence, are easily adaptable to industry [8]. In fact, industrial controllers are still dominated by PID controllers, as

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A Comparative Study of Software Development Waterfall, Spiral and Agile Methodology

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Abstract

Software development methodologies are used for developing the simple to complex project. It gives the idea of how systematically projects are developed. It plays important role in software development in academics to industries. It helps to reduce the chances of project failure. The major development technics like waterfall, spiral and agile methodologies, their processes and comparisons shows that, how efficient development occur. The article used to present the study of these three software development methodologies. The main contribution to this work in study and comparing the methodologies. This study helps the software development in academics and industries to understand and comparison to choose the method according to the application.

Index Terms—Waterfall, Spiral, Agile and Scrum.

I. INTRODUCTION

The software development methodologies play a very important role in developing the project. Any small to complex software development require systematic flow from requirement to maintenance. It helps the group to develop the project in collaboration. There are many development methodologies, every method having pros and cons. some are traditional development and rest are evolutionary type. Every development technique is useful, but choosing the best technique is important considering the application. The selection is very important in terms of systematic development. If the application is very small and to be developed in weeks then the proper methodology is required, otherwise it will make a negative impact on development process, time and deadline skip. The unplanned or without the use of standard methodologies will make major chances of project failure. It can be observed in terms of satisfaction of customers. The chances that, customer may argue at the time of delivery of project about the quality and scope deviation. To avoid this, choosing of right methodologies will increase the chances of customer satisfaction.

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SYSTEMATIC APPROACH TO FIND EFFECT OF CLOCK SKEW IN THE PERFORMANCE OF PHYSICAL CMOS DESIGN IN DEEP SUBMICRON TECHNOLOGIES

DR. SEEMA RAJPUT, DR. HARJEET KAUR, SWATI SHETKAR, DR. SANJAY KOLI, DR. SUNIL L. BANGARE AND DR. PUSHPA M. BANGARE

ABSTRACT

The Clock distribution has become an increasingly challenging problem for VLSI designs, consuming an increasing fraction of resources such as wiring, power, and design time. Clock skew is mainly because of static mismatches in the clock. We can define the clock as the variations in the arrival time of clock transition in an integrated circuit. They can dramatically affect the system wide performance and reliability. In this paper, we analyse the effect and impact of positive skewed circuitry on the performance of physical CMOS design in deep submicron technologies. The physical design is implemented and simulated in Microwind EDA tool in CMOS 45 nm technology with BSIM 4 MOS modelling. The VDD for simulation is 1V. The physical design simulation shows delay of 0.102 nsec between the clock arrival with the same clock source at different instances and that is of significantly 2.198 nsec between two different output instances of synchronous circuit.

Keywords: Clock skew, Clock distribution, physical design, BSIM 4 MOS Modelling, etc.

I. INTRODUCTION

In modern VLSI circuit, a clock distribution network may drive ,thousands of registers, active and passive components in a chip with a very small size, creating a large capacitive load that must be efficiently sourced. In addition to this, every transition of the clock signal when changes it also changes the state of every capacitive node within the network of clock distribution, in contrast with the switching activity in combinational logic blocks, where the change of logic state is dependent on the logic function. The current submicron technologies demand the low power application design with respect to size reduction of the device [1]. Power consumption is the most important term that the designer needs to think while developing the logic [2]. Primarily power dissipation in the digital circuits are dynamic power and short circuit power. Hence the dynamic power dissipation is reduced by lowering the clock frequency and power supply or the capacitive load of the clock distribution. But by lowering the clock frequency, will lowers down the speed of the processor. With the same, lowering the power supply will also affects the current strength of the devices. So, the clock reaching time for the circuits used can be designed in such manner that the clock will reach at the same instances to the respective circuits in order to lower down the power utilization [1] [3].

Because of clock skew, a circuit may get failure [4], that is a race around condition may occur which is independent of clock frequency. Advancements in chip fabrication technology improve chip size. It not only improves compactness in logic gates but also increases the operating frequency. Due to this, clock skew is an important factor to ensure the correct functioning of VLSI chips. But increase in clock frequency in a digital system makes it critical to reduce clock skew.

Therefore, we need to understand the skewed arises in the synchronous circuits because of the different instances of the clock arrival so that we can develop the mitigation techniques in order to lower down the clock delays. For designing Integrated circuits, It is important that set up and hold time parameters must satisfy timing requirements. Delay calculation is depending upon propagation delay and clock. The function of the clock distribution network is to maintain the flow of data signals along similar data paths.

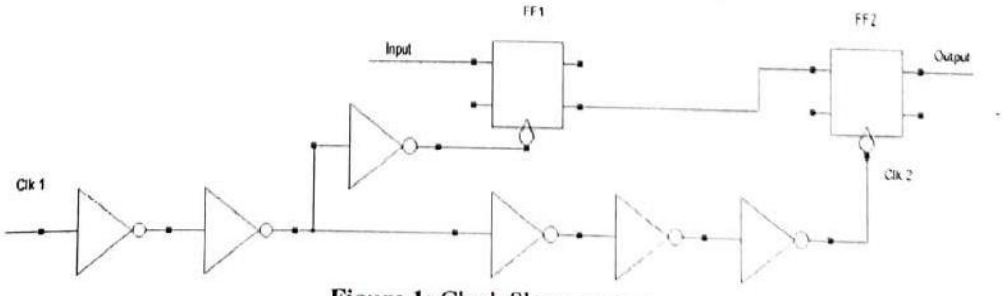

Figure 1: Clock Skew concept

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Exhaust Heat Recovery System using Organic Rankine Cycle (ORC) Technology: A Comprehensive Investigation

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ABSTRACT

The Organic Rankine Cycle (ORC) systems are well known as the advanced available method to develop mechanical or electrical energy.Continuous developments are undergone to develop new methods to improve the efficiency.In these systems, the organic fluids with medium temperatures are usually used to generate power.Large amount of exhaust gases and waste heat are generated in industries which are usually discharged into the environment.This heat is recovered and taken as input by the ORC system and used effectively in various processes.Earlier, only the low and medium temperature fluids were only used but now even high temperature working fluids are used for this purpose.This paper represents the technological and economic advances in the ORC technology to reuse the unwanted energy produced from various places and convert it into useful electrical or mechanical energy which can be used further.

Keywords:*Thermal energy, Organic fluid,ORC cycle, Waste heat recovery, Energy storage, Economical advancement*

1. INTRODUCTION

Organic Rankine system (ORC) was discovered on 1950s which was used to convert the low temperature energy into power.The working of the system depends on the fluid used as well as process undergone.The heat is recovered from the organic systems like biomass combustion, solar ponds and so on [**1**]. One of the significantimplementationsof ORC is the recovery of heat from exhaust of automobile engines which is one of the major causes for air pollution [**2**]. ORC have high range of promising heat recovery with huge potential market.They are preferable for low or medium heat sources which is reliable, and it can be easily accessible than steam Rankine cycles (SRCs) [**3**].Thisdevelopment emerged from SRC technology with both having same principle[**4, 5**].In case of SRCs the fluids used are mainly coal, oil combustion etc but in case of ORC it is usually organic fluids.Apart from this the former SRCs are used mainly in large power plants because the power generated will be high.While in case of later one the high temperature leads to the decomposition of organic fluids used[**6-8**].

Now-a-days the implementation of public power generation system based on sustainable methods becomes a necessary project to safeguard our environment.In this sense,the ORC plays an important role in generating electricity from renewable energy sources [**9, 10**]. In recent years, the use of this technology has spread worldwide with an average power generation of about 0.2 to 2.0 MW.The main aim is to generate economical,safer,non-toxic,inflammable,eco-friendly process.

2. ORGANIC RANKINE CYCLE (ORC): Working Principle

This is closed loop in which the working-fluid continuously flows inside loop to convert the waste heat generated to useful power[**11, 12**]. The selection of evaporation process is the initial stage;the waste heat generated is captured by the system which isused to increase the temperature of fluid passing through the device.Then the process of evaporation occurs, and this vapour is allowed to pass via the expander in which the mechanical or electrical power is produced.After that it is condensed into liquid form with the help of condenser.Finally, a pump compresses the fluid back into the system and energy is used as power.Thisis the operating principle of ORCs[**13,14**]. The working principle is same as SRC, but the fluid is organic in nature with low boiling point instead of liquid water [**15**].

3. WORKING FLUID REQUIREMENTS

This is mainly based on the temperature that needs to be used in the system.Apart the fluid selected should not cause much harm to the environment that is it should never contribute to ozone layer depletion and other natural calamities.Along with this the

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ORIGINAL RESEARCH

Text Region Identification in Indian Street Scene Images Using Stroke Width Transform and Support Vector Machine

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Abstract

Detecting the presence of text in street scene images is a very crucial task for many applications and its complexity may vary from script to script due to the unique characteristics of each script. A technique to detect and localize text written in Devanagari script from scene images is presented in this paper. Initially, candidate regions are localized using low-level features like edge and colour. Due to the complex nature of scene images, these regions may contain irrelevant informa- tion. Stroke Width Transform (SWT) and geometric features are then extracted from these localized regions for correctly identifying the text regions. An efficient technique is proposed in this paper for the extraction of stroke width from dark text (foreground) on a light background as well as from light text (foreground) on dark background. Methods based on heuristic rules are inefficient for text and non-text identification due to the nonlinearity of extracted features. It has been observed that Support Vector Machines are the most popular and efficient classifiers for text/non-text classification. Also, an attempt is made here to explore other computationally less expensive classifiers like Bayesian due to its simplicity and Decision Tree due to its pure class partitioning power. Hence SVM, Bayesian and Decision Tree classifiers are used for the classification of text and non-text regions and the results are compared. An image dataset containing 1250 scene images has been created for experimentation. It is clear from the experimental results that the technique proposed in this paper outperforms some of the existing techniques in terms of accuracy.

Keywords Natural scene images · Devanagari script · Text detection · Text extraction · Colour-based segmentation · SVM

Introduction

Image-based applications are gaining popularity due to the high availability of low priced, high-performance smart- phones and other handheld imaging devices. The text infor- mation present in natural scene images will be of great use in such image/vision-based applications. A smartphone/ imaging device-based application capable of detecting, localizing, extracting, recognizing and translating the text information (written in a local script) present in a scene image into a target language (script) will be very useful for foreign travellers and tourists in reading or interpreting the text information regarding route, directions, names of shops, instructions etc. Such a system shall also be used in automatic navigation systems, understanding environment for blind persons, content-based image search, object rec- ognition, automatic indexing and scene understanding etc. Text detection and recognition are the main steps in such text-based applications.

Once the text is detected, the same must be locatedby drawing bounding boxes around the text as shown in Fig. 1. Thus, text localization gives an answer to the loca- tion of the text present in a scene image. The background information must be removed from the text regions or bounding boxes for better recognition. In text extraction, the foreground text is separated from its background. Asthe cameras attached to smartphones are of low resolu- tion, enhancement of the text is also needed as the text region is of low resolution and is prone to noise. Also skew and slant corrections can be done at this stage to improve the recognition accuracy. Each word or text-line

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STUDIES ON MACHINE LEARNING AND ARTIFICIAL INTELLIGENCE

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Abstract:

AI-based techniques, such as machine learning, have already been established in theindustry to achieve sustainable manufacturing as a result of intensive research efforts in the field. Thus, the purpose of this study was to conduct a systematic review of the scientific literature on artificial intelligence and machine learning (ML) in industry. Although artificial intelligence and

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COMPARATIVE STUDY OF MACHINE LEARNING AND DEEP LEARNING ALGORITHM FOR FACE RECOGNITION

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ABSTRACT

In the present world, biometric systems are used to analyze and verify a person's distinctive bodily or behavioral features for authentication or recognition. Till now, there are numerous authentication systems that use iris, fingerprint and face feature for identification and verification, where the face recognition-based systems are most widely preferred, as they do not require user help every time, are more automated and are easy to function. This review paper provides a comparative study between various face recognition techniques and their hybrid combinations. The most commonly used datasets in this domain are also analyzed and reviewed. We have also highlighted the future scope and challenges in this domain, as well as various Deep Learning (DL)-based algorithms for facial recognition.

KEYWORDS

Face recognition, Local binary pattern, Convolutional neural networks, Principal component analysis, Histogram of oriented gradient.

1. INTRODUCTION

With the evolution of humans in every field of technology, there is a need to control who can access the place, machinery or information; so, we require an authentication system. There are many human authentication systems, such as signature, password, pin and biometric systems that have been developed. Face authentication systems have become popular as they doesn't disturb the privacy of the individual and there is no requirement to get in physical contact with the system, which helps in controlling the spread of diseases like viruses. Face authentication is defined as giving access to the authorized person; i.e., face identification problem. It is a two-step process; firstly face detection, which is the detection of the human face in the frame of the image or video and highlighting it by making a square around the face discarding the surrounding and secondly Face Recognition (FR), which means the face detected in the above step has to be verified with those present in the database and if there exists a match, then the person is authorized by the system; if not, then the owner can take the necessary measures. There are many factors the affect the FR algorithm, including physical factors (e.g. illumination, occlusion) as well as facial features (e.g. twins, relatives, pose and aging factor). The methods addressing all these issues have been surveyed in [1] by Mortezaie et al. To achieve the best results for FR, we also require expertise in the subject of psychology, so that we can study the feature characteristics of the face. Lots of work has been done on the FR from the standard algorithms, like Principal Component Analysis (PCA), Local Binary Pattern (LBP) to the latest DL methods, like Convolutional Neural Networks (CNNs).

The organization of the paper is as follows. In Section 2, we provide the main steps involved in the process of FR. In Section 3, we summarize the various FR algorithms based on ML and DL. In Section 4, we provide open challenges and directions for future scope and in section 5, we conclude the work.

2. STEPS INVOLVED IN THE PROCESS OF FR

FR can be considered as a way of authentication and verification. In this sence, a new unknown face is matched with various other faces present in the database which all have known entities. After this

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Automated Subjective Answer Evaluation System

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ABSTRACT

In this paper, we have studied LSTM (Long Short- Term Memory) network and presented a siamese adaptation of it for labelled data composed of variable-length pattern and pairs. Our model first takes in right answer and then assesses semantic similarity between the right answer and the given answer. In order to accomplish these we use word embedding vectors which are supplemented with synonymic information to the LSTMs. These vectors encode the expressed underlying meaning of the sentence which is of fixed size. The wording and syntax are also taken care of. We limit subsequent operations that rely on the simple Manhattan metric. The model's learned sentence representations are compelled to a highly structured space. The geometry of this space represents complex semantic relationships. Our results show that LSTM's can be really powerful language models and are especially suited to tasks which require intricate understanding.

Index Terms—RNN, LSTM, NLP

I. INTRODUCTION

Examining and evaluating answer sheets are time-consuming testing tools for assessing academic achievement, integration of ideas, and recall; however, manually generating questions and evaluating responses is costly, resource-intensive, and time-consuming. Manual evaluation of answer sheets takes up a notable number of instructors, a lot of valuable time and so it is a high-cost task. Also, different security concerns regarding paper leakage is one of the other challenges to conquer. The goal of this project is to create an automated examination system using machine learning, the natural language toolkit (NLTK), and the Python environment, Recurrent Neural Networks and web technologies to provide an inexpensive alternative to the

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A Comparative Study of Software Development Waterfall, Spiral and Agile Methodology

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Abstract

Software development methodologies are used for developing the simple to complex project. It gives the idea of how systematically projects are developed. It plays important role in software development in academics to industries. It helps to reduce the chances of project failure. The major development technics like waterfall, spiral and agile methodologies, their processes and comparisons shows that, how efficient development occur. The article used to present the study of these three software development methodologies. The main contribution to this work in study and comparing the methodologies. This study helps the software development in academics and industries to understand and comparison to choose the method according to the application.

Index Terms— Waterfall, Spiral, Agile and Scrum.

I. INTRODUCTION

The software development methodologies play a very important role in developing the project. Any small to complex software development require systematic flow from requirement to maintenance. It helps the group to develop the project in collaboration. There are many development methodologies, every method having pros and cons. some are traditional development and rest are evolutionary type. Every development technique is useful, but choosing the best technique is important considering the application. The selection is very important in terms of systematic development. If the application is very small and to be developed in weeks then the proper methodology is required, otherwise it will make a negative impact on development process, time and deadline skip. The unplanned or without the use of standard methodologies will make major chances of project failure. It can be observed in terms of satisfaction of customers. The chances that, customer may argue at the time of delivery of project about the quality and scope deviation. To avoid this, choosing of right methodologies will increase the chances of customer satisfaction.

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Sensor based vehicle detection and classification – a systematic review

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Abstract: Traffic management has become a major problem in every country due to day by day increase of vehicles on road. With this enhancement, sometimes it becomes difficult to keep track of vehicles for the purpose of traffic monitoring and law enforcement. We need an intelligent transportation system (ITS) which will help in traffic management. In this study, we presented a review of the smart transportation system that focuses on vehicle detection and classification (VDC) that is generally used in applications like congestion prediction, future road infrastructure requirement prediction, automated parking, and security enforcement. We have reviewed more than 130 papers that are published between 2010 and 2021 and found that various sensor technologies, machine learning, computer vision and deep learning techniques have been applied for the detection and classification of vehicles by many researchers. This study will provide useful directions to the researchers in selecting appropriate technologies for VDC.

Keywords: vehicle detection; vehicle classification; intelligent transportation system; sensor; machine learning; deep learning.

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1 Introduction

As day by day number of vehicle increases on-road, posed a serious problem of traffic congestion and management. Many a time people face traffic jams and due to this congestion, people do not follow traffic rules and regulations due to which personal injury, death, and damageto one's vehicle or other property takes place. ITS plays an important role in handling common traffic issues such as accidents, congestion of traffic, vehicle robberies, trafficrule violation, automatic toll collection and so on. That's why ITS attracted lots of researchers in the last decade and became an important area of study. Vehicle detection (VD) and classification is the heart of ITS which is widely used in effective traffic operation and transportation planning.

Various VDC systems have been developed on the basis of innovative sensor-based technologies, machine learning (ML), image processing, deep learning (DL), and wireless communication technologies. In this study, we present a review of smart traffic systems that focuses on the performance of VDC to provide insight and guidance on the choice of the right technology. The contributions to this study are as follows:

- This study focuses on the discussion of various research issues related to models and methods for sensor based VDC systems.
- This study provides the extensive application of ML and DL models in VDC system.

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Blockchain Driven Secure and Efficient Logging for Cloud Forensics

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Abstract: Cloud computing is one of the most holistically used technology nowadays. To do the forensics in the cloud, it is essential to accumulate as well as safeguard the justifiable facts of different events to find out the culprit. However, logging the events that take place in the cloud and securing them while preserving the privacy of cloud consumers is a big challenge. Currently, cloud consumers are relying on cloud service providers to get the logs of events that take place on their data despite multi-stakeholder collusion. Thus, there is a strong requirement of publicly verifiable secure logging which will play a vital role in criminal investigations without depending on a third party. In this paper, we developed a Blockchain-driven Secure Logging-as-a-Service (BlockSLaaS) scheme that supports, privacy-preserving secure logging and eclectic verification. To make a serene forensic investigation, the proposed scheme guarantees the trustworthiness and reclamation of logs in case of tampering. The scheme proposes integrating the Interplanetary File System (IPFS), a decentralized off-chain data storage platform with blockchain for efficient logging and its visualization. The extensive experiments on the number of transactions, storage requirement, uploading, reading, and downloading of log files for varying node count and file size are performed. The proposed method is compared with nine existing methods based on 9 security and performance features. The response, proof insertion, and proof-verification times of the proposed BlockSLaaS are 38.3, 29.7, and 26.3 milliseconds respectively which outperform the existing methods.

Keywords: Blockchain, Cloud Computing, Cloud Forensics, Secure and Efficent Logging, Forensic Investigation.

1. INTRODUCTION

Today, cloud computing services are widely used in various industries due to a tremendous efficiency of cost over conventional storage services [1] [2]. Currently, the market of cloud-based data storage is on the upsurge due to the successful espousal of cloud facilities in almost all companies. In India, cloud computing market will be valued at seven billion dollars by 2022 and expected to cross 1 trillion dollars by 2025 globally as per the NASSCOM report [3] [4]. However, the shift from onsite storage techniques to cloud storage services is a big challenge due to the rise in the issues of data security [5-11]. Certain malevolent cloud consumers can utilize the cloud storage to stock illegitimate information including but not limited to stolen Intellectual Property Rights (IPR) documents, pornographic content, and contraband documents or can target other cloud consumers by hosting the malware injection attacks, denial of service attacks, wrapping attacks, structured query language injection attacks, abuse and hijacking of services on cloud computing environment [12]. Once the attackers accomplish the unethical goal, they can smoothly wipeout the hints, traces, and remain unidentified [13] [14]. Therefore, there is a strong requirement of procedures and scientific methods to ensure trustworthiness and confidentiality of data in cloud computing environment for effective forensic investigations [2] [15]. Consequently, a new branch of forensics came into existence i. e. Cloud Forensics. Federal Bureau of Investigation (FBI) report of 2017 on internet crime statistics depicted that, over 3 lakh online misconductcomplaints have been registered which amounted to around fifteen thousand-million-dollar loss in the year of 2017 itself [12]. The count of digital forensic belongings is on the upsurge [16]. The existing forensic methods and techniques cannot be applied to the cloud directly due to the nature of the cloud. Also, they require to be modernized to be competent and suitable for the cloud environment [6] [15]. In cloud computing, virtual

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Enhancement of cloud performance metrics using dynamic degree memory balanced allocation algorithm

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ABSTRACT

In cloud computing, load balancing among the resources is required to schedule a task, which is a key challenge. This paper proposes a dynamic degree memory balanced allocation (D2MBA) algorithm which allocate virtual machine (VM) to a best suitable host, based on availability of random-access memory (RAM) and microprocessor without interlocked pipelined stages (MIPS) of host and allocate task to a best suitable VM by considering balanced condition of VM. The proposed D2MBA algorithm has been simulated using a simulation tool CloudSim by varying number of tasks and keeping number of VMs constant and vice versa. The D2MBA algorithm is compared with the other load balancing algorithms viz. Round Robin (RR) and dynamic degree balance with central processing unit (CPU) based (D2B_CPU based) with respect to performance parameters such as execution cost, degree of imbalance and makespan time. It is found that the D2MBA algorithm has a large reduction in the performance parameters such as execution cost, degree of imbalance and makespan time as compared with RR and D2B CPU based algorithms

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1. INTRODUCTION

Cloud computing allows user to store data remotely and access it from anywhere, using an internet connection [1]. In cloud computing, demand of resources is directly proportional to the number of users. Therefore, in cloud computing, load balancing among the resources is required to schedule a task, which is a key challenge [2], [3]. Load balancing improves system performance, provide backup plan in case of system failure and maintain its stability [4], [5]. Load balancing is carried out by two methods viz. Virtual machine (VM) scheduling and task scheduling. In VM scheduling method, VMs are created on a best suitable host within datacenter. In task scheduling method, tasks were allocated to a best suitable resource for execution. In load balancing, task scheduling is a non-polynomial (NP) hard problem because number of tasks and length of tasks vary rapidly, therefore it is difficult to calculate possible mapping of tasks to resources and evaluate an optimal mapping [6], [7].

To solve the NP hard problems in load balancing, researchers developed both static and dynamic category of algorithms [8]. Statics algorithms requires advanced information about tasks and resources. Also, static algorithm works better in an environment where there is a low variation of nodes in cloud. However, static algorithms are not suitable for cloud environments where load varies rapidly [9], [10]. In that case,

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Sarcasm detection of tweets without #sarcasm: data science approach

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ABSTRACT

Identifying sarcasm present in the text could be a challenging work. Insarcasm, a negative word can flip the polarity of a positive sentence. Sentences can be classified as sarcastic or non-sarcastic. It is easier to identify sarcasm using facial expression or tonal weight rather detecting fromplain text. Thus, sarcasm detection using natural language processing is major challenge without giving away any specific context or clue such as #sarcasm present in a tweet. Therefore, research tries to solve this classification problem using various optimized models. Proposed model, analyzes whether a given tweet, is sarcastic or not without the presnece of hashtag sarcasm or any kind of specific context present in text. To achieve better results, we used different machine learning classification methodology along with deep learning embedding techniques. Our optimized model uses a stacking technique which combines the result of logistic regression and long short-term memory (LSTM) recurrent neural net feed to light gradient boosting technique which generates better result as compare to existing machine learning and neural network algorithm. The key difference of our research work is sarcasm detection done without #sarcasm which has not been much explored earlierby any researcher. The metrics used for evolution is F1-score and confusion matrix.

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1. INTRODUCTION

Beginning of the internet gave a new vision to the world by changing the way people around the world interact. Now, people started expressing their feeling in front of other people to whom they even don't know. Also, people gather the opinion of each-others feeling, for a particular thing. It may be noted that for humans, it is easy to understand the opinion of other people. However, for a machine, it is very difficult to understand what people are says and how they feel. Sentiment analysis helps machine to analyze the written sentence and classifies it as a positive, negative, or neutral. Sentiment analysis gathers and recognizes attitudes and opinions depicted by users in social media toward a definitive topic. Research on sentiment analysis made machines capable of detecting whether a sentence is positive, negative, or neutral with a good accuracy depending upon the dataset. However it is very difficult to findthe exact sentiment, when the present sentence is layered with sarcasm, thus making it extremely difficult to find out whether the sentenceis said in sarcastic manner or not [1].

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Research Article

Machine Learning Model for Group Activity Recognition Based on Discriminative Interaction Contextual Relationship

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Copyright © 2021 Smita S. Kulkarni and Sangeeta Jadhav. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.
This paper represents the recognition of group activity in public areas, considering personal actions and interactions between people from the field of computer vision. Modeling the interaction relationships between multiple people is essential for recognizing group activity in the video scene. In artificial intelligence applications, identifying group activities based on human interaction is often a challenging task. This paper proposed a model that formulates a group action context (GAC) descriptor. The descriptor was developed by integrating the focal person action descriptor and interaction joint context descriptor of nearby people in the video frame. The model used an efficient optimization principle based on machine learning to learn the dis- criminative interaction context relations between multiple persons. The proposed novel group action context descriptor is classified by support vector machine (SVM) to recognize group activity. The proposed technique effectiveness is evaluated for group activity recognition by performing experiments on a publicly available collective activity dataset. The proposed approach infers a group action class when multiple persons are together in the video sequence, especially when the interaction between people is confusing. The overall group action recognition model is interrelated with a baseline model to estimate the performanceof interaction context information. The experimental result of the proposed group activity recognition model is comparable and outperforms the previous methods.

1. Introduction

Multiple person activity recognition algorithms have established significant attention in the field of computer vision as well as artificial intelligence. However, group activity recognition from video sequences is often a challenging task due to the dynamic interaction between multiple people. Group activity recognition is important in many applications such as computer-human interaction [1], video surveillance [1], content-based video recovery [2], video summarization [3], and healthcare [1]. In surveillance, medical, and social care fields, these algorithms are used to detect abnormal activities in healthcare fields and in public spaces such as air terminal and metro station places. In [4], for recognizing human activities from videos, a computationally storage efficient approach is proposed. In [5], *k*-nearest neighbors' techniques are developed for human activity recognition.

Most traditional methods in the computer vision system are focused on the recognition of an individual person's activities [6–9]. Although several recent works [10–16] have been handling group activities in real time, scenes often involve multiple persons in action along with their interrelated actions. Group activity recognition recognizes actions that are performed by multiple people.

It is normally hard to discriminate the activities of multiple people based on the appearance of an individual person alone. The visual appearance of the highlighted person in Figure 1(a) is just a standing action as an individual. However, the person is waiting in the queue ortalking with other persons. The highlighted focal person in

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ORIGINAL ARTICLE

Evaluating the performance of load balancing algorithm for heterogeneous cloudlets using HDDB algorithm

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Abstract Load balancing is the major concern in cloud computing where number of requests have to be handled by cloud resources. The load balancing techniques distribute the workloads among the computing resources and manage the cloud resources optimally. The load balancing algorithms seek to balance the system load by moving workloads from the overloaded resources to underloaded resources in order to ensure the balancing of overall workload in the cloud environment. The aim of this study is to allocate virtual machines to the best-suited hosts based on CPU availability and host membership value using Hybrid Dynamic Degree Balance (HDDB) algorithm. The proposed scheduling technique is utilizing two algorithms namely Dynamic Degree Balance CPU Based (D2B_CPU based) and Dynamic Degree Balanced Membership based (D2B_Membership) to present a hybrid technique which is capable of balancing the workload optimally. The suggested algorithm HDDB has been tested using the CloudSim simulation tool. To verify the performance of proposed hybrid algorithm, performance metrics are used in contact with turnaround time of cloudlets, execution cost, throughput time, degree of imbalance, CPU utilization, bandwidth utilization and memory utilization. The results reveal a considerable improvement in performance of the hybrid load balancing method when compared to other existing algorithms.

Keywords Cloud computing · Load balancing · Scheduling · CloudSim · Task scheduling · VM scheduling · CPU utilization · Bandwidth utilization

1 Introduction

In past few years, due to on-demand service, scalability, storage resource and reliability, cloud computing is getting more popularity (Joshi and Munisamy 2019). Cloud computing plays an important role in today's organization workspaces by providing preferred services based on the user requirements (Kaur 2016). Cloud computing faces challenges such as security, performance monitoring, load balancing, resource scheduling, scaling, energy consumption, carbon emission and data lock-in problem (Joshi and Devi 2020; Kaur and Kadam 2021; Patel and Gupta 2019; Jiang et al. 2021). Load balancing is key challenge in cloud computing where diverse resources are to be allocated to the user jobs (Ghomi et al. 2017a). The primary goal of load balancing is to distribute the load among all the cloud nodes so that no node is overloaded or under loaded (Ghomi et al. 2017b). As the number of user's increases, demand for resources is also increasing. Therefore, to schedule the task among available resources to balance the load is the key challenge (Kaur and Kadam 2019). Various scheduling algorithms are proposed to balance the load efficiently. Scheduling is the process of matching a collection of tasks to available resources and balancing allows the optimal allocation of cloud resources among the user jobs (Joshi and Munisamy 2020).

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Multiclass cyber-attack classification approach based on the krill herd optimized deep neural network (KH-DNN) model for WSN

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The Intrusion Detection System (IDS) is a useful infiltration detection tool. With IDS, it may mechanically categorize intrusions, attacks, or breaches of security stratagems across host-level within the network and within the organization. The Krill Herd Optimized Deep Neural Network (KH-DNN) is proposed in this document as a multiclass cyberattack methodology. This model is suggested by uniting the network-based intrusion detection system (NIDS) and the host-based intrusion detection system (HIDS) to advance flexible and actual IDS to categorize and detect unexpected and unpredictable cyber attacks. In this method, two types of IDS are classified, that is, NIDS and HIDS. Classification of the system call is exploited to discriminate behavior into normal and attack categories. In this manuscript accuracy, the parameter of the deep neural network classifier is optimized with the Krill Herd optimization algorithm. Finally, the DNN model is performed in the NIDS dataset and the HIDS dataset. For the HIDS dataset, the KDD Cup 99 dataset was used, which employed two datasets: ADFA-LD and ADFA-WD, and several types of attacks were detected and classified, including Adduser, Hydra-FTP, Java-Meterpreter, Hydra-SSH, and Web-Shell. The suggested IDS-KH-DNN algorithm attains higher accuracy 42.56% and 23.4%, high precision 84.74% and 52.43%, high F-score 53.5% 64.455, high sensitivity 33.4% and 45.23%, and high specificity 31.45% and 44.23% for the NIDS dataset. The proposed system is compared to two current processes: intrusion detection using Gray Wolf optimization-based support vector machine (IDS-GWO-SVM) and intrusion detection using artificial bee colony optimization algo- rithm based support vector machine (IDS-ABCO-SVM). Finally, the simulation results show that the suggested approach is capable of quickly and accurately locating optimal solutions.

Keywords: Deep neural network (KH-DNN); network-based intrusion detection system; host-based intrusion detection system; cyber-attack; text representation.

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Biomedical application of carbon nanotubes (CNTs) in vulnerable parts of the body and its toxicity study: A state-of-the-art-review

Nidhi Jain [a], Seema Tiwari [b]

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Abstract

Carbon nanotubes are known for its distinctive, newer generation, unique materials for its appealing properties. They have excellent high surface area, high biocompatibility, and flexibility, electrical, mechanical and thermal properties which can be customized and functionalized on the basis of the materials. The use of such materials in biomedical field is on demand. The application of carbon nanotubes in biomedicines has been saving the lives of human race. When CNTs merged with organic materials developed better alternative in the field of biomedicines. In present review the applications of carbon nanotubes in biomedical field has been discussed with special references to sensitive area of the body. These diagnostic applications cover nervous tissue regeneration, neural scaffolds, Myocardial Conduction, and tissue engineering, cancer treatment etc. Toxicities of CNTs and factors effective to carbon nanotube applications were discussed in the review.

Introduction

Increasing biomedical problems in humans leads to new materials. Carbon nanotubes are acting as good candidate for biomedical treatment. It has able to sever an alternative synthetic material which could combine with organic materials for better and improved results. As we all know that Carbon nanotubes (CNTs), are cylindrical in shape with C–C distance around *1.43Å*, interlayer distance is around *3.45Å*, and each carbon is having sp2 hybridization. As carbon nanotubes are already been used in various medical field but in this review CNTs use at very sensitive part of the body for diagnostic applications has been discussed such as nervous tissue regeneration, neural scaffolds, Myocardial conduction, and tissue engineering, cancer treatment etc [1], [2], [3], [4], [5], [6], [7], [8], [9].

Carbon Nanotubes are used in several other fields such as thermal conductivity devices, energy storage devices, conductive properties, adhesive, thermal materials, structural application etc. CNTs have appealing properties such as excellent high surface area, outstanding mechanical properties and light in weight, MWCNTs (Multi Walled Carbon Nanotubes) ability to bend, flexibility, and its strength measured by various scientists was around the value of 14.3 ±0.9 GPa. It has aspect ratio covering high surface area, hollow from inside, hydrophobicity,high biocompatibility, good electrical and mechanical properties. Out of all allotropes of carbon, CNTs and Graphene are significant ones. CNT is thin film rolled as cylinder like 3D tube and Graphene is a 2D material in a single layer.CNT because of its rolled structure is able to act as carrier materials for drug delivery and act as superconductor. Important Physical and Mechanical Properties of Graphene and CNTs have been discussed in Table 1 [10].

Solubility of CNTs, both in organic and aqueous vehicles, can be customized and functionalized on the basis of the materials. CNTs are used because of the specific properties such as high Chemical reactivity, better surface are easily improved by using biomaterials. Biomaterials are developed through nano-materials like CNTs. Other nanomaterials used in this regards are graphene and graphene related materials etc. The biomolecules like nucleic acid, protein, and peptides interact with the CNTs through functionalize (chemically modify) and improve the properties of CNTs for biomedical application, Human cells are found to be grown on CNTs and they are nontoxic in nature. Carbonnanotubes(CNTs) possess remarkable distinct properties which make them good candidate in biomedical application such as good electronic properties, extremely penetrating capability on the cell membrane, elevateddrug-loading and pH-dependent therapeutic use, reception capacities, thermal properties, huge surface area and trouble-free modification with molecules, which cause to be as useful material [11].

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CONNECTIVITY OF SINGLE-ELEMENT COEXTENSIONS OF A BINARY MATROID

GANESH MUNDHE[1] AND Y. M. BORSE[2]

ABSTRACT. Given an n-connected binary matroid, we obtain a necessary and sufficient condition for its single-element coextensions to be n-connected.

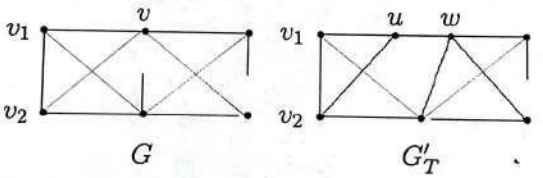
Keywords: coextension, element splitting, point-splitting, binary matroids, n-connected
Subject Classification (2010): 05B35, 05C50

arXiv:1812.01218v1 [math.CO] 4 Dec 2018

1. INTRODUCTION

For undefined terminologies, we refer to Oxley [6]. The point-splitting operation is a fundamental operation in respect of connectivity of graphs. It is used to characterize 3-connected graphs in the classical Tutte's Wheel Theorem [9] and also to characterize 4-connected graphs by Slater [8]. This operation is defined as follows.

Definition 1.1 ([8]). *Let G be a graph with a vertex v of degree at least $2n-2$ and let $T = \{vv_1, vv_2, \ldots, vv_{n-1}\}$ be a set of $n-1$ edges of G incident to v. Let G'_T be the graph obtained from G by replacing v by two adjacent vertices u and w such that u is adjacent to $v_1, v_2, \ldots, v_{n-1}$, and w is adjacent to the vertices which are adjacent to v except $v_1, v_2, \ldots, v_{n-1}$. We say G'_T arises from G by n-point splitting (see the following figure).*



Slater [8] obtained the following result to characterize 4-connected graphs.

Theorem 1.2 ([8]). *Let G be an n-connected graph and let T be a set of $n-1$ edges incident to a vertex of degree at least $2n-2$. Then the graph G'_T is n-connected.*

In this paper, we extend the above theorem to binary matroids.
Azadi [1] extended the n-point splitting operation on graphs to binary matroids as follows.

Definition 1.3 ([1]). *Let M be a binary matroid with standard matrix representation A over the field $GF(2)$ and let T be a subset of the ground set $E(M)$ of M. Let A'_T be the matrix obtained from A by adjoining one extra row to matrix A whose entries are 1 in the columns labeled by the elements of T and 0 otherwise and also having one extra column labeled by a with 1 in the last row and 0 elsewhere. Denote the vector matroid of A'_T by M'_T. We say that M'_T is obtained from M by element splitting with respect to the set T.*

For example, the following matrices A and A'_T represent the Fano matroid F_7 and its element splitting matroid with respect to the set $T = \{1,2,3\} \subset E(F_7)$.

$$A = \begin{array}{c} \begin{matrix} 1 & 2 & 3 & 4 & 5 & 6 & 7 \end{matrix} \\ \begin{pmatrix} 1 & 0 & 0 & 1 & 1 & 0 & 1 \\ 0 & 1 & 0 & 1 & 1 & 1 & 0 \\ 0 & 0 & 1 & 1 & 0 & 1 & 1 \end{pmatrix} \end{array}, \quad A'_T = \begin{array}{c} \begin{matrix} 1 & 2 & 3 & 4 & 5 & 6 & 7 & a \end{matrix} \\ \begin{pmatrix} 1 & 0 & 0 & 1 & 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & 1 & 1 & 1 & 0 & 0 \\ 0 & 0 & 1 & 1 & 0 & 1 & 1 & 0 \\ 1 & 1 & 1 & 0 & 0 & 0 & 0 & 1 \end{pmatrix} \end{array}.$$

Given a graph H, let $M(H)$ denote the circuit matroid of H. A matroid N is a *single-element coextension* of a matroid M if $N/e = M$ for some element e of N.

Research Publications
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1. Department of Electronics & Telecommunication Engineering (A.Y 2020-21)

TEST Engineering & Management

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A Review on AI based Predictive Battery Management System for E-Mobility

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Article Info
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Abstract:

Abstract: The advancement in digitalization and availability of reliable sources of information that provide credible data. Artificial Intelligence (AI) has emerged to solve complex computational real life problems which was challenging earlier. The Artificial Neural Networks (ANNs) play a very effective role in digital signal processing. However, ANNs need rigorous main processors and high memory bandwidth, and hence cannot provide expected levels of performance. As a result, hardware accelerators such as Graphic Processing Units (GPUs), Field Programmable Gate Arrays (FPGAs), and Application Specific Integrated Circuits (ASICs) have been used for improving overall performance of AI based applications. FPGAs are widely used for AI implementation as FPGAs have features like high-speed acceleration, low power consumption which cannot be done using central processors and GPUs. FPGAs are also a reprogrammable unlike central processors, GPU and ASIC. In Electric-powered vehicles (E-Mobility), Battery Management Systems (BMS) perform different operations for better use of energy stored in lithium-ion batteries (LiBs). The LiBs are a non-linear electrochemical system which is very complex and time-variant in nature. Because of this nature, estimation of States like State of Charge (SoC), State of Health (SoH) and Remaining Useful Life (RUL) is very difficult. This has motivated researchers to design and develop different algorithms which will address the challenges of LiBs states estimations. This paper intends to review AI based data-driven approaches and hardware accelerators to predict the SoC, SoH and RUL of the LiBs. The goal is to choose an appropriate algorithm to develop an advanced AI based BMS that can precisely indicate the LiBs states which will be useful in E-Mobility.

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Keywords: *Artificial Intelligence, Battery Management Systems, Electric-powered automobiles, State of Charge, Remaining Useful Life, State of Health, Field Programmable Gate Arrays, Graphic Processing Units, Application Specific Integrated Circuits, and Li-ion batteries.*

I. Introduction

In recent decades, E-Mobility has gained importance due to environmental concerns and the depletion of fossil fuels. Renewable energy is preferred over fossil fuels due to characteristics like renewability, non-depletion, and it does not give rise to environmental issues. LiBs have achieved considerable attention in the E-Mobility industry due to their safety, low maintenance, longer life span, high efficiencies, nominal voltage, reasonable cost, and ability to operate in a large temperature range [1].

The availability of extensive credible data and advancement in digital electronics that have high computing power, have revived AI [2]. The accurate determination of the LiB states is extremely challenging because of its high non-

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ORIGINAL ARTICLE

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Automated macula proximity diagnosis for early finding of diabetic macular edema

Sarika B. Patil [1] · B. P. Patil [2]

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Abstract

Purpose Diabetic retinopathy (DR) is non-recoverable in nature. One of the advanced sight threatening condition in diabetic patient is defined in terms of diabetic macular edema (DME), where the macula gets deposited with fluid rich in proteins called exudates. It is indisputably required to find and treat occurrence of exudates near macula in time, to avoid further complications of retina and vision loss at later stage. However, presence of various dark and bright lesions awakes the need of reliable macula and exudate detection process. Proposed work intends to present a robust, scale, and rotation invariant tool for early diagnosis of DME.

Methods Optic disc (OD) diameter is one of the important parameters; it is always proportional to the size of the retina; an adaptive method based on pixel count and histogram-based segmentation is used for optic disc detection. Center of macula is detected based on estimated optic disc radius calculations and anatomical priors. In order to reduce computational burden, two disc diameter (DD) region near macula is extracted. Hard exudates are extracted with unique combination of CLAHE and morphological operations, followed by Kirsch's mask for sharp edge detection of hard exudates, and further morphological operations for noise removal.

Results OD detection algorithm is evaluated on four different databases DiaretDB1, MESSIDOR, DRIONS-DB, and images from local hospital, overall sensitivity of 95.71% is achieved, highest sensitivity value is 98%, and is achieved on first 100 images from MESSIDOR database. Further DiaretDB1 and images from local hospital are processed further for macula detection and exudates finding in macular proximity, as DiaretDB1 is rich in variety of DR lesions and images from the local hospital to deal with real-time issues. Finding macula region is achieved with an overall success rate of 91.93% and overall sensitivity of 99% is reported on both the chosen databases.

Conclusion Proposed work provides an automated tool, for early diagnosis of diabetic macular edema. The method is straightforward, robust and computationally less complex and improved success rates for feature, and lesion detections are achieved as compared with state-of-the-art methods.

Keywords Diabetic macular edema · Hard exudates · Kirsch's mask · Optic disc

Introduction

Retina of human eye gets affected due to various reasons like diabetes, hypertension, glaucoma, age-related macular degradation, and retinopathy of prematurity. Retinopathy is an acute disease to retina (Jelinek and Cree 2010). Retina provides a window to examine human body in a non-invasive way. Diabetic retinopathy is one of the leading cause of global blindness. Diabetic retinopathy is parted into various phases. The primary signs of DR are micro aneurysms, small hemorrhages, cotton wool spots, and exudates that result from abnormal penetrability and non-perfusion of vessels. These initial signs are known as non-proliferative diabetic retinopathy

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Retinal fundus image enhancement using adaptive CLAHE methods

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Abstract: ***To detect the effect of lifestyle related diseases likediabetics and hypertension on retina of a human eye, non - invasive techniques as fundus photography is playing a significant role. Early diagnosis of retinal complications such as Microaneurysms, exudates and hemorrhages often not directly discernible by clinical investigation has the potential to reduce the global burden of retinal diseases.The traditional retinal image enhancement algorithm - Contrast Limited Adaptive Histogram Equalization (CLAHE), the results are dependent on, choice of the clip limit (CL) and number of sub-images(N). We have proposed the modified versions of CLAHE named Adaptively Clipped – CLAHE (AC-CLAHE) and Fully Automated-CLAHE (FA-CLAHE), to reduce the problems due to these limiting factors. The proposed methods are found effective to enhance the contrast between the retinal landmarks and lesions on retina. To inspect the subtle details on retina, developed technique can be used directly in hospitals and at remote places as an assistance to doctors for Diabetic and Hypertensive Retinopathy screening.***

Keywords- Adaptively Clipped – CLAHE,Fully Automated-CLAHE, Fundus photography, Microaneurysms, exudates, hemorrhages.

1. INTRODUCTION

In eye screening systems, timely treatment to the patients suffering from retinopathies like Diabetics and hypertensive has become possible due to the use of automatic disease analysis. The use of non-invasive fundus photography has increased the convenience to and efficiency of ophthalmologists and retina care providers and has become a prerequisite for automated retinopathy detection. Images that are observed with the syndromes of Diabetic or Hypertensive retinopathy can be referred further for disease analysis by the ophthalmologists [1,2].

Early finding of abnormalitiesgenerally not clearlyvisible by clinical investigation would lessen the global burden on retina doctors. Image processing along with superior machine learning algorithms can recognize and segregate featuressuch as optic disc, blood vessels and macula and lesions like hemorrhages, microaneurysms, hard exudates, cotton wool spots, Neovascularization, venous beading, arteriovenous nicking, etc. The quantitative analysis of these abnormalities will help in a better way to retina disease diagnosis [3].

A potential incidence of several lesions has been observed on retina of a human, caused by diabetics which is anongoing disease. The progression of disease goes on from mild Non-

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Automatic detection of COVID-19 disease using U-Net architecture based fully convolutional network

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ARTICLE INFO

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ABSTRACT

The severe acute respiratory syndrome coronavirus 2, called a SARS-CoV-2 virus, emerged from China at the end of 2019, has caused a disease named COVID-19, which has now evolved as a pandemic. Amongst the detected Covid-19 cases, several cases are also found asymptomatic. The presently available Reverse Transcription – Polymerase Chain Reaction (RT-PCR) system for detecting COVID-19 lacks due to limited availability of test kits and relatively low positive symptoms in the early stages of the disease, urging the need for alternative solutions.

The tool based on Artificial Intelligence might help the world to develop an additional COVID-19 disease mitigation policy. In this paper, an automated Covid-19 detection system has been proposed, which uses indications from Computer Tomography (CT) images to train the new powered deep learning model- U-Net architecture.

The performance of the proposed system has been evaluated using 1000 Chest CT images. The images were obtained from three different sources – Two different GitHub repository sources and the Italian Society of Medical and Interventional Radiology's excellent collection. Out of 1000 images, 552 images were of normal persons, and 448 images were obtained from COVID-19 affected people. The proposed algorithm has achieved a sensitivity and specificity of 94.86% and 93.47% respectively, with an overall accuracy of 94.10%.

The U-Net architecture used for Chest CT image analysis has been found effective. The proposed method can be used for primary screening of COVID-19 affected persons as an additional tool available to clinicians.

1. Introduction

SARS-CoV-2 has given rise to COVID-19, a widespread disease throughout the world. The virus first emerged in Wuhan, China, in December 2019 and has now become the worldwide health issue [1]. While several cases of COVID-19 are found to be asymptomatic, the majority of cases are reported with typical symptoms of fever, dry cough and tiredness. Many people are found with common onset syndromes like pains and aches, runny nose, sore throat, nasal congestion and diarrhoea [1,2].

Airborne spread, duration on surfaces and respiratory transmissions from one person to another triggered quick expansion of the pandemic [3]. The COVID-19 epidemic statistics as of 20th June 2020 indicates that there are in total 8,804,268 affected worldwide, 463,510 deaths caused and 4,656,912 are recovered from it.

Many technologically advanced countries fail to manage their medical care systems, as the demand for Intensive Care Unit facilities is increased due to patients with the most severe symptoms of COVID-19 disease.

We have shown the growth statistics of the COVID-19 disease worldwide from 22nd January 2020 to 20th June 2020 in Fig. 1, including death and recovery rates.

W.Wang et al. [4] evaluated a total of 1070 samples acquired from 205 people affected by COVID-19; the patients involved in the study were having an average age of 44 years. The patients were suffering from dry cough, fever and weakness; 19% of the cases were suffering from severe syndromes. Bronchoalveolar lavage fluid samples indicated the maximum positive rates (14 out of 15), up next was sputum (72 out

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Power line interference removal from electrocardiogram signal using multi-order adaptive LMS filtering

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Abstract: Electrocardiogram (ECG) signals are susceptible to noise and interference from the external world. This paper presents the reduction of unwanted 50 Hz power line interference in ECG signal using multi-order adaptive LMS filtering. The novelty of the present method is the actual hardware implementation for power line interference removal. The design of adaptive filter is carried out by the simulink-based model and hardware-based design using FPGA. The performance measures used are signal to noise ratio (SNR), PSNR, MSE and RMSE. The novelty of the proposed method is to achieve better SNR by careful selection of the filter order using hardware.

Keywords: adaptive filter; ECG; LMS filter; multi-order; power line interference; field-programmable gate array; FPGA; simulink model; signal to noise ratio; SNR; PSNR.

Reference to this paper should be made as follows: Surekha, K.S. and Patil, B.P. (2021) 'Power line interference removal from electrocardiogram signal using multi-order adaptive LMS filtering', *Int. J. Biomedical Engineering and Technology*, Vol. 35, No. 2, pp.135–151.

Biographical notes: K.S. Surekha is currently working as an Associate Professor at the Army Institute of Technology. She is currently pursuing her PhD in Biomedical Signal Processing from the Pune University, India. She has published several papers in international conferences and journals. Her research interests include bio-signal processing and embedded system design.

B.P. Patil is working as a Principal of the Army Institute of Technology, Pune. He is having 21 years of teaching and five years of industry experience. He has published 130 papers at national/international conference and journals.

TECHNICAL NOTE

ENERGY STORAGE WILEY

Process-based modeling of nylon separator supercapacitor

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Abstract

Type of separators along with the properties of electrode material, electrolytes decide the performance and hence the utility of supercapacitor. Nylon as a separator material is investigated in this paper. Comparison of parameters of nylon separator supercapacitor and polyethylene separator supercapacitor is presented. The processing of electrode materials plays a significant role on the performance parameters of supercapacitor. Material processing method such as ball milling is the most commonly used in energy storage devices such as supercapacitors, batteries, and fuel cells. The effect of variation of the most significant ball milling parameters such as forward-reverse time, total ball milling time and speed of ball mill machine on the performance of supercapacitor has been studied. Modeling of ball milling process on electrode material is done by using the statistical method design of the experiment. Pulse current density is taken as new output parameters which is more important than capacitance and internal resistance. Forward-reverse time, total ball milling time, and speed of ball mill machine are taken as input parameters for statistical modeling. Capacitance and pulse current density is taken as output parameters for the modeling of nylon separator supercapacitor. The model values of output parameters of supercapacitor are validated with experimental values.

KEYWORDS

ball milling, electrode, modeling, separator, supercapacitor

1 INTRODUCTION

The most of the developing countries in the world are increasing their power generation from the renewable energy sources. For remote sites where grid supply is not available, renewable energies with suitable electrical energy storage devices provide very good solution for meeting the requirement of electrical energy.[1] The various electrical energy storage devices such as lithium ion batteries, lead acid batteries, conventional capacitors, that is, electrolytic or ceramic-based capacitors, fuel cells, and supercapacitors are used in many applications.[2,3] Supercapacitors have better electrical properties such as high power density, rapid charging-discharging, high value of pulse current and longer cyclic life in comparison with conventional lead acid batteries. Due to these characteristics, supercapacitors can have many applications in combination with batteries, and fuel cells.[3] Supercapacitor is likely to be integral part in most of the future electric systems used across all sectors. It will be used as pocket energy source. Due to lower internal resistance, aqueous supercapacitors are more suitable in mobile and space applications. The main components of supercapacitor are electrolyte, electrodes, and separators.[9-11] The electrodes of supercapacitor are made up of highly porous material. The charge transfer is taking

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Development of Statistical Model for Selection of Electrode Parameters in Manufacturing of Ultracapacitor

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Keywords: Ultracapacitor, Electrode, Material, Modeling

Abstract. Ultracapacitor is a new electrical energy storage device which has high power density than conventional battery and capacitor. It offers high capacitance in small volume compared to conventional capacitors. While selecting ultracapacitors for various applications, parameters like specific resistance, internal capacitance, pulse current, energy density are required to be considered. Amongst these factors, specific capacitance of ultracapacitor depends mainly on parameters of electrode. The present paper is focused on modeling of ultracapacitor based on variations in some of the electrode parameters. The objective of present research work is to apply a statistical method to obtain an electrode material based model for prismatic type ultracapacitor. To have deep insight about the performance through modeling approach, the number of trials have been taken by doing the variations in the electrode materials of ultracapacitor and the quantity of the electrode material loaded on the current collector. The effect of both these variations is studied over the specific capacitance, which is taken as output parameter of model. Developed model is validated at selected values of input parameters.

Introduction

The storage of electrical energy is required in many portable and static applications. Electrical energy is mainly stored by conventional batteries and capacitors. Ultracapacitor which is also called as electric double layer capacitor emerges as new electrical energy storage devices which diminishes the gap between conventional battery and capacitor. Ultracapacitor comprises of two highly porous electrodes immersed or impregnated in electrolyte and separated by separator pieces. Electrolyte provides conducting medium for charge transfer while separator pieces prevents internal short circuit between the two conductive electrodes. Due to its long cycle life, wide thermal operating range, high pulse current and better power density, ultracapacitor finds application in many systems such as electronic circuitry, pulsing technique hybrid electric vehicle etc.

The proper selection of electrode material and processing of electrode material is important to enhance the physical parameters of electrode material. Electrode material should have large Specific Surface Area (SSA), high conductivity, small pore size, chemical stability and high temperature stability. Considering the above factors, various electrode materials such as activated carbon, carbon nanotubes, grapheme and carbon fibres [1] are commonly used as an electrode material for ultracapacitor. The manufacturer of ultracapacitor around the globe use carbon derived from coconut shell as an activated material for electrodes of ultracapacitor. Over the last few decades, carbon materials for ultracapacitor have been the focus of extensive research. A lot of research work is being carried on, to increase the energy density of ultracapacitor, made up of carbon material at a reasonable price. Activated carbon with high SSA is generally preferred but it has high Equivalent Series

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Mitigation of sulfation in lead acid battery towards life time extension using ultra capacitor in hybrid electric vehicle

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Highlights

- An Atom Search Algorithm (ASA) based Hybrid Energy Storage System (HESS) is designed to enable proper charging and discharging controller for lifecycles of the lead acid battery.
- Lead acid battery is connected with Ultra-Capacitor (UC) through bidirectional DC-DC converter.
- The controller performed through the consumption of the Fractional-Order Proportional Integral Derivative Controller (FOPID) in the bidirectional DC-DC converter.

Abstract

Batteries act as one of the primary sources of energy for high power Hybrid Electric Vehicle (HEV). The life of the battery becomes a significant constraint while building an HEV. So researchers found Lithium-ion batteries are more suitable for HEV with a better lifecycle. But the manufacturing cost of Lithium-ion batteries is expensive. Thus, while de

FEEDBACK

Seema Mathew[1]*
Parashuram Balwant Karandikar[2]
Neelima Ravindra Kulkarni[1]

Modeling and Optimization of a Jackfruit Seed-Based Supercapacitor Electrode Using Machine Learning

Supercapacitors can be used for portable energy storage applications. In this study, machine learning techniques are applied to optimize the process of preparation of supercapacitor electrodes from chemically activated carbon made from jackfruit seeds. Experimental trials were carried out using statistical design of experiments. Artificial neural network was employed to generate the process model and a multiobjective optimization was attempted by means of swarm intelligence and the Derringer's desirability function. The optimized electrode demonstrated high capacitance and low resistance making it suitable for supercapacitors. The algorithm developed in the study can be adopted by process engineers for efficient optimization.

Keywords: Activated carbon, Artificial neural networks, Derringer's desirability function, Supercapacitors, Swarm intelligence

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1 Introduction

In the quest for clean and affordable energy, energy sources like solar power, wind energy, hydro power, tidal power, and biogas are considered. But these resources suffer from intermittent supply, low efficiency, and geographic restrictions. Therefore, for reliable power, the power grids of tomorrow will require an economical and efficient method to store energy to face the variability of supply and constraints imposed by geography. Electrochemical storage as demonstrated by batteries and supercapacitors is the most effective method for portable storage applications [1]. Batteries convert chemical energy into electrical energy with the help of redox reactions while supercapacitors store charge at the electrode/electrolyte interface via electrical double layer or reversible faradaic reactions. In this scenario, supercapacitors, also known as ultracapacitors, have gained a lot of interest as an environment-friendly device with unmatched high power density and good cyclability [2].

Energy storage in supercapacitors occurs due to either of the two phenomena, i.e., electrical double layer capacitance or pseudocapacitance. The basic supercapacitor comprises electrodes, electrolyte, and separator [3, 4]. The electrical double layer phenomenon was first observed by Helmholtz in 1853. When voltage is applied to a supercapacitor, charge accumulates on the electrode surfaces while electrolyte ions diffuse across the separator into the pores of the electrode of opposite charge. Since the recombination of ions is not possible, a separation of charge takes place at the electrode-electrolyte boundary, thereby storing energy. In the case of pseudocapacitance, the energy storage of the electrical double layer is enhanced by faradaic reactions [5]. These faradaic reactions are voltage-dependent and are found in materials like transition metal oxides [6], conducting polymers [7], and carbons enriched with oxygen [8] and nitrogen [9]. Due to the battery-like redox reactions in pseudocapacitors, the specific capacitance and the energy density of these supercapacitors are high compared to electrical double layer capacitors.

No matter the phenomenon employed for the charge storage in a supercapacitor, an electrode with very high surface area becomes imperative. Activated carbon with high surface areas, high electrical conductivity, and low cost is the most commonly used material for electrodes [3]. As demonstrated by the authors in earlier works [10, 11], lignocellulosic biomass is a good precursor for activated carbon. The majority of the literature surveyed about activated carbon from biomass deals with applications like removal of impurities from water. There is a lack of literature about the use of activated carbon to produce supercapacitors from plant species abundant in India. The methods of production of activated carbon from these precursors also need to be studied.

As detailed by various researchers [12–16], the process of creating activated carbon begins with an organic precursor, such as coal, wood, coconut shells or any agricultural and forest

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Life Improvement of Lead Acid Battery using dc-dc Convertor for HEV

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ABSTRACT

Batteries play very important role in the Electric Vehicle (EV)/Hybrid Electric Vehicle (HEV) applications. Lead acid batteries are selected due to their low cost and other advantages. For HEV/EV applications life of lead acid battery gets adversely affected due to transients and drive cycle. Hence, in this paper, lead acid battery life is targeted to improve with the help of bi-directional dc-dc convertor. In this paper, simulation is done for the lead acid battery for HEV and lead acid battery with bi-directional dc-dc convertor for HEV. Various battery parameters are observed to see the improvement in the battery performance parameters. Service life of a battery is calculated using Peukerts law and it is found that the service life can be improved drastically.

Keywords: Bi-directional dc-dc convertor, Lead acid battery, HEV.

INTRODUCTION

Due to increased population and luxurious life demand, there is a need of increase in the number of vehicles. As a result there is steep rise in the vehicle demand. At the same time there is heavy pollution due to CO_2 and other poisonous gases. Hence, due to the enforcement of government 2020 EV project there is lot of research going on various fields of automotive design process. Now, EV/HEV is gaining lot of attraction for the advancement of energy storage point of view. In this regard, a lot of energy storage came into picture like fuel cells, batteries, ultra-capacitors etc. [1]. For HEV usage, we need to have such power sources which satisfy the required characteristics such as low cost, high efficiency and low volume [2]. Various batteries used in HEV are lead acid battery, lithium ion etc. Lithium ion battery is more suitable for HEV due to its more matched characteristics but it is very costly moreover its infrastructure is still under developing state [3]. Hence in order to reduce the cost, lead acid battery is selected for the work and for improving its life power electronic circuit is developed in the work. Lead acid battery is used as auxiliary power source in HEV, and it produces the required necessary power in acceleration and absorbs excess power produced during breaking mode of operation. Lead acid battery has very high power density hence it operates in various modes of charge and discharge stated in various papers [4, 5].

Different reasons for battery failure are mentioned in literature. Lead acid battery mode of operation

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Research Article

Study Of Parametric Mismatch Of Supercapacitor Materials

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Abstract: Since early 1980s, evolution in industrialization and rapid growth in population resulted in huge demands of automation and innovation in various sectors. One of the major innovations was energy storage systems. The present work is a research done on one of the modern-day energy storage devices i.e., Supercapacitor. Supercapacitor is an emerging energy storage device, and it has high potential to meet energy storage requirements for many applications in combination with batteries. Supercapacitors can be charged at faster rates and can deliver large output current. In this research, various components like electrodes, electrolytes, separators, and packaging materials are selected and tried to find the crux behind some of the issues in present day supercapacitor. This encapsulates various materials used in a supercapacitor, several parametric mismatches of the material used, and its impact upon capacitance value. This will help companies in manufacturing supercapacitors to select proper material having better characteristics.

Keywords: Supercapacitor, Electrodes, Electrolytes

1. Introduction

An energy storage device is an apparatus used for storing electrical energy when needed and releasing it when required. As a measure to counter global warming and other environmental degradation, the role of energy storage device technology in fields such as renewable energy generation and hybrid automobile systems will become important. When it comes to energy storage devices, Batteries have been the most prominent source in use till now. But batteries have their own limitations. Battery requires much longer time to charge, the output voltage supplied by batteries are quite low, it gives poor response to sudden power demand and use of batteries are mucky and grubby, when not operated with proper attention. One of the biggest pitfalls is its weight and makes it difficult in transportation and it is less portable. Hence, in the current scenario, supercapacitor is an operable replacement to batteries. Another reason which makes supercapacitor more inherent in use is rapid electrification of world. As world is moving towards using electric vehicles over current automobiles which run on conventional fuels like petrol, diesel; and in coming years engines will be replaced by motors that run on electricity. Hence it is important for nonstop modification and innovation in supercapacitor so that it becomes prominent energy storage device in various applications. In electrical circuitry, supercapacitors can be used as power boosters [1]. Supercapacitors also called Ultra-capacitors are electro-chemical storage device; whose capacitance value is much larger than conventional capacitors but displays lower voltage limits [2]. Supercapacitor in combinations or stacks can be a challenging power bank which can be used promisingly in automobile industry [3]. It typically stores 10-100 times more energy as compared with electrolytic capacitors, can accept and deliver charge much faster as compared to batteries. [4-6]. There are mainly two types of supercapacitors: Pseudo supercapacitor and double layer capacitor. It is seen that many papers have been published on supercapacitors related topic giving sufficient need and evidence about the urgency on further research on this topic [7-9]. Several electrode materials like Carbon Nanotubes (CNT), Mesoporous Carbons, and activated carbon like Vulcan, Vulcan XC72 R, etc have been tested with electrolytes. Similarly, several metal oxides have been tested with electrolytes such as potassium sulphate with manganese dioxide, sodium sulphate with manganese dioxide and lithium sulphate with manganese dioxide or ruthenium dioxide [10].

In supercapacitors, current collector is coated by porous carbon (electrolyte) and metal oxide. Biomass based materials can also be used as electrode in supercapacitors [11-12]. In this research paper various supercapacitors made from commercially activated carbon electrodes like VULCAN XC72 R, NORIT, PICA and NORIT are considered. The various electrolytes such as sulphuric acid, potassium sulphate, sodium sulphate and lithium sulphate are considered to study the performance and effectiveness of supercapacitor. The electrode-electrolyte double layer formed in the supercapacitor helps to store the charge[13-16]. On applying electric charge there occurs electrochemical reaction, these are the major reasons behind different charge storage capacity with different electrolytes [16-19]. Based upon relevant parameters above mentioned materials were analysed. With this purpose,

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GPU based Gaussian Bilateral Filter for Noisy MR Image

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Abstract— Magnetic resonance imaging (MRI) diagnostic technique is significantly used to diagnose disorders and deformities of the knee. The process of MRI corrupts the MR image with signal dependent rician noise which hinders accuracy of diagnosis. The paper proposes a new Gaussian Bilateral Filter giving better performance as against bilateral only and iterative bilateral filter, especially for knee MRI with high noise level. The research work further provides an accelerated solution to the challenge faced by the proposed filter for large resolution images. The work here implements the proposed Gaussian Bilateral filter using CUDA GPU there by achieving real time performance for knee MR image with 64Mega pixel resolution. The speed up achieved with CUDA GPU implementation of the proposed filter is 320.064 times more than its CPU counterpart. This would surely contribute to intelligent diagnostic setups.

Keywords: Gaussian Bilateral Filter, MRI, CUDA GPU, Shared memory

I. INTRODUCTION

Medical Practitioners rely significantly on imaging techniques for accurate diagnosis. MRI is the prime technique which has the ability to generate images in multiple planes of the body part without moving the patient. It uses physical and biochemical properties of the tissues to differentiate and categorize them [1][2]. The process of MRI introduces signal dependent noise in the MR image. This noise is modeled to be rician distributed which is a combination of additive gaussian noise and rayleigh noise [3]. Appropriate denoising filter needs to be used to remove this critical noise. Nonlinear denoising filters have proved to be better than their linear counterparts due to better edge retention ability [4][5]. Many researchers have been exploring different filtering algorithms from this category. Anisotropic diffusion filter is one of the popularly used nonlinear filters for image restoration. Gerig et al applied anisotropic diffusion nonlinear filter for 2D, 3D MR images giving good results. But the problem of edge sharpening prevailed with this filter resulting into blocky regions in the image [6]. Another nonlinear filter being explored by researchers for MR images is non local means filter for its ability to preserve edges and large scale structures. Different variations of NLM filter have been implemented for MRI denoising [7-14]. The only disadvantage of NLM filter is its computational complexity and slow execution speed.

Bilateral filter is also a non linear filter gaining popularity especially for medical image processing. Its simplicity of execution and its edge retention ability of soft tissue and structures have encouraged researchers to explore it for medical image denoising. M Elad et al. [15] presented different ways to improve denoising performance of bilateral filter. Wong et al. [16] presented their work on improved structure preservation ability of bilateral filter for biomedical images. The iterative feature of bilateral filter has been explored by R. Riji et al. [17] to remove rician noise from MR images. The author showed that iterative bilateral filter outperforms UNLM and NLM filter in terms of PSNR and MSSIM.

With advancements in digital technology, MRI machines generate images with resolution of the order of mega pixels which compromises the execution time of the filter. To achieve superior speed up especially for large sized MR image along with improved denoising performance, the proposed work presents a "Gaussian Bilateral Filter (GBF). It is mainly a bilateral filter in cascade form by preceding the filter with gaussian stage. The research work shows that the gaussian bilateral filter gives better performance than iterative as well as non iterative form of bilateral filter specifically for noisy MR image. To accelerate speed up catering to real time diagnostic setups, the work proposes parallel implementation of the filter using Nvidia's general purpose computing graphics processors (GPGPU). These devices provide an extensively parallel computing environment for real time processing which is extremely effective for large sized medical images. The GPU implementation is done using shared memory approach to achieve optimized results. It can be seen in case of the proposed filter that with GPU implementation, the execution time reduces by a factor of 418.32 than its CPU version for 64Megaprixel sized knee MR image.

The denoising performance of the proposed filter was analysed using pixel based metric (PSNR) and human vision based metric (MSSIM). It was observed that for maximum noisy image, the proposed Gaussian Bilateral

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Acceleration Techniques using Reconfigurable Hardware for Implementation of Floating Point Multiplier

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Abstract
A multiplier plays a vital part in multimedia and digital signal processors. The integer unit alone cannot achieve the desired computational speed required by modern applications. Unit specially designed to carry out operations on floating point numbers is required also commonly known as floating-point unit. The IEEE 754 standard is used for defining the format of floating point number which is widely accepted. Basically two formats are used for representing the floating point numbers, single precision which works on 32- bit floating point numbers whereas double precision working on 64 bit. Though the number of bits on which double precision operates doubles as compared to single precision number, it is hardly used due to its requirement of very large memory and also the delay generated for the IEEE-754 standard floating point multiplication. This is the mojor reason for its rare implementation in designs requiinge high computing speed.[1] In this paper we are proposing three efficient algorithms for enhancing the speed and optimizing the area required for implementing single precision floating point multiplication. Also compared the results in terms of power dissipation, execution time and area requirement for the implementation with the conventional methods used. Here the algorithms are implemented and analyzed by using the most popular semi-custom design tool Vivado ISE 2015 and is synthesized by using Artix-7 FPGA and the same is reflected in the mathematical model purposed for each circuit.

Keywords
Floating-point Arithmetic, Double Precision, IEEE-754, Multiplication, Single Precision, Vivado ISE.

Introduction

The microprocessors / microcontroller technically designed to handle the arithmetic operations for integers and less attentation is paid on arithmetics for real numbers.[2]. There are different ways a CPU can use to calculate the values for any floating point operation. The first method is by calling a floating-point emulator, that is nothing but the library of series of simple floating-point functions a than CPUs integer arithmetic operations which runs on the fixed-point ALU.[3] This method saves hardware but very slow. Second method is to use separate FPUs. The speed up of these operations is quite important, because floating point numbers are used in a wide range of applications including CAD, games, graphics, multimedia, and scientific applications also. Also, it is very important for data analysis and manipulation of various signals within Digital Signal Processing (DSP) devices. Floating point numbers are used to represent very small to very large numbers. In floating point arithmetic operations, addition and subtraction are less complex and easy to implement in terms of area required and power dissipation. Multiplication of floating-point numbers requires complex algorithms and it uses more space and there is high power dissipation as well as complex circuits are required. Several algorithms are available for calculation of floating point multiplication.

IEEE754 Standard

A technical standard for representing floating-point numbers was established in 1985 by the Institute of Electrical and Electronics Engineers (IEEE), known as IEEE 754 standard. The figure 1 shows the generalized format of floating point number for various precisions in IEEE standard. It is described by three integers:[1]

s = a sign (zero or one)
z = a significand
e = an exponent

The value is represented as shown in below equation for any floating point number,

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Fractional Order Control of Power Electronic Converters in Industrial Drives and Renewable Energy Systems: A Review

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ABSTRACT The power electronics industry is undergoing a revolution driven by an industry 4.0 perspective, with smart and green/hybrid energy management systems being the requirement of the future. There is a need to highlight the potential of fractional order control in power electronics for the highly efficient systems of tomorrow. This paper reviews the developments in fractional order control in power electronics ranging from stand-alone power converters, industrial drives and electric vehicles to renewable energy systems and management in smart grids and microgrids. Various controllers used in power electronics such as the fractional order PI/PID (FOPI/FOPID) and fractional-order sliding mode controllers have been discussed in detail. This review indicates that the plug-and-play type of intelligent fractional order systems needs to be developed for our sustainable future. The review also points out that there is tremendous scope for the design of modular fractional-order intelligent controllers. Such controllers can be embedded into power converters, resulting in smart power electronic systems that contribute to the faster and greener implementation of industry 4.0 standards.

INDEX TERMS Fractional calculus, power electronic converters, fractional order control, industrial drives, electric vehicles, renewable energy applications, smart grids and microgrids, industry 4.0.

I. INTRODUCTION

The 21st century power electronic systems should cater to the Industry 4.0 standard which envisages an energy sector which will eventually become more distributed, with smart devices and systems connected by IOT [1]. The need for cleaner and greener energy is being accelerated by the rapid development of energy management technology in smart grids, integrating smart devices, sensors, storage devices, renewable energy systems etc. using communication networks [2], [3] (Fig 1). Indeed, a new keyword such as Cognitive Power Electronics 4.0 was coined by Fraunhofer IISB, which develops innovative and modular power electronic systems wherein smart and robust controllers can be integrated with power converters [4].

Power electronics involves the conversion, control and conditioning of power using power semiconductor devices to suit the load requirements [5]. Modern power converters may involve multiple stages of power conversion. Applications of power electronics cover a wide spectrum including consumer electronics, switched-mode power supplies (SMPS), Uninterrupted Power Supplies (UPS), heating and lighting control, smart actuator based systems such as switched-mode variable speed motor drives, High Voltage DC Systems (HVDC), fuel cell technology, photovoltaic systems, wind energy systems, electric and hybrid vehicles, aircraft systems, grid-connected inverters etc., [6].

Power converters are inherently nonlinear due to the switching devices, voltage clamping, load variations, magnetic components that may saturate, etc., [7]–[9]. Efficient control of the power converters is therefore crucial to the performance of power electronic systems. The main control objectives are to design cost-effective, reliable and robust systems with high energy efficiency, packaging density and less complexity. The choice of the controller should be based on measures such as the robustness, accuracy, and stability, and also the dynamic performance of the controller such as fast response, disturbance rejection, etc., [9]. The commonly used control strategies for power converters are PI or PID control, sliding mode control, dead beat control, H_∞, optimal control, predictive control etc., [9]–[11]. Recently, intelligent

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A Novel Modulation Scheme of 8x8 MIMO in Industry 4.0

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ABSTRACT

A key component in the usage of Industry 4.0 arrangements is the up and coming age of system network, LTE/LTE advanced today, and 5G, later on. Industry 4.0 is conveying private LTE arranges today, as they trust it will give them an upper hand and a solid head start when 5G opens up. LTE uses multiple input multiple output (MIMO), a promising technique to accomplish the necessary data rate. This article presents consequences of 8x8 MIMO framework in fading channel utilizing V-BLAST by means of zero-forcing (ZF) with standard ZF. The relative investigation in the fading channel on account of symbol error proves V-BLAST by means of ZF has predominant execution than standard ZF finder. In addition to this, in order to support adaptive modulation, various M-QAM modulation schemes for these detectors are compared. This comparison shows 128-QAM performs superiorly to staying two. This investigation is carried out to help utilization of MIMO in LTE to support Industry 4.0.

KEYWORDS

Industry 4.0, LTE, MIMO, V-BLAST, ZF

INTRODUCTION

Industry 4.0 gives computerized change in the physical framework we use to reasonably extricate assets, move them to showcase, make, power, work what's more, administration all parts of our mechanical world, including the administration of our urban areas and the prosperity of our residents. Industry 4.0 empowers enterprises to intertwine physical with advanced procedures by interfacing all sensors, machines and laborers in the most adaptable way accessible. The major requirement of Industry 4.0 is large bandwidth. Industry 4.0 uses Long Term Evaluation (LTE) as the important factor. LTE uses MIMO to fulfill the requirement of peak data rate as described by Wei et al. (2007) and bandwidth. So as to improve information rate and channel limit different radio wires at the source region as well as at the beneficiary region are utilized as described by Telatar (1999). Here to understand and get the design ideas of MIMO system as described by Paulraj et al. (2001), practical MIMO systems along with its performance and limitations are studied as described by Nabar et al. (2004). The work of Golden et al. (1999) towards transmitting end, de-multiplexing of moving toward data stream in

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ANALYSIS OF TYPE OF CARDIOVASCULAR DISEASES BY COMPARING THE THRESHOLD VALUE OF HEART RATE USING IOT

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ABSTRACT

All around the world, the major reason for death can be attributed to heart related diseases. Annually, more people die due to cardiovascular diseases (CVD) than any other cause. Most of these lives can be saved if the disease is detected early. Therefore, a system is designed to detect CVD early. The system will continuously monitor the patient's heart rate, temperature. The parameters of the patient will be recorded in a cloud-based database and a local database. The heart rate values will be compared with the previously registered heart rate threshold values and once these cross their thresholds, an alert will be sent to the user and doctor. Also, the parameters of the patient recorded in the databases can provide help to the doctors in diagnosing the possible cardiovascular disease and help to treat it.

KEYWORDS:Heart Rate, Sensor, Health Monitoring, Internet of Things & Cardiovascular Disease

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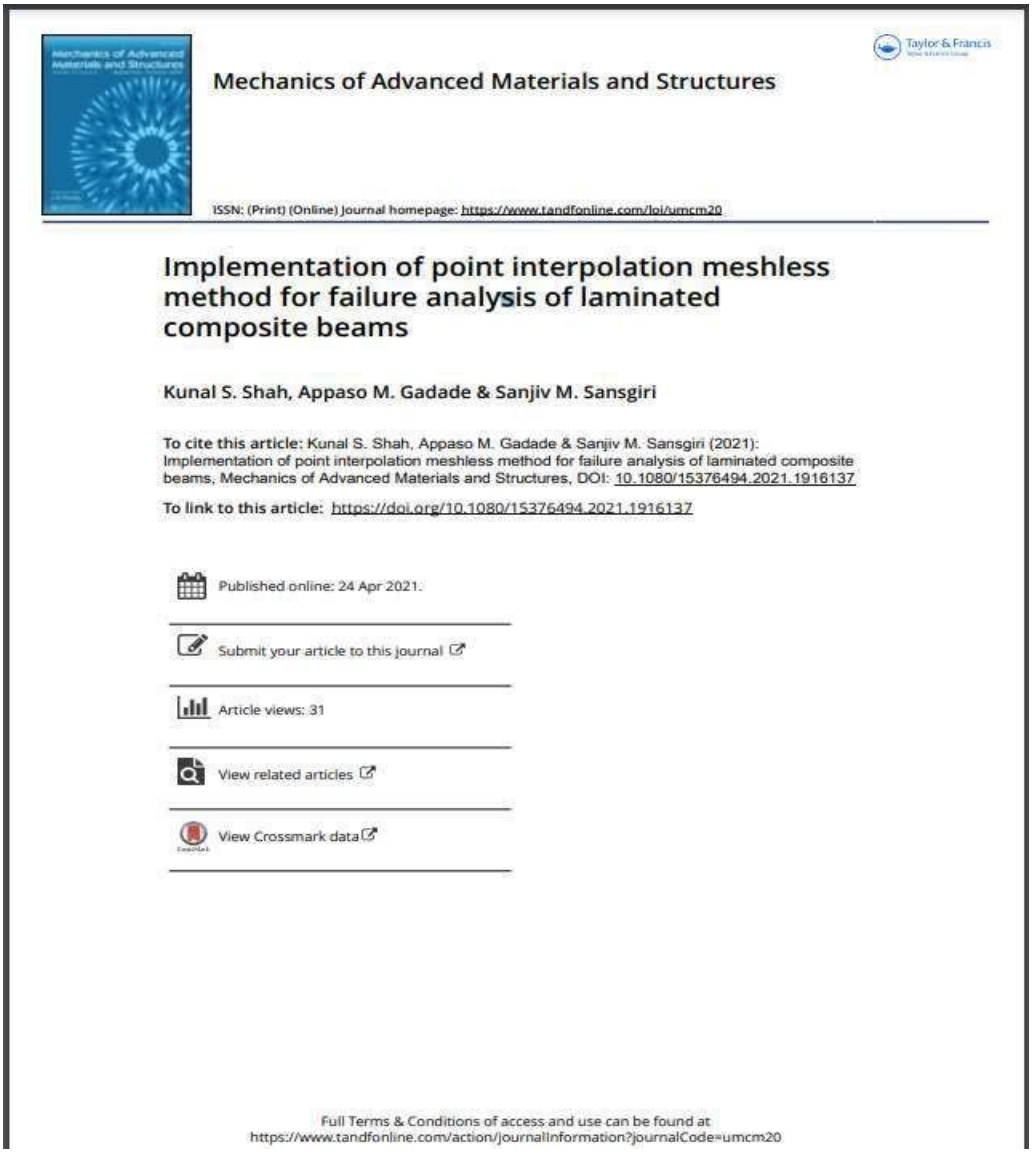
INTRODUCTION

Globally the dead cause due to CVD is 31% recorded by World Health Organization. Thus, people having cardiovascular disease are at high risk need treatment early. This system can help treat patients at an early stage and prevent deaths.

A system to monitor people's heart rate can help detect any anomalies present in their heart rate. The system allows you to initially configure an average heart rate. It then sets the upper and lower limits on the heart rate. Any values outside of these limits are treated as anomalies and reported immediately to the concerned. More often people tend to get themselves checked only after they get sick. Therefore, this provides an efficient solution by continuously monitoring your vitals. Any anomalies detected can be a sign of an underlying disease and one can get himself/herself checked up.

This system is also useful in emergency situations, where the person who's being monitored is not in a condition to take actions, such as if the person falls unconscious accompanied by an arrhythmia. In such a situation, if the person is alone, then there is no way for him to contact anyone. If the person is not discovered, it might be fatal. However, the proposed system would detect the sudden change in heart rate and contact the person's family or may even directly contact the hospital. Depending on the type of CVD they're experiencing, the person's pulse may become slower (bradycardic) or faster (tachycardic). In both cases, the heart rate would be out of the pre-set limits of heart rate. For a healthy adult, the ordinary heart rate is 60 to 100 bpm (beats per minute). Athlete's heartbeat generally ranges from 40 to 60 bpm depending upon their fitness. The proposed system allows us to set the upper and lower limits of heart rate manually because the heart rate varies from person to person, depending on the individual.

2. Department of Mechanical Engineering (A.Y 2020-21)



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Implementation of point interpolation meshless method for failure analysis of laminated composite beams

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ORIGINAL ARTICLE

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Implementation of point interpolation meshless method for failure analysis of laminated composite beams

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ABSTRACT

The present study develops computationally efficient meshless model for the first-ply failure analysis and predicts the weakest ply, based on various failure criteria via one-dimensional, higher-order beam theory. The effective property of lamina is obtained with the help of micromechanics based Eshelby's-Mori-Tanaka model. The governing equation is obtained with the help of point interpolation method based on polynomial basis function. The effects of different essential and natural boundary conditions, aspect ratio, lamination angle and volume fraction on the first-ply failure load of composite beam is studied.

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Composite laminated beam; failure analysis; geometric nonlinearity; higher-order beam theory; meshless method; Mori-Tanaka model

1. Introduction

The research work in composites has attracted attention due to its high flexibility on mechanical properties of a material, which provides close control on product design with properties such as strength to weight ratio, corrosion resistivity, durability, and lightweight. The design of any system with such properties, that can achieve functional requirements, it is necessary to have an efficient computational tool for prediction of accurate and realistic failure. The computer based numerical approaches for failure analysis of composites offers us a great alternative besides experimental testing in recent years due to its cost and time efficiency. The domain representation in finite element method depends on the mesh of elements. The shape of element also needs to be as regular as possible to have valid results, which is not possible in complex geometries. The analyst has to spend a lot of time in creating an appropriate mesh. Also, remeshing at each step is required in case of adaptive analysis. The accuracy of secondary or derived variables such as strains and stresses in solid mechanics is not adequate. Meshless methods give advantage over these issues.

Micromechanics-based models have provided us wider range of choices for combination of fiber and matrix to obtain suitable effective mechanical properties at lesser costs. Various methods of homogenization techniques based on micromechanics such as Voigt, Reuss, Hashin and Shtrikman, Mori-Tanaka and Self-consistent methods are reviewed [1, 2]. Mori-Tanaka based on Eshelby's equivalent inclusion shows closeness to the exact values [3–6]. The composite laminates can be modeled with the help of several laminate plate theories. In the beginning classical laminate theory (CLT) is developed for thin laminates, which is an extension of Love-Kirchhoff assumptions for isotropic plate, as transverse stresses are not considered [7–9]. After that, first-order shear deformation theory (FSDT) was discovered, which considers transverse shear stress with correction factor [10–14]. CLT and FSDT show reasonable accuracy in the kinematics of most laminates. The higher-order shear deformation theory (HSDT) eliminates requirement of correction factor and yields more accurate transverse shear stresses. [15–18]. Reddy's third-order theory is considered in the present work due to its proven results [19–22]. The computer-based numerical approach for solving partial differential equation of solid mechanics problems is adopted for its time efficiency and accuracy. Various types of meshless methods are reviewed based on approximation such as moving least square, and kernels and partition of unity [23–25]. The meshless methods eliminate requirement of elements in the discretization process, which reduces time consuming process of meshing as well as errors caused due to element distortion. Point Interpolation Method (PIM) is adopted for current work due to its easy handling of essential boundary condition and high accuracy [26, 27]. The ply failure is predicted with consideration of first-order shear deformation theory (FSDT) of laminated composite plate subjected to in-plane or bending load [28]. Three-dimensional failure modes such as delamination, fiber or matrix failure are proposed with the help of an iterative 3 D finite element model [29]. The progressive failure is implemented for laminated beam using Tsai-Wu and maximum stress criteria [30, 31]. The use of independent modes, interacting stresses and physical based failure criteria for progressive

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Numerical investigation and experimental validation of shape and position optimisation of a static wavy flag for heat transfer enhancement

Swadesh Suman , Vineeth Uppada , Swati Singh & Sanjay Mahadev Gaikwad

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Numerical investigation and experimental validation of shape and position optimisation of a static wavy flag for heat transfer enhancement

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ABSTRACT

This work demonstrates the effect of different shapes and positions of a wavy flag vortex generator on the heat transfer in a rectangular channel using Computational Fluid Dynamics (CFD) analysis. It covers the shape optimisation as well as the position optimisation of the shape optimised flag to achieve the best heat transfer enhancement. The result of post analysis shows that the shape optimised flag is the combination of rectangular and triangular flag and the optimised position is the flags arranged horizontally along the breadth of the channel. Average Nusselt number in the shape optimised flag is 20.5%, 20.88% and 21.35% higher whereas in best optimised position in which 3 shape optimised flags are used it is 63.18%, 67.87% and 73.03% higher than that of no flag condition for *Re* 8236, 12354 and 18344, respectively. This work also covers the experimental validation for the result of position optimisation. Heat transfer enhancement by introducing additional turbulence have been widely studied, but the use of flag, the effect of different shapes of flag and the flag positions for improving the heat transfer have not been explored much in practical applications. This paper thus presents the use of flag for heat transfer enhancement.

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KEYWORDS
Convective heat transfer; heat transfer enhancement; turbulence; vortex generator

Nomenclature

ρ_a	Density of fluid (air) (kg/m^3)
A_c	Cross-section area of the channel (m^2)
V	Velocity of the fluid (air) (m/s)
C_p	Specific heat capacity of air at constant pressure (J/kg K)
k	Thermal Conductivity of the medium (w/m-K)
μ	Dynamic viscosity of the fluid (air) (Pa.s)
ρ_{al}	Density of aluminium (kg/m^3)
A_s	Surface area of the aluminium plate (m^2)
$C_{p(al)}$	Specific heat capacity of aluminium at constant pressure (J/kg K)
k_{al}	Thermal Conductivity of aluminium (w/ m-K)
Q	Heat carried away by the fluid (w/m^2)
D_h	Hydraulic diameter of the channel (m)
$\dot{M}$	Mass flow rate (kg/s)
h	Average heat transfer coefficient (w/m^2 K)
Nu	Average Nusselt number of the fluid
Re	Reynolds number
$\emptyset_q$	Heat flux (W/m^2)
T	Temperature (K)
T_o	Final average temperature of the fluid at the channel's outlet (K)
T_i	Initial average temperature of the fluid at the channel's inlet (K)
T_d	Difference between the final and initial average temperature of the fluid (K)
T_w	Average temperature of the aluminium plate surface (K)
T_f	Average temperature of the fluid (K)
T_a	Difference between the average temperature of the surface and fluid (K)

Flag geometries

RF	Rectangular flag
TF	Triangular flag
EF	Elliptical flag
ROTF	Rectangular flag combined with triangular flag
RTTF	Rectangular flag combined with two triangular flags
RSTF	Rectangular flag with semicircles on its top and bottom edges

Flag formation

RH	RTTF arranged horizontally
RD	RTTF diagonally arranged
RC	RTTF with centre flag forward
RS	RTTF with side flags forward and tilted by 15 degrees

1. Introduction

All the industrial systems dealing with heat and fluid transfer involve fluid flow through channels and must deal with efficient heat dissipation problem at the same time. Heat transfer through channels is one of the classical problems in the heat transfer and fluid mechanics. The thermal behaviour of these channels has been described well by the correlations given by Bergman and Incropera (2011). These correlations imply that the Nusselt

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Investigation of heat transfer and fluid flow characteristics in straight and zigzag microchannels with water as working medium

Sanjay Mahadev Gaikwad & M.K. Nalawade

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Investigation of heat transfer and fluid flow characteristics in straight and zigzag microchannels with water as working medium

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ABSTRACT

In the present work, experimental investigation on single-phase liquid flow in straight and zigzag microchannels is performed. The objectives are to investigate experimentally, the effect of influencing parameters on heat transfer coefficient and pressure drop in these microchannels. Parameters are wave length and amplitude of the zigzag microchannel. Experiments are performed for Re range of 100–1000 with water as the working fluid. The measured values of bulk mean temperature and surface temperature are used to calculate the heat transfer coefficient. Experimental results show that the zigzag microchannels have a significant heat transfer enhancement when compared to the straight microchannels. It is further observed that the increase in heat transfer from 58% to 88% in the zigzag microchannels is associated with the increase in pressure drop from 22 to 35% than that of the straight microchannels.

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KEYWORDS
Heat transfer; straight channel; zigzag channel; microchannels; heat enhancement

Nomenclature

A:	amplitude, m
a:	channel width, m
A_c:	cross-section area of pipe/fin, m^2
b:	channel depth, m
Cp:	specific heat at constant pressure, J/kg K
d_h:	hydraulic diameter of the channel, m
E:	enhancement
f:	fanning friction factor
h:	convective heat transfer coefficient, W/m^2 K
K:	thermal conductivity, W/m K
k_w:	thermal conductivity of water, W/mK
L:	length of channel, m
L_{hy}:	hydrodynamic entrance length, m
L_{th}:	thermal entrance length, m
L_c:	entrance length
m:	mass flow rate of cooling water, kg/s
n:	number of parallel microchannels
Q:	heat rate, W
Q_f:	volume flow rate, m^3/s
Q_{out}:	heat output, W
q:	heat flux, W/cm^2
s:	thickness of fin, m
Tm:	mean fluid temperature, °C
Tw:	wall temperature, °C
Tin:	temperature at inlet, °C
Tout:	temperature at outlet, °C

Greek symbol

α_c:	channel aspect ratio
ρ:	density of water, kg/m^3
μ:	dynamic viscosity, Ns/m^2
ν:	kinematic viscosity, m^2/s
η_f:	fin efficiency
Δp:	pressure drop across the micro-channel, Pa
λ:	wave length, m

Highlights

- Numerical investigation of straight and zigzag microchannel
- Numerical investigation of straight and zigzag microchannel

1. Introduction

Nowadays there is an increased demand for the investigation of liquid flow in micro- and minichannel due to boosting development in electronic devices. In the process control of electronic devices, behaviour of the liquid in the microchannel is important. It needs to exchange heat rapidly from heat-generating devices. From the last two decades, many researchers have developed cooling technology to fulfil this requirement from electronics industries. Micro-channel heat sink [MCHS] was first developed and proposed by Tuckerman and Pease (1981); they investigated high-performance heat sink for VLSI, IEEE Electron Devices. They reported that by reducing the dimensions of liquid cooling heat sink to micro-scale helps in enhancing heat transfer performance. MCHS usually consists of a maximum number of parallel channels with hydraulic diameter varying from 10 to 1000 µm. The coolant flows through such channels to extract heat from heat sink. Peng and Peterson (1995, 1996) investigated

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PORTABLE WATER COOLING SYSTEM USING DESERT COOLER

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ABSTRACT

Water coolers are quite prevalent in areas with hot and dry climates. In such climates, cool drinking Desert water is also desirable. In the wake of climate change and rising awareness about green products, looking for ways to reduce consumption of electricity is the need of the hour. The goal of our work is mainly to design an attachment which will use basic laws of thermodynamics and design, to cool drinking water instead of consuming additional electricity. Our work is to design an extension device that is mounted on a desert cooler and uses the properties of certain materials to pass through the water cooled by the desert cooler during its usage. It includes design an extension device (accessory) that can be mounted on a desert cooler and utilizing the properties of certain materials to pass through the water cooled by the desert cooler during its usage. We analyze different geometries and materials for pipes to pass through the desert cooler's water. The analysis results serve as a proof of concept. By using this apparatus, a sufficient temperature drop is detected in our drinking water which passed through the piping of our designed accessory. We have analyzed different geometries and materials for pipes to pass through the desert cooler's water. The analysis results serve as a proof of concept. By using this apparatus, a sufficient temperature drop is detected in our drinking water.

KEYWORDS: Heat Transfer, Convention, Silencer Cooling, Delta Wing & Heat Dissipation

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Original Article

1. INTRODUCTION

Desert coolers are devices that are providing cold air by using evaporative cooling of water. Cooling due to evaporation is different from the conventional systems used in air-conditioners. The air-conditioners are using the refrigeration cycles like, vapor compression refrigeration (VCR) or vapour absorption system (VAS). In evaporative cooling water absorbs the large amount of heat and evaporates by virtue of enthalpy of vaporization [1]. The dry air temperature moving around the surface gets reduced due to the phase change from water to vapour. This is the classic case of evaporation. This type of air cooling is using negligible amount of energy compared to refrigeration. Effective evaporative cooling is observed in extremely dry climates. It gives comfortable air-conditioning [2].

The cooling rate by evaporative cooling is largely depend the on the difference between dry bulb temperature (DBT) and wet bulb temperature (WBT) and also on the wet bulb depression. Evaporative cooling is the best alternative to the conventional vapour compression system and vapour absorption system in arid climates [3]. In the environment without arid climatic conditions the evaporative cooling system is beneficial due to proper humidity. Passive evaporative is an exceptional alternative to cooling system without any additional complex equipments and ductwork [4]. Evaporative cooling is most old and easiest water cooling method which is being used traditionally. Conventionally water is being stored in an earthen pot and it is being cooled due to evaporative

cooling in all seasons. Especially in the summer season the rate of evaporative cooling is highest [5].

The earthen pots kept on the roof top helps in better evaporative cooling by using the cool night breezes of air. It evaporates the moistures and enhances the cooling rate. These systems are known as passive cooling systems as no direct external energy is provided, no external or direct inputs are given for cooling purpose. These systems are also used in providing comfort air conditioning in summer [6]. But it is dependent on weather conditions and also unpredictable. The maximum cooling is possible at high temperature weather condition [7].

The work is focused on developing an accessory to utilize conventional desert air cooler for water cooling to provide potable drinking water and minimizing use of electricity [8]. The main objectives of the present work is to design and fabricate a mountable accessory for a desert air cooler which can achieve a considerable drop in drinking water passed through it [9]. Providing an accessory to utilize conventional desert air cooler for water cooling to provide potable drinking water and minimizing use of electricity. Calculate numerically the different temperature drops of water for various geometries and lengths of the copper coil and selection of optimum length and geometry [10]. Bring out the effects of parameters namely number of channels, the type of fluid used and manufacturing tolerances on temperature drop. Study the effect of header shape, header dimension and inlet/outlet location on flow misdistribution.

2. EXPERIMENTAL METHODS

2.1 Cad Model

The first step was the numerical computation for the determination of temperature of exit water temperature and the exit air of the cooler and the determination of tank water temperature with load, which provided the boundary conditions for the further analysis. The variation of temperature drops for various geometries and lengths of copper tube was also computed. A number of geometries were designed in Pro- Engineering Wildfire. Fig. 1 shows the CAD model illustrating Top view of copper coil, b) housing case of cooler, c) base of cooler and d) assembly of water cooler. These geometries were analyzed using Ansys Fluent for determination of effective profile of water cooling coil with boundary conditions provided from the former calculations. Finally, validation was obtained experimentally from the fabricated model which gave satisfactory results in form of an appreciable drop in temperature.

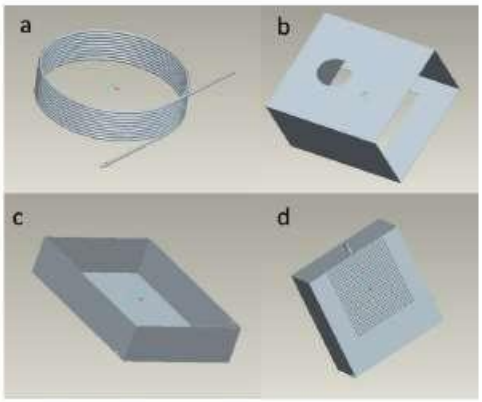

Figure 1: a) Top View of Copper Coil, b) Housing Case of Cooler, c) Base of Cooler and d) Assembly of Water Cooler

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Tribological behaviour of uncoated steel and fluorocarbon coated steel under dry and lubricated sliding conditions

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ABSTRACT

Due to positive tribological performance, fluorocarbon coatings have established an importance in many applications, as a possible replacement to enhancement and substitute traditional liquid lubricants. The literature in this area is to a certain extent limited, especially on the Tribological behaviour of fluorocarbon coated and fluorocarbon uncoated components in aggressive conditions. In this work, fluorocarbon coated on HSS M2 and fluorocarbon uncoated components friction and wear along with this it also gives smooth and noise free running operation. Long-term durability experiments also showed the superiority and suitability of fluorocarbon coating for potential use in many applications. Fluorocarbon coatings are considered for their advantageous mixture of properties, in specific it has exceptional low friction as well as release capability and good chemical properties. As a result of experimentations, fluorocarbon coating shows the coefficient of friction as low as 0.196 which is much better than many other coatings in the fluorocarbon category and wear rate is also way better which is $1.0610\times10^{-5}mm^3/Nm$.
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1. Introduction

In different industries friction and wear are one of the intrinsic factors to increase energy consumption. According to [1] in the industrialized developed nations the energy losses and damaging of machine components because of friction as well as wear accounted for 5% to 7% of their GDP which is nearly about one third of the world's total energy sources in actual practice it appears as a friction or in the form of wear. Yearly thousands of machine campers in different industries become useless because of excessive wear. According to [2] in Europe and America 10% of total oil consumption is used to counter the damage caused by friction and wear. The side effect of increase of friction and wear in machine component is not only limited to damage of machine but it also dangerous for environmental point of view because the friction and wear factor also responsible for excessive CO_2 emission specifically in case of vehicles. It is a huge problem and it is also necessary to overcome the friction and to limit the where with the help of different engineering and typology ideas and principles. Which include appropriate use of surface modification and survey statement processes, proper use of lubricants, materials, coatings and special structural designs. Out of these all options surface modification and surface treatment, coatings which is collectively called as surface engineering is the best operational and flexible way out for tribology issues. This surface engineering more precisely coating modifies the tribological properties by introducing the compressive stresses which helps to minimize the coefficient of friction by maximizing the surface hardness. In this way coating develops and increases the wear resistance of surface and also helps to increase the life of machine components. From last few years' different types of coating and their depositions method of have been developed successfully to reduce the damage of machine from friction and wear. Now a day in industries greater performance is essential for components and different tools of machine which cannot be achieved only by selecting the proper materials or improving the mechanical structures of components. The final result of performance of components can be improved by effective use of coating which can be positively replicate the results in terms of greater reduction in friction, improving the wear resistance ability, to withstand or survive under different environmental conditions, to reduce corrosion and improve other characteristics. Along with improving all these characteristics it is also important to keep original properties of main substrate which is responsible for strength and toughness. Besides all these points at present situation we are distant or far away to actual senior you where the friction coefficient as well as rate of wear can be

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precisely calculated for specific experimental, working conditions which is totally concentrated or based on theoretical evaluation and studies of calculation. Practically a harder component coated by soft tin coating shows or gives the probability of decrease in sliding friction. But the main issue of soft thin coating is their wearout time and life span is critical and the coating on the substrate is not executed or did precisely and correctly then there is possibility of detachment of coating material from base material. Along with all these for soft coating the selection of parameter is also a considerable factor or problem. These parameters may include sliding speed, applied load, deposition method of coating, thickness of coating substrate and environmental conditions. According to [3] when soft coating sliding against still the range of friction coefficient is 0.1 to 0.5 which is much less than that of uncoated steel sliding against still under dry conditions whose value is 0.6 or more [4]. The wear resistance of soft coating like fluorocarbon coating is better under low and medium loaded condition. A soft coating mainly the fluorocarbon coating has high resistance to chemical reaction such as acid and alkaline also different environmental conditions. Further in this study the experimentation conducted on fluorocarbon coated samples under different parameters are tested. Perfluorocarbon or PFC is the other name by which Fluorocarbon is famous for precisely it is compound of organofluorine having chemical formula C_xF_y and has a combination of different elements mainly carbon & graphite etc. The fluorocarbon and it's by products can be used as solid lubricant, refrigerant, fluoropolymers and also for coating purpose. According to E. Costa, A. Cavaleiro [5] Fluorocarbon coatings, when slided against steel, present a friction coefficient of 0.25. During the wear test, the friction coefficient suddenly increases when the coating wears out. According to Emerson Escobar Nunez, et al. [6] In the case of the Fluorocarbon Coated Specimen, the interface scuffed after 2874 m sliding distance, which is considered due to abrupt rise in the friction coefficient due to penetration of the coating and high temperature (Fig. 1).

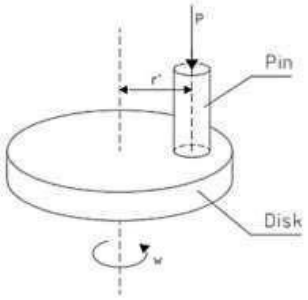


Fig. 1. Pin on disc assembly.

2. Problem statement

To study the tribological behavior of fluorocarbon coating on steel under dry and lubricated condition (Fig. 2).

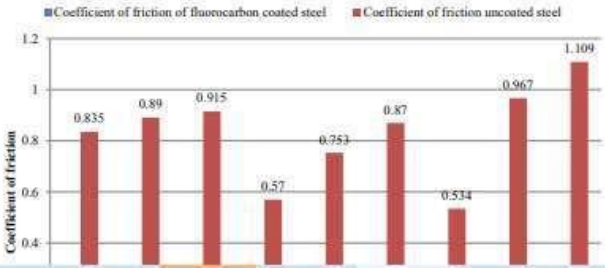
3. Objectives

1. Coating of fluorocarbon on steel to perform organized tribological experimentation.
2. To study the tribological performance of fluorocarbon coated steel tested at different speed and loading conditions.

4. Material and methods

4.1. Base metal details

Engineering design is very tough job because in it one must select a suitable metal for certain application and this selection of metal is based on many factors like cost, availability of material, properties of material and functionality of material. Most of the machine elements like came for our specifically played type camp follower or made up of still in precise HSS M2 grade steel because of its strength and toughness as well as ability to which stand at high loads. The HSS M2 steel used as a substrate of coating is basically tungsten molybdenum high speed steel with well-balanced composition of different materials (elements) (Fig. 3).



Design Study of an Electric Motorcycle Chassis Obtained using Topology Optimization

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Abstract. Rising Carbon emission and associated pollution forcing government of India to make stringent emission norms and policies. Hence, it is need of the hour to switch to alternative fuels such as electricity. About 60% of the petrol consumption in India is attributed to the motorcycles and there hasn't been significant research in the electric mobility in motorcycles. This work is based on study of an electric motorcycle chassis with integrated battery-pack space that has been obtained as a conceptual geometry using topology optimization. The layout of the chassis for this work has been obtained by applying topology optimization on a design domain representing a space obtained on the basis of presently available dimensional measurements of commuter segment motorcycles in India. The chassis has been subjected to linear static and modal analysis for further enhancing the strength, stiffness and natural frequency using the design study approach on critical region.

1. Introduction

Chassis, also known as frame is the support framework that bears static and dynamic loads acting on the vehicle. Its design plays critical role in vehicle performance, rider comfort, steering quality, handling etc. Kurdi et al. used FEM to analyse stresses in truck chassis [1]. They have stressed on predicting fatigue life of the chassis and durability loading in its designing so as to verify safety during its use in real life situations. Also, they have shown that the critically stressed zones in the chassis due to loading must be located using FEM because such regions are the first points of fatigue failure propagation. Jonathan Hastie et al. have studied the front and side impacts and loading due to shock mounts on SAE BAJA vehicle [2]. It helped them in modifying the chassis by adding three key structural components to bear the loading conditions. It was also found out that the design failure occurred in roll over and hence an integrated solution from the beginning could be proposed using the FEA methodology.

Four repetitions of analysis have been studied by Bennett et al. for designing a frame [3]. They applied simple load cases to various frames and the one with highest factor of safety (FOS) was considered for further analysis such as side impact, drop test etc. In order to reaffirm ability of the vehicle to endure extreme loading conditions, Raina et al. have analyzed the frame with considerable

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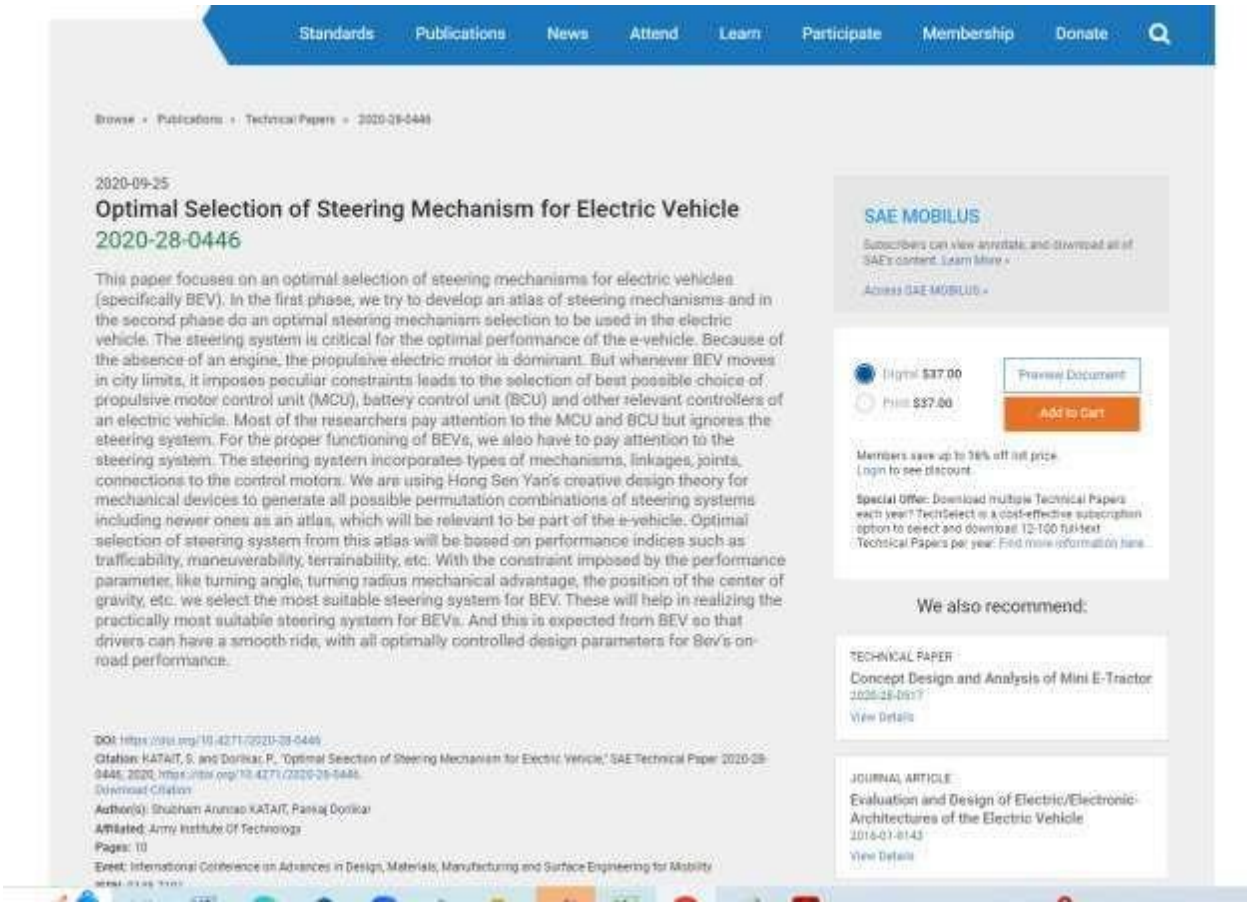
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Optimal Selection of Steering Mechanism for Electric Vehicle
2020-28-0446
This paper focuses on an optimal selection of steering mechanisms for electric vehicles (specifically BEV). In the first phase, we try to develop an atlas of steering mechanisms and in the second phase do an optimal steering mechanism selection to be used in the electric vehicle. The steering system is critical for the optimal performance of the e-vehicle. Because of the absence of an engine, the propulsive electric motor is dominant. But whenever BEV moves in city limits, it imposes peculiar constraints leads to the selection of best possible choice of propulsive motor control unit (MCU), battery control unit (BCU) and other relevant controllers of an electric vehicle. Most of the researchers pay attention to the MCU and BCU but ignores the steering system. For the proper functioning of BEVs, we also have to pay attention to the steering system. The steering system incorporates types of mechanisms, linkages, joints, connections to the control motors. We are using Hong Sen Yan's creative design theory for mechanical devices to generate all possible permutation combinations of steering systems including newer ones as an atlas, which will be relevant to be part of the e-vehicle. Optimal selection of steering system from this atlas will be based on performance indices such as trafficability, maneuverability, terrainability, etc. With the constraint imposed by the performance parameter, like turning angle, turning radius mechanical advantage, the position of the center of gravity, etc. we select the most suitable steering system for BEV. These will help in realizing the practically most suitable steering system for BEVs. And this is expected from BEV so that drivers can have a smooth ride, with all optimally controlled design parameters for Bev's on-road performance.
DOI:
Citation: KATAIT, S. and Dorlikar, P., "Optimal Selection of Steering Mechanism for Electric Vehicle," SAE Technical Paper 2020-28-0446, 2020,
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Virtual design analysis of the sleeping structure

Narendra B Kulkarni and Sanjiv M Sansgiri

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Abstract. The sleeping structures are the structures which are utilized for sleep or rest purpose. The utilization of them in day-in day-out activities is common in present era. Designing of any structure, requires examining its behaviour for the applied load and boundary conditions. Designing of such sleeping structures have caught attention of many inventors from decades. This research paper focuses on brief description about the linear analysis of the sleeping structure i.e. Bed designed by authors. The new designs of sleeping structure designed by inventors have gained most attention in the development of sleeping structures. The authors design of the structure is modelled in Computer Aided Design software PTC Creo and analysed in analysis software Altair's Hyperworks. In this paper the sleeping structure is formulated as 2D beam with three support, two supports at both end and one at middle. The aim of this paper is to analyse the behaviour of structure for maximum stress and deflection for different load stages.

1. Introduction

Most likely in all analysis evaluating bending moment and the shear stress is an essential step. Likewise, simplifying the complex real problem with two-dimensional (2D) line diagram provides ease in analysis. From the past decades, the inventors have contributed in the development of the sleeping structures [1-4]. This development is moreover observed in new product development and are based on the indigenous thoughts of inventors and researchers. The designs contribute more in space savings. The novelty of this work is to contribute by developing the linear static analysis of the sleeping structure.

1.1. Objectives

- To study the linear analysis of sleeping structure.
- To understand the behaviour at different loading stages.
- To study maximum stress region due to applied load.

The main objective of the work is to perform the linear analysis with different loading stages. The secondary objective of this work is to study the response of the structure for the applied load over the complete structure. The deflection and the Von Mises Stress generation regions and understanding their maximum values.

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Merge Maneuver by Autonomous Vehicle using Reinforcement Learning in Dense Traffic

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***Abstract*—Autonomous vehicles are good at mundane driving tasks. Merging in traffic is challenging task. Humans look for a empty slot in traffic and guess the behaviour of other drivers on road to perform the merge maneuver and avoid deadlock. This dynamic makes it even more challenging for autonomous vehicles. An autonomous vechicle cannot consider other cars on the road as moving objects; the human behaviour has also to be considered.**

Keywords : Autonomous vehicle, Partially Observable Makarov Decision Process, Reinforcement learning, belief, driver model.

I. Introduction

Autonomous or self-driving vehicles is rapidly developing field mainly due to developments in machine learning techniques and advantages it provides that includes improved safety, reduced congestion, lower emissions and greater mobility. A lot of research has happened in motion planning and obstacle avoidance algorithms using probabilistic methods and it remains an active area of research with developments in machine learning. While transporting passengers or goods from a given origin to agiven destination, motion planning methods incorporate searching for apath to follow, avoiding obstacles and generating the best trajectory that ensures safety, comfort and efficiency.

The goal for motion planning for autonomous vehicle is to select a collision free trajectory that fulfills the mission goal, reaching the destination as fast as possible, while at the same time taking into account the effect of our own motion on surrounding traffic participants. In congested traffic, it is not always for a vehicle to progress along its route without any negative effect on other participants such as requiring them to slow down slightly.

The remainder of the paper starts with a presentation of related work (Section II). It is followed by a presentation of approach (Section III). Based on that, we present implementation (Section IV) and experiment (**??**). Finally, a conclusion is drawn (Section VI).

II. Related Work

In dense traffic scenarios vehicle may come to a halt. With no movement al all, it freezes. Cooperation and collision avoidance models are required to prevent deadlock scenarios aka freezing robot problem [2]. Planning for autonomous

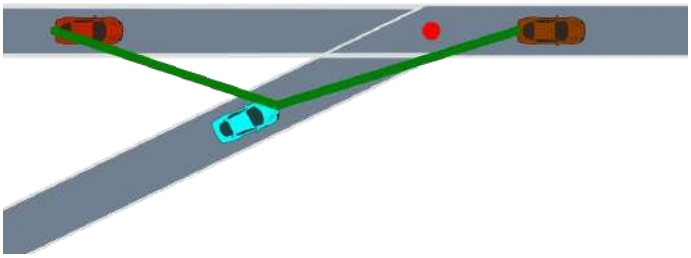

Figure 1. Merging Scenario

systems is challenging because of interactions with other dynamic systems in environment such as humans. Probabilistic interaction models for online planning address this problem [3] - [6]. Online planners take decisions in real time as they perceive the environment. And so require heavy computation whentaffic is dense. Online planners take decisions or plan based on inputs from environment that it simulates upto some future time. This future time horizon is shortened due to computation complexity [4], [7]. The behaviour policy of agent depends on the environment model [8]. Policy performance increases when the planning algorithm has access to information about the driver internal state in lane changing scenarios [8].

Mutual influence between human and agent has been studied using using data-driven approaches, probabilistic models, inverse reinforcement learning, rule-based methods, or game theoretic frameworks [3], [5], [6], [9], [10]. Schmerling et al. demonstrated a datadriven approach to learn the interaction model on a traffic weaving scenario involving two agents [5] but is not suitable for dense traffic scenarios where more than two traffic participants are interacting. Lane changing [11], and intersection navigation [12], [13] are two of many driving scenarios where reinforcement learning promises good results.

Here, we test a reinforcement learning agent's ability to interact with environment to successfully perform a merge maneuver in dense scenarios. There is uncertainity associated with behaviour of human driver. That leaves the autonomous system devoid of an important input that can help it perform its task efficiently. Deep Reinforcement learning can capture this

Analysis and Prediction of CIBIL Score using Machine Learning

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***Abstract*—CIBIL is India's first Credit Information Company founded in August 2000. CIBIL collects and maintains records of an individual's payments pertaining to loans and credit cards on a monthly basis, which is then used to create Credit Information Reports (CIR) and credit scores which are provided to the credit institutions in order to help evaluate and approve loan applications. Despite having a good CIBIL score, NPAs and bad loans are increasing. The current metric of CIBIL score doesn't include various essential parameters for its prediction and is thus clouded and provides incomplete information. This paper presents a platform by which we can getbest results to reduce the cases of bad loans and can get better predicted CIBIL score by including more parameters.**

***Index Terms*—Web development, Logistic Regression, Random Forest Classifier, Support vector Machine, Gradient Boosting Classifier.**

I. Introduction

CIBIL score analysis and prediction is the act of trying to determine whether the customer is eligible for taking loan or not. CIBIL score is the important part of economy of the country and plays a vital role in the growth of the industry and commerce of the country that eventually aff ects the economy of the country. Both investors and industry are involved in stock market and wants to know whether some stock will rise or fall over certain period of time. The stock market is the primary source for any company to raise funds for business expansions. It is based on the concept of demandand supply. If the demand for a company's stock is higher, then the company share price increases and if the demand for company's stock is low then the company share price decrease.

The existing CIBIL System does not provide any method to calculate score for the new users, whereas, this research is based on the methods to calculate score for both the existing aswell as the new users. The two most critical questions [1] in the lending industry are: 1) How risky is the borrower? 2) Given the borrower's risk, should we lend him/her? The answer to the first question determines the interest rate the borrower would have. Interest rate measures among other things (such as time value of money) the riskiness of the borrower, i.e. the riskier the borrower, the higher the interest rate.

With interest rate in mind, we can then determine if the borrower is eligible for the loan. A credit score is a numerical expression based on a level analysis of a person's credit files, to represent the creditworthiness of an individual. It is also called as CIBIL score. A credit score is primarily based on a credit report, information typically sourced from credit bureaus.

Lenders, such as banks and credit card companies, use credit scores to evaluate the potential risk posed by lending money to consumers and to mitigate losses due to bad debt. Lenders use credit scores to determine who qualifies for a loan, at what interest rate, and what credit limits. Lenders also use credit scores to determine which customers are likely to bring in the most revenue. The use of credit or identity scoring prior to authorizing access or granting credit is an implementation of a trusted system.

Credit scoring is not limited to banks. Other organizations, such as mobile phone companies, insurance companies, landlords, and government departments employ the same techniques. Digital finance companies such as online lenders also use alternative data sources to calculate the creditworthiness of borrowers.

CIBIL score in India is a three-digit number ranging from 300 to 900, which signifies the creditworthiness of an individual based on his credit profile and past repayment track record.

II. Related Work

This section briefly explains reviews related work that contributes to the discussion of prediction of CIBIL score using different machine learning methodologies.

A. Study by Wilson and Sharda

Wilson and Sharda [2] studied prediction firm bankruptcy using neural networks and classical multiple discriminant analysis, where neural networks performed significantly better than multiple discriminant analysis. Min and Lee were doing

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Online Learning Management System and Analytics using Deep Learning

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ABSTRACT

During this pandemic we have seen rise in popularity of online learning platforms. In this paper, we are going to discuss E-Learning using analytics and deep learningfocusing on mainly four objectives which are login systems for teachers and students, Gamification to engage learners, AR contents to increase the involvement of learners and learning analytics to develop competency. We will use Data Mining and Buisness Intelligence to extract high levelknowledge from the raw data of students. To predict engagement of students we have used several ML algorithms. This study provides an introduction to the technology of AR and E-Learning systems. The main focus of this paper is to use research on augmented reality and integrate it with Buisness Intelligence and Data Mining(DM).

Engaging student till the end of the course became really difficult for traditional E-Learning Platform. Therefore, Gamification in E-learning is good way to solve this problem.

Keywords-- Business Intelligence in Education, Classification and Regression, Decision Trees, Random Forest, E-Learning

I. INTRODUCTION

FRAMEWORK

The main framework could be made using any of the new technologies which provide and encourages rapid development and clean design should be open-source and can be easily accessible to everyone and should be fast and rigid when deployed. The following are the main pros of the framework:

- Ridiculously fast.
- Reassuringly secure.
- Fully loaded.
- Exceedingly scalable.
- Incredibly versatile.

Gamification in the Learning Platform

Gamification is the mechanism of giving application some game like elements like giving badges, stars etc. Gamification helps in increasing motivation of learner by giving him sense of accomplishments.

AR Implementation in the Learning Platform

Augmented Reality (AR) have many advantages:

a. Doesn't require additional hardware. So that the default device is much sufficient to perform every function such as reading and scanning data from the camera device from the provided in the device.
b. Provides a better learning process for learners as in Augmented reality and virtual reality operations the knowledge comes through inholographic or as a very descriptive performanceof data.
c. Helps in long distance practical learning. As explained in the above point and as concerning situation of covid-19 is increasing practical knowledge can be provided very easily.
d. Main advantage of augmented reality and virtual reality is that it can be applied to any level of educations regardless of any thing as it is only platform dependent

LEARNING ANALYTICS

During Pandemic of COVID-19 teacher arefacing an a challenge to create and have faith in a system that could let them enable a more efficient and optimized manner of teaching. The huge chunk of data can play a huge role there. The rise in popularity in Buisness Intelligence and Data mining is due to Information Technology, that lead to increase in groth of buisness and organizational database. All the data like likelihood, habits, and patterns contains valuable information which helps in improving decision making and optimizingsuccess rate. Humans can left some important details. Hence, this can help in automation of analysis of raw data and extration of high level information.

BI can do a lot in education systems since there are multiple sources of data (e.g., traditional databases, web pages, offline accounting) and diverse interest groups (e.g., students, teachers, administrators, or alumni) for example there are lot of question we can answer using

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ARTICLE

Devanagari Text Detection From Natural Scene Images

Authors: Sanjeev S. Sannakki, Sankirti Sandeep Shiravale, R. Jayadevan Authors Info & Claims

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Abstract

Text present in a camera captured scene images is semantically rich and can be used for image understanding. Automatic detection, extraction, and recognition of text are crucial in image understanding applications. Text detection from natural scene images is a tedious task due to complex background, uneven light conditions, multi-coloured and multi-sized font. Two techniques, namely ‘edge detection' and ‘colour-based clustering', are combined in this paper to detect text in scene images. Region properties are used for elimination of falsely generated annotations. A dataset of 1250 images is created and used for experimentation. Experimental results show that the combined approach performs better than the individual approaches.

International Journal of Computer Vision and Image Processing

Feedback

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Recognition of Devanagari Scene Text Using Autoencoder CNN

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Abstract

Scene text recognition is a well-rooted research domain covering a diverse application area. Recognition of scene text is challenging due to the complex nature of scene images. Various structural characteristics of the script also influence the recognition process. Text and background segmentation is a mandatory step in the scenetext recognition process. A text recognition system produces the most accurate results if the structural and contextual information is preserved by the segmentation technique. Therefore, an attempt is made here to develop a robust foreground/background segmentation(separation) technique that produces the highest recognition results. A ground-truth dataset containing Devanagari scene text images is prepared for the experimentation. An encoder-decoder convolutional neural network model is used for text/background segmentation. The model is trained with Devanagari scene text images for pixel-wise classification of text and background. The segmented text is then recognized using an existing OCR engine (Tesseract). The word and character-level recognition rates are computed and compared with other existing segmentation techniques to establish the effectiveness of the proposed technique.

Key Words: scene text recognition; Devanagari script; OCR; segmentation technique; encoder-decoder CNN

1 Introduction

Text recognition systems are becoming more efficient due to the increasing availability of multimedia data, low-cost image capturing devices, and high-performance computing devices. Understanding the text present in a scene image like nameplates, instructional boards, navigation boards, banners, wall paintings,etc. is essential for effective communication. But, understanding the text written in an unknown language or script is a massive challenge in scene text recognition. A solution can be provided by developing a smartphone-based system that can process, detect, recognise and translate the text present in a scene image from one language to a known language. Detection and recognition of the text are the two major steps insuch applications. The process of localization and extraction of text regions from the image is called text detection. The output of the text detection is always in the image format. The process of converting that text image into the corresponding digital format (Unicode) is called text recognition. This paper presents a technique to recognize Devanagari text from natural scene images. In the last few decades, various methods have been reported regarding the recognition of text present on document images. But scene text recognition is still a challenging task compared to the document image recognition [1, 2]. Foreground and background

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My Experience: Science behind Online Teaching-Learning

Asha.P.Sathe

Abstract: A Coronavirus disease has changed the scenario of the education system altogether. Online delivery of courses is not a new thing. We do have YouTube videos, Udemy, Edureka Live sessions and Nptel, MOOC courses, and many more. All the stakeholders' students as well as professors, parents are familiar with Online and live sessions. But when it comes to total replacement of physical education by complete online sessions then it's challenging. Plenty of excellent tools, frameworks, and products like Microsoft Team, Zoom, Moodle, Gomeetings, and many more are available to deliver classes as well as Practicals. In this paper, I would like to share different methodologies like students mind preparation, Students engagement, Assignments, summarization and feedback which proves very fruitful during my course delivery.

Keywords: Mind Preparation,video-ken,Summarization ,Microsoft-Team.

I. INTRODUCTION

A Coronavirus disease has changed the scenario of the education system altogether. Online delivery of courses is not a new thing. We do have YouTube videos, Udemy,Edureka Live sessions, and Nptel and MOOC courses, and many more. All the stakeholders' students as well as professors, parents are familiar with Online and live sessions. But when it comes to total replacement of physical education by complete online sessions then it's challenging. Plenty of excellent tools, frameworks, and products like Microsoft Team, Zoom, Moodle, Gomeetings, and manymore are available to deliver classes as well as Practicals. I would like to put forward the methodologies I have been using for the delivery of my course.

II. METHODOLOGIES

When it comes to the teaching-learning process, it is the scientific process. Both the entities are living entities and when it comes to replacing this process totally by virtual/online mode then there are so many challenges like students as well as professor's readiness, flexibility, adaptability, acceptance of new environment, and many more. While overcoming the above-stated challenges, I have been using the following methodologies which might prove useful for some of you to conduct your courses.

A. Mind preparation: The most important faculty of the human being is his/her mind. All the power lies in the mind [1]. The state of mind matters a lot. So, the first method/activity that I have been practicing is in the initial 5 mins I asked students to close their eyes and ask them to recite," I am sorry, Please forgive me, Thank you so much, I Love you," Ho'oponopono technique[2][3]. You can use any technique for mind readiness or relaxation. But the student's mind must be prepared to be with you and content delivery for the next 1 hour. This technique proved very successful in my case. Irrespective of age group, connect is very important. I am using Microsoft-Team for my course delivery where there are excellent features like video, sharing, chat, and many more. But to start within the virtual world, we as a personality not there so to create that connection between students and us that touch which is a language of love must be created first. Within just the first 5 mins, once this has been done, the rest of the session proves fruitful.

B.Students Engagement: The most important use case of the teaching-learning process is the student's involvement. As I stated, I have been using Microsoft Team there is a chatbox feature where you can post questions and students can post their answers [8]. You can give in advance assignments to students and in the next session, you can ask students to share their screen and give them an experience of the actual happening of class in reality because as far as engineering is concerned, seeing your own creation/implementation gives happiness. This way we can have a healthy competition among students and the generation is very smart with these tools and technologies, we can keep them engaged and make them to an understood subject as well. Sometimes changing the role of students from attendee to presenter proves very beneficial.

C.Assignments: Giving online assignments is okay but I have asked students to write some assignments and scan them and they have mailed me. This way we can maintain their writing habits too. But such assignment with minimal numbers, because this situation shall pass away and students must be habitual for writing. Giving quizzes also proved very fruitful [6].

D. Summarization: To start with the summary of the previous class and concluding the current class is very important. Record your sessions and Video-ken [4] is an excellent tool with which you can create a summary of your video and give students for future reference. Recording of my own session helps me a lot to improve my teaching peace, modulation of voice, and many improvements and such recordings can prove beneficial for absentees too.

E. Feedback: The most important activity is to take feedback from students either using Google form or any other forms after each class. Feedback is the most important to improve our way of delivery of content and course and learning outcome evaluation.

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A Review on Sentiment Analysis from Multimodal Data

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Abstract

A sentiment analysis is becoming a popular research area. Sentiments can be expressed in various forms like text, image, audio, video etc. Opinion of large population is anticipated by aggregating sentiments of individual and used in numerous applications. Traditional sentiment analysis system focuses on single modality to infer user's perception about subject. Such type of sentiment analysis has its own limitation and failsto employ other modality's expressiveness.

With the advent of technologies, the conventional system evolved into multimodal sentiment analysis which integrates multifarious data (i.e. text, audio, and visual) available over internet. Multimodality refers to the availability of more than one modality or medium. Every mode of data has unique features and helps users to express their emotions, opinions or attitude about the entity. Incorporating such features from multiple content enhance the effectiveness of sentiment analysis process. To find a constructive fusion mechanism to integrate these features is the challenging aspect of sentiment analysis. In this survey we have defined different modalities of sentiments, characteristicsand fusion techniques of multimodal data. This paper gives an overview of different approaches for and applications of multimodal system.

Keywords: *Multi-modal data, Sentiment Analysis, Opinion Mining.*

1. Introduction

Nowadays social media has become very convenient and easy mode for knowledge sharing in various forms like text, images, audio, video, etc. People are freely sharing their opinions with each other through different platforms such as Facebook, Twitter, YouTube, and Foursquare. This huge amount of available information is further analyzed to help e-commerce, political reviews, recommender system and etc. Airport service quality is examined by user generated content on social media using text based sentiment analysis (SA) [21]. SA aims to acquire people's attitude hidden in shared views oropinions. SA helps in improving teaching and learning process by analyzing student's feedback from textual comments [19, 20]. Nowadays twitter is gaining more attention from people and have potential to influence the traditional media. Twitter allows users to create and post short text messages in the form of tweets. These tweets are categorized into positive or negative score [22]. The accuracy of tweet's content plays an important role in critical incidents such as natural calamities or social issues. This can be achievedby incorporating machine learning techniques with sentiment analysis in order to minimize spreading of misinformation [23].

People are expressing themselves through verbal, facial expressions, modulating tone of voice or body gestures. All these means exhibit strong correlation to affective computing which influences the judgment about entity (product, service, aspects etc.) into consideration. A multimodal sentiment analysis leverages SA by incorporating expressions from different modality to infer user's intent behind it [27, 5]. It also works

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APPLYING VARIOUS MACHINE LEARNING TECHNIQUES FOR THE CLASSIFICATION OF WEB SERVICES: A SURVEY

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ABSTRACT: The task of allocating a category or class to a web service from the existing collection of web services is known as web services classification. Currently, manually discovering the desired web services from the repository or manually organizing the web services as per category is a challenging job. The reason behind this is the increasing number of web services that are registered to the repository. Hence, web service classification plays a significant role in web service technology and service-oriented architecture. There are numerous methods that can be implemented for classification of web services. The main emphasis of this study is reviewing the machine-learning algorithms that can efficiently classify web services to their respective category. This paper reviews the available research methods of web services classification. The research papers published between 2008 and 2020 are considered here for writing this survey paper. This paper explains various machine learning approaches for the classification of web services.

KEYWORDS: Service Oriented Architecture, Web Service, Universal Description and Discovery Integration (UDDI), SOAP, Web Service Description, Web Service Discovery, Web Service Description Language (WSDL), Web Service Classification, Naïve Bayes, SVM, kNN, PCA, SVD

I. INTRODUCTION

Service Oriented Architecture is a basic architecture design model that supports service computing. Service-oriented Architecture can be successfully implemented with the help of web service technology [67]. There are three entities involved in web service technology. These entities are service providers, service registry and service requesters. The provider ofservice develops a web service in the form of a WSDL document and thenregisters this web service to the UDDI service registry. The Service requester discovers the desired web services through this registry (i.e., UDDI). The present web service discovery [8] is built on the UDDI service matching framework [8]. In UDDI, service providers must assign categories manually to their web services from several predefined groups such as business, travel, communication, education, finance, etc. In UDDI, the web service needs to be assigned to its respective category at the time of registration of that web service. If the web service is categorized properly at the time of registration, it can be discovered in less time. This task of assigning an appropriate category to a web service is a challenging task because of increasing number of web services [53] andthe large number of existing categories in repositories of web services.

Methods for classifying web services automatically and semi-automatically have been proposed thus far (Bennaceur et al., 2012 and Sawant et al., 2014). This paper explains a detailed study of various web service classification methods. The remaining part of this paper is organized as follows: Section 2 covers the technology of web services. Section 3 covers the web service classification. Section 4 presents a detailed study ofreview of related work in the field of web service classification methods, and Section 5 concludes the paper.

II. WEB SERVICE TECHNOLOGY

Web service usage is the utmost proficient choice to implement Service-oriented Architecture and its strategic ideas. Service-oriented Architecture consists of 3 entities that interact with each other. These entities are service providers, service registry, and service requesters. The web service technology architecture is depicted in Figure 1.

Facilitating Secure and Efficient Health Information Exchange using Blockchain

Sagar Rane , Sanjeev Wagh , Arati Dixit

Abstract

In traditional health information exchange activities in India, most patient i.e. end user data is shared either through paper records or verbally. Transfer of patients between different hospitals across the country
ensues a transfer of medical information, which due to the above modes of transfer can get damaged or be only
partially communicated. Even though the above model allows low-cost and confidential mode of data sharing,
the paradigm increase in medical data over the years and the importance of accuracy in the transfer of such
information, requires for a similar low-cost, confidential as well as a secure and decentralized system for
medical record sharing. This paper proposes a blockchain-enabled ecosystem enabled with interplanetary file
system (IPFS) to surpass this challenge. We put forward an amalgamation of technologies primarily involving
smart contracts, to maintain a safe channel of medical records between the patients and healthcare providers.
Ethtereum blockchain is used to build a prototype of a mobile application available to both users and

Apparel Recommendation System using NLP and Deep Learning

Anup Kadam[1], Sagar Rane[2], Archana Saini[3], Karandeep Singh Bajwa[4], Ameet Rana[5] and Avinash Tiwari[6]

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3

Abstract: *Online shopping websites are growing rapidly all around the world. These websites rely heavily on recommendations systems for generating suggestions on the basisof user preferences. Most of the system proposed so far either uses the text based or image based methods. The individual techniques have certain drawbacks which can be overpowered if both the techniques are used in hybrid. In this paper, we present a comparative study of techniques proposed by different authors. Along with the techniques,the achievement and future scopes are also highlighted. Out of all the approaches, we opted for a variety of NLP techniques (bag of words, IDF, TF-IDF and word to vector) for handling the text based queries and CNN (transfer learning) to deal with image based queries.*

Keywords: Natural Language Processing (NLP), Inverse Document Frequency (IDF), Term Frequency (TF), Convolutional Neural Network (CNN).

1. Introduction

In recent years, the number of users of commercial websites, like Amazon, Myntra, Netflix, Youtube etc, has increased rapidly [9]. All of these e-commercial websites make great use of the recommendation system. With immensely growing data through electronics media, the user faces challenges in accessing the most suitableinformation. Though, this problem can be partially resolved with the help of information retrieval systems [8]. But, this approach does not include the user's preferences or any past history. So, it is highly required to have a good recommendation system because it becomes difficult for the user to find what they require. It can assist customers in choosing products from a variety of items. A website that generates relatable recommendations can increase customer satisfaction with products and eventually increases the sales and business [7].

However, the traditional recommendation systems are still struggling with the keyword matching methods [6]. To generate more user-relatable recommendations, image based recognition is also required [3][6][8]. Thus, a combination of textual and image based recommendation methods can be encapsulated to overcome the loopholes of individual techniques.

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A Survey of Audio Synthesis and Lip-syncing for Synthetic Video Generation

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Abstract

The fields like Media, Education and Corporations etc have started focusing on content creation. This has led to the huge demand for synthetic media generation using less data. To synthesize a high-grade artificial video, the lip must be synchronized with the audio. Here we have compared the various methods for voice-cloningand lip synchronization. Voice cloning procedure include state of the art methods like wavenet and other text-to-speech approaches. Lip synchronization methods describe constrained and unconstrained methods. Various recent research like LipGan, Wav2Lip are discussed. The methods are compared and the best method is suggested. Apart from studying and comparing the various methods, their drawbacks, future scopes, and application are also there. Different social and ethical issues are also discussed.

Received on 13 March 2021; accepted on 10 April 2021; published on 14 April 2021

Keywords: Video Synthesis, Voice Cloning, Lip Synchronization, Video Generation Application

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1. Introduction

The project is to make media generation and content more individual-focused, personalized. We aim to make Ads personalized such as by using the targeted user's name. Sending bulk personalized congratulations videos, celebrations videos, etc. The core of our research is to do audio synthesis is the speaker's voice using fewer data. At present media-generated is generic such as Ads we see, video emails we get, etc [1]. Our project purpose is to make generic media content specific to a user. The user will be provided with premium services where each video generated will be mailed to specific clients with custom content of the user. In this kind of service. The user will have to upload a file containing email addresses corresponding to each string. The Ad industry targets many ads on us through videos we see on social networks (Facebook, Instagram, Twitter, etc), video platforms (YouTube).

Deep learning has shown its potential in various fields using machine learning. One of the major usage of Deep learning is Text to Speech(TTS) [2]. Whilethe complete training of a single-speaker TTS model is technically a form of voice cloning, the interest rather lies in creating a fixed model able to incorporatenewer voices with little data. The common approachis to condition a TTS model trained to generalize to new speakers on an embedding of the voice to clone [3]. This approach is typically more data-efficient than training a separate TTS model for each speaker, in addition to being orders of magnitude faster and less computationally expensive. Interestingly, there is a large discrepancy between the duration of reference speech needed to clone a voice among the different methods, ranging from half an hour per speaker to only a few seconds. This factor is usually determining the similarity of the generated voice with respect to the true voice of the speaker. Apart from voice cloning, one more important feature is lip synchronization [4]. There have been many useful applications of lip syncing in making a perfect synthetic video. Generally application requires generic and speaker independent models. One more challenge which we face is different sizes of lips [5]. The audio and movement of lips go out of sync which makes an automatic generated video look absurd. Approximately, 1 sec out of sync lip movement is identified by the viewers. To remove this out of sync thing, we use lip-synchronisation technique.

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Multilabel Toxic Comment Detection andClassification

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***Abstract*— Toxic comments refers to hatred online comments classified as disrespectful or abusive towards individual or community. With a boom of internet, lot of users are brought to online social discussion platforms. These platforms are created to exchange ideas, learning new things and have meaningful conversations. But due to toxic comments many users are not able to put their points in online discussions. This degrades quality of discussion. In this paper we will check the toxicity of comment. And if the comment is toxic then classify the comments into different categories to examine the type of toxicity. We will utilize different machine learning and deep learning algorithms on our dataset and select the best algorithms based on our evaluation methodology. Moving forward we seek to attain high performance through our machine learning and deep learning models which will help in limiting the toxicity present on various discussion sites.**

Keywords— Toxic Comments, Natural Language Processing, Machine Learning, Deep Learning, Text Classification, Multilabel Classification

I. INTRODUCTION

There is increase in number of people using internet. Internet is main invention for 21st century. According to website , the number of internet users have increased from 1100 million in 2005 to 3969 million users in 2019 which is staggering 260% increase [1]. Hence, more people are using social networking and online discussion platforms.

There is also a huge shift the way internet is used. In the initial days of the internet, people used to communicate with each other through Email. But with a platform like social media, we see that people got a way to keep in touch with their long-lasting friends, meet new peoples having same interests and hobbies. We are now more connected than ever. Not only discussion of friends and people, but social media has also evolved to support business needs. With increase in services like gaming and live streaming, more velocity of comments is added to sites. Social media has broken down many of the communication barriers between different consumer groups as well as between individuals. Hence no doubt that social media sites such as Facebook, Twitter, Reddit, etc. have become billion-dollar companies.

Over these all years we have seen lot of instances where social media have played pivot role due to toxic comments and hatred. For example, Chief Minister of Uttar Pradesh State of India blamed social media like Facebook, Twitter, and YouTube for escalating tensions during communal conflict between Hindu and Muslim community in Muzzafarnagar, India in 2013 [2]. Kalamboli police on booked a man for abusing and threatening the police via a comment on a Facebook post [3]. Another example is of Riots that took place in DJ Halli, Bengaluru, India in 2020 over a provocative Facebook post against Islam that left 3 dead and many injured [4].

On January 6, 2021 US Capitol Riots took place by supporter of Donald Trump. Many extremists had posted on Social Networking sites posts such as “occupy the Capitol”, “bring revolution”, etc. before riots [5]. Hence, it is very important to detect such threats, hatred, toxicity on online discussion platforms and social networking sites. Because not doing so can cause violence, riots, prevent good debates, make internet an unsafe place and can affect people mentally.

Let us take an example of comment present in our dataset “Just shut up and stay shut. Don't edit anymore”, it can be easily identified that the phrases like “shut up”, “Don’t edit anymore”, etc. are negative and thus this comment is toxic. But it besides toxic we need to go through series of steps to classify comment using machine learning classification algorithms to verify type of toxicity of obtained results.

We will use different machine learning and deep learning models on our Data set which is made available by Conventional AI in Kaggle.com. In this paper we will use Logistic Regression and Support Vector Machine Models with TF-IDF Vectorizer, Long Short-Term Memory with Glove and Word2Vec Embedding. We have used all models on given dataset and compare their scores to find which one will be best.

The rest of the paper is arranged as follows. All the recent approaches being used for text classification and Natural Language Processing have been elaborated in

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Approaching Image Manipulation Detection using Yolov5

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***Abstract*—With the rise in digital media that has led to a more connected and informed society, has also come the proliferation of digital media sources. This in tandem with the wide adoption of image modification tools has created an acute problem of verifying the authenticity of images from unreliable sources. Moreover, advancements in deepfake technology can string together many images to create entirely new videos that are extremely realistic. These factors have led to the requirement of powerful tools that can determine fake images.**

Prior work on image manipulation detection has made progress and treated this problem as an image segmentation problem. We propose to consider this task as an object detection problem and create a model using Yolov5 architecture. We create a synthetic manipulated image dataset using PASCAL VOC Dataset [1] to train our model. We also document the test results on the synthetic dataset as well as the standard COLUMBIA Uncompressed Image Splicing Detection Evaluation Dataset [2] to provide a benchmark for future research in this field. Our results prove that Yolov5 can be used to learn rich features [3] to perform image forensics.

Keywords—Deep Learning, Machine Learning, Image Manipulation Detection, Deepfake Detection, Yolov5

I. INTRODUCTION

Advancements in Image modifying technologies have grown at an unprecedented rate worldwide. Software can easily be found to remove blemishes in photos, add make-up and to depict a perfect paradise.

With advancement in these seemingly benign technologies, there have also been advancements on the front of creating fake images and deepfakes. It is a matter of national security to be able to detect these maligned images and videos and prevent their spread before they can cause substantial harm. Some harmful uses of image tampering can be spreading misinformation, avoiding detection with fake ids and person impersonation by creating deepfakes depicting the person. In case of deepfakes, it is sometimes very hard to distinguish between a genuine video and deepfake by eye.

Therefore, we are interested in creating automated tools that can help us detect these tampered images. These tools have the ability to perform much better than the human eye as they can analyze images at the pixel level. They arecapable of analyzing the picture contrast, saturation, brightness, anomaly detection and other such techniques. They can also be used to augment human attention by pointing to the part of the image that is likely to be manipulated.

Various tampering tools are easily available over the internet. The most common tampering operations aresplicing, copy-move and removal.

1) Splicing: Some part of another image is pasted in the original image.

Fig. 1. Example of a Spliced Image. Here on the left is the original image, and to the right is the spliced image where a dove has been added.

2) Copy-Move: Some part of image is copied and moved within the image.

Fig. 2. Example of a Copy-Move operation. Here on the left is the original image, and to the right is the spliced image where the ball has been moved.

Development of speech recognition model for specially abled individuals

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***Abstract*—With the advancement of artificial intelligence and the computing community, it is now possible to efficiently diagnose depression and its severity. Speech has features that are useful for the various acoustic fields and one possibility is the diagnosis of depression. Feature selection and domain knowledge are the important aspects in designing and which also makes process time and labor consuming. Deep learned features based on neural nets have an edge over handmade features in terms of performance. In this paper, we will use deep learned features along with handmade features to effectively measure the severity of depression. We firstly built deep convolutional neural networks to learn deep learned features from raw speech waveforms and spectrograms. Secondly, we extract the texture descriptors known as median robust extended local binaries MRELBP (Median Robust Extended Local Binary Patterns) from waveforms and spectrograms. We then combine the raw and spectrogram DCNN (Deep Convolutional Neural Networks) to increase the depression recognition performance.**

I. INTRODUCTION

Depression and anxiety disorders are increasing day by day. A recent study after the COVID-19 pandemic shows that 1 in 5 people developing depression. Depression is a common mental disorder. difficulty thinking coherently, sadness, loss of interest in activities, changes in appetite and sleep patterns, loss of energy and increased thoughts of suicide are symptoms of depression.

Studies suggest that detection of depression at preliminary stages can aid effective treatment in a fleeting time. According to WHO (World Health Organization) depression is the fourth most mental disorder by 2020. People avoid getting to psychologists to get support for their mental disorders.

Depression is one of the difficult to diagnose disease because till now there is no such device or machine builtthat can accurately measure severity. The common diagnosis methodologies are assessments that rely on clinical judgements subjective patient self-report on symptom severity.

Deep learning has been successful in various fields. Both theoretical and practical knowledge suggests that deep learning can learn a lot of information from audiovisual sources. Deep learning has various variants such as probabilistic model, single layer learning, convolutional neural networks, and Autoencoders. So, in this work how spectrogram patterns of speech can benefit from the CNN (Convolutional Neural Network) on depression severity prediction.

In summary, first to effectively capture vocal information we develop an automated framework. Second, for estimating depression severity we find complementary characteristics between deep learned features and hand-crafted features. Third deep learned features and hand-crafted features are combined to measure the severity of depression from speech. Data augmentation is proposed to address problems with small samples.

The remaining paper is organized as follows earlier work on acoustic depression analysis is discussed in section 2, proposed framework and implementation details are discussed in section 3.Dataset and experimental results are discussed in section 4. And in section 5 conclusion, future scope and challenges are discussed. .

A. Related Work

Depression recognition sub challenge of the audio-visual emotion challenge and workshop has been the platform for researchers to publish various depression recognition approaches.

AVEC2013 and AVEC2014 datasets were used to develop regression models and AVEC2016 and AVEC2017 datasets were used for classification approaches. Recorded audio is used in these datasets.

Competitive audio-based models for measuring depression severity are described in the following section.

Researchers have used the AVEC2013 depression recognition dataset to extract audio baseline features by using the open-source openEAR (open-source Emotion and Affect Recognition) toolkit's feature extraction backend openSMILE.

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ANDROID OFFLOADING COMPUTING OVER CLOUD

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Abstract:In this fastest growing world of technology , usage of mobile phones has doubled to that of PC's . But the mobile phones are restricted because of the limited resources . Limited resources include CPU , battery and processing power(memory) . In this paper we are going to present a framework for offloading of those heavy tasks of mobile applications like Face Detection application on the cloud . By heavy tasks , tasks whose computation costs more in processing and time . It allows automatic offloading of heavy computation tasks to a standalone android virtual machine (cloud) . Different parameters are considered hereto declare whether a task has to be offloaded or not . These parameters are how much energy the task is consuming , remaining battery life of the mobile device on which application is running .

Index Terms – android , cloud , offloader

I. INTRODUCTION

Across the globe mobile phones are widely used . And with the growing usage several computation intensive applications are blooming in the market . As mobiles phones are becoming smarter there is a boom in these applications but the device is still limited as we cannot increase the capacity of mobile phones beyond certain limits . So as discussed in paper [1] we are switching to Mobile Cloud Computing . In the backend we have a complete support system to overcome these difficulties of efficiently running all these applications involving heavy tasks.Google photos and Apple iOS's Siri are examples of these code offloading techniques as discussed []. Many frameworks have been proposed since then . But most of them are not so convenient for developers working out there.In this paper we are proposing a framework for offloading of computation intensive tasks of applications(face detection application) with the use of an already existing framework as mentioned in paper [1] . We are offloading it to a remote server . The framework does not require any changes to be made in the android device side.The static analysis is done to make the decision making more fast and light than the previous techniques. This framework will empower the application to offload its compute intensive part to the cloud via the internet after analyzing the cost of offloading over the cost of running the application on the phone itself. The analysis will be done using parameters like input size and internet connectivity.
The remainder of the paper is organized as follows . In section II the existing technologies related to offloading and in section III we summarize the work done related to the idea we are working on . Section IV describes the design of the framework which we are proposing and all the architecture of our framework . The conclusion is presented in section VIII.

II. LITERATURE SURVEY

It is very vital to recognize the right technique with which we can go forward for our work .
So in this section we will be discussing some of already existing techniques about which we read in depth . There are several research works proposing different code offloading techniques for improving the application's performance and minimizing the energy usage by using resources in the cloud as done in paper[2]. They are discussed below:

1. MAUI provides method level code offloading for .NET applications. This is a realtime framework as it makes its decisions at runtime as mentioned in paper[2]. It offers energy-aware offloading from the mobile device to the remote infrastructure.The MIUI is more dependent on the hardware structure of its hosts and this leads to its drawback .Mobile devices typically have different CPU instruction architecture than desktops and servers. Processes cannot easily run on devices with different architectures when using MAUI.

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A Review on Exploring Clustering Algorithms for Partial Object Classification Problems Through Spatial Data Analysis Using Grid Dbscan Technique

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Abstract

Clustering is the most utilized method in data mining. Clustering expand the intra-cluster likeness and limit the inter clusters closeness. DBSCAN is the fundamental density based clustering algorithm. Cluster is characterized as areas of high density are isolated from locales that are less thick.DBSCAN algorithm can find clusters of arbitrary shapes and size in enormous spatial databases. Close to its ubiquity, DBSCAN has disadvantages that its most exceedingly awful time intricacy compasses to O (n2). Additionally, it can't manage differed densities. It is difficult to know the underlying estimation of information boundaries. In this investigation, we have examined and talked about some huge upgrade of DBSCAN algorithm to handle with these issues. We examined all the improvements to computational time and yield to the first DBSCAN. Lion's share of varieties embraced crossover procedures and use apportioning to conquer the constraints of DBSCAN algorithm. Some of which performs better and some have their own helpfulness and attributes.

Keywords*: Data Mining, Spatial databases, Clustering, DBSCAN, spatial data mining.*

INTRODUCTION

Clustering is a mainstream data examination strategy. Clustering algorithms can be broadly applied in numerous fields including: design acknowledgment, AI, picture preparing, and data recovery, etc. It additionally assumes a significant part in data mining. All the current clustering algorithms have their own qualities, yet in addition remain imperfect. As a sort of other clustering, density based algorithm is straightforward and high proficiency algorithm. Clustering is the way toward gathering the data into classes or clusters, so that objects inside a cluster have high likeness in contrast with each other yetare unlike items in different clusters. Dissimilarities are evaluated based on the property estimations depicting the articles. Regularly, distance measures are utilized. The field of clustering has gone through significant upset in the course of the most recent couple of many years; it has its underlying foundations in numerous regions, including data mining, measurements, science, and AI. Clustering isportrayed by progresses in guess and randomized algorithms, novel plans of the clustering issue, algorithms for clustering hugely huge data sets, algorithms for clustering data streams, and measurement decrease methods.

We study the prerequisites of clustering strategies for a lot of data and disclose how to register dissimilarities between objects spoke to by different quality or variable sorts. A few examinations inspect a great deal of clustering procedures, coordinated into the accompanying classes: parcelling strategies, progressive techniques, density-based strategies, matrix based techniques, model-based strategies, techniques for high-dimensional data, (for example, successive example based techniques),

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Research Article

Exploring Clustering Algorithms For Partial Object Classification Problems Through Spatial Data Analysis Using Grid Dbscan Technique

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Abstract: Spatial clustering analysis is a significant spatial data mining technique. It separates objects into clusters as per their likenesses in both area and traits perspectives. It assumes a fundamental function in density appropriation ID, hot-spot detection, and trend discovery. Spatial clustering algorithms in the Euclidean space are moderately adult, while those in the organization space are less well-informed. Spatial data mining is the use of data mining techniques to spatial data. Data mining all in all is the quest for concealed examples that may exist in huge databases. Spatial data mining is the discovery of intriguingthe relationship and qualities that may exist certainly in spatial databases. This paper planned to introduce a notable clustering calculation, named density-based spatial clustering of utilizations with clamour (GRID DBSCAN), to organize space and proposed another clustering calculation named network space DBSCAN (GRID-DBSCAN). For this reason, clustering is oneof the most important strategies in spatial data mining. The principle bit of leeway of utilizing clustering is that fascinating structures or clusters can be found straightforwardly from the data without utilizing any earlier information. This paperpresents an outline of density based strategies for spatial data clustering.

KEYWORDS: Clustering, DBSCAN, Density- based method, Data Mining, Network Spatial Analysis, Spatial Data Mining

Introduction

Clustering is the way toward gathering the data into classes or clusters, so that objects inside a bunch have high likeness in contrast with each other however are unlike items in different clusters. Dissimilarities are surveyed based on the property estimations portraying the items. Regularly, distance measures are utilized. The field of clustering has gone through significant transformation throughout the most recent couple of many years; it has its foundations in numerous territories, including data mining, measurements, science, and AI. Clustering is described by propels in estimate and randomized algorithms, novel definitions of the clustering issue, algorithms for clustering greatly enormous data sets, algorithms for clustering data streams, and measurement decrease techniques. Clustering is a division of data into gatherings of comparable articles. Each gathering, called bunch comprises of items that are comparative among themselves and unlike objects of different gatherings. Speaking to data by less clusters essentially loses certain fine subtleties (likened to lossy data pressure), yet accomplishes rearrangements. It speaks to numerous data objects by couple of clusters, and thus, it demonstrates data by its clusters. Data demonstrating places clustering in a recorded viewpoint established in science, insights, and mathematical analysis. From an AI viewpoint clusters compare to concealed examples, the quest for clusters is unaided learning, and the subsequent framework speaks to a data idea. Consequently, clustering is unaided learning of a concealed data idea. Data mining manages enormous databases that force on clustering analysis extra serious computational necessities. These moves prompted the development of amazing comprehensively material data mining clustering strategies overviewed underneath.

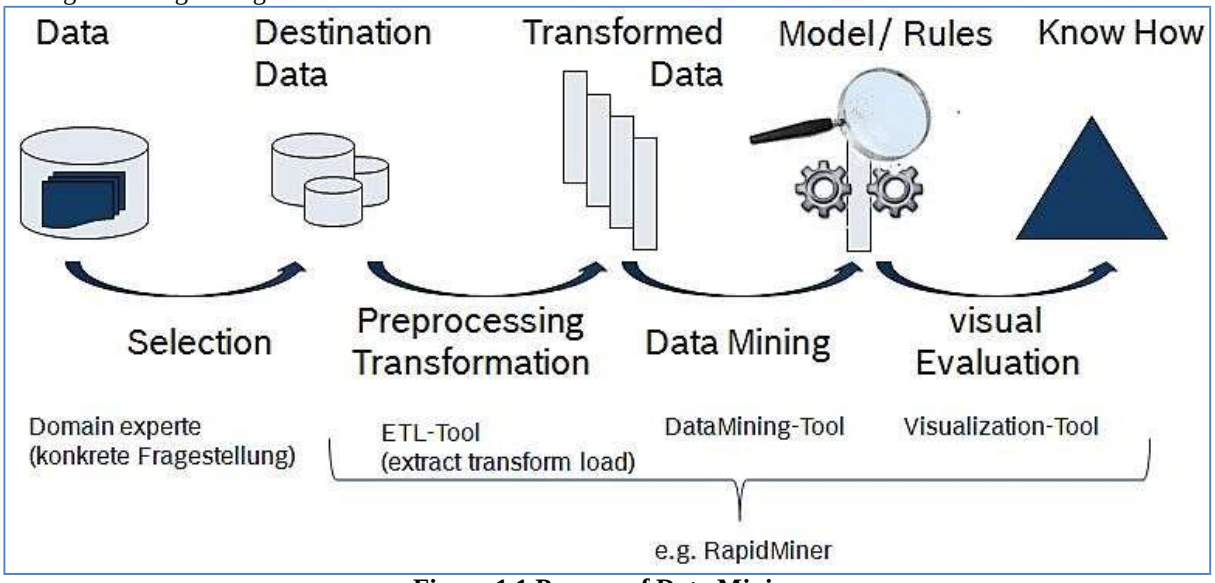

Figure 1.1 Process of Data Mining

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Authors: Gajanan Madhavrao Walunjkar, Anne Koteswara Rao, V. Srinivasa Rao Authors Info & Claims

ARTICLE

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0 0

Feedback

Abstract

Effective disaster management is required for the peoples who are trapped in the disaster scenario but unfortunately when disaster situation occurs the infrastructure support is no longer available to the rescue team. Ad hoc networks which are infrastructure-less networks can easily deploy in such situation. In disaster area mobility model, disaster area is divided into different zones such as incident zone, casualty treatment zones, transport areas, hospital zones, etc. Also, in order to tackle high mobility of nodes and frequent failure of links in a network, there is a need of adaptive routing protocol. Reinforcement learning is used to design such adaptive routing protocol which shows good improvement in packet delivery ratio, delay and average energy consumed.

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Biomedical application of carbon nanotubes (CNTs) in vulnerable parts of the body and its toxicity study: A state-of-the-art-review

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Abstract

Carbon nanotubes are known for its distinctive, newer generation, unique materials for its appealing properties. They have excellent high surface area, high biocompatibility, and flexibility, electrical, mechanical and thermal properties which can be customized and functionalized on the basis of the materials. The use of such materials in biomedical field is on demand. The application of carbon nanotubes in biomedicines has been saving the lives of human race. When CNTs merged with organic materials developed better alternative in the field of biomedicines. In present review the applications of carbon nanotubes in biomedical field has been discussed with special references to sensitive area of the body. These diagnostic applications cover nervous tissue regeneration, neural scaffolds, Myocardial Conduction, and tissue engineering, cancer treatment etc. Toxicities of CNTs and factors effective to carbon nanotube applications were discussed in the review.

Introduction

Increasing biomedical problems in humans leads to new materials. Carbon nanotubes are acting as good candidate for biomedical treatment. It has able to sever an alternative synthetic material which could combine with organic materials for better and improved results. As we all know that Carbon nanotubes (CNTs), are cylindrical in shape with C–C distance around *1.43Å*, interlayer distance is around *3.45Å*, and each carbon is having sp2 hybridization. As carbon nanotubes are already been used in various medical field but in this review CNTs use at very sensitive part of the body for diagnostic applications has been discussed such as nervous tissue regeneration, neural scaffolds, Myocardial conduction, and tissue engineering, cancer treatment etc [1], [2], [3], [4], [5], [6], [7], [8], [9].

Carbon Nanotubes are used in several other fields such as thermal conductivity devices, energy storage devices, conductive properties, adhesive, thermal materials, structural application etc. CNTs have appealing properties such as excellent high surface area, outstanding mechanical properties and light in weight, MWCNTs (Multi Walled Carbon Nanotubes) ability to bend, flexibility, and its strength measured by various scientists was around the value of 14.3 ±0.9 GPa. It has aspect ratio covering high surface area, hollow from inside, hydrophobicity,high biocompatibility, good electrical and mechanical properties. Out of all allotropes of carbon, CNTs and Graphene are significant ones. CNT is thin film rolled as cylinder like 3D tube and Graphene is a 2D material in a single layer.CNT because of its rolled structure is able to act as carrier materials for drug delivery and act as superconductor. Important Physical and Mechanical Properties of Graphene and CNTs have been discussed in Table 1 [10].

Solubility of CNTs, both in organic and aqueous vehicles, can be customized and functionalized on the basis of the materials. CNTs are used because of the specific properties such as high Chemical reactivity, better surface are easily improved by using biomaterials. Biomaterials are developed through nano-materials like CNTs. Other nanomaterials used in this regards are graphene and graphene related materials etc. The biomolecules like nucleic acid, protein, and peptides interact with the CNTs through functionalize (chemically modify) and improve the properties of CNTs for biomedical application, Human cells are found to be grown on CNTs and they are nontoxic in nature. Carbonnanotubes(CNTs) possess remarkable distinct properties which make them good candidate in biomedical application such as good electronic properties, extremely penetrating capability on the cell membrane, elevateddrug-loading and pH-dependent therapeutic use, reception capacities, thermal properties, huge surface area and trouble-free modification with molecules, which cause to be as useful material [11].

Dr. S. Tiwari

CONNECTIVITY OF SINGLE-ELEMENT COEXTENSIONS OF A BINARY MATROID

GANESH MUNDHE[1] AND Y. M. BORSE[2]

ABSTRACT. Given an n-connected binary matroid, we obtain a necessary and sufficient condition for its single-element coextensions to be n-connected.

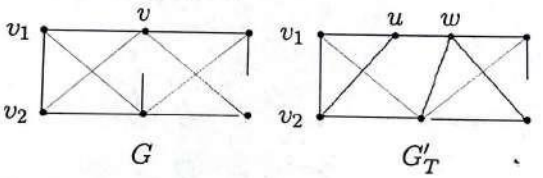
Keywords: coextension, element splitting, point-splitting, binary matroids, n-connected
Subject Classification (2010): 05B35, 05C50

arXiv:1812.01218v1 [math.CO] 4 Dec 2018

1. INTRODUCTION

For undefined terminologies, we refer to Oxley [6]. The point-splitting operation is a fundamental operation in respect of connectivity of graphs. It is used to characterize 3-connected graphs in the classical Tutte's Wheel Theorem [9] and also to characterize 4-connected graphs by Slater [8]. This operation is defined as follows.

Definition 1.1 ([8]). *Let G be a graph with a vertex v of degree at least $2n-2$ and let $T = \{vv_1, vv_2, \ldots, vv_{n-1}\}$ be a set of $n-1$ edges of G incident to v. Let G'_T be the graph obtained from G by replacing v by two adjacent vertices u and w such that u is adjacent to $v_1, v_2, \ldots, v_{n-1}$, and w is adjacent to the vertices which are adjacent to v except $v_1, v_2, \ldots, v_{n-1}$. We say G'_T arises from G by n-point splitting (see the following figure).*



Slater [8] obtained the following result to characterize 4-connected graphs.

Theorem 1.2 ([8]). *Let G be an n-connected graph and let T be a set of $n-1$ edges incident to a vertex of degree at least $2n-2$. Then the graph G'_T is n-connected.*

In this paper, we extend the above theorem to binary matroids.
Azadi [1] extended the n-point splitting operation on graphs to binary matroids as follows.

Definition 1.3 ([1]). *Let M be a binary matroid with standard matrix representation A over the field $GF(2)$ and let T be a subset of the ground set $E(M)$ of M. Let A'_T be the matrix obtained from A by adjoining one extra row to matrix A whose entries are 1 in the columns labeled by the elements of T and 0 otherwise and also having one extra column labeled by a with 1 in the last row and 0 elsewhere. Denote the vector matroid of A'_T by M'_T. We say that M'_T is obtained from M by element splitting with respect to the set T.*

For example, the following matrices A and A'_T represent the Fano matroid F_7 and its element splitting matroid with respect to the set $T = \{1,2,3\} \subset E(F_7)$.

$$A = \begin{array}{c} \begin{matrix} 1 & 2 & 3 & 4 & 5 & 6 & 7 \end{matrix} \\ \begin{pmatrix} 1 & 0 & 0 & 1 & 1 & 0 & 1 \\ 0 & 1 & 0 & 1 & 1 & 1 & 0 \\ 0 & 0 & 1 & 1 & 0 & 1 & 1 \end{pmatrix} \end{array}, \quad A'_T = \begin{array}{c} \begin{matrix} 1 & 2 & 3 & 4 & 5 & 6 & 7 & a \end{matrix} \\ \begin{pmatrix} 1 & 0 & 0 & 1 & 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & 1 & 1 & 1 & 0 & 0 \\ 0 & 0 & 1 & 1 & 0 & 1 & 1 & 0 \\ 1 & 1 & 1 & 0 & 0 & 0 & 0 & 1 \end{pmatrix} \end{array}.$$

Given a graph H, let $M(H)$ denote the circuit matroid of H. A matroid N is a *single-element coextension* of a matroid M if $N/e = M$ for some element e of N.

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Performance Analysis of 8 X 8 MU-MIMO in Uplink of LTE-A

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ABSTRACT: The 3rd Generation Partnership Project (3GPP) uses radio access technologies Long-Term Evolution (LTE), and its advanced version, LTE-Advanced (LTE-A). Release-10 of 3GPP standards is called as LTE - A. As per the definitions of the International Telecommunication Union (ITU), it will be considered as a 4G technology because of its attainable performance. LTE/ LTE-A are rising communication technologies in transit toward 5Gcommunication systems. In this paper performance analysis of MU-MIMO is carried out in LTE-A uplink. Thisresearch work deals with investigations based on the performance analysis comparison of Turbo coded MU - MIMO in LTE-A networks using Zero Forcing (ZF) and Minimum Mean Square Error (MMSE) receiver and tap delay channel models like VehA and VehB. Uplink throughput is evaluated in terms of Signal to Noise Ratio (SNR) with antenna configuration of 2 × 4 × 8 for uplink transmissions using MATLAB simulation and compared.

Keywords: MU – MIMO, LTE, LTE-A, VehA, VehB, Uplink.

I. INTRODUCTION

3GPP LTE-A standard used to increase peak data rates up to 1Gbps for low mobility and 100Mbps for high mobility scenario. The aim of the high data rate is to support advanced services and applications [1]. These striving targets can be accomplished with the help of MIMO and OFDM techniques together as a MIMO-OFDM [2]. But still, because of high peak to average power ratio (PAPR) of the transmitted signal OFDM is not acceptable for the uplink transmission. Single carrier frequency division multiple access (SC-FDMA), also known as DFT-Spread OFDM (DFT-S-OFDM), has been adopted by 3GPP as the LTE uplink multiple access scheme [3].

Uplink MIMO transmission has been presented in 3GPP LTE and LTE-A standards to increase spectrum efficiency. In order to boost this spectrum efficiency user equipments (UEs) have less number of antennas than base station (eNB) antennas. One of the key MIMO strategy to acknowledge rapid transferring is spatial multiplexing (SM). With SM, multiple layers of data can be transmitted simultaneously in the same set of frequency-time resources. Up to four layers SM can be supported by the specifications of LTE-A, which increase the peak data rate of LTE-A uplink from 75 Mbps to 300 Mbps. Both SU-MIMO and MU-MIMO can be used. And for MU-MIMO, each of the co-scheduled UEs may transmit multiple layers of data as well. LTE and LTE-A both adopt single-carrier frequency-division multiple access (SCFDMA) in the uplink.

In MU-MIMO similar resources are used by multiple users and transmitted at the same time. At the receiving end these transmitted signals are divided in spatial domain. In Release 10 LTE – A allows 4 × 4 MIMO in uplink transmissions with number of receiving antennas at eNB are more than number of transmitting antennas at UE. This combination of MU – MIMO gives significant increase in sum throughput [4, 5]. Linear receivers and interference cancellation receivers are used with this type of arrangement in order to increase sum throughput [6-8]. In case of linear receivers to resolve all receiving signals at eNB, number of users with single transmitting antennas should not be greater than number of receiving antennas at eNB [9]. In a cell if number of UEs are greater than the number of receiving antennas at eNB then problem of scheduling arises [8, 10].

In LTE-A, link adaption is used if UE is with single transmitting antenna. In case of link adaption, Modulation and Coding Scheme(MCS) adapts Channel State Information (CSI).

This quantized CSI is in terms of feedback from eNB to all scheduled UEs as a Channel Quality Indicator (CQI), is explained in [11]. The spatial as well as multipath diversities were exploited in [12] with the help of multi band MIMO coding context in UWB schemes. The study of LSE and MMSE estimators in case of block style as well as comb style pilot preparation are carried out in [13].

Existing LTE-A system uses 4 × 4 MIMO for uplink transmission. In this paper, the advantage of spatial multiplexing among antenna are taken into account, and 8 × 8 MIMO for uplink transmission is proposed. This proposed system is compared with ZF and MMSE receiver in VehA and VehB channel. This system performance is analysed in terms of cell throughput. The organization of the paper is as; the UL MU-MIMO system model is discussed in section II, LTE uplink signal processing is explained in section III, Algorithm in section IV, Simulation parameters are given is section V, Results and discussion in section 6 and work is concluded in section VII.

II. UL MU – MIMO SYSTEM MODEL

The proposed MU – MIMO scheme which is used in uplink of LTE-A is as shown below.

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GWO Based Optimal Channel Estimation Technique for Large Scale Mimo in LTE Network

Rajashree A. Patil, P. Kavipriya, B. P. Patil

Abstract: ***The Wireless Systems Are Employed With More Number Of Antennas For Fulfilling The Demand For High Data Rates. In Telecommunication, Lte-A (Long Term Evolution-Advanced) Is A Well-Known Technology Intended For Wireless Broadband Communication Aimed At Data Terminals And Mobile Devices. Multiple Input Multiple Output (Mimo) Technology Is Used By Lte Which Is Also Known As Fourth Generation Mobile Networks To Attain Very High Data Rates In Downlink And Uplink Channels. Though The Mimo Systems In Massive Mimo Are Provided By Multiple Antennas, The Design Of The Appropriate Non-Erroneous Detection Algorithm Is A Major Challenge. Also, With The Increase In Quantity Of Antennas, The System's Spectral Efficiency Begins To Degrade. So As To Deal With This Issue, A Proper Algorithm Has To Be Utilized For Channel Estimation. The Bio Inspired Algorithms Have Shown Potential In Handling These Issues In Communication And Signal Processing. So, Grey Wolf Optimization (Gwo) Algorithm Is Used In This Approach To Estimate The Most Optimal Communication Channel. Also, The Spectral Efficiency And Data Capacity Are Enhanced Using The Presented Approach. The Proposed Approach's Performance Is Compared With The Existing Approaches. The Simulation Result Exposes That The Presented Channel Estimation Approach Is Far Better Than Existing Channel Estimation Approaches In Performance Metrics Such As Bit Error Rate, Minimum Delay, Papr, Spectral Efficiency, Uplink Throughput, Downlink Throughput And Mean-Squared-Error.***

Keywords: ***Channel estimation, large scale MIMO, LTE, channel matrix, Wireless communication, antenna, Grey Wolf Optimization, Mean-Squared-Error and spectral efficiency.***

I. INTRODUCTION

LTE is internet protocol based network that provides higher throughput, best handoff capabilities and wider bandwidth when compared with third generation networks. Increase in demand of higher data rates in mobile devices has resulted in the introduction of MIMO systems in LTE. The mobile terminal's antenna is the main key element in MIMO system that can have its effect on the overall performance of the MIMO link. LTE MIMO is capable of using the multiple path propagation that provides enhancement in the performance of the signal on using multiple antennas.

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Though LTE MIMO makes the system complex, it also is capable of providing some crucial enhancements in spectral efficiency and performance. An antenna technology for a wireless communication where both the source also known as transmitter and destination also known as receiver uses multiple antennas is known as MIMO (multiple inputs, multiple outputs). For minimizing the errors and for optimizing the speed of data, the antennas at the each end will combine. A large scale antenna systems is an extension of MIMO wherever the antenna at both ends (transmitter & receiver) are grouped together for attaining improved throughput and improved spectrum efficiency in a wireless communication system [1]. While using massive MIMO, it has features such as; TDD (time-division duplex) operation. Linear processing, Favorable propagation and scalable. In massive MIMO, it has the following challenges; Unfavorable Propagation, Pilot Contamination. New Designs and Standards are needed and Channel estimation for both TDD and FDD system protocols [2]. Channel estimation is one of the major challenges in a large scale MIMO. In base station (BS) it is necessary for valuing CSI (channel state information) for both protocols (TDD & FDD) for minimizing the overhead of the pilot and for improving the energy and spectral efficiency to enhance the overall performance of an large scale MIMO (massive MIMO) [3] . In TDD during the channel estimation process of uplink, the base station requires the CSI for identifying transmitted signal and that is estimated on base station with minimum k channel use. During downlink transmission in TDD, BS needs to perform precoding of the transmitted signal [4]. Based on received pilot signals, every user estimates the effective channel gains that requires minimum k channel use [5]. During the channel estimation in FDD, the BS has to perform precoding of the CSI previously communicating it to k user for downlink transmission.
The channel based received pilots are estimated by every user that requires M channel for both the transmission [6].
The BS has to decode the transmitted signal by using CSI from the k signal in the uplink transmission. Then depending on received pilot signals that require minimum k channel use, the BS estimates the channels [7]. Hence the channel estimation is required for large scale MIMO (massive MIMO) for enhancing the overall performance and increases the both energy efficiency and spectrum efficiency. In case of massive MIMO scheme, it is required for minimizing the overhead of the pilot overhead [8].
An elaborate survey has been performed for identifying the different research articles available in the literature in the area of large scale MIMO and channel estimation for analyzing the crucial contribution and its merits.

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A Fast and Optimized Architecture to Perform Multi-Bit Permutation Operation

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Abstract

The advanced bit processing operations implemented in the microprocessors and microcontrollers very inefficient. Normally programming techniques are used to emulate the complex bit-related operations. The bit manipulation functions are every now and then required in the areas that are eventually becoming very important. This paper is proposing a techniques which can directly support these bit operations in the form of multimedia shifter unit that can implement standard shifter operations in microprocessors and controllers. The design of the proposed shifter unit is based on the butterfly and inverse butterfly circuits. We show how the proposed design for new shiftes can implement the standard multi-bit scatter and deposit functions found in some processors. The technique proposed in this paper for performing the two operations is based on only Mux. The design of Shifter-Permute functional unit is very challenging work towards its power consumption, speed and area. We have implemented 8-bit Shift-Permute functional unit for bit manipulation and have analyzed the proposed design with the existing design in terms of power consumption, speed and area. Here the circuits are implemented and analyzed by using VHDL and is synthesized by using Xilinx ISE and the targeted device used is Vertex 4 FPGA xc4vlx15-12-sf363 and the same is reflected in the mathematical model purposed for each circuit.

Keywords

Control Unit, Data Reversal, Deposit, Extract, Multiplexer, VHDL.

Introduction

Todays general purpose processors are designed with special instructions for multimedia applications [1]. They are provided with larger sets of multimedia instructions as compared to the earlier generation processors. Consequently, providing efficient multimedia hardware has become an important design task.[12] The multi-bit scatter and gather operations for microprocessors and microcontrollers have not been considered and implemented thoroughly as integer and floating-point arithmetic and data transfer operations. The design of the microprocessors is basically around the processing of words. This is the main reason that bit-level operations are typically not as well supported by current word-oriented microprocessors and microcontrollers.[11] AND, OR, XOR and NOT are the basic bit-oriented logical operations implemented by the Arithmetic Logic Unit (ALU), which is a very important functional unit of a controller or a processor. The very regular operations like shift and rotate where all bits in an operand change their place by the same value, are typically supported by a separate shifter functional unit.[3] [4] [9]

The emerging applications, like biometrics, imaging and cryptography need advanced multi-bit manipulation operations. These bit-manipulation operations can be implemented in a single circuit using only multiplexers or demultiplexers or circuit including both.

Parallel scatter operation can be performed only with the butterfly network and that parallel gather operation can be performed only with the inverse butterfly network.[2][11]

1. Parallel Deposit [11]

This design circuit is explained by Yedidya[11]. The structure of the butterfly network is shown in Figure 1. The rightmost bits from the source register are scattered in the destination register according to a mask bits in the mask register. The i-bit network consists of log(i) stages. Each stage is designed using i/2 two-input multiplexer, for a total of i×log(i) multiplexers as shown in figure 1. In the n^{th} stage, the paired input bits to a switch are i/2n positions apart for the butterfly network and 2n−1 positions apart for the inverse butterfly network. A switch either passes through or swaps its inputs based on the value of a control bit. Thus, the operation requires i/2 × log(i) control bits.

Control bits for 8-bit input, for each stage are calculated as follows:

1st Stage:

- The mask bits are divided in two parts, L and R, each 4-bits.
- Number of 1's in the R are counted i.e. from I_3 to I_0= count.
- Left rotate and complement (LROTC) of '0000' is done depending on the value of count.
- This generates the control bits= S_{03} S_{02} S_{01} S_{00}

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Design and Implementation of Robust Navigation System Platform for Autonomous Mobile Robot

Deepak Kumar Yadav, Bharat Prasad Dixit, Pankaj Yadav, Gajanan R Patil, Jayesh Jain

Abstract: *An autonomous robot can navigate in a given region and reach to a specified location. The navigation system for these robots has to be reliable, versatile and rugged. In this paper, design and development aspects of such navigation system are discussed. A two level architecture is proposed for navigation of the autonomous robot. The low level controller (LLC) generates odometry data and implements closed loop feedback based PID algorithm. The high level controller (HLC) is used to generate velocity commands based on the path planned and inputs sensed from environment. The two controllers continuously exchange data with each other to reach the final destination. This navigation system platform can be used to develop autonomous mobile robots.*

Keywords: *Autonomous Mobile Robot, PID, Odometry, Robotic Operating System (ROS), High Level Controller (HLC), Low Level Controller (LLC).*

I. INTRODUCTION

Autonomous robot navigation has attracted attention of many researchers in the areas of robotics and autonomous systems. The robot is required to reach a specified location in an known or unknown environment [1]. There are number of challenges while designing the navigation system which include unknown and dynamic environment, limitations due to sensor capabilities and lack of efficient navigation algorithm. Moreover these robots are used for different applications hence the design has to be application specific. For example, an autonomous beach cleaning robot design is discussed in [2]. There are number of other applications of robot navigation like manufacturing automation, explosive detection, automation in malls etc. Our aim is to design and develop a navigation system platform which can be utilized in any autonomous robotic application. This will make the development of autonomous mobile robots faster and cheaper. For design of navigation system platform we need to have appropriate control systems. Such control systems are supposed to have control algorithms that will make mobile robots successfully moving over a rugged surface, avoid obstacles, follow a path as a coordinates given by a user. In this paper the design and simulation of reliable and robust navigation system for autonomous mobile robots is proposed. The navigation system described here is a part of general purpose mobile platform to be developed.

The rest of the paper is organized as follows. Section II gives related work in this area. Section III describes detailed architecture of the autonomous mobile robot. Section IV gives details about navigation system. Section V has discussion on implantation and testing. Finally section VI gives conclusion and future scope.

II. RELATED WORK

The navigation problem involves various subtasks such as path planning, collision detection, search algorithms, environment representation etc. A detailed review of these aspects and research challenges is given in [3]. Navigation system can be implemented for known or unknown environment. The latter is more challenging. The early navigation systems for intelligent mobile robots [4] used ultrasonic range sensors. Experimental study of outdoor navigation system using GPS is presented in [5]. Researchers also have attempted to replicate navigation of a robot in cyber world to real world [6]. Implementation and testing of localization and navigation of indoor mobile robot is discussed in [7]. Several control algorithms for autonomous navigation are available in literature. One such simple algorithms using PID controller can be found in [8].

III. SYSTEM ARCHITECTURE

A mobile robot consists of an on board computer or microcontroller to perform various operations related to navigation of the mobile robot. It collects data from different sensors connected to it. There are two motors mounted with rotary encoders for differential drive robot. They are used to measure rpm of the motors which helps in calculating distance travelled by the mobile robot. A two level architecture is used to collect information of the current position of the robot and surrounding environment. The HLC is interfaced with Inertial Measurement Unit (IMU), 2D laser and the user device. IMU collects the directional values which are used to measure angular displacement and orientation of the mobile robot. The calculated distance & angle together is used to localize the mobile robot & further navigate to its next location.

Fig. 1 shows the block diagram of the autonomous mobile robot.

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A Wavelet Based Hybrid Threshold Transform Method for Speech Intelligibility and Quality in Noisy Speech Patterns of English Language

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Abstract
The paper proposes a method to improve the performance of speech communication system in a highly noisy industrial environment. For the improvement, different speech signals are considered which includes signals from different environments such as car noise, railway station, babble noise, street noise which are corrupted with additional noise as input data set for processing. This database is processed using suitable filters which will remove the effect of noise to some extent. Different algorithms have been proposed to minimize the effect of noise to a certain limit. The denoising algorithms are generally the different wavelet thresholding method which removes the noise from the speech signal. Many researchers have worked on soft and hard thresholding for image processing. The proposed method of hybrid thresholding comprises of both soft and hard thresholding process which is comparatively better method than the previous methods. The method can be implemented for the non-stationary noise and it also removes the problems of edges. Unlike the traditional way of using single value, different values are used for the adaptive filtering to remove the edges. During the course of experiments, the dataset of IIIT-H with a set of noisy files from Noizeus and AURORA database having sampling rate of 16 kHz has been used. Results are calculated with subjective and objective measures for fine and broad level quality assessment. SNR, SSNR, PSNR, NRMSE, and PESQ parameters are used as performance parameters and outperform with other combinations as compared to conventional methods. The hybrid threshold method yields better results with significant improvement in speech quality and intelligibility.

Keywords Speech enhancement · Speech patterns · Wavelet transforms · Signal to noise ratio SNR · Mean square error MSE · Peak signal to noise ratio PSNR

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Optimization Of Battery - Ultracapacitor For Electrically Operated Vehicle For Urban Driving Cycle In India

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Abstract: Depleting fossil fuels will be a major challenge in front of coming generation. This is going to hit the transportation sector heavily. Compressed air vehicles and electric vehicles are seen as viable solution for future transportation. Electric vehicle system can be implemented from small vehicle to very large transportation system like train or aeroplane. Use of ultracapacitor is inevitable in most of the electrically operated vehicle as it is the only way to supply pulse current requirement of electric motor. Electrical energy storage is as persistent problem in electric vehicle. Battery has its limitations. Use of battery- ultracapacitor combination is most viable option. Optimization of battery- ultracapacitor rating is addressed in this paper.

Index Terms: Ultracpacitor, Battery, Electric Vehicle, urban transpiration

1 INTRODUCTION

Electric transportation is at tipping point. Use of more electric vehicles presents new challenges in energy storage devices and their effective unitization. Existing IC engine based vehicles, hybrid vehicles also uses battery. Use of ultracapacitor is considered only for starting of vehicle as this device is pulse current device[1]. Energy density of ultracapacitor has increased considerably by various improvements in electrode, electrolyte and separator materials through modelling approach [2],[3]. Development of any new device/ product involves system formation, material selection, optimization of material/ process, prototype development and then final product manufacturing [4],[5]. It is often found that manufacturing requirements / issues are neglected at design and development stage which results in failure of commercialization of the product [6],[7].Use of only battery lead to over sizing of this device in electric vehicles which is sensitive to self weight[8]. Photovoltaic charging of ultracapacitor has been very effective in automobile application [9]. Use of desulphesion in lead acid battery has been investigated [10]. Ultimately goal of all scientific community, researchers and industry is to reduce stresson battery used in electrically operated vehicles [11]. Reduced maintenance and cost with improvement in the life is achieved by this. Pulse current is just not required at the time of starting but it is also required to give extra push to motor during top speed operations and acceleration. High speed and quick acceleration are quite common in urban and rural drive cycle. Such conditions are more predominant in urban drive cycle at peak hours i.e at 9am and 5pm. There is possibility that charged ultracapacitor can help battery to give extra power to electric motor during every high acceleration apart from helping battery in every starting.

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This paper presents study related to use of ultracapacitor in high acceleration during urban drive cycle. Optimization of size of ultracapacitor and battery is investigated by using peak hour urban drive cycle developed through trials on actual vehicle. Standard mathematical equations are used for energy and power calculations. In short, this paper attends to optimization of battery ultracapacitor combination for electric vehicle in Indian road conditions. This paper is organized as follows: Section 2 is based on drive cycle data collection. Section 3 is about use of ultracapacitor in electric vehicle. Section 4 presents the optimization of battery ultracapacitor combination of electric vehicles mainly running in city driving conditions. Section 5 has concluding remarks.

2 Drive Cycle Data Generation

Typically drive cycle data consist of speed variation with respect to time. This data can give us the acceleration and retardation information. It can also give us information regarding distance covered and other parameters of vehicle. Some standard drive cycles are available, requires to be periodically updated. Geographical conditions of road due to construction of flyovers, underground tunnels and grade separators are changing. Introduction of dedicated lanes for public transport is gaining momentum. This is affecting the movements of private vehicles. Improvement of road surfaces from tar based to concrete and plastic based is also causing changes in pattern of vehicle movements. In some cases, there is hardly any change Insome cases road condition is not changing but there is change in population density, this is slowing down the vehicle movements. Drive cycle data in growing urban areas where there is drastic growth in vehicle density is heavily dependent on time at which data is collected. This time dependency can be easily experienced in metropolitan cities around the globe. Unpredictable weather conditions are also affecting the drive cycle data. Drive cycle data is also dependent on type of vehicle use for data collection. Due to heavy competition in automobile industries, vehicles with wide range in terms of engine capacity and size can be seen on road Hence it was decided to collect the derive cycle data for optimization of battery ultracapacitor combination in electric vehicle. Pune is a city with heavy vehicular traffic of two wheelers, three wheelers. Number of four wheelers and multi axle vehicles are growing in recent

Applications Of Ultra Capacitor In Indian Vehicles

Vishnu Kokate, RM Holmukhe, PB Karandikar, Saurabh, Nidhi Yadav

Abstract: Presently self-start two-wheelers, including motorcycles and scooters between 50 - 200 cc capacities, use standard lead-acid battery of 5, 9 and 12 Ah rating as the energy source. A battery is a well-known energy source, but it cannot supply a large amount of power in a short time. The size of the battery is decided based on the starter motor requirement. Further, deep discharge at the time of cranking reduces the life of the battery drastically as compared to normal use. Also, an extra factor of safety is provided for cold weather cranking performance, poor maintenance and end of live performance in view of deep discharge. Hence the battery becomes heavy and bulky. On the other hand, Ultra-capacitors can supply a large burst of power for short time but cannot store much energy, hence a limited number of starts. Decentralized Ultra-capacitors network is another major advantage in the future of automobile sector.

Index Terms: Battery, Solar–Panel, Self–Start, Ultra-Capacitors, two-wheeler, Decentralized Network,

1. INTRODUCTION

In the recent past, with the increase in purchasing power of Indian customer, preference for two-wheelers fitted with Starter Motor is on the increase. More than 25% of the two-wheelers manufactured, that is about 2 million two-wheelers manufactured till 2007, are with the starter motor. Also, two-wheelers of more than 150cc are fitted with starter motor as kick-starting and such engine is physically demanding on the part of the customer [1],[2]. In response to the changing global landscape, energy has become a primary focus of the major world powers and scientific community. There has been great interest in developing and refining more efficient energy storage devices. There is various electrical power storage device but, the battery is the most common electrical storage device used in vehicles [3]. Ultra-capacitor is one of the power storage devices used in vehicle hence it has emerged with the potential to facilitate major advances in energy storage. Ultra-capacitor is a new technology in India as compared to developed countries. It is pulsed current device and it can be used in almost all automobiles which are operating on the conventional energy source [4]-[6]. Ultra-capacitor technology is emerging technology in which very few scientists are working around the globe. USA, Germany, Australia have taken initiative in this research area. Maxwell, Evans, Epecos are only a few companies of USA, Europe, China, Japan in the world who have commercially made this product available in the market. Vehicles like two-wheelers are being the best transportation for a common man in developing countries like India .For starting various types of two-wheelers, initially kick is use but during the kick, knee gets a sudden jerk which harms knee. For overcoming these tremendous problems, battery-based /button start has come into use, but battery life, cost and size, and maintenance are main issues [7],[8]. During key starting pulse current of high magnitude and short direction required, it is supplied by over ratted battery, but it increases the cost of the vehicle. Ultra-capacitor is a high faradic value which is capable of delivering a large amount of current by connecting parallel with the battery [9].

As the name suggests it is a capacitor with large capacitance. It polarizes an electrolytic solution to store energy electro statically. Though an electrochemical device, no electrochemical reactions are involved in its energy storage mechanism [10]. This mechanism is highly reversible and allows the Ultracapacitor to be charged and discharged hundreds of thousands of times, without any appreciable loss in its capacitance. Electrochemical Double Layer Capacitors (Ultracapacitor/Ultra caps/Super capacitor), with its short charging & discharging time, is ideally suited for the intermittent loads [11]. Starting with the introduction of 'Coin/Button Cells' in the '80s to the present mega-ultra-capacitor units, the industry has come a long way. In the '80s and '90s, manufacturing of Ultra-capacitors was primarily an art. With the advance in technology, automated assembly techniques have replaced the labor-intensive aspects of manufacturing. As a result, costs have decreased substantially.

Table 1.
Comparison of Ultra-Capacitor and Battery.

Parameter	Ultra-Capacitor	Battery
Expected life, years	More than 20	1 to 3
Charge-discharge cycles	More than 500,000	1000
Power density, W/Kg	4000	300
Energy density, Wh/Kg	3 to 5	80 to 100
Charge control	Not needed	Needed

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IoT based Animal Monitoring System

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Abstract

The rate of loss of cattle due to various reasons like Stealing of herd, Attack by wild animals, Getting lost in dense forests, falling into rivers and ditches, etc. are predominantly increasing. These factors can be controlled or eliminated using tracking. This paper aims at achieving a viable solution to herder's problems of managing a large herd. We intend to minimize the loss of cattle and reduction of workload of herders. It is an inspiration from multiple international research papers and already implemented farm automation. Using this setup a herder can remotely monitor his/her cattle. He/She can monitor the cattle's heart rate and position. In case of an emergency, an alarm would be put off.

Keywords; *wildlife monitoring, ESP8266 wife module, heartbeat sensor, python, data analytics.*

I. INTRODUCTION

There has been a strong relationship between humans and animals throughout the centuries. We depend on animals in many aspects of life such as sports, food, clothes and other product that support and facilitate our living. Therefore good care of animals is very important. The livestock industry could greatly be benefitted from a systematic way of continuously monitoring the health of animals, collecting the data and forwarding the obtained results to owners.

IoT is a technology in which billions of devices can be connected using the internet and can be accessed from anywhere in the world. Animal monitoring is considered as one of the important applications of IoT technologies. The application is based on deploying sensors to monitor the activities of the animals. Loss of cattle due to multiple causes like stealing of herd, attack by wild animals, falling into rivers or ditches or unnoticed illnesses, cause a drastic loss to herders. These animals are livelihood to a large section of society. The herders seldom need money, their currency is their cattle. Entire households sustain on the herd.

An efficient system of monitoring the heart rate and positions of animals, aggregating this data and analyzing this data on the herder's device would enable swift actions in times of need. It would also enable the herder to manage multiple tasks without worrying about the herd.

II. LITERATURE SURVEY

Anuj Kumar,Gerhard P. Hancke [1] stated that the Severe Acute Respiratory Syndrome Corona Virus(SARS-CoV) can spread easily from one animal to another. The virus can even affect human beings. The review paper by Suresh Neethirajan[2] elaborates on the scope of various wearable technologies for animals to detect infectious diseases. The author also highlighted the comparison of various technologies with regard to their drawbacks and advantages in the domain of animal health management. Muhammad Hunain Memon et. al [3] proposed that a system can be designed cost effectively by using microcontrollers, multiple sensors, IP cameras along with internet or intranet connectivity with the devices i.e., smartphones or computer.

Secure Radio Frequency Transmission for Paperless Voting System

Anshu Banerjee, Ananya Tewari, Renuka Bhandari

Abstract: ***In any democracy, elections play an important role. If the traditional Electronic Voting Machine (EVM) is secured by encryption, it could be made more reliable. Traditional voting process provides security through the use of a paper audit trail which is not environment friendly making it unfit for use in the long run. This paper proposes the use of Blowfish algorithm for encryption along with secure transmission using radio frequency and verification of the cast vote. In this approach, the cast vote is encrypted using Blowfish encryption algorithm and transmitted to the server through radio frequency. At the server, the data is decrypted and sent back to be displayed on the screen of the EVM, eliminating the paper audit trail. This approach will account for a considerable amount of cost reduction without compromising on the security and sanctity of the election process.***

Keywords: ***Blowfish algorithm, encryption, radio frequency, decryption, cloud***

I. INTRODUCTION

Elections are conducted using electronic voting machines (EVM).[1] They have been developing over the past two decades and have replaced the process of voting through ballot papers, thus making the election process much easier by avoiding manual tallying of ballot papers.[2] EVMs are fast and reliable, and save lot of time and manpower. However, there are many security loop-holes and threats, which may lead to tampered results in the election. Security and privacy are main concerns in the EVM. An implementation of secure voting system has been proposed that improves the security.

II. HISTORICAL BACKGROUND

Voting in India was conducted using ballot boxes till 1982.[2] Ballot boxes had many major security concerns. Apart from that, they were difficult to transport and required specific storage conditions. Ballot boxes were then replaced by EVMs.[2]

A. Electronic Voting Machines (EVM)

Electronic Voting Machine (EVM) is a device that is used to record votes electronically. It is made up of two Units – a Control Unit (CU) and a Balloting Unit (BU). A five-meter cable joins these two units.[2] There exists a Presiding/Polling Officer who watches the CU while the voting compartment houses the BU. Instead of issuing the ballot papers, the Polling Officer who is in-charge of the CU releases a ballot by pressing the Ballot Button on the CU. The voter then casts his vote by pressing a blue colored button on the BU against the candidate and symbol of his choice. In this way, the possibility of casting an invalid vote is completely eliminated as opposed to paper ballot system where invalid votes were cast in large numbers. This has enabled EVMs to reflect a more authentic and accurate choice of people. EVMs, also reduce the printing of millions of ballot papers needed for every election, and make the counting process very quick (result can be declared within 3 to 5 hours as opposed to 30-40 hours, on an average, under the conventional Ballot paper system).[2]

B. Voter Verifiable Paper Audit Trail (VVPAT)

Voter Verifiable Paper Audit Trail (VVPAT) or Verifiable Paper Record (VPR) is an independent system attached to the EVM. It facilitates the voters to verify that their votes are cast as intended. After a vote is cast, a paper slip is printed containing the serial number, name and symbol of the candidate. It is shown through a transparent window for about 7 seconds. After this period of time, the printed slip falls in a box that is sealed. This process is automated. This process helps detect malfunction or possible election fraud and the electronic results can be audited.[2]

III. THE PROBLEM

The traditional EVM is susceptible to several security threats such as: Before voting- The unit may be replaced with a fraudulent one which may be pre-programmed to transfer a certain set of the votes in the favor of a previously decided candidate. After voting- The EVM's memory can be manipulated in between the election and the counting phase. Manipulation of the data is done using an on-clip interface by swapping the vote from one candidate to another. EVM's may also be hacked with a Bluetooth device. Moreover, the VVPAT which is used to confirm the vote, unnecessarily creates infrastructural burden and large amounts of waste paper. To avoid problems such as BU manipulation, fake votes and duplication of votes, cryptography can be used to ensure security and the voter's privacy.[3]

Exploring encryption algorithms:

1) Data Encryption Standard (DES): It is a symmetric- key block cipher. It was released in 1977 as FIPS-46 in the Federal Register by the National Institute of Standards and Technology (NIST).

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SMART FARMING USING AUTOMATED BOT

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Abstract - Agriculture is one of the fastest growing industries and with advancements in Science and technology, this sector is booming exponentially. In order to make the industry more efficient and meet the growing demand of food, it is necessary to increase the efficiency of poly crop and automated mono crop farming. This can be achieved by integrating the technologies of future, like IOT, data analysis, big data etc. with each and every step. Agrobot is an automated machine consisting of microcontrollers(raspberry-pi , Arduino), stepper motors, pumps and other software components, will take input from user regarding the crops to be grown at specific co-ordinates through an Android App /Web page and use the data related to soil profile , weather conditions required , water requirement , fertilizer requirement etc. from the cloud to grow the crop autonomously. This product will reduce the chances of human error to almost zero and could be used as a personalized bot for terrace gardening, kitchen gardening etc.

Keywords - Internet of Things, Data Analysis, Big Data, Raspberry-PI, Android App, Kitchen Gardening, Polycrop, Green Revolution, Agro bots.

I. INTRODUCTION

Agriculture is the world's most important industry. Agriculture is going through growing pain as our global social change is faster than ever before. The population is rising and we are running out of resources and space. In 2012 report by the world wildlife fund, they state that humanity must now produce more food for the next 4 decades than in the last 8000 years of agriculture combined. That's a monumental challenge that we face. In a race to feed the world, 2 major paradigms have come to damage the landscape.

On one hand we have the Poly crop system where multiple types of plants are grown in the same area mutually benefitting each other as well as the soil, it's an ecosystem at work which is very biologically efficient and because of that we don't have to add fertilizers and pesticides to make it function. However, the Poly crop is very labor intensive. Now on the other end of the spectrum, stemming from the industrial and green revolution, is the mono crop. It is a paradigm that has reduced the ecosystem down to a single plant type, such that a machine and plants can tend to all of these plants in the same fashion. From a mechanical efficiency and automated standpoint, this is great. However, this system which contains single plants requires fertilizers and pesticides just to sustain itself which are very damaging to the environment and also the food itself.

In order to uproot these paradigms there came a technology, a tractor which used a camera and a computer vision system to detect and destroy weeds but its cost is around half a million dollars, however, it reduced the cost of labor with a good yielding.

Agrobot, an integration of future technologies IOT and data analysis with embedded electronics and basic robotics is the solution for above paradigms- an automated farming machine, which plant seeds at very specific locations. Each plant has coordinates, and then Agro-Bot positions other tools very precisely in relationship to those plants in order to destroy the weeds, water the plants and even sample the soil. Hence, it can be concluded that agrobot is a robot that does the job of a farmer for those who aren't terribly interested in the actual work of gardening.

II. METHODOLOGY

2.1 WORKING

The Agrobot is a robot that moves around a small garden bed using tracks on the sides of a defined space. It can plant seeds, water plants, and perform other basic agricultural and gardening tasks. The robot works in three dimensions, it can go left to right; forward and backwards; and up and down. If you've ever seen a 3D printer, it moves around in a similar fashion but instead of squirting out plastic, the agrobot sows seeds, waters plant and gets rid of weeds using different attachments for each job. It can grab different tools, depending on the task at hand.

It collects weather report from internet, crop related data from the cloud and measures soil related parameters from the ground to aid the process of cultivation. Accordingly, it notifies user about the growth of the produce time to time using a message protocol.

2.2 ARCHITECTURAL MODEL

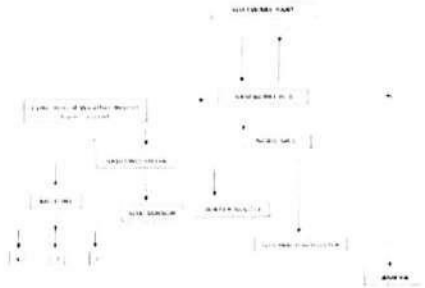

Figure 1: System Block Diagram

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Novel Method to Compute Cube Confirming Low Device Utilization on FPGA

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Abstract

The contribution made by authors in a calculation of a cube of a number includes the digital architectures leading to a computation of cube of an 8- bit binary number which produces the result with reduced hardware utilization on FPGA. The cube is a prominent operation required in many mathematical operations, signal and digital image processing applications. The cube also required in many cryptographic applications as well as trigon arithmetic operations such as taylor series and Mclauren series. The conventional method of finding the cube of a number is faster but required dedicated multiplier block on FPGA and or a large amount of digital gate level resource. The architectural novelty is proposed which can be used at gate level as well as algorithmic level. The cube proposed by authors include features of Vedic mathematics Anurupya sutra, Vertical and crosswise sutra also used, leading to a new better architecture. The cube operation is carried out in VHDL and is compared over conventional as well as Vertical and crosswise based multiplier architectures and provide out better in terms of area and speed optimization. The targeted device used is Spartan XC3S400PQ208 on Xilinx platform.It is observed that the area optimization is achieved with proposed architecture at 2131 gate count compared over 2250 with Vertical and crosswise based cube operation and 8000 gate count with conventional cube calculation method whereas speed enhancement registered over Vertical and crosswise method as proposed method reports 38.348 ns and second one report 43.309 ns.

Keywords

Vedic Mathematics, Vertical and Crosswise, Duplex Method, Anurupya Sutra, Cube of a Number, VHDL.

Introduction

The cube of a number is mathematically its third power, means if b is a number then its cube is the number b multiplier by itself three times. And the result is represented as given in equation 1.

$$b^3 = b \times b \times b. \quad (1)$$

And the same is calculated as a square of a number multiplied by b directly as given in equation 2.

$$b^3 = b \times b^2. \quad (2)$$

The same equations is also a formula for calculating the volume of a cuboid shape with having length, breadth, and height as b. Cube is an odd function as its output is as given in equation 3.

$$(-b)^3 = -(b^3). \quad (3)$$

As the cube is an odd function it gives the graph which is a parabola in nature and is plotted against b verses b^3 as shown in Fig 1. The graph shows that the curve has no axis of symmetry.

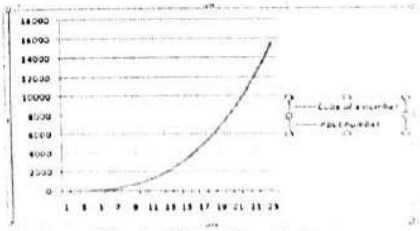

Fig 1: Cube Parabola

A positive integer b is a perfect cube in geometrical point of view when its possible to arrange b solid cube units into a larger cube.

Example, 27 small cubes can make a large cube as $3 \times 3 \times 3 = 27$. The consecutive cube numbers difference by expressed as follows:

$b^3 - (b-1)^3 = 3(b-1)b + 1$. Or $(b+1)^3 - b^3 = 3(b+1)b + 1$.

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A NOVEL ARCHITECTURE FOR MULTI-BIT SHIFT AND ROTATE OPERATION

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Abstract

In the available microprocessors and microcontrollers, the multi-bit operations are implemented with very less efficiency. Generally, these complex bit operations are emulated using programming logic. These bit manipulation operations are frequently required in the applications that are becoming very important. In this paper, we propose two new techniques which can directly support these bit operations in the form of shifter unit that can implement standard shifter operations in microprocessors and controllers. The design of the proposed shifter unit is based on the inverse butterfly circuit.[X] In this paper, we propose two techniques that have shift/rotate and mask circuits which enable the same circuit to perform all types of the standard shift and rotate operations found in some processors. The first technique is using Data reversal method and second using Two's complement method. The design of Shifter-Permute functional unit is the important and critical task towars optimizing parameters such as speed, area and power consumption. Here we have implemented an 8-bit Shift-rotate functional unit for bit manipulation in the form of two approaches and have analyzed the circuits in terms of speed, area, and power consumption. Here the circuits are implemented and analyzed by using the most popular semi-custom design tool Vivado ISE 2015 and is synthesized by using Artix-7 FPGA and the same is reflected in the mathematical model purposed for each circuit.

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SQUARE OPERATION IMPLEMENTATION ON RECONFIGURABLE HARDWARE LOGIC TO ATTAIN HIGH SPEED, AREA OPTIMIZATION AND LOW POWER CONSUMPTION

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Abstract

The contribution made by authors in the research work carried out on square operation is bought forward operated on a four and eight-bit number using duplex property of number based on Vedic mathematics. The conventional method of computing square of a number follows the polynomial multiplication of the same number to find the square. The said method requires the area and power consumption is not sufficiently optimized considering today's low power application needs. The proposed method of computing the square of a number presented here is based on the Dwandva yog of Vedic mathematics which also called as duplex property of a number. The duplex method of calculating the square of number gives the online solution which can be easily calculated mentally and the efforts were to prove the same with the electronic circuit. The implementation of the square algorithm using polynomial multiplication and Vedic mathematics based duplex property for square operation is carried out with VHDL coding on the Xilinx Vivado 2015 ISE tool and the FPGA used is Artix7 device: 7a35tcpg236-1. The results were compared with 4-bit as well as 8-bit operation using both algorithms for a square operation are it is observed that the speed of operation is improved by 20 % whereas the hardware resources utilized were reduced by 66 %.

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Management

SMART MUNICIPAL SOLID WASTE MANAGEMENT

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Abstract

Municipal Solid Waste generated by India in urban areas is 62 million tonnes. Only 70% of the total waste is collected and 20% is treated. Most of the solid waste is dumped in landfill sites. This paper targets the reduction in the size of the solid, particularly wet waste. Similar problems have been tackled in other parts of the world. We propose a solution that fits the Indian context. The key idea of Smart Municipal Solid Waste Management system (SMSWM) is to allocate a weekly garbage limit per household in a residential society. The DSS (Decision Support System) designed for this purpose allows the authenticated user to access the smart dustbin. The smart dustbin is equipped with the electronic circuitry where the weight of the garbage in the bin is measured and the value is updated in the database. The database of the families will be created and maintained by the municipality. A web portal gives the involved people and authorities access to the related information. A house is penalized for every kilogram more than the allotted garbage weight limit. Further enhancements are explored. Thus, the residents are incentivized to produce lesser waste.

Keywords: Waste Management; Wet Waste; Weight of the Garbage; Database; Electronic Circuitry; Garbage.

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1. Introduction

Municipal authorities provide solid waste management as a basic service [1,2]. This helps to keep cities clean. In most of the situations, the system is poorly handled. The cities are not well equipped in the effective handling of solid waste. This has resulted in open dumping, burning of solid waste. This is a dangerous health hazard and even spread infectious diseases.

Waste management is a very serious issue, especially in developing countries. As shown in fig. 1, the untreated urban waste will cause environmental pollution. The waste generated increases due to population growth. The municipalities have to develop recycling centres locally instead of a single system which is located at a central place. A system of waste separation requires more types of bins and containers. To improve collection efficiency [3], a suitable methodology needs to be

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IoT BASED FOOD MONITORING SYSTEM IN WAREHOUSES

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Abstract *- Warehouses are used by producers, middlemen, traders, customers etc. Every year, farmers face a huge loss due to the problem of storage requirements in warehouses. This is due to improper monitoring of the food stored and the inability to provide proper refrigeration systems. Various traditional storage methods were initiated which forced a huge manual approach which is time-consuming and inefficient. This paper presents a smart IOT based food monitoring system in warehouses using Raspberry pi and various sensors that continuously monitor the various factors which may affect the food quality. The ThingSpeak is used as a cloud that helps in the visualization of data. A database is maintained using Mysql and a login page is created which helps the warehouse administrator for the continuous surveillance of temperature and humidity.*

Key words: *Food monitoring, IoT, Sensor.*

1. INTRODUCTION

India is the country where the agricultural sectors play a major role in the economy. Every year farmers face numerous problems due to the storage requirements, lack of proper monitoring of the food stored. Warehouses are used for storage purposes. Only a small part of the food grains are stored in the state run [1] warehouses. A large part of the crops is left without proper storage facilities. The global production includes maize, wheat and rice. But due to the fluctuations in the market supply both from one season to next and from one year to next, the losses that the country faces every year due to improper storage is about Rs.50,000 cores in monetary terms.

There are various environmental factors that influence the natural contamination of food grains such as type of storage structure, pH, moisture, temperature, sufficient light, humidity, etc. As the storage time increases, the food will lose its value. This results in the problem of food safety. [2, 3]. Various traditional storage methods were initiated which forced a huge manual approach and requires more time and is also less efficient. Another drawback was the absence of a multi-parameter monitoring system. So the IoT based system for monitoring of food grains not only aims at implementing a multi-parametric system which helps in preventing the loss against various factors like moisture, aging and decaying but also consumes less time and cost-effective.

2. LITERATURE SURVEY

Rajesh Kumar Kaushal et. al [4]proposed an IoT framework to prevent food from getting contaminated during storage and transportation. System architecture.K Mohan Raj et. al proposed [5]an IoT based smart warehouse monitoring system. Various types of sensors used in the system are vibration, humidity, temperature, fire sensors etc. Alexandru Popa et. al [6]proposed a method of integrated food monitoring. The system is suitable for vacuum-packed foods. Sipiwe Chihana et. al [7] proposed and developed a real-time intrusion and tracking system. Soumya T K et.al proposed [8] a multi-parameter monitoring system using wifi. Saleem Ulla Shariff et. al proposed a system [9] for monitoring food grains at home. The information related to the food and storage is sent to the owner using the auto SMS and email alert system.

Sazia Parvin et. al proposed [10] a grain storage system with monitoring and controlling. Qinghua Zhang et. al proposed an IoT based system framework for the monitoring of the warehouse environment. Li Lijuan et.al [11] present a wireless transceiver and microcontroller-based monitoring system.

The system described in the literature survey shows efforts taken by the researchers in the area of food management. However, the food management system needs to be continuously monitored to check the temperature and humidity.

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Detection of Small Red Lesions in Retinal Fundus Images Using AC-CLAHE, Gabor Filter and One Class SVM

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Abstract

Presence of long term diabetes affects different body organs, one of the dominant effect it causes on, is retina of human eye ,called Diabetic Retinopathy(DR).DR progresses from mild Non-Proliferative DR too Severe Proliferative DR- leading to loss of vision. The syndromes it causes on retina are treatable if diagnosed in time. Earlier indications occur, due to leakage in retinal capillary, forming red deposits on retina, termed Microaneurysms. The occurrence of microaneurysms counts in diabetic retinopathy and its close correlation tothe gravity of the disease is well noted. As a result, identification of Microaneurysms is must; to avoid the further impairments. A novel three stage approach for MA detection is proposed in this paper. Pre-processing is done using advanced - Adaptively Clipped – CLAHE and Directional feature enhancement using Gabor Filter, Candidate region segmentation is performed using Single Optimal Thresholding. Blood vessels are extracted and removed using cascade of morphological operations and line detectors. Further, with feature vector extraction and One Class-SVM, candidate regions are classified as MA's and outliers. The proposed method is tested on images from publicly available DiaretDB1dataset and accomplished the results compatible to the state-of-the-art methods.

Keywords – AC-CLAHE, Diabetic Retinopathy, Gabor filter, Microaneurysms, OC-SVM, DiaretDB1.

I. Introduction

With an upsurge in the old masses worldwide there is rise in eye disorder, as a result there is a comparative diminution in ophthalmic assistances, particularly in rustic zones and emerging nations. The World Health Organization (WHO) has initiated "Vision 2020," a worldwide lead for stopping the preventable visual loss by the year 2020. Eye fitness includes more than a few methodslike magnifying attempts to create alertness regarding eye fitness, identification the syndromes earlier, recognition of the disease, exact analysis, and aimed inhibition to get better results. Current statistics indicates that worldwide, around 37 million people are blind plus124 million with low eyesight, exclusive of uncorrected refractive faults. The major reasons for worldwide vision loss are glaucoma, cataract corneal scarring, age-related macular degeneration (AMD), hypertensive retinopathy and diabetic retinopathy. The global

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CFD Analysis of Diesel Autorickshaw Exhaust System

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CFD Analysis of Diesel Autorickshaw Exhaust System

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Abstract. This work aims to study exhaust flow pattern of one of the Three Wheeler Exhaust System (Bajaj RE Diesel Auto Rickshaw) in order to understand the exhaust characteristics, implications to surroundings, flow tendencies and exhaust dispersion at outlet. This work utilizes Finite Volume Computational Fluid Dynamics (CFD) Analysis which is performed using Solid Works Flow Simulation tool to analyse Autorickshaw Exhaust System Model developed using Proe Creo. The Model is created by measuring actual dimensions of the Exhaust System Components, neglecting all hangar positions as their contribution to thermal behaviour is negligible.

1. Introduction

The branch of fluid mechanics which uses numerical analysis to solve and analyse problems or system that involve fluid flows which might be forced or natural and also to perform calculations required to simulate interaction of fluid with surfaces defined by boundary conditions of given system is called as Computational Fluid Dynamics. Fundamentals of all CFD problems is the Navier-Stokes equations, which define many single-phase (gases or liquids, but not both) fluid flows. The equations are simplified by removing terms describing viscous actions to obtain the Euler equations [1]. Further simplification is achieved by removing terms describing vorticity to obtain the full potential equations. For small perturbations in subsonic and supersonic flows (not transonic or hypersonic) these equations are linearized to obtain the linearized potential equations [2].

In history, these methods were first developed to solve the linearized potential equations. Two-dimensional methods, utilizing the conformal transformations of flow about a cylinder to flow about an airfoil were developed in the 1930s [1]. Current research yields software capable of improving the accuracy and speed of complex simulation scenarios like transonic or turbulent flows. Utilizing high-speed supercomputers, enhanced solutions can be achieved [3]. Initial Experimental validation of such software is performed using a wind tunnel and the final validation is performed using full-scale testing, e.g. flight tests [2].

The three wheelers are basic part of commercial and public transportation in underdeveloped and developing countries, Intermediate Public Transports (IPTs) generally referred as Autorickshaws in India form a major chunk of these three wheelers. These vehicles have small Horizontal Exhaust System which is suspended at rear below the Frame of IPT.

The exhaust system is composed of piping used to guide exhaust gases liberated by combustion away from combustion chamber inside an engine or stove. The system transfers flue gases from the

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Development and Validation of Nusselt Number Correlations for Mixed Convection in an Arc-Shape Cavity

R B Gurav, Mandar M Lele

Abstract: *The analytical study has been performed to investigate the combined effects of lid movement and buoyancy force parameter on mixed convective flow in an arc-shape cavity. The dimensional analysis based on Buckingham π-Theorem is used in the present study. It results in correlations for Nusselt number in terms of non dimensionalized parameters, viz. Re, Pr, Gr, θ etc. The correlations developed are validated against the experimental data of horizontal arc- shape cavity and numerical data of inclined arc-shape cavity obtained from open literature. The correlation developed in the present study for horizontal arc-shape cavity is valid for wide ranges of Re varying from 30 to 1500 and Gr from 0 to 10⁷. In inclined arc-shape cavity it is valid for Re varying from 30 to 1500, Gr from10⁵ to 10⁷ and inclination angle from 15θto 60θ.The close agreement in the comparison between predicted results by correlation developed in the present study and reported Nu correlation shows the validity of the correlation.*

Key words: *Arc shape cavity, Buckingham π-theorem, Dimensionless correlation, Mixed convection, Nu.*

I. INTRODUCTION

The mixed convection process in lid-driven cavities has developed substantial importance because of its congruence to heat transfer performance and variety of applications like nuclear reactors, solar ponds, dynamics of lake and heat exchangers, wet clutches and solar collectors [1,2]. In order to analyze the flow of physics and heat transfer, experimental and numerical studies of mixed convection effect in rectangular and non-rectangular cavities have been reported widely in the literature. Mei-Hsia Chang et al. [4] studied the flow pattern and heat transfer of lid-driven flow inside the cavity. High Re number is used for analysis. Prasad and Koseff [5] performed experimental investigation of combined convection in deep rectangular cavities for Re varies from 0 to 12000.They obtained correlation for Nusselt number as a function of Re, Gr/Re2 and depth aspect ratios. However, deep analysis the heat transfer characteristics and fluid flow in a complex-shape cavity with dimensional analysis is not studied .Chin-Lung Chen et al. [6] studied the mixed convection effect inside a lid-driven arc-shape cavity. Results show that the minimum Nu is found in the transition zone of buoyancy-dominated and the inertia-dominated situations. However the correlations for Nusselt number in terms of non dimensionalized parameters, viz. Re, Pr, Gr etc were not obtained in this paper which provides useful information for design applications. Chin-Lung Chen et al. [7] continued to study combined effects of natural and Forced convection effects in an inclined lid-driven arc-shape cavity with three physical parameters including Gr ranging from 10⁵ to 10⁷, Re varying from 30 to 1500 and θ from 15θ to 60θ. Their results show that for all inclinations, average Nu increases as Gr increases. However the correlations for average Nusselt number related to inclination angles is not reported in this study.

The studies presented above are merely focused on numerical and experiential investigations of natural and mixed convection heat transfer inside the arc shape cavity. The objective of this study is to develop correlations using dimensional analysis to relate the variables of buoyancy effect and heat transfer characteristics of any flow undergoing mixed convection inside an arc-shape cavity. The set of dimensionless correlations relating average Nusselt number for mixed convection in a lid driven arc shaped cavity are developed using Buckingham π-theorem in the present study. Validation of the obtained Nu correlations for horizontal and inclined arc-shape cavity is also made to check their applicability for combined convection flows. The physical model of an arc shape cavity is subjected to moving lid is schematically shown in Fig.1. The profile of an arc shape wall is defined by the expression, $(x-p)^2 + (y-q)^2 = r^2$. In this analysis the ratio p/r, q/r and r/L are fixed at 1/2, 1/2√3 and 1/√3 respectively. An arc-shape cavity of height D and width L is placed horizontally. A lid maintained at lower temperature T_L is moving from left to right with constant speed v. The lid speed can be varied to produce Reynolds number up to 1500. The bottom arc-shape wall of cavity is kept at higher temperature T_H.

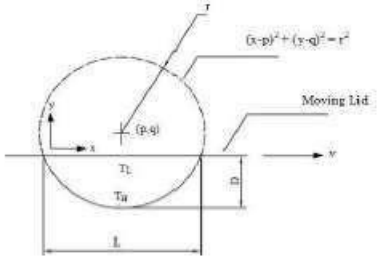

Fig.1 An arc shape cavity with moving lid

II. DIMENSIONAL ANALYSIS AND DATA REDUCTION FOR MIXED CONVECTION IN ARC-SHAPE CAVITY

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Original Article

HEAT TRANSFER ENHANCEMENT IN MOTOR-BIKE SILENCER USING DELTA WING VORTEX GENERATOR

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ABSTRACT

A silencer is the passage through which exhaust gases leaves the vehicle after being combusted in the engine. The combustion temperature may reach close to 800°C. Even though engines are provided with fins to keep it cool with air flow, the exhaust gases are forced out of the chamber while they are still hot. Thus, the silencer also gets heated by the effect of these gases. Hence, there is a need to reduce the effects of harmful heated exhaust gases. Therefore, manufacturers provide chambers within stock silencers to curb sound and emission. The exhaust gases bounce off these chambers and thus tend to keep the silencer hot. Extreme heat can cause a host of problems and results in the reduction of engine performance. Also, excess heat generation may results in deterioration of motor oil properties and it can create deposits on the surface of intake valves. Deposits on the air valve affect the airflow inside the engine and it is the major reason of poor sealing of the entire combustion chamber. This series of events lead to misfire, rough idle and also reduced power and fuel economy. The hot spots on the silencer surface are reducing its life. The objective of this research is to increase convective heat transfer coefficient of air in the annular area of silencer and its enclosure sheet to enhance heat transfer using passive methods. Method employed to achieve these using delta wings as vortex generators on the enclosure sheet of silencer. We studied the flow behavior and convection heat transfer characteristics of fluid passing through an annular region between silencer outer surface and an enclosed sheet. The enclosed sheet is installed with delta wing attached on the surface facing silencer at an angle of attack, α=45° and aspect ratio, A=2.0. The use of delta wing increases convective heat transfer coefficient and increases over all turbulence thus improves heat dissipation through the spaced annular region. Heat transfer and flow pattern are obtained at varying velocities at an angle of attack, α= 45°.

KEYWORDS: Heat Transfer, Convention, Silencer Cooling, Delta Wing & Heat Dissipation

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1. INTRODUCTION

The hot gases generated from combustion of fuel passes through the exhaust system of an automobile. A silencer is the passage through which exhaust gases leaves the vehicle after being combusted in the engine. The combustion temperature may reach close to 800°C. Even though engines are provided with fins to cool with the air flow, the exhaust gases are forced out of the chamber while they are still hot. Thus, the silencer also gets heated by the effect of these gases. The average operating temperature of most of bike silencer is around 130°C. An unavoidable side effect of silencer is back pressures due to this waste heat builds up on the silencer surface. If this waste heat cannot escape, it can overload the cooling system and can cause hotspots on the silencer surface.

Heat transfer augmentation or heat transfer intensification is the technique used for improving the heat transfer performance [1]. Improvement in performance of heat transfer aspect deals with improvements in factors like heat transfer coefficient h, pressure drop reduction and enhancement in the Nu number [2]. Vortex generator is

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A non-intrusive approach for drowsy and drunk driving usingcomputer vision techniques

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ABSTRACT

This paper presents a holistic, non-intrusive approach for drunk and drowsy detection of the driver using computer vision techniques of facial landmark detection and motion detection. The driver's continuous real-time video feed is observed with the help of a smartphone camera. A singlescalar quantity, Eye Aspect Ratio (EAR) which characterizes persistent eye blinks continuously analyses this feed. Simultaneously the system checks the body and the head movements using the differential imaging technique, which operates in real-time. A severity score indicating the fitness to drive is generated cumulatively using both methods. The driver is notified with the sound of an alarm if the results are positive based on a threshold value of the severity score.

Keywords— *Computer vision, Real-time processing, Motion detection, Facial landmark detection, Eye Aspect Ratio, Severity score*

1. INTRODUCTION

Drunk and drowsy driving are the leading causes of road accidents across the world. Klauer et al. [1] have found that drowsiness increases the risk of an accident up to six times, which is further compounded due to nighttime conditions or in situations without prior sufficient sleep [2]. It is a well-known fact that the influence of alcohol is one of the major causes of reduced vehicular control and increased risk of accidents. Numerous studies have established that the risks of road accidents, injury or death increase exponentially under the influence of alcohol [3]. In Europe itself, there is an estimation of 10,000 deaths each year because of drunk driving [4]. Alcohol-impaired driving accidents contribute to approximately 31% of all traffic casualties in the USA [5]. In China, Li et al. found that about 34.1% of all road accidents were alcohol-related [6]. All of these studies indicate serious human lapses and avoidable causes of death, which can be prevented byproper monitoring and alerting technology. Therefore, it is essential to develop a holistic, non-intrusive system to continuously monitor a person's physical and facial movements and to alert them at critical moments to avoid road [17] and [18]; techniques using a stereo camera [18] and [19]. Some of these techniques have also been converted into commercial products such as Smart Eye [18], Seeing Machines DSS [19], Smart Eye Pro [18] and Seeing Machines Face API [19]. However, these commercial products are still limited to controlled environments and require laborious calibrationtechniques. Thus, there is a long way to go before a reliable androbust commercial product is built in this category.

The existing systems based on real-time driver monitoring, using image processing techniques are largely tackling one aspect of the problem, i.e. either drowsiness or drunkenness. Toaccidents, thereby significantly preventing serious injury and loss of lives.

2. RELATED WORK

Existing methods use both active and passive techniques to develop real-time monitoring systems. Active methods use special hardware such as illuminators [7], infrared cameras, wearable glasses with special close-up cameras observing the eyes [8], electrodes attached to the driver's body to monitor biomedical signals, like cerebral, muscular and cardiovascular activity [9] [10]. These methods provide reliable and accurate detection. However, the cost of such specialized equipment is a major drawback hindering their popularity. These equipment are also intrusive that is, it causes annoyance to the driver's body and hinders regular driving. The unusual effect of driving in the presence of invasive instrumentation reduces the drowsiness in testing and simulation conditions. Consequently, the efficacy of such models is limited in real road conditions. Most of them are yet to be effectively introduced in the market.

Passive techniques in monitoring systems majorly rely on the standard remote camera. A set of these passive methods are

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Person Identification using Deep Learning

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***Abstract*—**In the present scenario, digital data generation, data consumption becoming necessary due to advancement in technology. The business process are taking advantage of the available data. The human data processing becoming important in various types of applications like person authentication, verifications automatically by the machines. One of the application is to identify the person automatically by the machine.

Face recognition technology is available for use for couple of years. The face recognition technology is limited by the use of the restricted environment. In this paper, the method for person identification in unrestricted environment is presented using deep neural network. The face recognition and body part recognition these two important steps are used to identify the person.

***Keywords*--Face recognition, deep learning, Person Re-identification.**

1. INTRODUCTION

Identification of the individual person using various technologies becoming important due to the use of person identification in various applications like verification as airport, different unities, digital transactions, access to the restricted area or information.

The person identification problem has been studied for several years, but the human like performance for person recognition by the machine is not achieved. There are many challenges for the person identification such as size, color, orientation and occlusion. The face recognition, recently available for use in the restricted environment.

The person identification is done using face matching process. In this case, face images are stored in the face database. The unknown face image is matched with the face images available in the face database. The Face Recognition is implemented to person recognition but the constraints is the person should be close enough and also should front towards the camera. This process of face identification has limitations for real time face recognition application.

In surveillance application, person recognition becoming very important as video cameras are installed in different areas. Previous work related to the Identification of Person is done through Facial Recognition only and that in addition, when the person has to show himself in front of the camera with properly aligned face fronting camera. This approach was very tedious as each time person has to manually show himself in front of camera to mark himself present many areas. This produces large video data for the processing.

The person identification in surveillance video is challenging problem due to several issues like person orientation, scale, occlusion by other objects, lighting illumination etc. This paper the problem of person Identification using process of the person re identification is explored.

Person re-identification is the process of mapping images of the individual person captured from various cameras or in a different directions or in different situations or instances. Another way to define is allocating an identity (ID) to a person in multiple camera configuration. Generally the re-identification is limited to a minor duration and a small environment (area) covered by camera. Humans have that ability to recognize other persons by using descriptors based on the person's characteristics related to body like height, face, clothing, hair style and shade, locomotion(walk pattern), etc. and this seems to be an easy problem for humans but for a machine to solve this problem is extremely difficult.

In visual surveillance technique, it is very important to link or associate individual people across different camera orientations. Cross view individual person re-identification ensure automatic identification and structure of particular individual person-specific features or movements over huge expanded environment and it is important for surveillance used in many applications for example tracking people using multi-camera and in forensic search. Particularly, for doing person re-identification, one compares a query person (person to be identified) the image is captured by camera view against a database created of the many people captured in another view for creating a ranked list or array according to their comparison distance similarity index.

The most existing methods or approaches in order to perform ReID (re-identification) by changing visual appearance such as shape of the face, texture of the body and color of individual or multiple person's images. People's appearance is naturally limited because of the unavoidable ambiguities related to visual ability and untrust due to appearance

COMPARISON OF EFFICIENCIES OF LINEAR REGRESSION AND GAUSSIAN BELL CURVE FOR CASH INFLOW MANAGEMENT OF ATM'S

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Abstract

Management of Cash inflow is an essential operation of banks for the ATM machines on day to day basis.So, Estimation of cash inflow is required in a very precise manner hence the need arises that we use the best possible methodology to garner optimum results .therefore,either the best single methodology or the combination of methodologies in an appropriate manner is needed to be sought.

Index Terms- *Linear regression, Gaussian bell curve, Time series analysis*

I.INTRODUCTION

Comparison of efficiencies of linear regression and Gaussian bell curve for cash inflow management of atm's involves:

1. Finding out the linear regression efficiency.
2. Finding out the Gaussian bell curve efficiency.
3. Finally, comparing the efficiencies and finding out the best suitable algorithm.

Automated Teller Machines (ATMs) are 24-hour self-service machines that enable bank customers conducting their financial transactions without visiting the bank branch. In spite of online banking facilities expansion, need for ATMs transactions remains high over years and makes ATMs an irreplaceable devices in everyday life. In order to meet growing cash needs of bank clients, banks have to increase continually the number of their ATMs in different location to make cash available.

1. While supplying ATMs with cash, Bank faces with minimizing of total costs. Total costs are consisted of 3 basic parts:

    1. Cost for unwithdrawn cash in the ATM itself (cash freezing);
    2. Cost for transport from the branch to the ATM.
    3. Cost for insurance of the cash in the ATM.

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Tracing the original source of FMCG-SCM using Blockchain

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ABSTRACT

Fast Moving Consumer Goods come a long way from the production of their raw materials to finally being bought by the end user, that is. the customer. Their Supply Chain Management is a tedious task and doesn't really provide you with an auditable trail. The source and thus the quality of the product raises few questions. The paperwork involved in this leads to days of auditing for even a small discrepancy arising in the whole SCM. One of the obvious solutions to this is the digitalization of the whole process. But that still doesn't stop it from getting tampered. The truth still poses a question with the quality of the product being consumed by the end user. Adding another level of surety is only possible by ensuring that the data is not tampered with during the whole supply chain of the product. This is only possible by having a blockchain to moderate the whole process. This will not only make sure that the data regarding the product is true to its point but also make the auditing easy and fast in case of any discrepancy. Few western countries have already implemented blockchain for the products which require high quality throughout the supply chain. Since the type of supply chains vary and data privacy is required in some stages between different parties, private blockchains are preferred in such scenarios to create that balance between truth auditability and data privacy.

Keywords— *Blockchain, FMCG, Source truth auditability, Supply Chain Management*

1. INTRODUCTION

Supply chain management of a fast moving consumer good is a long chain of the product preparation starting from its raw materials to the final consumption by an end user that is the customer. It begins from the manufacturing of the raw materials, which then move towards the processing units, distributors and then finally sellers. The chain isn't really that simple as it seems to be. Majority of tasks are handled by paperwork in small to medium scaled supply chains. The large ones, though with the facility of digitalization for their internal workings, don't provide with the concrete source of truth to ensure the quality of the food being consumed by the customer. Having a quick look over the current supply chain and its working doesn't reveal much about their underperformance in real life. Though it seems a tedious work over a long chain, nothing much can be done over the operations and working involved in it. Though, the efficiency can be tuned by improving the time required to solve any discrepancy between the multiple parties involved in the whole chain by automating their asset transfer operations. But theactual benefit lies in the ability to trace to the original source andhaving the sense of reliability that the data isn't tampered with during the whole journey of product preparation. This will not only help the end user with a sense of satisfaction but will also force the intermediaries to focus on their quality control so that their contracts aren't affected.

The ability to have the above-mentioned functionalities without breaking the existing system is to have a continuous record of the transfer of assets taking place between the multiple parties along with the state of the raw materials and processed items. This is nothing but having a blockchain for the whole supply chain to make sure the data regarding the quality during the stages isn't tampered with. The smart contracts, that is. the contracts between the multiple parties get executed automatically on the transfer of assets, thus reducing the time it takes to do so via the traditional way. This blockchain ensures that there is proper accountability of the data being entered into it regarding the product at different stages.

But all this doesn't mean that the data can be made public regarding the whole chain. The contracts being executed are made after an agreement between the parties involved, that is. they have a proper channel of execution between them. Their data privacy is a point of concern for them and wouldn't want other parties to have a look into it. Therefore, to address this concern of the intermediaries, different types of blockchains are brought up called the private blockchains to address the enterprise level issues involved between parties with varied agreements and different level of privacies. These private blockchains, along with the advantages of public blockchains,

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Implicit Aspect Extraction for Sentiment Analysis: A Survey of Recent Approaches

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Abstract

The research in Sentiment analysis (SA) is in vastly growing stage as people become more expressive on social media, blogs, forums and e-commerce websites by sharing their opinions, reviews and comments. In Aspect-level SA opinions about various aspect or features of an entity is extracted. Users specify aspects by explicit words (i.e. Explicit aspects) or sometimes the aspects must be inferred from the text (implicit aspects).Detecting implicit aspects is challenging but very important and limited studies focused on the extraction of implicit aspects. This paper provides a survey on recently proposed techniques for detecting implicit aspects. We have classified the studies according to approaches they have followed, also specified limitations and future work stated by authors. We have discussed different issues in implicit aspect extraction which will give directions for future research.

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*Keywords:*Aspect Extraction;Implicit Aspects; Aspect based Sentiment Analysis

1. . Introduction

Sentiment analysis (or opinion mining), is a field of research which deals with the analysis of user's opinions, sentimentsexpressed in written text. SA is currently very dynamic research area due to the fast growth of internet and users' active participation for sharing, commenting and discussing over blogs, forums, social sites and shopping portals. SA can be helpful for manufactures, governments, businesses to get the feedback /impact of their product, service or decision. Sentiment Analysis is done at document-level, sentence level, and aspect-level. In document-level

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Video Object Detection through Traditional and Deep Learning Methods

Sita M. Yadav, Sandeep M. Chaware

Abstract*: Object detection in videos is gaining more attention recently as it is related to video analytics and facilitates image understanding and applicable to . The video object detection methods can be divided into traditional and deep learning based methods. Trajectory classification, low rank sparse matrix, background subtraction and object tracking are considered as traditional object detection methods as they primary focus is informative feature collection, region selection and classification. The deep learning methods are more popular now days as they facilitate high-level features and problem solving in object detection algorithms. We have discussed various object detection methods and challenges in this paper.

***Keywords* : Video Object Detection, Deep Learning Methods**

I. INTRODUCTION

Computer vision is a field in which, object detection from the video sequences is an interest point for many vision based application like, video surveillance, traffic controlling, action recognition, driverless cars and robotics. The task of object detection includes localization and classification. From video frames data is extracted to predict the objects in which task of drawing a bounding box around one or more object is called localization and task of assigning label is classification. The object detection from video sequences can be based on feature, template, classifier and motion. Various papers have discussed about role of moving camera and fixed camera in object detection. But object detection in videos which capture using moving cameras is less and work is still going on. Object detection becomes primary requirement for computer vision which helps in understanding semantic of images and videos.

II. LITERATURE SURVEY

In [1] the author introduced method based on single deep neural network for detecting objects. The approach is based on SSD which use aspect ratio and scales for feature map, performance can be improved by using RNN. In [2], the authors have proposed a Region Proposal Network (RPN) which work on detection network with full-image convolutional features, hence gave cost-free region proposals. This paper showcases a deep learning based object detection method which achieves speed of 5-17 fps. [3] have proposed a framework by using object detection, classification and semantic event description. The event is analyzed by integrating the object detection and scene categorization. The system can be improved by automatic scene learning methodologies.

The authors of [4] have proposed methods and architectures to understand videos. The architecture is given for automatically categorization and caption in the video. The system implemented on temporal feature pooling (TFP), 3D Convolution, frame majority and LSTM for classification. Microsoft multimedia dataset used, the output is the predicted video categories and video captioning. Better dataset cleaning is required along with focus regions. One frame per second extracted from video which may probably missed some important information. The various detection algorithms are explained using given algorithm but accuracy of detection is not discussed. [5] proposed a system to detect moving objects using background subtraction, edge detection and geometrical shape identification**.** If the object is moving in speed then this system does not give accurate result. [7] Suggested pedestrian detection method which separates the foreground object from the background by utilizing image pixel intensities. The foreground edges are enhanced by high boost filter. [8] the authors put forward object detection system using CNN. The neural network algorithms are able to handle the occlusions and camera shake problems, with use of frame difference method. However, proper analysis of training model is required. [9] introduces BMA (Block matching algorithm) for moving object detection. This method divide the video frames into non-overlapping blocks then matching is done in reference frame. The computational time for BMA is low and robust. However, further study is required for lossless compressed video based Background Subtraction (LIBS) method is used. [14][15] have given state of art region based object detection methods.

III. FACTORS AFFECTING OBJECT DETECTOR

The object detection requires to identify the features that impact performance of detector with framework. Based on literature survey the various factors which affect detector performance are feature extractor, threshold decision for loss calculation, boundary box encoding, training dataset, data augmentation, localization factors and feature mapping layers.

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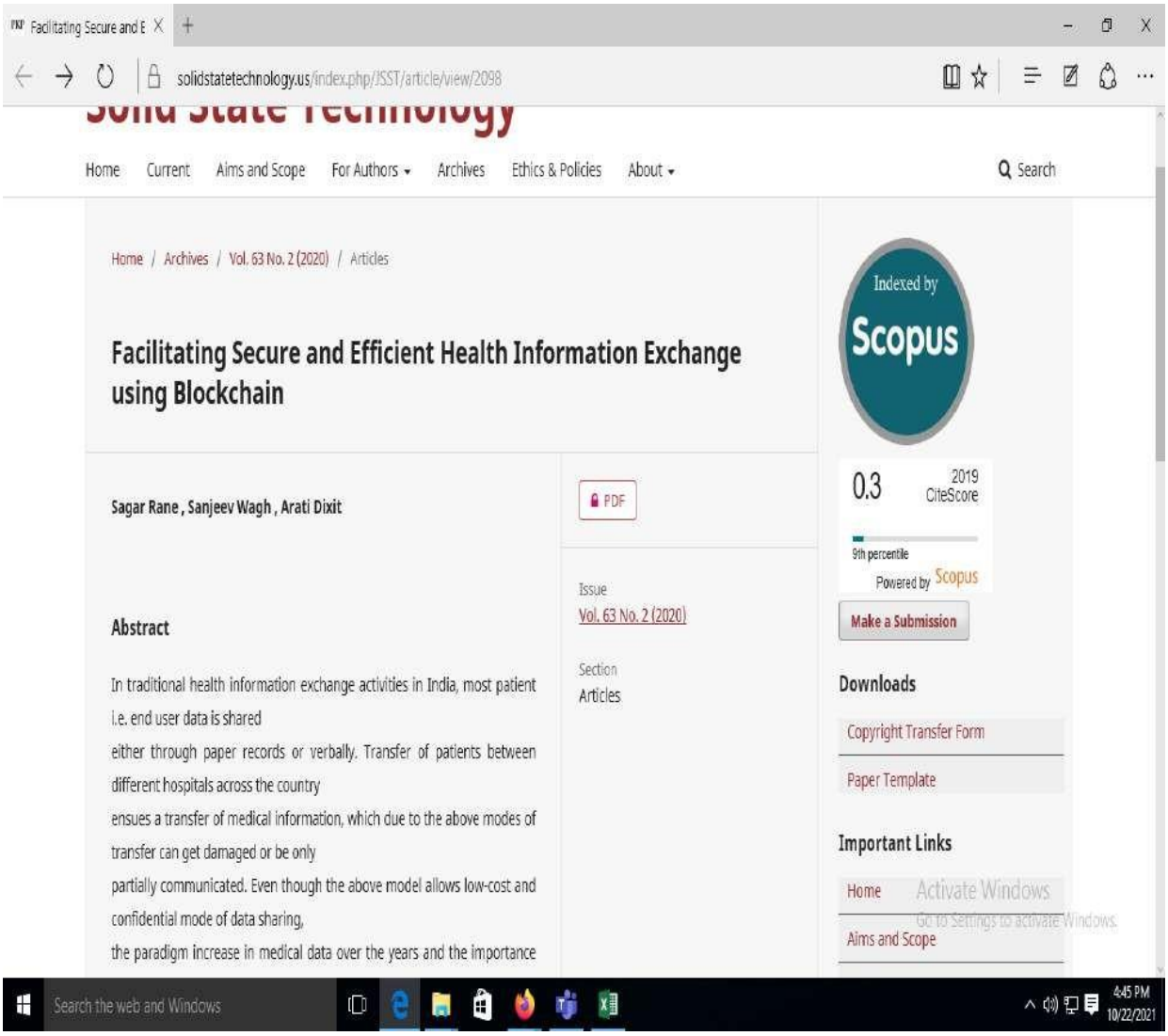
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Facilitating Secure and Efficient Health Information Exchange using Blockchain
Sagar Rane , Sanjeev Wagh , Arati Dixit
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Section
Articles
Abstract
In traditional health information exchange activities in India, most patient i.e. end user data is shared
either through paper records or verbally. Transfer of patients between different hospitals across the country
ensues a transfer of medical information, which due to the above modes of transfer can get damaged or be only
partially communicated. Even though the above model allows low-cost and confidential mode of data sharing,
the paradigm increase in medical data over the years and the importance
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Text Summarization Using Neural Networks

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Abstract— There are various news/articles which cannot be read completely in the hush of our daily schedules. Thus, summarization comes into picture. This paper focuses on summarizing a text using neural networks which creates a summary containing the important key points of the text/article. This summarization will be done using neural networks (word2vec model).It will focus only on English articles. The input given will be in .txt format. Thus it will make a lot easier to get a quick summary of the long articles and derive the conclusion about what is there in the articles and whether they are relevant for a user according to their interest.

Key words: Word2vec, Neural Network, Abstractive, Extractive, LSTM

I. INTRODUCTION

As the amount of information on the web is increasing rapidly day by day in different format such as text, video, images. It has become difficult for individuals to find relevant information of the interest. When user queries for information on the internet he gets thousands of result documents which may not necessarily be relevant to his concern. To find appropriate information, a user needs to go through the complete documents which results in information overload problem which leads to wastage of time and efforts. To deal with this situation of dilemma, automatic text summarization plays a vital role [6]. Automatic summarization compresses a source document into meaningful content which reflects main thought in the document without altering information. Thus it helps user to grab the main notion within short time span. If the user gets effective summary it helps to understand document at a glance without checking it completely, so time and efforts could be saved. Text summarization process undergoes in three steps analysis, transformation and synthesis. Analysis step analyzes source text and select attributes. Transformation step transforms the result of analysis and finally representation of summary is done in synthesis step.

In an abstract summary, the summarized text is an interpretation of an original text. The process of producing involves rewriting the original text in a shorter version by replacing wordy concept with shorter ones[9].

II. RELATED WORK

A. Types of Summarization

A large document is entered into the computer and recapitulated content is returned, which is a non-redundant extract from the original passage. Automatic text summarization process model can be divided into three steps. First is the preprocessing of source text, second is interpretation of source text representation and source representation transformation to summary text representation with an algorithm and in the final step, summary text generation from summary representation [10] .

Feature extraction for Wikipedia articles is done using ten different feature scores which is fed to the neural network and the neural network returns single value signifying the importance of the sentence in the summary[8].

There are two distinct types of features: non-structured features (paragraph location, offset in paragraph, number of bonus words, number of title words, etc.) and structured features (rhetorical relations between units such as cause, antithesis, condition, contrast, etc.) [2]

1) Extractive Method:

Extraction is mainly concerned with judging the importance, or indicative power, of each sentence in a given document [1].Extractive text summarization involves the selection of phrases and sentences from the source document to generate the new summary. Techniques involve ranking the relevance of phrases in order to choose only those most relevant to the meaning of the source. Extractive summarization is basically just picking up the words from the text as it is which are important and putting them in the summary. No interpretation of the text is done in this process .We also anticipate that shod sentences are unlikely to be included in summaries[3].

There are four major challenges for extractive text summarization as follows: identification of the most important pieces of information from the document, removal of irrelevant information, minimizing details, and assembling of the extracted relevant information into a compact coherent report[5].

2) Abstractive Method:

Abstractive text summarization involves generating entirely new phrases and sentences to capture the meaning of the source document. This approach is commonly used by humans for getting the summary but it proves to be a challenging approach. Classical methods operate by selecting and compressing content from the source document. Abstractive summarization techniques tend to copy the process of ‘paraphrasing’ from a text rather than simply summarizing it. The abstractive method is more difficult and complex as compared to extractive.It copies the way human gets the summaries.

B. Techniques of Summarization

1) Bag of words:

This model is a simplified representation which is used by natural language processing and information retrieval (IR). A text which can be a sentence or a document is represented by bag (multiset) of its words, disregarding grammar and even word order but keeping multiplicity. In this approach, words are tokenized which are used for each observation and frequency of each token is found.

2) TF-IDF:

Tf-idf refers term frequency-inverse document frequency, and the tf-idf weight is a weight often used in information retrieval and text mining. TF-IDF weight is a statistical measure which is used to evaluate the importance of a word in a document in a collection or corpus. The importance shows proportional behaviour to the number of times a word

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Performance Evaluation of Routing Protocols in Large Size Disaster Scenario

Gajanan Walunjkar, Anne Koteswara Rao

Abstract: ***Peoples in the disastrous areas under collapsedbuildings or landslides need to be rescued in seventy-two hours. Ad hoc networks have been proved to be suitable for various disaster scenarios since no infrastructure needs to be deployed for communication. In this paper, various ad hoc routing protocols such as destination distance vector routing protocol, dynamic source routing protocol, ad hoc on demand routing protocol etc. are discussed and analyzed in such disaster scenario using disaster area mobility model on large size. Disaster area mobility model is more desirable in such scenario. Also these protocols arecompared using various performance qualitative and quantitative metrics such as packet delivery ratio, delay, throughput, control overhead and energy etc.***

Keywords : MANET, DSDV, DSR, AODV, AOMDV, DM

I. INTRODUCTION

Many people trapped in the disastrous areas may have a large chance to survive if they are rescued in 72 hours [1,2] (Golden 72 Hrs.). Communication is required at variouslevels among peoples for their rescue and relief operations. Due to the disasters, existing communication setup fails [3] and it is also difficult to set up a new infrastructure in short period of time. In order to simplify the communication process, ad hoc networks are very much useful in such scenarios. Such type of networks does not need infrastructure; instead communication among all entities takes place throughradio waves.

Routing protocols in ad hoc networks are classified as proactive and reactive routing [4,5]. Proactive protocols are Destination Sequenced Distance vector (DSDV) [6,7], and Optimized Link State Routing Protocol.. Reactive protocols are Dynamic Source Routing (DSR), Ad Hoc On Demand Distance Vector (AODV) and Ad Hoc On Demand Multipath Distance Vector (AOMDV)[7,9].

The table 1 thus summarizes the various routing protocols discussed before.

Table 1: Routing protocol summary

Parameters	**DSDV**	**AODV**	**AOMDV**	**DSR**
Type of Routing	Proactive	On-demand	On-demand	On-demand
Route Updation	Periodic, Triggered to the neighbors	No	No	No
Loop Free	Yes	Yes	Yes	Yes
Routing Overhead	High	Less	High	Less
Caching Overhead	Medium	Low	High	High
Throughput	Low	High	High	Low

Movements of nodes inside ad hoc network are characterized by mobility models [10]. Random Waypoint mobility model is the most widely used in ad hoc networks. Manhattan mobility model also allows nodes to move determined paths like vehicles. In Disaster area model, various action areas such as incident location, transport location, casualty's treatment area and hospital zone exists. All peoples trapped in disasters area and involved in rescue operations belongs to any of the above areas.

II. TECHNOLOGY USED

In disaster area model (DM), the disaster scenarios are divided into different action areas [11] and the movements of nodes emulate the movements of ambulances taking injured people and other vehicles. Every person belongs to any of the above areas and represented by nodes. [12,13]. Separation of room method is used in this. Thus the disaster scenario is divided into different areas. There areas are: (1) incident site, (2) casualty's treatment area, (3) transport zone, and (4) hospital zone.

../bin/bm -f emer2 DisasterArea -n 250 -x 500 -y 500 -p 10 -a 1 -g 140 -r 3 -e 6 -q 3 -d 100 -i 1 -j 1 -b 20,190,20,174,56,190,56,174,38,174,56,182,1,40,30 -b 66,110,92,110,66,60,92,60,79,110,79,60,2,40,30 -b 20,190,20,174,56,150,56,174,38,174,56,182,1,40,30 -b 75,200,75,170,225,200,225,170,75,182,140,170,0,40,30 -b 160,15,160,55,200,15,200,55,270,0,130,0,160,25,200,25,4, 50,30 -b 40,10,65,10,65,35,40,35,50,10,50,11,3,40,30 -o 230,200,230,140,270,200,270,140

../bin/bm NSFile -f emer2 –d

The various configuration parameters are set as follows:

0 incident location 1 patients waiting for treatment area, 3 for technical operational command, 4 for ambulance parking
For 1, 08 wanted groups and 04 transport groups
For 2, 07 wanted groups and 00 transport groups
For 1, 08 wanted groups and 05 transport groups
For 0, 12 wanted groups and 10 transport groups
For 4, 12 wanted groups and 10 transport groups
For 3, 3 wanted groups and 0 transport groups

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Performance analysis of routing protocols in MANET

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Institute of Science and Technology, India

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ABSTRACT

Popularity of Mobile ad hoc network in research is due to their ad hoc nature and effectiveness at the time of disaster management when no infrastructure support is available. Due to the limited transmission range of wireless network interfaces, multiple network hops may be needed for nodes to exchange data across the network. In such a network, each mobile node operates as a router, forwarding packets for other mobile nodes in the network that may not be within the direct reach. Routing protocols developedfor wired networks such as the distance vector or link state protocols are inadequate here as they not only assume mostly fixed topology but also have high overheads. This has lead to several routing algorithms specifically targeted for ad hoc networks. In this paper, we include the MANET supported routing protocols and their performance analysis over different performance parameters such as packet delivery ratio, delay, throughput, control overhead and energy etc.

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1. INTRODUCTION

Wireless network is one of the types of data communication network that utilizes wireless connections for connecting devices for exchanging information [1, 2]. Wireless network technology avoids the expensive method of the installations of cables for the data connection between devices within various locations. Radio networks and Wi-Fi local networks are two of the examples of wireless networks. There exists two main classification of wireless networks; infrastructure and infrastructure less wireless networks. In the former, the data communications are created and maintained through access points or routers. An example of this type of network is cellular networks. The latter type is basically known as Ad hocnetworks. In such a network where stations are capable of created by themselves and exchanging informationbetween them in a multi-hop style without the fixed infrastructure. Such an infrastructure less property of the network can be easily adapt in a given location.

The highly dynamic nature of a mobile ad hoc network results in frequent and unpredictable changes of network topology, adding difficulty and complexity to routing among the mobile nodes. The challenges and complexities, coupled with the critical importance of routing protocol in establishing communications among mobile nodes, make routing area the most active research area within the MANET domain [3].

2. PROPOSED MODEL

MANET has routable networking environment to process the exchange of information or packet from one node to other node. Different protocols are simulated for measuring the packet drop rate, the overhead introduced by the routing protocol, end-to-end delay of packet, network throughput,

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Articles

Dynamic degree balanced with CPU based VM allocation policy for load balancing

Aparna S. Joshi & Shyamala Devi Munisamy

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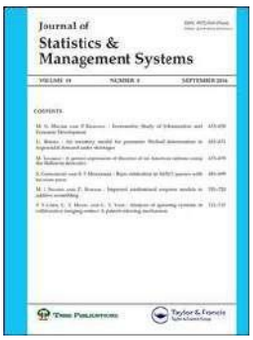
Abstract

In cloud computing environment, Load balancing is key challenge. To address above challenge, we have proposed Dynamic Degree Balance with CPU based VM allocation policy. The proposed algorithm includes both VM allocation



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Assessment of feature selection for student academic performance through machine learning classification

R. Suguna, M. Shyamala Devi, Rupali Amit Bagate & Aparna Shashikant Joshi

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Challenges in Engineering Education in India during the Time of Corona Virus Pandemic and the Consequent Total Lockdown

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Abstract:
Corona virus pandemic has taken the world by storm. Its highly contagious nature has made social distancing a norm. To curb and control the pandemic, central and state governments have taken the path of complete lockdown, coupled with social distancing. Educational institutions have also been shut down as a precautionary measure. Though a well thought move, it's sudden implementation has shifted the emphasis from traditional face-to-face class room teaching to teaching using digital platforms. This shift has caused a major disruption in functioning and management of engineering educational institutions resulting in new challenges in engineering education. Various adversities faced in the teaching and learning process of engineering education during Corona virus pandemic lockdown are summarized and possible solutions to overcome the same are suggested in this paper.

Keywords: Engineering Education, Pandemic, Online Teaching, COVID 19

Introduction:
The World Health Organization (WHO) has declared a pandemic[1] over a highly contagious novel corona virus that causes an illness known as COVID 19. This has rapidly spread across the world. The disease has killed more than 414,588 people and infected some 7.36 million and counting, according to data compiled by Johns Hopkins University[2]. More than 3.63 million people have recovered. As per WHO recommendations, an effective way to fight COVID 19 pandemic is by maintaining social distance.[3]

The first case of COVID-19 pandemic in India was reported on 30 January 2020, originating from China[4]. On 10th June 2020, a total of 280,067 cases, 137,022 recoveries (including 1

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Terpolymeric Nanocomposites of Silver for Wound Healing Applications

Seema Tiwari, Nidhi Jain, Aniket Aggarwal

Abstract: *In the present work, silver nanoparticle, sodium alginate, chitosan and gelatin are used to form nanocomposite films and films have been prepared for wound healing application. These films have been characterized by Fourier transform infrared (FTIR) spectroscopy, X-ray diffraction (XRD), Scanning electron microscopy (SEM) and an antibacterial study of the sample. The dynamic release data were interpreted with various kinetic models. These film has shown remarkable antibacterial property against E.Coli, thus offering their candidature for the application in the near future.*

Keywords *: silver nanoparticle; nanocomposites; wound healing.*

I. INTRODUCTION

Today the nanoscience can without much of a stretch be assumed as the key component of current world innovation. In this manner, because of the arranged field of usages, it is assuming an urgent job in the material science industry. Its applications can financially grow the properties and estimations of material getting ready and things. The nanomaterials are arranged either by consolidating into the centre frame of the material or through cleaning over the outside of planned materials. The broad utilization of nanomaterials ranges from catalysis to gadgets and optics just as in magnetics close by the wellbeing and condition applications. However, the fate of nanotechnology in material applications lies in domains where the new measures will be joined into solid, multifunctional material systems without dealing with the inherent material properties.

Silver nanoparticles are tyrannical among the most significant and hypnotizing nanomaterials among a couple of metallic nanoparticles that are locked in with the biomedical applications. They display astounding antibacterial, antifungal, mitigating, and antiviral properties liberally or either in the wake of responding with explicit components to grant such utilitarian properties. To a degree, the silver nanoparticles can be used against an expansive assortment of contaminations.

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The utilization of silver nanoparticles isn't limited to the restorative field just; they have been likewise utilized as self-cleaning, UV insurance, improving strength and optoelectronics.Silver is steady in unadulterated water and air situations yet the encompassing of ozone, hydrogen sulfide or sulfur if present in air or water may achieve silver discolouring due to the arrangement of silver sulfide. Nano-silver has been commonly used as a result of its antibacterial microbial development for the headway of things containing silver fuse sustenance contact materials, (for instance, compartments, bowls and cutting sheets), fragrance safe materials, devices, and nuclear family mechanical assemblies, decorating operators and individual consideration things, remedial contraptions, water disinfectants, room sprinkles, youngsters' toys, infant kid things and wellbeing supplement.

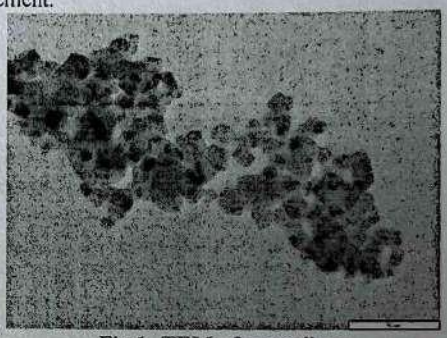

Fig.1- TEM of nanosilver

Chitosan is a generally cheap financially accessible material. It is gotten from chitin, an insoluble straight polymer of N-acetylglucosamine found in the hard shells of shellfish e.g., shrimp, lobster, crab, which are blessed to receive expel unessential material.

Chitosan is gotten from chitin by the expulsion of an extent of the N-acetyl bunches which renders it dissolvable in numerous acids, including certain weaken natural acids, for example, formic, acidic and propionic acids. Both chitin, what's more, chitosan has been utilized for an assortment of purposes, ordinarily as powders, in arrangement or films in the type of viscose practically equivalent to cellulose gluey.

It has been discovered that a gel or gel-like layer, which meets the above prerequisites for use on wounds can be effectively produced using chitosan broken down in a corrosive water-glycerol arrangement which is then killed with a base. The resultant unbiased arrangement out of the blue transforms into a gel after standing. In event that a slight layer of the corrosive water-glycerol-chitosan arrangement is utilized, upon the balance, a gel-like layer is formed.

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Hand Sanitizer: Effectiveness & Characterization

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***Abstract*— Alcohol based sanitizers are often compared with the traditional method of washing hands with soap. So some of the major advantages of sanitizers over soap are Hand sanitizer can be more portable and accessible when people are on the go, which can increase the number of times they are able to disinfect their hands. This can help reduce the likelihood of transmitting viruses , it can often be the most convenient option.The benefit of hand sanitizer is the ability to combat germs when water and soap are not immediately available.**

Keywords—Hand sanitizer; antimicrobial; antiseptic agents; fingerpad

I. INTRODUCTION

Hand sanitizer is a liquid or gel generally used to decrease infectious agents on the hands. They are available as liquids, gels, and foams. The paper focuses on addressing various pros and cons of Alcohol based hand sanitizer (ABHS). Data suggests that more than 1.4 million patients in developed and developing countries worldwide are affected at any time with healthcare-associated infections (HCAI).

According to the Center for Disease Control (CDC) hand hygiene encompasses the cleansing of your hands by using hand washing with soap and water, antiseptic hand washes, antiseptic hand rubs such as alcohol-based hand sanitizers (ABHS), foams or gels, or surgical hand antisepsis.For many reasons, alcohol hand sanitizers are increasingly being used as disinfectants over hand washing with soap and water. Their ease of availability, no need for water or plumbing, and their proven effectiveness in reducing microbial load are just a few.

According to the Centers for Disease Control and Prevention (CDC), alcohols have excellent in vitro germicidal activity against gram-positive and gram-negative vegetative bacteria, including multidrug-resistant pathogens (MRSA, VRE), *Mycobacterium tuberculosis*, HIV, influenza virus, RSV, vaccinia, and hepatitis B and C viruses.

One concern is that the antimicrobial effect of ABHS is very short lived. ABHS are tremendously effective in preventing the spread of the seasonal flu, H1N1, URI, and other viral-based and bacterial-based diseases. Another advantage to using ABHS is that they are often less irritating to the hands. Hand sanitizers may not be as effective when hands are visibly dirty or greasy.

Depending on the active ingredient used, hand sanitizers can be classified as one of two types: alcohol-based or alcohol-free. Alcohol-based products typically contain between 60 and 95 percent alcohol, usually in the form of ethanol, isopropanol, or *n*-propanol. At those concentrations, alcohol immediately denatures proteins, effectively neutralizing certain types of microorganisms.

Alcohol-free products are generally based on disinfectants, such as benzalkonium chloride (BAC), or on antimicrobial agents, such as triclosan. The activity of disinfectants and antimicrobial agents is both immediate and persistent. Many hand sanitizers also contain emollients (e.g., glycerin) that soothe the skin, thickening agents, and fragrance.

II. MATERIALS AND METHODS

Most alcohol-based hand antiseptics contain isopropanol , ethanol , n-propanol , or a combination of 2 of these products. The antimicrobial activity of alcohols can be attributed to their ability to denature and coagulate proteins. The microorganism's cells are then lysed , and their cellular metabolism is disrupted. Alcohol solutions containing 60% to 95% alcohol are most effective. Notably, higher concentrations are less potent because proteins are not denatured easily in the absence of water. Alcohol concentrations in antiseptic hand rubs are often expressed as percent by volume. The highest antimicrobial efficacy can be achieved with ethanol (60% to 85%), isopropanol (60% to 80%), and n-propanol (60% to 80%).

Ethanol, the most common alcohol ingredient, appears to be the most effective against viruses; whereas, the propanols have a better bactericidal activity than ethanol. None of the alcohols has shown a potential for acquired bacterial resistance. The combination of alcohols may have a synergistic effect.

The concentration of alcohol does change the efficacy with one study showing a hand rub with 85% ethanol being significantly better at reducing bacterial populations compared to concentrations of 60% to 62%. ABHS also often contain humectants, like glycerin, which help prevent skin dryness, and emollients or moisturizers, like aloevera , which help replace some of the water that is stripped by the alcohol.

Efficacy is also very dependent on the technique of application of the alcohol hand sanitizer. One must apply the

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Magnetically driven poly(sulfur/oil) composite as an efficient oil adsorbent. Part-I: Synthesis, characterization and preliminary oil removal study

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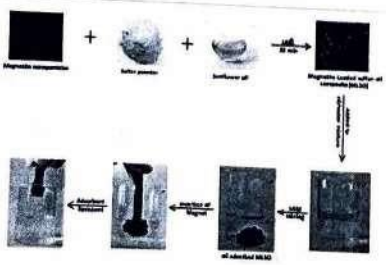
Highlights

- Magnetite nanoparticles have been loaded into poly(sulfur/oil) composite material.
- The polymer, when spreaded over the oil surface, absorbs the oil and settles down.
- The oil-sorbed polymeric sorbent is easily removed by introducing a bar magnet.
- This offers an unique technology for effective oil uptake and easy removal of sorbent from the adsorption system.

Abstract

In this work, magnetite loaded poly(sulfur/oil) (MLP(S/O)) composite super hydrophobic polymer has been prepared by allowing reaction between sulfur powder and edible oil in the presence of magnetite nano particles. The magnetite particles, with 68 % of the particles in the range of 5–10 nm, were characterized by TEM and SAED analysis. The MLP(S/O) material was also characterized by FTIR, XRD, TGA/DTA, EDS and SEM analysis. The M-H curves were also obtained for the adsorbent material MLP(S/O), taking native magnetite nanoparticles as control. It was found that the composite MLP(S/O) possessed fair magnetization. The saturation magnetization MS for the native magnetite and the MLP(S/O) composite were found to be 27.889 and 7.996 emu/g respectively. In addition, the Remanent Magnetization (MR), for the samples magnetite powder and MLP(S/O) composite were found to be 0.172 and 0.0199 emu/g respectively. Finally, the MLP(S/O) material was used as adsorbent to remove oil from water and the oil-adsorbed MLP(S/O) was removed from the adsorption system by using a bar magnet with moderate strength.

Graphical abstract



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Extrapolation of data by mathematical calculation for removal of Fluoride, Arsenic, Lead by Non-conventional (NLP, PLP, ALP) absorbents

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Abstract *- In the present study effect of PH solution has been studied for the removal of fluoride, lead and arsenic with the help of Neem Leaf Powder (NLP), Peepal Leaf Powder (PLP), Amla Leaf Powder (ALP, NLP, PLP, ALP leaves. The initial solution pH plays an important role in the adsorption of metal ions on various adsorbents. The Experimental results are summarized in the tables, it is having been observed that the % removal of lead and Arsenic is more dominant at pH – 6. adsorbed fluoride increased at lower pH in all cases that is at 2. The experimental values regarding removal of ions are extrapolated using MATLAB software to formulate corresponding quadratic equations. These equations can be used to interpolate the values of ions removal for pH values. The extrapolated values by MATLAB software helps, in theoretical calculations of the values without experiments, which in turn useful for the pilot project as well as to scale up the material at industrial level.*

I. Introduction

Asian countries use groundwater as a major source for drinking (Al-Hatim et al., 2015; Raj and Shaji, 2017). Asia's approximately population is 4.5 billion, and this is 60% of World's population (WPR, 2018). The supply of groundwater is getting decreased due to its misuse whereas the demand is getting increased in Asia because of increase in population (Gleeson et al., 2012; Gupta et al., 2013; Alhababy and Al-Rajab, 2015). Countries like India, Pakistan, China, Nepal and Bangladesh consume approximately 300km^3 of ground water in a year (Shah et al., 2003).

Arsenic:

Arsenic is the predominately found as rare element in nature. Through many natural processes like biological activities, volcanic emissions and weathering reactions it is arranged in the environment (Kinniburg and Smedley 2001; Kapaj et al. 2006; Walter and Carter 1995). Use of arsenical products like pesticides and herbicides have decreased expressively in last decades, but for wood conservation its use is still same, but the influence of the arsenical compounds on the environment will remain for few years (Nadeem and Shafiq 2007; Faust et al. 1983).
It is in group VA of periodic table and period 4 which arises in many minerals, mostly as As2O3. Ashes of coal also contain Arsenic. Most of the Arsenic compounds are strongly adorable to soil and because of this it cannot be transported to over long distance in groundwater and surface water. Arsenic is not good for skin, as it can damage the skin and have high chances of cancer.

Lead:

Lead is one of the commonly available heavy elements in the environment (Greenwood and Earnshaw 1984). It is one of the furthermost toxic heavy metal, and food and water absorbs its inorganic form (Ferner 2001). Many diseases are caused by lead poisoning like teratogenic effect, dysfunctions in the kidneys, inhibition of the synthesis of hemoglobin, cardiovascular system, chronic damage to the central nervous system and peripheral nervous system, reproductive systems (Ogwuegbu and Muhanga 2005). And many more effects damage to the urinary tract which results in bloody urine, gastrointestinal tract, neurological disorder and permanent brain damage. Central nervous system, peripheral nervous system, gastrointestinal tract and organic forms also get affect from the inorganic form of lead. (McCluggage 1991; Ferner 2001; Institute of Environmental Conservation and Research INECAR 2000; Lenntech Water Treatment and Air Purification 2004). And the very importantly the brain of children also get affects by lead which results in low aptitude (Udedi 2003). Through calcium and zinc deficiencies its absorption is increased in the body. It is a member(metal) of IV group and VI period of the periodic table with atomic number 82, atomic mass 207.2, density 11.4gcm^{-3},

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Regenerative Shock Absorber: Research Review

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Abstract— **Sustainable power source advancements, especially in electric vehicles (EVs), have gotten noteworthy consideration in recent years. Because of the anomalies out and about surfaces our vehicles experience shocks. The customary suspension framework in our vehicles lessen these shocks and convert this mechanical vibrational energy into heat. In this procedure a lot of fuel energy is squandered which can be recouped utilizing a regenerative suspension framework. A regenerative suspension framework can successfully retain these vibrations just as lessen the measure of energy lost to the encompassing. This paper audits the current research on the regenerative shock absorbers. It initially examines about the energy dispersal from the vehicles and afterward the capability of recouping this scattered energy utilizing a regenerative shock absorber. It additionally audits the different innovative work done on the regenerative shock absorber.**

Keywords—Electromagnetic actuator, regenerative shock absorber, structure, vehicle suspension system, vibration energy.

I. INTRODUCTION

These days because of fast development and advancement in innovation and ascend in the ways of life the quantity of car vehicles on street is likewise expanding quickly. This has prompted immense increment in energy utilization, squander creation and different issues like environmental pollution. Thus, we should discover approaches to preserve energy and non-regular sources to deliver it. As of late, EVs have picked up fame because of lower energy utilization and decreased contamination. Be that as it may, because of the inadmissible battery limit and unwavering quality, the EVs are not utilized properly.

At the point when a vehicle is driven on any road surfaces it encounters shocks because of the anomalies on the road. A suspension system is introduced in a vehicle to damp the relative movement between the wheels and body of the vehicle and give better handling and comfort to the travelers. For the most part, a conventional suspension system contains a curl of spring and a damper. A damper is gadget which changes over the vibrations into heat and disperses it to the encompassing. This disseminated heat energy originates from the fuel energy of the vehicle. Thus, a lot of fuel energy is wasted.

This lost energy can be recouped utilizing a regenerative shock absorber. A regenerative shock absorber is a device which can adequately weaken the shocks experienced by the vehicles and rather scattering the active energy from the shocks into dissipating heat energy, its damper converts it into helpful electrical energy. This valuable electrical energy can be put away in batteries for some time in the future. It can likewise be utilized to improve the damping ability of the shock absorber or to run the hardware of the vehicle to expand the eco-friendliness of the vehicle.

This paper has various sections, which review different researches on regenerative suspension system. The first section reviews the research done on the amount of energy that is dissipated from a moving vehicle. Then the next section reviews the potential of recovering the lost energy through the suspension system. The third section reviews the types and present state of research on regenerative shock absorbers.

II. ENERGY DISSIPATION FROM VEHICLE

The energy scattered from the vehicles is very critical in sum and we occasionally focus on this issue. As in [1], Out of the all-out fuel energy created by the motor of the vehicle just 10% to 16% of it is utilized for the portability of the vehicle. The rest is scattered in beating friction, suspension system and exhausts. What's more, significant piece of this energy is scattered through the suspension system.

In reference [2], inspected the impact of climb of road paths on the motion of the vehicle due energy loss in street scouring and suspension system. They exhibited that the authentic fuel ate up by the vehicles is more obvious than that appeared in the assessment places. They showed that the energy dispersal in a vehicle moving at 48km/h is from its suspension system is commonly 200W.

Another analyst, Browne [3], broke down the energy dispersal from the suspension system of the vehicle. It is discovered that from each shock absorbers of a vehicle running on parkway, roughly 40-60 Watts of power is disseminated.

In 2009, Yu [4], demonstrated that the energy dissipating from a vehicle isn't a direct result of pounding, it moreover depends upon the outside of the road, mass of the vehicle and speed. By using CARSIM diversion programming to and deduced that for a vehicle running on a class C road at a speed of 10m/s will around spread 42.3% of its fuel energy through its suspension system. Again in 2010 Yu [5-6], thought about the regenerative suspension system. Using an entertainment, it was assumed that a vehicle running at 20m/s

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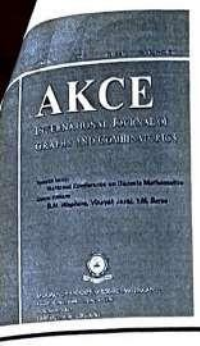

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On -connected splitting matroids

Y.M. Borse & Ganesh Mundhe

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HYBRID TECHNIQUE FOR ECG SIGNAL COMPRESSION USING PARALLEL AND CASCADE METHOD

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ABSTRACT

The recording of electrical activity of the heart by using electrodes is known as electrocardiography (ECG). In long time monitoring of ECG, a huge amount of data needs to be handled. To handle the situation, an efficient compression technique which can retain the clinically important features of ECG signal is required. The continuous monitoring of this signal requires a large amount of memory. Hence, there is a requirement of compression. The compression of ECG signal using transforms in cascade is explored to incorporate the added advantages of both the transforms. This paper presents compression of ECG signal by hybrid technique consisting of cascade and parallel combination of discrete cosine transform (DCT) and discrete wavelet transform'(DWT). The simulation is carried out using MATLAB tool. Various wavelet transforms are used for the testing purpose. The performance measures used are Percent square mean Root Difference (PRD) and CR to validate the results. The methodology using cascade combination proved to be better than the parallel technique in terms of Compression Ratio (CR). The highest CR achieved is 28.2 in the method using DCT and DWT in cascade. Different DWTs are used for the testing purpose. The parallel method shows the improved PRD as compared to the cascade method.

Keywords: DWT; ECG; DCT; Parallel.

INTRODUCTION

Cardiac function assessment is very important to analyse the heart abnormalities. An ECG analysis is the cardiac test used to check for heart related problems. It can provide useful information for the doctors for diagnosis purpose. To record ECG, electrodes are used and these are placed at different locations. The ECG signal has different peaks and valleys. In ambulatory or in continuous cardiovascular diseases (CVDs), it is necessary to monitor the ECG continuously. The continuous monitoring of ECG involves huge amount of data. The huge data needs large storage area. The compression technique gives a reduced information rate and also preserves the important diagnostic information after reconstruction. There is tremendous demand for highly efficient compression techniques with low computational complexity in the medical field. Such compression techniques are useful in various applications such as ambulatory, health care system in remote places, mobile health care system, etc. The reconstruction of the signal is also equally important to preserve the clinically important parameters in the signal. Hence, there is a requirement of an efficient compression technique.

The compression techniques are classified as direct, transform based and parameter extraction method.

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Fast Denoising Filter for MRI using Parallel Approach

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ABSTRACT

Real time medical image processing is necessary in the domain of remote medical care, diagnostics and surgery. To provide fast MRI diagnostics especially for neuro imaging, the research work proposes CUDA GPU based fast denoising filter with a parallel approach. Bilateral filter is the most suitable candidate for denoising, as it has unique ability to retain contours of soft tissue structures of the brain. The work proposes improvised memory optimization techniques for the GPU implementation to achieve superior performance in terms of speed up when compared with existing work. For a 64Megapixel brain MR image, shared memory approach gives speed up of 256.5 while texture memory usage with tiling approach stands the next in speedup with 42.16 over its CPU counterpart. The results indicate that in spite of increase in image size, the execution time of the filter does not increase beyond 500msec keeping the performance real time.

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1. INTRODUCTION

Medical diagnostics plays a significant role in healthcare industry. Magnetic resonance imaging is a noninvasive clinical diagnostic technique extensively used and preferred by medical practitioners. The technique is used for treating different neural diseases such as spinal cord injuries, stroke, tumor, and hemorrhage. The brain MR scans make structural abnormalities of the brain visible and help to diagnose diseases like multiple sclerosis, Parkinson and Alzheimer.

The process of MRI introduces multiplicative rician noise in MR image which is signal dependent at low SNR. This makes it necessary to apply efficient denoising filter to the MR image to reduce the noise in homogeneous areas while preserving the image contours. Nonlinear filters are preferred for denoising especially for medical images due to their capacity to retain edges of tissue structures which is necessary for clinical diagnosis. Gopinathan et al in their work highlighted significance of nonlinear filters for image denoising [1]. Bilateral filter is a nonlinear filter which is gaining popularity in recent years for its efficiency and simplicity of execution. It was Tomasi and Manduchi [2] who presented the filter as "Bilateral" after which it has been explored by researchers in different domains of image processing applications. Paris et al. in his research manuscripts has explained its behavior elaborately discussing its strengths as well as limitations with great insight [3]. Also, Zhang M. has presented detailed analysis of the filter as applied to image processing [4]. In recent years, the filter is dominating medical image processing domain due to its edge retention ability for soft tissue structures [5]-[7]. The literature survey asserts superior denoising efficiency of the bilateral filter and indicates extensive work being done to analyse and improvise further its denoising performance.

But, bilateral filter being spatial neighborhood filter is attributed with long execution time which increases with image size and resolution. As the MR image data has escalated from few kilobytes to several gegabytes with evolution in digital technology, denoising the large MR imaging data is challenging for a CPU

Spectral Efficient Blind Channel Estimation Technique for MIMO-OFDM Communications

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Abstract--- With emerge of increasing research in the domain of future wireless communications, massive MIMO (multiple inputs multiple outputs) attracted most of researchers interests. Massive MIMO is high-speed wireless communication standards. A channel estimation technology plays the essential role in the MIMO systems. Efficient channel estimation leads to spectral efficient wireless communications. The critics of Inter-Symbol Interference (ISI) are the challenging tasks while designing the channel estimation methods. To mitigate the challenges of ISI, we proposed the novel blind channel estimation method which based on Independent component analysis (ICA) in this paper. Proposed channel estimation it works for both blind interference cancellation and ISI cancellation. The proposed Hybrid ICA (HICA) method depends on pulse shape filtering and ambiguity removal to improve the spectral efficiency and reliability for MIMO communications. The Kurtosis operation is used to measure the complex data at first to estimate the common signals. Then we exploited the advantages of 3rd and 4th order Higher Order Statistics (HOS) to priorities the common signals during the channel estimation. In this paper, we present the detailed design and evaluation of HICA blind channel estimation method. We showed the simulation results of HICA against the state-of-art techniques for channel estimation using BER, MSE, and PAPR.

Keywords--- Blind Channel Estimation, Error Rates, Interference, Independent Component Analysis, MIMO-OFDM, Spectral Efficiency.

I. Introduction

Since from last decade, continues growth in the requirements for higher data rates on constrained resources and available bandwidth. This demand for higher data rate is resulting in the significant attention of researchers to initiate the working towards future wireless communications [1]. In future wireless communications, the resource utilization using MIMO (Multiple Input Multiple Output) is better than other methods [2] [3]. Hence massive MIMO is the crucial technology for future communication systems like 5G. The MIMO combined with transmission method like OFDM (orthogonal frequency division multiplexing) also the CDMA (code division multiple access). The critical part for MIMO systems is the design of efficient channel estimation to improve the overall communication performance and minimize the error rates. Therefore, several channel estimation methods designed in literature. The methods reported in [4]-[7] depend on ICA and wavelet-based channel estimation for MIMO wireless systems.

The channel estimation techniques of MIMO-OFDM divided into the three types such as semi-blind, blind channel, and training based evaluation methods [4]. In training based techniques, plan known training samples used to perform the extensive channel estimations. The least square (LS) and MMSE are the cases of training based channel assessments techniques. In blind channel estimation techniques, SOS (second-order stationary statistics) or HOS techniques used for transporting maximum spectral efficiency. In the semi-blind channel estimation, the main order statistics utilized. The semi-blind channel estimation technique consolidated attributes of training based and blind based channel estimation are interconnected with MIMO-OFDM respectively. The semi-blind strategy sets aside longer time for the channel estimation and subsequently increases the overall communication costs. The blind channel estimation technique is superior to other two types of channel estimation methods. Thus in this paper we focused on designing the novel blind channel estimation method.

In OFDM systems, block-based symbol transmission method used; hence for 4G communications, the technique of block-based and iterative channel estimation introduced. For future wireless communication systems, same methods will be applicable. Therefore, it motivates to use blind channel estimation to obtain the initial symbol estimation and furthermore it is utilized the initial symbol evaluation to increases the more considerable dedication

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Spectral and Power Efficient Blind Channel Estimation Technique for MIMO-OFDM Communications

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Abstract--- Nowadays, massive MIMO (Multiple Input Multiple Output) is widely studied research domain in future wireless communications. There are two key performances needs to be considered while designing the MIMO systems such as spectral efficiency and power efficiency. The channel evaluation techniques play the important role in spectral and power efficiency performance. In this paper, we first proposed novel spectral efficient blind channel estimation technique using Independent Component Analysis (ICA). The proposed blind channel estimation algorithm uses the 3rd and 4th order HOS (higher order statistical) approach and pulse shaping to minimize the blind interference and Inter-Symbol Interference (ISI) effects. To reduce the errors, process of ambiguity removal introduced after the blind channel estimation. Secondly, to mitigate the problem of high PAPR, we introduced PAPR reduction method with blind channel estimation. For PAPR reduction, adaptive clipping technique used in which the energy constellation of every input symbol is utilized to compute the clipping threshold. The adaptive clipping method is combined with hybrid channel estimation technique to achieve the trade-off between spectral efficiency and power efficiency for MIMO. The simulation outcomes demonstrated that proposed PHICA (PAPR aware Hybrid ICA) method improves performance against the state-of-art methods.

Keywords--- Channel Estimation, Interference, ISI, MIMO-OFDM, Peak to Average Power, Spectral Efficiency, Power Efficiency.

I. Introduction

Nowadays, the emerging demand for higher data rates over the constrained resources leads the development of future wireless communication technology. The massive MIMO attracted the significant interest of researchers since from last decade for future wireless communications. To improve the performance of wireless communications, massive MIMO technologies are the strong candidate; therefore massive MIMO is crucial for the wireless communications. There are two essential requirements of MIMO systems such as spectral efficiency and energy efficiency. This paper, we concentrate on channel estimation techniques for spectral efficiency and PAPR (Peak to Average Power Ratio) reduction for power efficiency for the MIMO-OFDM systems. In wireless communications, the MIMO is mostly integrated with the OFDM (Orthogonal Frequency Division Multiplexing). The transmission methods for MIMO-OFDM systems are widely studied in recent past. The transmitter antennas employed using the spatial multiplexing as well as improve the link reliability to achieve the higher data rates in MIMO. The reliability of link can optimize by either of three coding methods like space-time, space frequency, and space-time-frequency [2]. For all these coding standards, accurate channel information is essential characteristics at the receiver end. If the channel information not available, the solutions of suboptimum equalization differentiation approach at received designed to path and integrated the forwarding data using the training data manner. However, use of training sequence having the extra computation burden [3]. For future wireless communications, MIMO-OFDM wireless communication systems are essential framework due to the distinct features and advantages of using OFDM and MIMO.

The spectral efficiency of MIMO-OFDM systems are based on channel estimation method. There are three categories of channel estimation methods designed for the MIMO-OFDM such as training based, semi-blind, and blind channel estimation [4]. In training-based channel estimation, it is working via the known as training samples. The conventional training based channel estimation techniques are the LS (least square) and MMSE (minimum mean square error). In semi-blind channel estimation for the integrated attributes of training based and blind channel estimation exploiting for efficient channel estimation. Finally, the blind channel estimation in which either HOS (Higher Order Statistic) or SOS (Second-Order Stationary Statistics) used for blind channel estimation in MIMO-

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Novel Spectral Efficient Technique for MIMO-OFDM Channel Estimation with Reference to PAPR and BER Analysis

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Abstract
With emerge of increasing research in domain of future wireless communications, massive multiple input multiple output (MIMO) attracted most of researchers interests. Massive MIMO is nothing but high speed wireless communication standards. The performance of MIMO systems is based on techniques used for channel estimation. Efficient channel estimation leads to spectral efficient wireless communications. There are number of channel estimation techniques presented recently in literature with pros and cons. The recent method shows the spectral and bit error rate (BER) efficiency, however apart from this, there is need of improving the peak to average power ratio (PAPR). Recently we proposed, novel channel estimation method as the existing channel estimation techniques failed to effectively solve the inter symbol interference (ISI) problem. The presence of ISI in MIMO-OFDM may leads to worst performance. Our proposed blind channel estimation is combined with independent component analysis (ICA) hence this method is called as hybrid ICA (HICA) to minimize the ISI effect. The extensive simulation analysis of proposed HICA required to claiming the scalability as well as reliability. In this paper, proposed study on additional performance metrics such as PAPR and computational costs (energy) along with BER and spectral efficiency performances. The result claims that HICA is not improving the PAPR and energy performances significantly.

Keywords MIMO-OFDM · Channel estimation · Spectral efficiency · Error rates · ICA · Interference · PAPR

1 Introduction

Since from last 5 years, there is continuously growing requirements for higher data rates on constrained resources and available bandwidth. This demand of higher data rate is resulting into increased interest of researchers to initiate the working towards 5G (fifth generation) wireless communications [1]. For such future wireless communications,

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Performance Evaluation of Large MIMO

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Abstract
In wireless network, MIMO (multiple inputs multiple output) is an advance antenna in which multiple antennas are employed at basis and target terminals. The hopeful expansion of advance MIMO structure is to connect tens with numerous antennas. Particularly, when it united by synchronous development of a widespread quantity of client terminals then this contains numerous modernized throughput and energy ability. Whereas, if OFDM (orthogonal frequency division multiplexing) is diminishes the information rate, then the conventional MIMO can also be utilized to augment QoS at low information rate. In this research work, the framework stage implementation can be augmented by the exploitation of spatial multiplexing among antenna configuration of 16 × 16 for downlink transmission and 8 × 8 for uplink transmission and also explains about the implementation of MIMO setup of LTE superior corporeal layer exploiting 64 QAM and 256 sub-carriers. The projected procedure can be take place in the operational phase of MATLAB and the implementation consequences were also examined.

Keywords MIMO–OFDM · QAM · LTE · MATLAB

1 Introduction

MULTIPLE—INPUT multiple—output orthogonal frequency division multiplexing (MIMO–OFDM) unites the fundamental equalization of OFDM modulation through the boundary, dissimilarity, and array expand of MIMO communication. Currently, MIMO–OFDM is utilized as relation in dissimilar multiuser frameworks as well as rapid wireless local area networks and the forthcoming invention cellular frameworks. Similarly, the communication in multiuser MIMO–OFDM frameworks necessitate

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[IJEEI] Editor Decision on your paper "Fast Denoising Filter for MRI using Parallel Approach"

IJEEI Editor <ijeei.iaes@gmail.com>

Mon 12/3/2018 8:30 AM

Journal_Reviews

To:Shraddha Oza <sdoza@aitpune.edu.in>;

Cc:Kalyani Rajiv Joshi <krjpune@gmail.com>;

Dear Ms Shraddha Dinesh Oza,

We have reached a decision regarding your submission to Indonesian Journal of Electrical Engineering and Informatics (IJEEI), ISSN 2089-3272, a Scopus-indexed journal. It is our great pleasure to inform you that your paper with the title:"Fast Denoising Filter for MRI using Parallel Approach" has been ACCEPTED for publication in the next issue of the journal. Congratulations!

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American Sign Language Translator and CallingDevice

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ABSTRACT

Communication plays a vital role in our life and in today's world there are disabled people (deaf, dumb, blind, etc.) who faces a lot of problems when they try to communicate with others. Sign language is one of the commonly used medium to establish communication among disabled and common people. This paper describes an aiding device for the deaf, dumb and physically challenged people. Such people are made to wear gloves fitted with flex sensors whose resistance changes with each gesture shown by them. Flex sensor produces a voltage change and the Raspberry Pi will process and display the codes corresponding to each gesture on LCD and the sound code is heard via speaker. The device gains more versatility by establishing communication via GSM.

Keywords: Sign, Microcontroller, calling, communication

1. INTRODUCTION

Deaf and dumb people communicate with each other by means of sign-language. A sign language gesture is a predefined movement of fingers and palm of the hands with a particular sign made out of them. At first, gesture is formed by the user. Then recognizing gesture once it has been captured is challenging, especially in a continuous stream. The problems faced by deaf and dumb people are categorized in two levels. First one is deaf and dumb people communicating with other people and second one is communication with technology.

The device described in this paper aims at solving the above mentioned problems of deaf and dumb people. The gestures formed by user in American sign languages converted into speech. The speech is transmitted using an interfaced mobile phone. Thus, enabling deaf and dumb people to be able to use mobile phone. With decreasing prices and easy availability of mobile phones, it can be made easily accessible for anyone. Thus enabling deaf and dumb people to communicate easily with other normal people and using mobile phone for communication.

2. LITERATURE SURVEY

2.1. Previous Work

The past working of Ankit P.Parmar, Dr. Nehal G. Chitaliya [1] on "gesture recognition system for Indian sign language on smart phone" is quite fascinating. In this they have make use of an android based smart phone application to deliver sign language interpreter. Smart phone has camera module which is used to capture hand movement and the captured image is compared with the predefined database image. If any match is found, an appropriate text is displayed hence establishing communication. If not found the iteration is repeated until a match is found. But the whole action from image capturing to image processing is quite a lengthy process and sometimes not very accurate. The accuracy reduces when a same gesture can have two meanings or the flexibility of the hand gesture signifies a message which a user doesn't want to convey. Hence the effort of image processing can be reduced by using sensors to capture real time data and put it on to some useful purpose which is defined in this paper.

Supriya Shevate, Nikita Chorage, Sidhee Walunj [2] work on "Gesture based vocalizer for deaf and dumb" makes use of sensors. They have used accelerometer for tilt detection, flex sensor for bend detection, microcontroller, ADC and speech synthesis. A wireless data gloves attached with flex sensor on each finger and micro controller mounted over it. Flex sensor and accelerometer reading is fed to microcontroller and this is processed and displayed on LCD. In this paper there are certain limitations. It makes use of accelerometer which takes reading of only linear orientation and

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Smart and Optimized Dough Maker for Domestic Use

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ABSTRACT

Dough kneading machine is used for the formation of dough. Quality of dough depends upon kneading process. The conventional process of kneading is either by hand or by use of the machine. This paper aims at building a machine that provides dough for a fixed number of chapattis, one at a time. This product also optimizes the process of dough kneading as the dough maker available nowadays take water and dough as input in a single section and they require a minimum amount of flour to work which is liable to wastage. This product overcomes this problem by providing two different sections for water and dough after the user gets his specified number of chapattis the remaining flour can be put back into the container. It also takes the help of gravity for the flow of water and flour, so we do not need any extra motor to make the flour and water fall into the container thus reducing the power requirement.

Keywords: Dough, Kneading, Microcontroller, Motor

1. INTRODUCTION

Flatbread is an important part of the diet of a large population in the world. Most of the Indians' staple diet includes roti's. Kneading is a process, used to mix the ingredients and add strength to the final product. Its importance lies in the mixing of flour with water. When these two ingredients are combined and kneaded, the gliadin and glutenin proteins in the flour expand and form strands of gluten, which gives flour its texture. If the proportion of flour and water is not proper, then the dough turns out to be too hard or too soft. Hence, the dough kneader we have designed has a mechanized system for proportion control using the input mechanisms to control the proportions of the two. Usually, people knead the dough by hands, but It is a difficult activity. Hence various machines for kneading dough sprouted in the markets. But these machines are not affordable to middle-class. Moreover, the dough kneading that is done by the hand is done in a fixed amount that may in most cases be more than the amount required at the time. This extra dough needs to be kept in the refrigerator which degrades its quality and the nutritional value. It also occupies additional space in the refrigerator.

The motivation behind this project is to make a simple and cost-effective device that will help towards the upliftment of the society. Also due to the majorly horizontal assembly of the traditional dough kneaders that have been in place until now the amount of power consumed to operate the device is larger since the number of motors required to transfer flour and water from one container to the other is also more.

Hence, the idea of building a dough kneading machine that would be much cheaper than the already existing devices came. Apart from being less expensive this machine also produces dough in accordance with the number of roti's required thus the need for storing extra dough is also eliminated.

The dough kneader in this project has been made to work on motors and pumps of a very small voltage level thus reducing energy consumption moreover the kneader kneads the dough for only one roti at a time, hence the amount of wastage will be reduced to a great extent. Apart from this, the assembly of the kneader has been made vertical which would also ensure that no extra power is used in the transfer of materials from one compartment to the other. Due to all the above reasons, the device will become quite affordable.

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ECG Signal Compression using Parallel and Cascade Method for QRS Complex

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Abstract

Objectives: In this paper we present, compression of QRS complex of ECG signal by hybrid technique. The methodology employs both cascade and parallel combination of DCT and DWT. **Methods/Statistical Analysis:** QRS complex is an important part of ECG signal used by doctors for diagnosis purpose. The transmission of QRS complex requires less memory and complexity as compared to the complete ECG signal.The methodology employs both cascade and parallel combination of DCT and DWT. The performance measures such as PRD (Percent Root mean square Difference) and CR (Compression Ratio) are used to validate the results. **Findings**: MIT-BIH ECG database is used for the study. The threshold based technique is implemented on both cascade and parallel system. The cascade technique shows improved CR and proved to be better than the parallel sytem in terms of storage and transmission. The lower value of PRD also demonstrates the improved quality of the reconstructed signal in the cascade and parallel system. **Application/Improvements:** The cascade system with a high CR requires less memory. Both the cascde and parallel system show good reconstruction quality with the low PRD.

Keywords: Cascade, ECG, Parallel, QRS complex

1. Introduction

An ECG can provide important information related to heart abnormalities. The information obtained is useful for diagnosis purpose. ECG is observed by placing electrodes at different positions. The ECG signal has different peaks and valleys such as P, QRS complex and T wave[1]. The ECG signal is shown in Figure 1.

Transform based compression techniques produces better CR. Hence researchers are focussing on techniques such as DCT[2], Burrows-Wheeler Transformation[3], KL transform, DCT Wavelet transform[4], etc. The important goal is to achieve higher CR and lower PRD. Hence there is a lot of scope for ECG signl compression. This paper presents a QRS complex compression of ECG signal.

The paper is presented as follows: Literature Survey is presented in Section 2, The Technique of compression is highlighted in Section 2. The Method used and Results and Discussion are covered in Sections 3 and 4 respectively. Conclusion and References are included as concluding sections.

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Effect of chromium addition on properties of sinter-forged Fe–Cu–C alloy steel

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The present work deals with sinter-forged powder metallurgical (P/M) steels alloyed with chromium by addition of ferrochrome powder, which allows a close control over the chromium contents of alloy steels. Chromium contents can be varied by adjusting appropriately weighed ferrochrome powder in the P/M mixtures. Fe–Cu (2%) and C (0.7%) is the base composition for this P/M alloy steel. Study with the addition of 0.5% and 3% chromium by weight in the form of ferrochrome powder is carried out. The P/M alloy steel of base composition with no chromium content is also prepared for comparative study. The paper deals with these three alloy steels formed by the sinter-forging technique of powder metallurgy. The results of hardness and wear in hardened and tempered condition are reported in the present work.

Keywords: Powder metallurgy; sintered alloy steels; sinter-forging; ferrochrome powder.

1. Introduction

Gears, pistons, connecting rods are well-established powder metallurgical (P/M) products due to the features such as ease of formability, good strength and net shape production of parts at competitive cost.[1] Fe–C and Fe–Cu–C systems have been the focus of the P/M industry for meeting various automobile and other engineering requirements.[2] The elemental chromium containing P/M alloys steel can

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Lane Segmentation for Self-Driving Cars using Image Processing

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Abstract - *Technology is advancing day by day, more advanced cars are being built every year but still we are not able to reduce the no. of road accidents. Approximately 1.35 million people die each year as a result of road traffic crashes. Road traffic crashes cost most countries 3% of their gross domestic product. More than half of all road traffic deaths are among vulnerable road users: pedestrians, cyclists, and motorcyclists.*

When the vehicle is four-wheeler and an accident occur than the chances of serious injuries or even deaths increases. We need more efficient systems which can prevent the accidents and help us to reduce them. One of the most common mistakes committed by human driver is talking on phone while driving or not paying attention on the road. Sudden change of the lanes leads to accident.

A lane detection system can be built and which can identify the lanes and indicate the driver on sudden alteration in the lanes. Most of the car companies have ongoing projects on these technologies. This can be done with the help of image processing.

I. INTRODUCTION

A lane segmentation system is built using image processing. Image processing can be done with help of the python library like OpenCV. OpenCV provides various functions and tools to work on frames captured by the camera. With the help of OpenCV many complex calculations can be done easily.

For making a prototype we need a camera, a bot and a raspberry pi. The camera will be mounted on the top of the bot and the raspberry pi will be fit on it. The raspberry pi will be operated with the help of a battery. The camera will capture the live events and provide them to raspberry pi. The camera captures frames which are then passed to the raspberry pi which does further processing on the frames. We can even control the frame rate too. We need to import NumPy library in our code which provides a high-performance multidimensional array object, and tools for working with these arrays.

For better efficiency and good outcome, we need powerful cameras.

The model architecture is shown in figure 1.

A. Morphological Transformations:

Morphological transformations are operations which are performed on the images on the basis of their shapes. The image is first converted in binary form and then the transfor-mations are applied. Two inputs are given to the function. First is the original image and second is the kernel or the structuring element which decides the nature of the operation. There are many types of morphological transformations. The two basic types are Erosion and Dilation.

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Machine learning based classifier model for autonomous distracted driver detection and prevention

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ABSTRACT

Recent researches and surveys have provided us with the evidence that distracted driver is a major cause of vehicle crashes all around the world. In-vehicle information systems (IVIS) have raised driver safety concern and thus, detecting distracted driver is of paramount importance. The project (or paper) shows a method of real-time distraction detection and initiates safety measures. In the realization of this project we have used Web-Cam, Raspberry Pi (a low cost, small size computing device), along with concepts of deep learning and convolutional neural networks. We classify drivers into multiple categories of distraction, some of them are texting, drinking, operating IVIS etc. Web-Cam feeds the classifier with real-time images of the driver of a particular vehicle. The system also constitutes a buzzer alarm which rings once the distraction is detected.

Keywords: *Machine Learning, Convolutional Neural Network, Classification, Hyper parameters.*

1. INTRODUCTION

Distracted driving is characterized as a movement which redirects a man's concentration or consideration from his fundamental errand of driving. These sorts of exercises incorporate utilizing a cell phone, eating and drinking, discussion with co-travelers, self-preparing, perusing or watching recordings, modifying the radio or music player and notwithstanding utilizing a GPS framework for exploring areas. Among the greater part of the above, cell phone utilization is said to be the most diverting component. Diverted driving has been distinguished as an essential hazard factor in street activity wounds. Cell phone use has formed into an essential wellspring of driver diversion as it can prompt drivers to take their consideration off the street, consequently making vehicle tenants more helpless against street crashes. The utilization of cell phones while driving causes four kinds of commonly non-selective diversions – visual, sound-related, subjective and manual/physical. While visual diversions make drivers turn away from the roadway, manual diversions require the driver to grasp their hands off the guiding wheel; sound-related diversions cover those and Sounds that are critical for the driver to hear while driving and intellectual ones incite the driver to consider an option that is other than driving.

A system with web-cam integrated to raspberry pi running python classifier can be used to capture the image and classifying it into either distracted state or safe driving state. If the driver is in a distracted state, a buzzer alarm is generated. For classifier, we have obtained the dataset of drivers driving in different states. This is fed in as our training data set and with an open source machine learning python library Scikit-Learn a classifier is generated to predict the distracted state of the driver. Following states of the driver is to be predicted: texting, talking to co-passengers, phone call, looking left or right, reaching back seat, self-grooming, operating IVIS and eating or drinking. We aim at building an integrated system of webcam and classifier model based on Convolutional Neural Network which would classify images based on different states of the driver. The training set used for building the model has been taken using a static driving

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Novel Spectral Efficient Technique for MIMO-OFDM Channel Estimation with Reference to PAPR and BER Analysis

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Abstract
With emerge of increasing research in domain of future wireless communications, mas- sive multiple input multiple output (MIMO) attracted most of researchers interests. Mas- sive MIMO is nothing but high speed wireless communication standards. The performance of MIMO systems is based on techniques used for channel estimation. Efficient channel estimation leads to spectral efficient wireless communications. There are number of channel estimation techniques presented recently in literature with pros and cons. The recent method shows the spectral and bit error rate (BER) efficiency, however apart from this, there is need of improving the peak to average power ratio (PAPR). Recently we proposed,novel channel estimation method as the existing channel estimation techniques failed to effectively solve the inter symbol interference (ISI) problem. The presence of ISI in MIMO-OFDM may leads to worst performance. Our proposed blind channel estimation is combined with independent component analysis (ICA) hence this method is called as hybrid ICA (HICA) to minimize the ISI effect. The extensive simulation analysis of proposed HICA required to claiming the scalability as well as reliability. In this paper, proposed study on additional performance metrics such as PAPR and computational costs (energy) along with BER and spectral efficiency performances. The result claims that HICA is not improving the PAPR and energy performances significantly.

Keywords MIMO-OFDM · Channel estimation · Spectral efficiency · Error rates · ICA · Interference · PAPR

1 Introduction

Since from last 5 years, there is continuously growing requirements for higher data rates on constrained resources and available bandwidth. This demand of higher data rate is resulting into increased interest of researchers to initiate the working towards 5G (fifth generation) wireless communications [1]. For such future wireless communications,

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Leaf Disease Diagnosis using Online and Batch Backpropagation neural network

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***Abstract*—**Productivity of the crops is affected due to diseases. Traditional disease diagnosis system is very time consuming in which pathologist carried out experimentation in the laboratory. Hence it is needed to produce the system which diagnosis the disease accurately and fast with the help of the technology. Identifying disease of crops in its early stage is a major challenge in front of researchers. Many machine learning algorithms and image processing techniques are applied to efficiently identify the disease based on the symptoms that appeared on the leaves. In this paper, the infected leaf is segmented using the Kmeans clustering algorithm and further the 12 texture features are extracted from the segmented image. The backpropagation (BP) algorithm is used for identifying the disease. Here two versions of the backpropagation i.e. online BP and batch BP are used. The Pomegranate infected leaf image database is used for the experimentation purpose. It is observed that online BP performance is better as compared to the batch BP.

***Keywords*—**Leaf disease, Agriculture,Backpropagation neural network

I. INTRODUCTION

Agriculture is the prime and important occupation in India, which is facing problems of the low productivity. Precision agriculture is the field in which the latest advanced technologies such as remote sensing, computer vision, image processing and machine learning are used to improve the productivity. When the plants are infectedwith disease, its symptoms are physically appeared on its leaves. The leaf disease diagnosis system uses these symptoms and detects accurately the disease of plant in early stage, using machine learning and image processing algorithms. Hence, the measures can be taken at proper time to diagnosis the disease. Leaf disease diagnosis system consists of the 5 steps: Image Acquisition, Image Preprocessing, Image Segmentation, Feature Extraction, Image classification. In Image acquisition step, the infected and healthy leaf images are aquired either by camera or spectrometer. Digital camera will capture color image which is RGB visible band reflections, whereas spectrometer captures the other electromagnetic spectrum band reflections (i.e. Hyperspectral imaginging) which helps in identifying disease at its early stage. In [1], S. Sankaran has given detailed review of plant disease diagnosis where they discussed about difference between colour and hyperspectral imaging. Sometimes these imagesare either not clear or contain the unwanted signal i.e.noise. In image preprocessing, the images are enhanced using some image enhancement techniques such as contrast stretching or histogram equalization. The noise is removed from the image using different filtering mechanisms. Once the image is preprocessed, the segment of the infected part of image is extracted and used for further processing. This process is known as the segmentation. The most important step of the leaf disease diagnosis system is the feature extraction technique used inthe system. The success of this system is majorly dependent on the features, that are extracted from the infected images. Color, texture and shape features are extracted from the infected image. These features are further given as an input to the classifier which identifies the disease. There are many classifiers such as Support Vector Machine, Backpropagation neural network, K Nearest Neighborhood and Naïve bays algorithm, which can be used in leaf disease diagnosis system. Backpropagation algorithm predicts disease accurately. In this article, the online and batch backpropagation algorithms are used for leaf disease classsification. Kmean algorithm is used here for the segmentation. Total 12 texture features are extracted from the Gray Level Cooccurance Matrix (GLCM). It is observed that onlineBP performance is better than the batch BP.

The paper is organized as follows, Section I contains the introduction of leaf disease diagnosis system, Section II contains the related work carried out on segmentation,

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5. Department of Applied Science & General Engineering (A.Y 2018-19)

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GRAPHIC AND COGRAPHIC Γ-EXTENSIONS OF BINARY MATROIDS

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Abstract

Slater introduced the point-addition operation on graphs to characterize 4-connected graphs. The Γ-extension operation on binary matroids is a generalization of the point-addition operation. In general, under the Γ-extension operation the properties like graphicness and cographicness of matroids are not preserved. In this paper, we obtain forbidden minor characterizations for binary matroids whose Γ-extension matroids are graphic (respectively, cographic).

Keywords: splitting, Γ-extension, graphic, cographic, minor.

2010 Mathematics Subject Classification: 05B35, 05C50, 05C83.

1. INTRODUCTION

We refer to [5] for standard terminology in graphs and matroids. The matroids considered here are loopless and coloopless. Slater [9] introduced the point-addition operation on graphs and used it to classify 4-connected graphs. Azanchiler [1] extended this operation to binary matroids as follows.

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On k-Connected Γ-Extensions of Binary Matroids

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Abstract—Slater introduced the point-addition operation on graphs to classify 4-connected graphs. The Γ-extension operation on binary matroids is a generalization of the point-addition operation. In this paper, we obtain necessary and sufficient conditions to preserve k-connectedness of a binary matroid under the Γ-extension operation. We also obtain a necessary and sufficient condition to get a connected matroid from a disconnected binary matroid using the Γ-extension operation.

DOI: 10.1134/S1995080218090226

Keywords and phrases: *binary matroid, splitting, k-connected, Γ-extension.*

1. INTRODUCTION

We refer to [9] for standard terminology in graphs and matroids. The matroids considered here are loopless and coloopless. Slater [12] introduced the point-addition operation on graphs and used it to classify 4-connected graphs. Azanchiler [1] extended this operation to binary matroids as follows:

Definition 1 [1]. *Let M be a binary matroid with ground set S and standard matrix representation A over $GF(2)$. Let $X = \{x_1, x_2, \ldots, x_m\} \subset S$ be an independent set in M and let $\Gamma = \{\gamma_1, \gamma_2, \ldots, \gamma_m\}$ be a set such that $S \cap \Gamma = \phi$. Suppose A' is the matrix obtained from the matrix A by adjoining m columns labeled by $\gamma_1, \gamma_2, \ldots, \gamma_m$ such that the column labeled by γ_i is same as the column labeled by x_i for $i = 1, 2, \ldots, m$. Let A^X be the matrix obtained by adjoining one extra row to A' which has entry 1 in the column labeled by γ_i for $i = 1, 2 \ldots, m$ and zero elsewhere. The vector matroid of the matrix A^X, denoted by M^X, is called as the Γ-extension of M and the transition from M to M^X is called as Γ-extension operation on M.*

An example given at the end of the paper illustrates the definition. Note that the ground set of the matroid M^X is $S \cup \Gamma$ and $M^X \setminus \Gamma = M$. Therefore M^X is an extension of M. The Γ-extension operation is related to the *splitting operation* on binary matroids, which is defined by Shikare et al. [11], as follows:

Definition 2 [11]. *Let M be a binary matroid with standard matrix representation A over $GF(2)$ and let Y be a non-empty set of elements of M. Let A_Y be the matrix obtained by adjoining one extra row to the matrix A whose entries are 1 in the columns labeled by the elements of the set Y and zero otherwise. The vector matroid of the matrix A_Y, denoted by M_Y, is called as the splitting matroid of M with respect to Y, and the transition from M to M_Y is called as the splitting operation with respect to Y.*

Let M be a binary matroid with ground set S and let $X = \{x_1, x_2, \ldots, x_m\}$ be an independent set in M. Obtain the extension M' of M with ground set $S \cup \Gamma$, where $\Gamma = \{\gamma_1, \gamma_2, \ldots, \gamma_m\}$ is disjoint from S, such that $\{x_i, \gamma_i\}$ is a 2-circuit in M' for each i. The matroid M'_Γ obtained from M' by splitting the set Γ is the Γ-extension matroid M^X.

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Wavelets As Minimizers Of Uncertainty From The Kinematical Group

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Abstract: In this paper we propose a method of obtaining a family of wavelets. The members of the family are tagged by the time parameter. We obtain these wavelets as minimizers of an uncertainty principle. The wavelets are directional in nature. As the family depends on the time parameter, each value of time parameter associates with it a wavelet and because of this scenario the method suggests utility of the idea in motion tracking, video analysis and other such situations.

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INTRODUCTION

J P Leduc in his paper [6] analyses rotational motion in image sequences. His paper introduces Lie theory as the actual mathematical foundation of all observable kinematics embeded in spatiotemporal signals. In another paper [7] the same author designed a new family, the Galilean wavelets, using transformation groups and representation theory. In their paper [10] the authors study wavelet based spatiotemporal decomposition techniques for dynamic texture recognition. Murenzi et al. in [15] apply spatiotemporal wavelets to analyze moving patterns. The authors F Mujica et al. in [11], [12] apply continuous spatiotemporal wavelets to missile warhead detection and tracking. Kazuyoshi and Bin Wang in [13] have applied spatiotemporal wavelets in the field of geophysics to analyse multiscale phenomena in ocean currents. The authors in [14] attempt to understand brain function with reported success using spatiotemporal wavelet transform as compared to other techniques.

In this paper we study the spatiotemporal wavelets that arise from a unitary representation of the kinematical groups in dimensions one to four.

We present here a brief note on the kinematical group in n-dimensions. We refer to [1], (Chapter 15, page 342). The wavelets traditionally have been used for analysing static signals or images. To analyse moving objects, changing images or signals one considers $s \in L^2(\mathbb{R}^{n+1}, d^n x dt)$, the space of time dependent signals of finite energy. The operations one would like to carry out on such signals are space translations, time translation, space dilation, time dilation, and space rotations. In the stated reference, it is mentioned that in order to be visible, a fast moving object needs to be wide and narrow objects have to be slow. The transforms that reflect such behaviour are modelled by the following operators.

Define $\mathcal{D} : L^2(\mathbb{R}^{n+1}, d^n x dt) \to L^2(\mathbb{R}^{n+1}, d^n x dt)$ by $(\mathcal{D}^a s)(x,t) = a^{-\frac{n+1}{2}} s(a^{-1}x, a^{-1}t)$, where $a > 0$, $x \in \mathbb{R}^n$ and $t \in \mathbb{R}$. This operator is called the operator of global dilations. Define $\mathcal{A} : L^2(\mathbb{R}^{n+1}, d^n x dt) \to L^2(\mathbb{R}^{n+1}, d^n x dt)$ by $(\mathcal{A}^c s)(x,t) = s(c^{\frac{1}{n+1}}x, c^{-\frac{n}{n+1}}t)$, where $c > 0$, $x \in \mathbb{R}^n$ and $t \in \mathbb{R}$. This operator is called the operator of speed tuning. It is easily checked that these two operators commute indicating the independence of the scale and speed analysis which could be desirable from the physics point of view.

The calculations that follow are promising as they suggest a method of obtaining a family of wavelets depending on the time parameter.

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