

Comparative study of Unscented and Extended Kalman Filtering methods for State-of-Charge Estimation of Lithium-Ion Battery in EVs

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Mansi Samir Bhandarkar; Rutuja Jagdish Kulkarni; Tanvi Suhas Kumbhar; Milind Patankar; Prachi Mukherji [All Authors](#)

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Abstract:

Battery Management Systems (BMS) are one of the most important systems that manage a large number of battery cells while ensuring safe and reliable operation. Prediction of state-of-charge of the battery should be much accurate to ensure vehicle run safely and reliably. Complex chemical reactions inside the cell determine the nonlinear relationship between cells' Open Circuit Voltage(OCV) and State-Of-Charge(SoC). SoC also gets affected by temperature, charging-discharging hence it is difficult to predict. Therefore, the paper establishes a 3-RC precise model of Lithium-ion battery and proposes the Unscented Kalman Filtering(UKF) method for SoC estimation. Comparison of estimated and actual SoC is done using Simulink® as a simulation platform. The Root Mean Square Error(RMSE) and Mean Absolute Error(MAE) of UKF and the extended Kalman filter at different ambient temperatures are compared. It is found that UKF shows superior performance than EKF in all aspects.

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I. Introduction

One of the major contributors to GHG emissions is the transportation sector. Newer and cleaner fuel sources with improved vehicle performance are being developed to reduce the carbon footprint. Electric transportation has proven to be a viable option with numerous advantages. Due to the utilization of renewable energy sources and the use of battery technology, EVs perform better than fossil-fuel driven vehicles [1].

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Abstract:

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DOI: [10.1109/PuneCon52575.2021.9686511](#)

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Analysis of WBC, RBC, Platelets Using Deep Learning

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Srushti Shinde ; Jui Oak ; Kajal Shrawagi ; Prachi Mukherji [All Authors](#)

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Abstract

Document Sections

- I. Introduction
- II. Literature Survey
- III. Methodology
- IV. Results

Abstract:

Human blood composition is mainly described into three components which are White Blood Cell (WBCs), Red Blood Cell (RBCs) and platelets. The Complete Blood Cell (CBC) count is used to diagnose the health of a particular person. Proper identification of blood components is the major factor for various uncertainties and health issues in the human body. This paper deals with the analysis of different blood cells using the You Only Look Once (YOLO) framework and has been trained with a dataset of blood smear images taken from BCCD (Blood Cell Count and Detection). Diseases such as dengue, bone marrow disorder, thyroid condition, iron deficiency require blood cell count for the diagnosis. Ordinary methods used in the hospital laboratories require counting of blood cells manually using devices. This led to imprecise outcomes which were strenuous, slow and laborious. The proposed method focuses on obtaining better accuracy with YOLOv5 as compared to previous versions of YOLO models which is based on automatic detection, segmentation and count of each blood cell from blood smear images.

laboratories require counting of blood cells manually using devices. This led to imprecise outcomes which were strenuous, slow and laborious. The proposed method focuses on obtaining better accuracy with YOLOv5 as compared to previous versions of YOLO models which is based on automatic detection, segmentation and count of each blood cell from blood smear images. Also, Real time implementation can take place and immediately results can be sent for further diagnosis of patient. The main objective of this paper is to identify three major categories of blood cells and improved accuracy is achieved for detection and segmentation of blood cells. The outcome of the experiment on YOLO v5s concludes that highest mAP was observed for 8 batches, 75 epochs with mAP value as 93%.

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Abstract:Fast and efficient object detection and collision avoidance is an increasingly significant task for autonomous driving technology. This paper proposes a deep learning and... [View more](#)

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Abstract: Fast and efficient object detection and collision avoidance is an increasingly significant task for autonomous driving technology. This paper proposes a deep learning and swarm intelligence based approach in the automotive domain to detect objects and subsequently avoid collisions. By combining them, improvement can be achieved in the speed and accuracy of self-driving cars to avoid longitudinal collisions. Our proposed approach uses a highly accurate and well-suited deep learning technique for object detection to detect objects in real-time using algorithms and methods such as Mask Region-Based Convolutional Neural Networks (Mask R-CNN) and different versions of You Only Look Once (YOLO). Particle Swarm Optimization (PSO) is used to optimize and predict the parameters (velocity and acceleration) required for the self driving car to avoid colliding with the detected object.

Published in: 2021 IEEE Pune Section International Conference (PuneCon)



Covid-19 Detection Using Chest X-Ray

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Abstract

COVID-19 is spreading rapidly throughout the world. As of 14 April 2020, 128,000 people died of COVID-19. As the virus spreads at a very high rate, there is a huge shortage of medical testing kits all over the world. The respiratory system is the part of the human body most affected by the virus, so the use of X-rays of the chest may prove to be a more efficient way than the thermal screening of the human body. In this paper, we are trying to develop a method that uses radiology, i.e. X-rays for detecting the novel corona virus. Along with the paper, we also release a dataset for the research community and further development extracted from various medical research hospital facilities treating COVID-19 patients. This may be useful in an inpatient setting where the present systems are struggling to decide whether to keep the patient in the ward along with other patients or isolate them in COVID-19 areas. It would also help in identifying patients with high likelihood of COVID with a false negative RT-PCR who would need repeat testing. Further, we propose the use of modern AI techniques to detect the COVID-19 patients using X-Ray images in an automated manner, particularly in settings where radiologists are not available, and help make the proposed testing technology scalable. We present CovidAID: COVID-19 AI Detector, a novel deep neural network based model to triage patients for appropriate testing. On the publicly available covid-chestxray-dataset [2] dataset, our model gives 90.5% accuracy with 100% sensitivity (recall) for the COVID-19 infection. We significantly improve upon the results of Covid-Net [10] on the same database

Keywords—COVID-19, Computer Vision, Radiology, Deep learning

1 INTRODUCTION

The sudden spike in the number of patients with COVID-19, a new respiratory virus has put unprecedented load over healthcare systems across the world.



Text Summarization of News Articles

[Tanvi Oka](#) , [Prachi Patankar](#), [Shivani Rege](#) & [Mrudul Dixit](#)

Conference paper | [First Online: 04 January 2022](#)

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Part of the [Lecture Notes in Networks and Systems](#) book series (LNNS, volume 321)

Abstract

Text summarization gives condensed information of long texts and documents. Extractive and abstractive are two approaches for summarizing texts. Extractive text summarization is a type of forming summary by finding out the key phrases in a text or article. These important phrases are extracted to form the summary. In this paper, we aim to carry out text summarization of texts in two foreign languages, namely English and German, and two Indian languages: Marathi and Hindi. We have considered an entire sentence in a text as a feature to be extracted to form the summary. We have summarized news articles in the above-mentioned languages. For summarization, supervised or unsupervised algorithms can be used. We aim to find performance of unsupervised algorithms, namely weighted, TextRank, and fuzzy logic for summarizing texts in the above-mentioned languages. The performance evaluation of algorithms is done using ROUGE metric.

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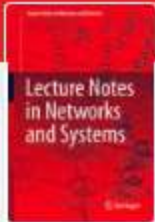
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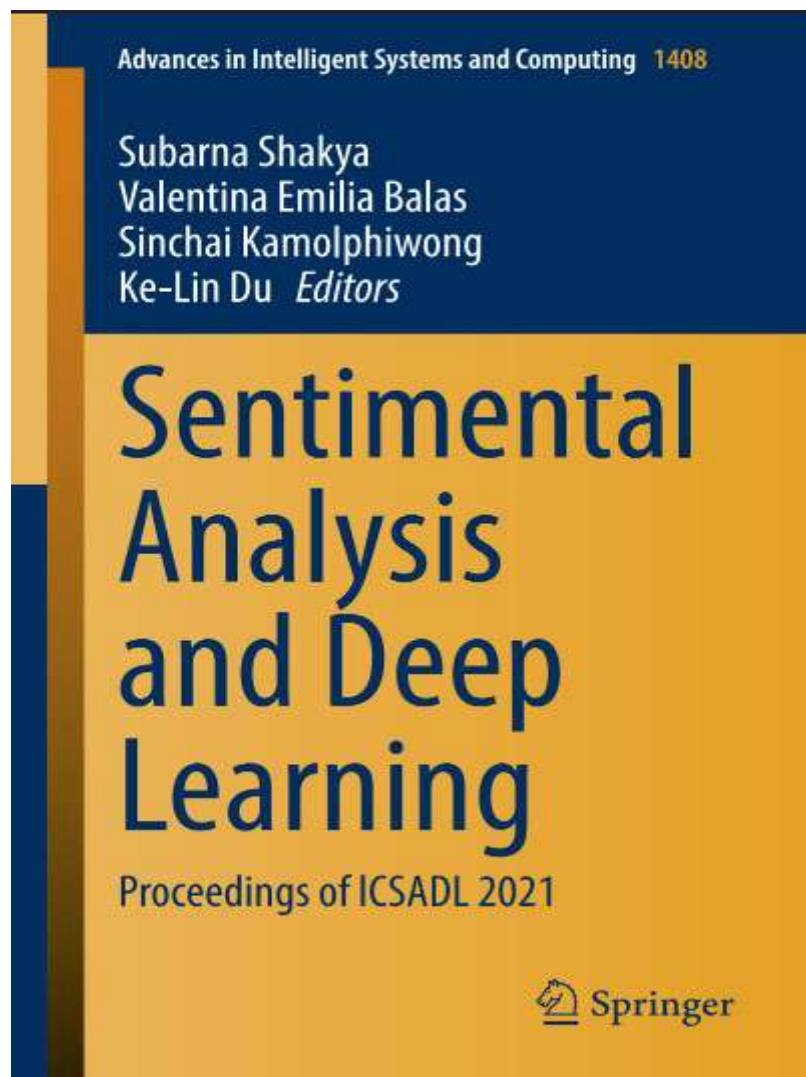
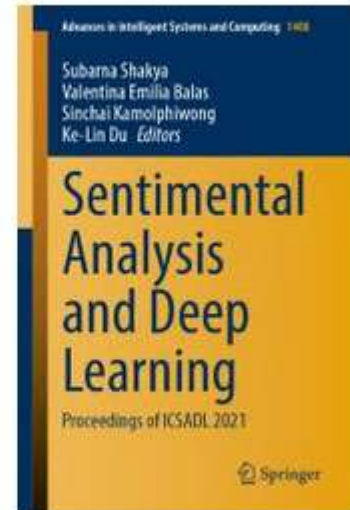
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Denoising of Surface Electromyography Signal Using Parametric Wavelet Shrinkage Method for Hand Prosthesis

[S. H. Bhagwat](#) , [P. A. Mukherji](#) & [S. Paranjape](#)

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Abstract

sEMG signals are significantly corrupted by noise, making signal analysis challenging. This paper investigates the wavelet shrinkage-based parametric and non-parametric techniques for sEMG denoising. The sEMG signal utilized for the analysis includes an extension of the index finger. Three non-parametric thresholding methods, SURE, Universal, Minimax, and a parametric thresholding method are analyzed. Birge–Massart has been used to remove white Gaussian noise and color noise from sEMG signals. This study has considered forty-eight different wavelet functions with soft thresholding and two threshold estimation

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Abstract



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- I. Introduction
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Abstract:

As a consequence of the Covid-19 pandemic, the retail industry has altered customer behaviour and conventional wisdom. People in India still prefer buying products offline due to their 'try before you buy' way of thinking. This scenario can be changed through a tech-based solution. Augmented Reality can bridge the gap between online and offline shopping. Users can superimpose the desired electronic product sitting at home. They can also ensure how the product looks at their house. Users can also adjust the size and rotate the object to get a sense of assurance. This paper will explain marker-based and markerless techniques used in our system to place the realistic 3D model and to give a virtual try-on experience. This system will help businesses grow despite challenges caused by Covid-19. As a result, people will be in a position to maintain social distance, but using Augmented Reality technologies they will also be virtually close.

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Published in: 2021 IEEE 4th International Conference on Computing, Power and Communication Technologies (IC3PCT)

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Conference Location: Kuala Lumpur, Malaysia

☰ Contents

I. Introduction

Augmented Reality (AR) got its recognition through the success of the game Pokemon Go [1]. Use of marker based AR technique was first seen in 2008 through a commercial ad of BMW Mini [2]. Later in the early 20's the 'virtual try on' phase came into picture to interact with live movements in the real world [3]. Apart from this, AR can be immensely applied in the cultural, historical and geographic side of environs. Looking at the ongoing Covid-19 situation, AR needs different approach in India i.e. It's just a slight boost and that's where Signia and Opti AR helps customers in better decision making not only in the pandemic but also in contemporary age. Wheelchair users or physically disabled people found it difficult to shop independently, interacting with the products on sale is also hard for them [5]. Keeping that in mind AR can give these individuals a new way to forget their deficiencies and shop like abled people. Taking into consideration the aspects of the shopping/retail industry if this is taken to a professional level this could be a step to milestone [6].

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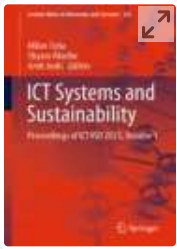
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Family of Friends—A Hostel Utility System

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Conference paper | [First Online: 04 January 2022](#)

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Abstract

The main objective and the driver force for building an android hostel management system is to increase the efficiency of how a typical hostel works while taking care of factors such as security, administration, and student portal. Parents who send their children to the hostels whether it is for education or for some different domestic reasons are concerned about their child's safety the most. Digitizing the whole process will make things easier to monitor. Being the students from information technology, we always have seen a lot of new applications being used in the college like the portal for result declaration, etc. The hostels still work in an old-fashioned manner where there goes a lot of manual energy in keeping up with the whole

Development of VOC monitoring System for Newly Painted Buildings

Wankhede Shweta, Panditrao Anagha

IEEE International Conference on Information Systems and Computer Network, Mathura

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Development of VOC Monitoring System for Newly Painted Buildings

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Abstract— In Today's developing world with new houses and buildings which are constructed, a lot of paint is required for it, which leads to harmful emissions in the surroundings that is VOC. For instance, the construction of infrastructure is increasing day –by-day all around the world. Also, Multiple materials are required such as cement, concrete, bricks, and so on. However, to make it look like more alluring paint is required for this purpose, because nowadays, people are more attracted to charming things. Therefore, paints are used to make houses more attractive. In contrast, these paints release harmful toxic emissions in the surroundings that are VOCs. These toxic substances can cause long-term damage or acute. So, to prevent this problem we are planning to build a monitoring system which measures the harmful fumes in the

of VOC in the surrounding environment. As liquid ingredients start evaporating they release from which contains harmful VOC into the surrounding the indoor air quality is concerned with the release of the gases that are present in the surroundings.[2] This may cause the irritation of eyes nose headache and long-term damaging effects to the organs in the body.[3] The large group of chemicals that are found in many Paints that we used to build and maintain our homes and also they release the different gases in the air which we breathe.[4] The project aim is to observe the emission of the VOC compound from the paints and the coatings and to make the person get "alert" with the help of a LED.



Chapter

Internet of Things – Essential IoT Business Guide with Different Case Studies

By *Nutan Hemant Deshmukh*

Book [Computing Technologies and Applications](#)

Edition	1st Edition
First Published	2021
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Pages	21
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ABSTRACT

The new era of computing technology is what many are calling the Internet of Things (IoT). The first Coca Cola vending machine was an Internet-connected appliance. The IoT focuses on 5 As (anytime, anywhere, anyone, anyhow, anything) and 3 Is (interconnect, intelligent, interaction). Machine to machine, machine to infrastructure, machine to environment, the Internet of Everything, the Internet of Intelligent Things or Devices, intelligent systems—call it whatever you want, but it's happening, and its potential is huge. The IoT is seen as billions of smart, connected "intelligent things" (a sort of "universal global neural network" in the cloud) that encompass every aspect of human life, and its foundation is the intelligence that embedded processing provides. The IoT consists of smart machines interacting and communicating with other machines, objects, environments, and infrastructures. As a result, huge volumes of data are being generated, and that data is being processed into useful actions that can "command and control" things to make human lives much easier and safer – and to reduce human impact on the environment. The creativity of this new era is boundless, with amazing potential to improve human lives. The chapter is an extensive reference to the



Chapter

Autoscaling Techniques for Web Applications in the Cloud

By *Priya Deokar, Sandhya Arora*

Book [Cloud Computing Technologies for Smart Agriculture and Healthcare](#)

Edition	1st Edition
First Published	2021
Imprint	Chapman and Hall/CRC
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ABSTRACT

That cloud computing offers numerous benefits is the reason why lots of web applications are migrated to the cloud. Elasticity is one of the important features of the cloud that allows resources to be scaled dynamically based on resource demand. Resource scaling has to be efficiently implemented in order to meet Service Level Agreement (SLA) requirements as well as to keep the costs low. Besides, automatically provisioning resources a few minutes prior to actual demand helps maintain Quality of Service at the provider end. VM bootup time needs to be considered in auto scaling techniques.

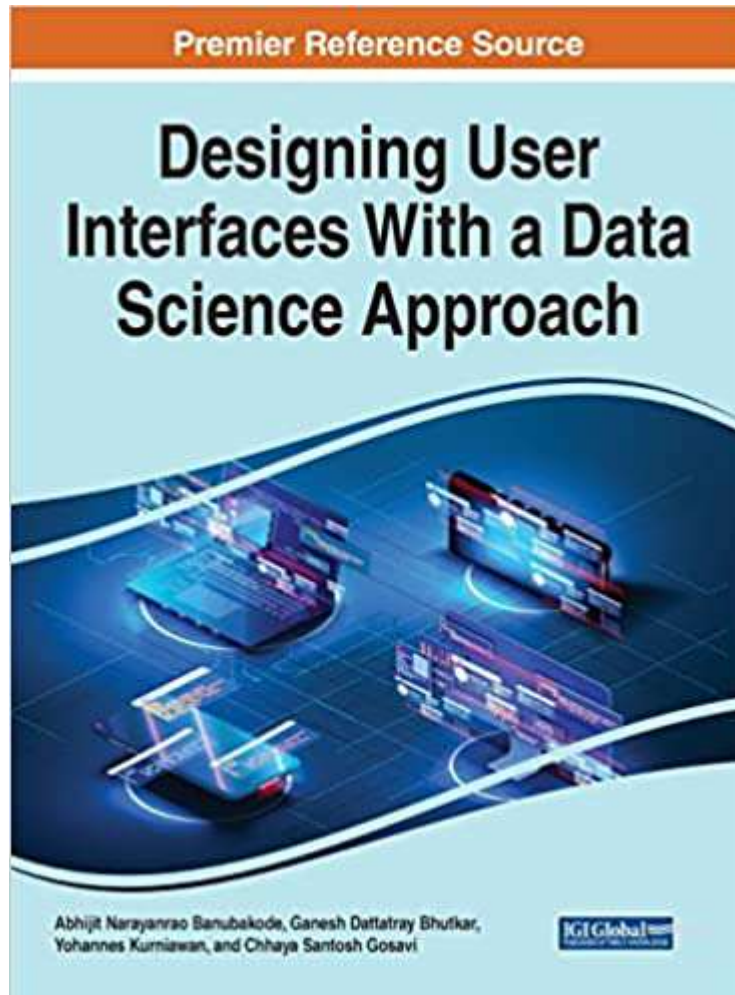
Various techniques are studied in the literature which facilitate elasticity in the Cloud. This article provides a comprehensive view of auto scaling techniques.

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Chapter 7

Disease Prediction System Using Image Processing and Machine Learning in COVID-19

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ABSTRACT

Diseases such as cancers, pneumonia, and COVID really need to be detected at the right time. If early detection and treatment of such diseases get started as soon as possible, then, probably, patients can be cured completely. Early detection of such diseases is very important, and early-stage imaging can be done based on x-rays, mammography reports, or pathological reports. The purpose of this system is to provide predictions for the different major diseases like cancer and some general occurring diseases. Image processing along with machine learning techniques made it possible to find the chances of occurrence of cancer/tumor/lump in the human body. As per the predicted probability, a patient can make an early decision by discussing it with doctors. The system will predict the most possible disease based on the given symptoms and precautionary measures required to avoid the progression of disease. It will also help doctors analyze the pattern of presence of diseases in the society.

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Chapter




Human Factors in Autonomous Driving Systems

A User Perspective

By *Neeta Maitre, Neeraj Hanumante*

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ABSTRACT



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Chapter 17

Human factors in autonomous driving systems: A user perspective

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Keywords: ADS, human factors, levels of automation, design principles, user perspective

Automated driving systems (ADS) are the systems which work with little or no human assistance. It is the human factor that affects the usage of autonomous vehicles. This chapter aims to narrate the types of autonomous systems designs and human facets related to them. Interaction of users with autonomous vehicles has multiple dimensions, namely - robotics, psychology, social, policy and economics. Amongst these components, the psychology and social components of user interaction is critical from ADS development and acceptance point of view. Technological advancements, associated with assistance to drivers, reduce distractions and improve safety but trust in these technologies for augmenting driver capabilities is a must. Enhancement of drivers' self-awareness and potential distraction awareness associated with technology can be achieved through cognitive engineering principles. Successful deployment of ADS can help to improve mental health and social well-being in the local environment. It requires an effective collaboration between manufacturers and governments (local and central), that can provide the best suitable automated driving system. This chapter discusses these aspects in detail and in the process, underlines the criticality of the human-centric nature of ADS during its usage.

17.1 INTRODUCTION

ADS are being developed since the 1920s. The technology has seen its evolution through transmission of guiding signals, image processing algorithms like Cart's Vision algorithm, Blocks World planning method, bifocal camera systems, EMSVision autonomy system. With the overall development of technological know-how specifically related to computer technology, this development process accelerated. However, in addition to the technological dimension, the ADS also has an equally crucial human dimension. The human dimension encompasses both the elements of the automated road transport system -- an ADS user as well as the non-ADS users of the road. In this chapter, the human factors in the ADS from a users' perspective are discussed. The broad question being investigated here is how do users



Chapter

Low-Resource Language Document Summarization: A Challenge

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Sensor Applications in Agriculture – A Review

By *Jyoti Lagad, Sandhya Arora*

Book [Cloud Computing Technologies for Smart Agriculture and Healthcare](#)

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ABSTRACT

Today's agribusiness is more information-focused, more adaptive to technology, and more evolving than ever. The rapid revolution in IoT-based innovations is changing the agriculture sector and moving agribusiness from factual to quantitative methodologies. Such progressive changes are creating new challenges and opportunities in agriculture. This article features the capabilities of smart agriculture using IoT and wireless sensors. For example, it discusses how the primitive farm practices are changing by integrating and implementing sensor applications. Major agriculture applications using wireless sensors, information communication technologies, and IoT are analyzed in detail. The sensors which are used in various agriculture operations like irrigation, land preparation, land protection, weed management, nutrition management, planting, harvesting, etc are listed. Also, the advancements in farm management with the help of unmanned aerial vehicles and remote sensing to determine the area under cultivation, to determine the relative health of agriculture fields, to estimate agriculture yield, and to strategize plantation and irrigation design and watershed management are discussed in detail.



Chapter

Research Issues in IoT

By *Sayali A. Sapkal, Sandhya Arora*

Book [Computing Technologies and Applications](#)

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ABSTRACT

The Internet of Things (IoT) is the next step of the evolution of the Internet in which huge numbers of “things”, including sensors, actuators, and processors, are networked to provide high-resolution data on their settings and isometrics a degree of control over it. IoT is changing the state radically by beginning an essential role in current trends and uses emerging technologies consist of heterogeneous communication devices. Lack of resources and mechanism restricts the implementation of IoT in a full phase. Technical issues related to interoperability and scalability, as billions of heterogeneous devices will be connected should be resolved. Big challenge for business people as how to invest in the IoT as well as major social, legal and ethical issues that include security and privacy of data collection, which must be resolved.

Due to differences in terminology by different authors, many recent surveys of the IoT include a section on research challenges but the fact is that different research challenges cannot be completely separated from each other, and also it is the fact that they can be described at different levels in detail. IoT design can be treated as one of level of research challenge, but this includes a number different research challenges such as scalability, architecture, interoperability. Each of these research challenges may include other research challenges such protection, security, privacy and safety. As the future IoT will be a multi-technology infrastructure, multi-industry, multi-national, this article reviews the global tuning efforts that are ongoing to facilitate its worldwide creation and adoption. Hence it becomes necessary to do more survey on research issues in IOT for current scenario.



Chapter

Convolutional Neural Network and Its Advances: Overview and Applications

By Jyoti S. Raghawan, Sandhya Arora

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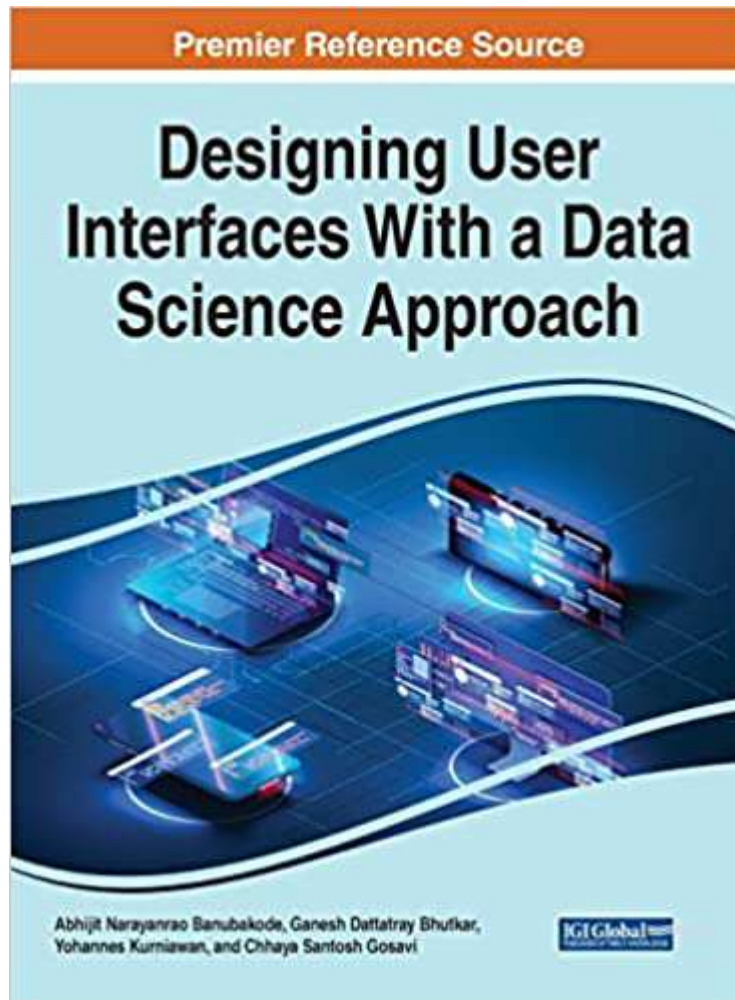
ABSTRACT

For the last few years, deep learning has become an area of interest for academicians and researchers. Convolutional neural network (CNN) is one of the deep neural networks that shows excellent performance in more areas than the classical machine learning methods and is the most powerful and popular deep neural network. CNN uses different building blocks like convolution layers, pooling layers, and fully connected layers to automatically learn features through backpropagations. This chapter focuses on basic concepts and understanding of CNN elements and commonly used CNN architectures and learning algorithms. Various parameters like activation function, loss function, regularization, optimization, number of layers, and layer design affect the performance of CNNs. Hence, we summarize recent enhancement of CNNs by considering all these aspects. CNN shows its excellence in areas like computer vision, natural language processing, speech processing, and radiology. Based on various scenarios, different dimensions of convolutions like one-dimensional, two-dimensional, and multi-dimensional CNN are used. This chapter details such applications of CNN in various domains. Further, the chapter discusses some common issues and future research directions in the field of CNN. The aim of this chapter is to provide a detailed understanding of CNN with its advances and applications, which will help researchers further develop applications in the field of CNN.

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Chapter 10


Social Network Mining, Analysis, and Research Trends: A Case Study

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ABSTRACT

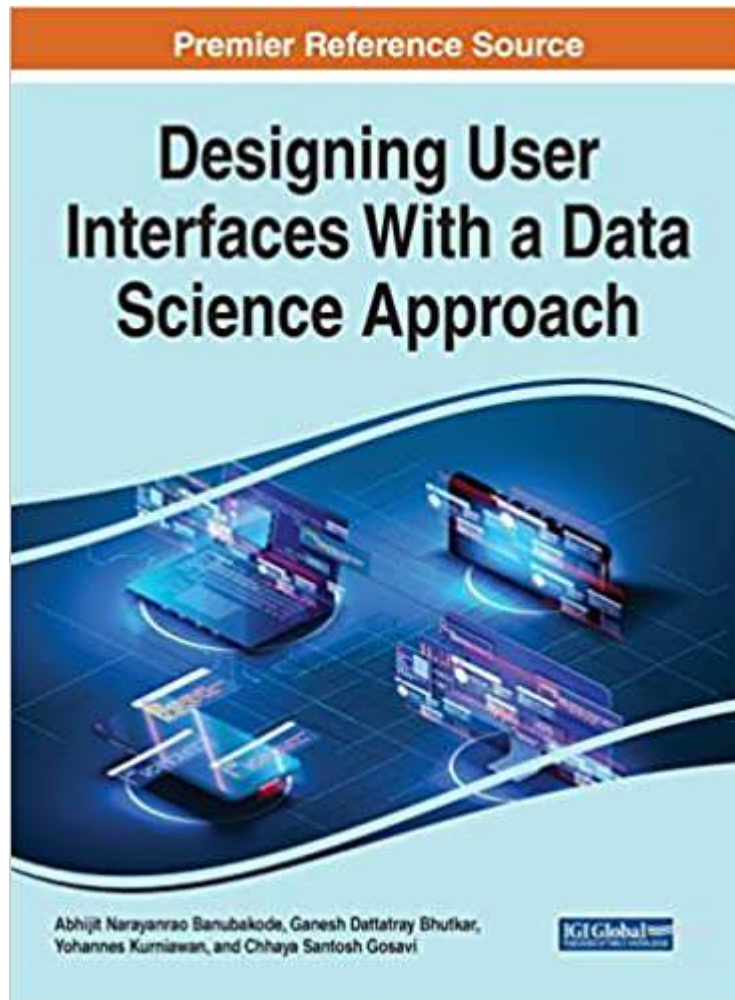
Social media has altered the way we interact with the world around us. Social media usage has taken the world by storm the previous couple of years, and the wide variety of users has grown manifold. The analysis of social networks has been given special attention in recent years, mainly because of the success of online social networks and media sharing sites. In intelligence management, social structures need to be revealed to see social behaviour and social change based on the interactions that have taken place between the social members. Social network mining is very important because of various reasons. For example, studying and analysing social networks allows us to understand social behaviours in different contexts. In addition, by analysing the roles of the people involved in the social network, we can understand how information and opinions spread within the network, and who are the most influential people. This chapter presents a methodical review of social media and mining by applying data mining algorithms to study social networks.

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Chapter 10


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ABSTRACT

Social media has altered the way we interact with the world around us. Social media usage has taken the world by storm the previous couple of years, and the wide variety of users has grown manifold. The analysis of social networks has been given special attention in recent years, mainly because of the success of online social networks and media sharing sites. In intelligence management, social structures need to be revealed to see social behaviour and social change based on the interactions that have taken place between the social members. Social network mining is very important because of various reasons. For example, studying and analysing social networks allows us to understand social behaviours in different contexts. In addition, by analysing the roles of the people involved in the social network, we can understand how information and opinions spread within the network, and who are the most influential people. This chapter presents a methodical review of social media and mining by applying data mining algorithms to study social networks.

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An insight into the technologies required for building an AI based Help Desk

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Abstract:--

A help desk is a platform to build a huge customer base as well as maintain the good will of the company in the customer's minds. It helps the company to identify the various issues with their solutions, the customer feedback, along with the problems arising while the IT vendors are trying to develop solutions. The help desk receives a number of queries from the clients as well as IT vendors each day, and hence it becomes very difficult for the people responsible for handling the help desk to manage and process all the requests received. Hence, we have created a solution which automates this process and ensures the processing of all the requests with minimum wastage of time. Our solution consists of an Artificial Intelligence (AI) based chatbot, which would be hosted on the company's website and an email automation system. The chatbot would ensure that all the primary customer queries like the information of basic product information would be handled at the website level, thus reducing the load of emails received to the company. The email automation system would ensure that all the incoming emails would be answered in a timely manner and without human intervention. Also, we are providing a User Interface (UI) where all the email logs would be visible to the concerned authorities and thus they can have a full control over the functioning of the system. Thus, our solution aims at reducing human costs incurring to the company and targeting maximum customer satisfaction using applications of Artificial Intelligence, Natural Language Understanding (NLU), Natural Language Processing (NLP), Optical Character Recognition (OCR) etc.

Index Terms

AI, help desk, chatbot, email, Python, OCR, database

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Role of Information and Communication Technology in Retail Innovativeness

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Abstract

Retailers need to operate within competitive environment so that innovations could become the source for sustainable competitive edge. Studies have been done for exploring the connection between the retail innovativeness and technological advancements and solutions of information and communication which are implemented by the store chains. Also, the researchers have tried to test existence of prominent differences in the perception of the consumers and the behavioural intentions that exist between the retailers who may be perceived as the high innovators and the ones considered to be low innovators. Resultantly, the differences between consumer behaviours are considered to be low and high innovators which may be understood through strong relation between the retail innovativeness and technologies implemented by stores. Innovation and the advancements in ICT cause prominent and constant changes in retail sector. It has become a very crucial part of operations of the retail companies and they also influence the success of these stores.

Keywords: ICT, retail innovations, consumer behaviour

I. Introduction

The advancements and innovations in the Information Communication Technologies cause a good number of changes in retail industry. It has become quite crucial for operations in the retail sector and it also has a huge impact on the success of the retail companies. The retailers need to understand the technological advancements and they also need to manage the retail opportunities as well as challenges for staying competitive in digital retail market. Therefore, studies have been done for discussing the impact of ICT on retail sector and also shows the

Study on Seizure Detection from the Features of EEG Signals

Anita Patil^{1*}

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ABSTRACT

Determining a seizure is essential in order to support the diagnosis and treatment of an epileptic patient. The objective of this work is to automatically detect the epileptic seizures in a patient from EEG signal. As compared to different biological signals like PET, MEG, MRI and fMRI, the EEG signal is found to be more advantageous. The recorded EEG signal was first preprocessed. Features of the EEG signal were then obtained and finally it was classified into seizure or normal on the basis of the calculated features. The results were compared among the features like Mean, PSE (Power Spectral Entropy), variance and energy and the best performing features were selected. Weighted combinations of these features were obtained in order to confirm a robust feature vector. In this paper, we propose a weighted combination of variance and energies (in two particular frequency bands), resulting in a composite feature. We set a threshold for this composite feature, on the basis of which, a given EEG signal can be classified into a normal or a seizure sequence. The proposed composition of features gives up to 96.5% accuracy.

Keywords: EEG; seizures; mean; variance; PSE; Energy.

1. INTRODUCTION

In the treatment of patients having psychological disorders, monitoring their brain activity becomes very essential. Keeping the statistical record regarding frequency of occurrence and duration of epileptic seizures in such patients is beneficial. Seizure is an uncontrolled malfunctioning of brain resulting in a physical paroxysm, abnormal physical signs, hallucinations or a combination of multiple symptoms. The type of symptoms and seizures depend on where the abnormal electrical activity takes place in the brain, its cause and other factors as patient's age and his/her general health conditions. Long term fevers, genetic disorder, severe injuries, tumors or mal-development of the brain are the common causes of seizures [1]. The epileptic detection in most previous research suffers from low power and unsuitability for processing large datasets. Therefore, a computerized epileptic seizure detection method is highly required to eradicate the aforementioned problems, expedite epilepsy research and aid medical professionals. In this work, we propose an automatic epilepsy diagnosis framework based on the combination of multi-domain feature extraction and nonlinear analysis of EEG signals [2].

In order to detect the seizure, the first step is to capture the brain activity through electrical signal. There are different techniques for capturing brain information such as magneto-encephalogram (MEG), Positron Emission Tomography), functional Magnetic Resonance Imaging (fMRI), Electroencephalograph (EEG) etc. The EEG is a non-invasive technique to capture the brain activities. Its set up is compact, tolerable to the movement of patient, cost effective and most importantly, it has high temporal resolution. Due to these advantages of EEG over other techniques, it is popularly used for studying brain activities. As the EEG signal is highly nonlinear and nonstationary, the traditional Fourier analysis which expands signals in terms of sinusoids cannot appropriately represent the amplitude contribution from each frequency value [3].

¹Department of Electronics and Tele-Communication, Cummins College of Engineering for Women, Pune, India.

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A rapid use of the social network for communication prompts the broad and quicker dispersion of information than normal news channels. The validation of information is very challenging due to massive data on a social network. Unverified news can be a talk or phony news that harms an individual, association and severe effect on humankind. Hence, battle the talk dissemination to limit the unfriendly impacts on society. Regardless of incredible endeavors to manage this issue, analysts chiefly focused on transient dynamics of posts alongside different highlights from a user, content-based, network-based features and exhibited a moderate exactness. The time series highlights are related to an occasion that smothers the other quality highlights identified with each post. There is a degree of development in precision, so this paper centers around the significant role of various features in rumor detection in social networks. This involves the highlights from the user-based, syntactic-based, lexical and temporal features. The obtained results compared to a benchmarked real-world dataset of a Twitter network.

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I. Introduction

Exploding various social networking websites (e.g., Twitter, Facebook, Reddit) leads to a high impact on news and information propagation. According to social network statistics, around the globe, there are 3.78 billion users on social media, equal to 48% of the current population [1]. Stories or news related to politics, economy, social, scientific are uploaded continuously and spread rapidly in social networks shows a close real-time view of events or incidences that happened around the world. A social network helps the public connect to the world, have smooth and faster access to live updates, and help others. Even though it has many advantages, the social network presents challenges. Signifying Online Reading posts, identifying the user who propagates bogus messages like a rumor or fake news [2]. Original material or posts are frequently tampered with by malicious users and disseminated quickly around the internet. Due to these successive moderations, the meaning of the initial post changes in the wrong way. In the rapid diffusion of such news, bots play an important role, where bots are the automatic programs that share fake news with a very high frequency than usual social media users [3]. Fake news and rumor are used alternatively in the literature, but there is a difference in the terms. Misinformation is a bulletin story that is verifiably false and written intentionally to mislead the users [4].

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Demo-Based Learning: An Effective Teaching-Learning Pedagogy in STEM Education

Vaishali Upadhye^{1*} and Swati Madhe²

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ABSTRACT

A figure is worth a thousand words when explaining a topic. Demonstration of a theoretical concept taught is worth a thousand figures. STEM (Science, Technology, Engineering & Mathematics) education involves understanding concepts/processes which have complex dynamics, speed, procedures, transformations etc. Such topics are difficult to visualise through just text or static figures. So there is a need to develop an appropriate teaching methodology for better learning of such concepts. This paper presents demo-based learning as an effective teaching-learning pedagogy in STEM education. Demo-based learning involves demonstrations of various theoretical processes/procedures/skills using animated video clips, simulation software and actual demo of prototypes/instruments. Demonstrations help students to understand things that are difficult to visualise. In this paper, the authors have experimented with the use of demo-based learning to teach courses in Instrumentation and Control Engineering curriculum. The activity was implemented in the classroom. The feedback of the students was taken to test the efficacy of the method used. The study shows that the student found the activity interesting and it promoted more student engagement. It is found that the students could do their assignments with confidence. This method of teaching has a lifetime learning impact which helps students to easily incorporate the theory concepts in real-time applications.

Keywords: STEM, teaching pedagogy, demo-based learning, skill enhancement

Introduction

In STEM education, the purpose is to educate students in the fields of science, technology, engineering and mathematics using an interdisciplinary and applied approach. STEM integrates these fields into an integrated learning paradigm based on real-world applications. The conventional teaching method is monotonous. Active participation of students in classroom activities is limited. The students are left with merely listening to lectures continuously (Senthilkumar et al, 2017). To implement STEM education effectively, there is a need to use modern teaching pedagogies. Through this, working in a team, interaction and interdisciplinary skills of the students get developed (Raju et al, 2000). This will also help in the readiness of graduate engineers for industry. Advancement in technology has greatly contributed towards development of innovative techniques and tools. Teachers all over the world have been using teaching pedagogies like flipped classroom, think pair share, peer instruction, project-based learning, problem-based learning, case study-based learning, demo-based learning, activity-based learning (role play, crossword, quiz, etc) so that there is an improvement in the teaching-learning process. The authors of this paper have implemented demo-based learning teaching pedagogy for effective teaching and learning. In the paper, the definition of demo-based learning, various modes for implementing this teaching pedagogy, experimentation has been done, the observations and the impact analysis have been presented. Over the last few years, there have been many instances where concerns regarding the quality of engineering education were raised (Kumar et al, 2018; Sujatha, 2017; Press Trust of India, 2016). The author of (Kumar et al, 2018) has experimented on, teaching learning pedagogies like collaborative learning, peer learning, technology enabled learning and participative learning. Information and Communication technology (ICT) based teaching technique which included video lecturing, discussion forums, different assessment patterns was used by the author of (Reddy et al, 2014). The paper also speaks about industry partnership courses. In (Kavitha et al, 2018), the author used collaborative learning for teaching programming courses. Through this exercise significant improvement was observed in the knowledge, learning level, and overall productivity of the students. With the use of peer learning teaching pedagogy, the author of (Boud et al, 2005) found improvement in the skill set of the students in the research domain. Through this activity, the students could learn

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Novel Micro flow Sensor for Air Purge Method to Monitor the State of Charge of Lead Acid Battery

Yashwant Adhav¹, Dayaram Sonawane² and Chetankumar Patil³

¹ Cummins College of Engineering for Women, Pune-411052, India

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Abstract. The foremost aim of the present research study is to measure specific gravity of lead-acid batteries and further know battery's state-of-charge (SoC). In this article, air purge method is used to monitor the status of a battery; back differential pressure is measured using MPX4006 DP MEMS pressure sensor. In air purge method, it is essential to adjust the rate of bubbles in acid. This can be achieved by controlling the compressors speed or controlling the air flow by controllers. When air purge tubes are inserted through a battery's cap, it is difficult to observe bubbles produced in the acid as the battery is nontransparent. If the bubble rate is too slow, the system lowers the output signal and hence stops working. During the calibration of the instrument, air flow measurement through the pipe is of prime importance. In this method, FS1012 MEMS gas flow sensor is used to monitor the discharged air flow. FS1012 is based on the thermo-transfer principle. Compared to the resistive technique, this flow sensor consists of a thermopile for air flow sensing whose signal-noise ratio is exceptional. The output of the sensor is exponential; signal conditioning circuit has been designed to get linear output 0 to 3.3 V standard range. The amplified output of signal conditioning circuit is monitored using TM4C123GXL arm controller. FS1020 is first time proposed to monitor the air flow of a small air purge probe used to monitor the state of charge of a lead-acid battery. FS1020 ensures an ideal flow of the air bubbler system, which improves the performance of the battery charge monitoring system. Conventional flow sensors for example, rotameter cannot be used for very low flow measurement; they are costlier as well as bulky. The minimum flow required to produce sufficient bubbles in acid is 0.50 liter per minute (LPM) which is measured by FS 1012.

1. Introduction

The present research study mainly attempts to design a real-time measurement system for a specific gravity of acid of a lead-acid battery using an air purge tube that can be inserted in a small quantity of acid (the novelty is already patented [1]). Specific gravity directly indicates the percent of the charge in a battery. There are several methods to determine the state of the charge (SoC) of a battery, however, among them, the method based on specific gravity measurement techniques is more accurate, precise and valid [2]. At present, lead-acid batteries are still the most frequently utilized energy storage systems (ESS) [3][5]. These batteries, having a competitive price and high capacity, can transform energy into electrical energy. ESS can be driven from several batteries, namely fuelcell batteries, Li-ion batteries and lead-acid batteries.



Development of VOC Monitoring System for Newly Painted Buildings

Publisher: IEEE

Cite This

PDF

Shweta Wankhede; Anagha Panditrao **All Authors**

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- Keywords
- Metrics

Abstract:
 In Today's developing world with new houses and buildings which are constructed, a lot of paint is required for it, which leads to harmful emissions in the surroundings that is VOC. For instance, the construction of infrastructure is increasing day -by-day all around the world. Also, Multiple materials are required such as cement, concrete, bricks, and so on. However, to make it look like more alluring paint is required for this purpose, because nowadays, people are more attracted to charming things. Therefore, paints are used to make houses more attractive. In contrast, these paints release harmful toxic emissions in the surroundings that are VOCs. These toxic substances can cause long-term damage or acute. So, to prevent this problem we are planning to build a monitoring system which measures the harmful fumes in the newly painted buildings. This system is proposed for monitoring the VOC like Toluene, formaldehyde, benzene, and Methane. To measure these VOCs., we are using MS 1100. This sensor will sense the fumes and the output will be measured in parts per million which will be given for signal conditioning. The output of signal conditioning is given to Analog to Digital convertor (ADC) which converts analog output in the Digital form. The output will be displayed on the screen and if the range exceeds the specified limit, then the buzzer will turn ON. This prevents the person from entering the house or building. This way we can prevent health problems caused by these emissions

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Smart Irrigation System using IoT based Control Valve

Publisher: IEEE

[Cite This](#)[PDF](#)Sumedha Mujoo; Anjali Sharma; Kamini Gaikwad; Swati Madhe; Atul Joshi line; Subrahmanyam Sista; Mamta Khatape [All Authors](#)

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Abstract:

For over decades, the traditional irrigation methods are ditch irrigation, sprinkler system, and drip irrigation. The traditional irrigation systems have uncontrolled irrigation practices, waterlogging, soil deterioration, wastage of water and require continuous human intervention leading to higher usage of electricity and uneven growth of plants. Introducing IoT solutions enables precise crop watering and results in increased productivity with low maintenance, optimal use of resources, and enables future harm prediction. A new sophisticated approach minimizes the problem by connecting one mother/feeder pipe to various child pipes which in turn covers the entire area for watering. The IoT-enabled control valve boxes are mounted covering a range of half-kilometer area. The system is solar-operated without the requirement of an external battery that can sustain under unfavorable conditions.

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Book

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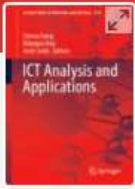


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ABSTRACT

Making use of digital technology for social care is a major responsibility of the computing domain. Social care services require attention for ease in social systems, e-farming, and automation, etc.

Thus, the book focuses on suggesting software solutions for supporting social issues, such as health care, learning about and monitoring for disabilities, and providing technical solutions for better living. Technology is enabling people to have access to advances so that they can have better health.



ICT Analysis and Applications pp 299–305 | [Cite as](#)

STAT Simple Text Annotation Tool (STAT): Web-based Tool for Creating Training Data for spaCy Models

[Darshita Kumar](#), [Kshitija Choudhari](#), [Pooja Patel](#), [Shambhavi Pandey](#), [Aparna Hajare](#) & [Shubham Jante](#)

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IV. Implementation

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Abstract:

Modern day software applications are required to have high availability and performance capabilities to ensure highly productive features and a smooth user experience. It becomes increasingly difficult for organizations to innovate with rapid building, testing and deployment of systems in static, monolithic environments. In order to ascertain the development of resilient applications, Kubernetes is widely used for distributed systems for workload scalability and orchestration of containers. The management of the system using Kubernetes becomes progressively inconvenient with increasing size and complexity. In order to make the process of Kubernetes configuration simpler and faster, Helm charts are used to preconfigure applications and automate the processes of development, testing and production. This paper proposes a method to ease the deployment of the enterprise application in Kubernetes using Helm charts. Our study shows that deployment of Kubernetes resources is simplified using Helm such that applications can be defined as a set of components in the minikube Kubernetes cluster. The experimental results of the proposed method show that there is 6.185 times speed improvement in the deployment process by using Helm. This makes it extremely influential for DevOps teams to improve their cluster management.

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I. Introduction

A business' IT systems keep growing as their operations go on increasing. This becomes challenging when new features need to be added, changes have to be made or functions have to be scaled. The IT industry is constantly under great pressure to enhance agility as well as enable faster delivery of new functionality to the business domain. A specific focus of importance is the deployment of new or improved application programs at the immediate frequency that any digital transformation demands [1]. Using containers, complex programs with their configuration and deployment related dependencies are encapsulated and run in an isolated environment making applications portable, hence adopted in High Performance Computing (HPC) clusters [2]. Containerization is a type of virtualization of the operating system, by means of which applications can be executed in isolated, independent user spaces called containers, while sharing the underlying hardware and shared operating system (OS) [3]. Containerization provides the benefits of: increased productivity and improved security. Kubernetes is a container orchestration engine [4] which simplifies the management of multiple containerized applications. It facilitates the automation of the deployment, scaling and networking of containers and encompasses portability and extensibility in its platform for management of containerized workloads and services, allowing declarative configuration, as well as self-healing [5]. Kubernetes achieves reliability and availability of services during system downtime and enhances user demand [6]. This research paper contributes towards ease of user experience and productivity of the user's cluster.

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Abstract:

The process of digitization of data through Optical Character Recognition has been most commonly done through means of Computer Vision. An attempt was made to replace this with a Natural Language Processing method called Named Entity Recognition for extraction of the required data values from the OCR output of the images of documents through means of spaCy. Named Entity Recognition is a technique used to automatically identify named entities in a text and classify them into predefined categories. It helps businesses easily analyze huge amounts of unstructured data. Text Annotation helps machines recognize the crucial words in a sentence making them more powerful. It is an essential requirement for making a dataset that can be used for NLP Models. Labeling the keywords in each statement is important to make the entire statement understandable to machine learning models. A generalized NER framework was developed by the authors which lets users build training models on top of the existing spaCy models to allow for named entity recognition on their text data. The framework takes a configuration file which contains model name, model size and hyperparameters, along with annotated data in JSON format as input, and returns a customized spaCy model as output. An annotation tool STAT was also built by the authors specifically for use with the framework which produced the required training data files. The model built by the authors is based on test configurations with drop as 0.2 and 30 iterations whose results are discussed in the Results Section.

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Abstract:

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I. Introduction

Manually uploading data from physical documents is time-consuming and prone to human errors. To eliminate such errors and to make the process of digitization of documents more efficient, a large number of techniques can be used

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Chapter

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By *Pranjali Deshpande, Sunita Jahirabadkar*

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The chapters of this volume present novel and state of the art research works conducted at the intersection of HCI aimed at developing trust, increasing user acceptance, augmenting user performance, and fostering human-technology partnerships. Chapters cover usability testing in digital healthcare systems, user experience testing of handicapped children and assistive technologies for visually impaired users and a gamified user experience design for learning. The volume also presents a review of twitter usability testing among Indian users, along with specific cases of arthritis diagnostic systems, meteorological draught analysis and the role of EUPS in improving GUI design to improve the user experience.

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is an informative reference for scientists, researchers, and developers in both academic and industry who wish to learn, design, implement, and apply these emerging technologies in HCI in different sectors, with the goal of realizing futuristic technology-driven living and functional smart cities and environments.



Human-Computer Interaction and Beyond: Advances Towards Smart and Interconnected Environments (Part I)

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A Survey of Approaches for Facilitating Rich User Experience in Healthcare Domain

Author(s): Pranjali Deshpande and Chhaya S. Gosavi *

Pp: 1-8 (8)

Doi: 10.2174/9789814998819121010003

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Abstract


HCI is a discipline concerned with designing, evaluating, and implementing interactive systems for human use. HCI focuses on the fact that "people should come first." The healthcare industry has more rapid influence and development with HCI in recent days. Healthcare systems with improved HCI would benefit the industry in terms of quality of service and throughput. In the healthcare domain, the Interaction possibilities are spread in a broad spectrum, i.e., from tangible interfaces to wearable and implanted devices. The survey of the diverse device interactions in various healthcare systems from technological aspects is a significant area of research, useful to the medical fraternity and ordinary people. The presented survey will open up the doors for exploring novel approaches related to the rich User Experience in the healthcare domain for the benefit of society.

Keywords: Artificial Intelligent, DSS, Embodiment, HCI, Health Care, ICT, Implanted devices, Literature Review, Medical Services, Mobile Applications, Multidisciplinary, NLG, PRO, Quality Parameters, SHT, Tangible Interfaces, Ubiquitous Computing, User Experience, Voice Assistants, Wearable devices.

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Review on Log-Based Anomaly Detection Techniques

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Conference paper | [First Online: 26 February 2022](#)

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Right from the operating system to the actual application, every part of a system produces logs on an everyday basis. Instead of just purging these files, smart algorithms can be deployed to extract meaningful information from these logs to identify anomalies in the system. Considering the volume and frequency of log data produced, manual analysis can be a tedious task, especially when the file runs into gigabytes. This paper aims to comprehensively compare and contrast the various methods that have been proposed for anomaly detection (AD) using logs. The

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Financial Forecasting of Stock Market Using Sentiment Analysis and Data Analytics

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Abstract

The stock market prediction is the focus of many research works. State of art methodologies for stock prediction uses historical stock indices, News headlines, social media mentionings, and official reports influence stock market movements remarkably. The aim of this paper is to combine traditional data analytics methodologies and sentiment analysis to forecast the stock market trends. Along with machine learning classifiers we move one step forward and propose a system using deep learning methodologies and correlation of both the textual and numerical data analysis. We present the research done on prediction on stock trends using natural language processing. We further enhance the predictive model by integrating a sentiment analysis module on textual data to correlate the public sentiment of stock prices with the market trends. The experiments performed on real-world datasets conclude that Support Vector Machine (SVM), Random Forest Classifier, and Decision Tree Classifier performed well with more than 90% accuracy. For deep learning models, LSTM showed the highest accuracy (92%) followed by bidirectional RNN, deep CNN, shallow RNN neural networks. Our analysis shows that deep learning can be applied efficiently for stock market sentiment analysis, and the LSTM model is proven to be best performing on the textual data under study.

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Abstract

Old handwritten documents written in regional languages are difficult to interpret. It is also hard to identify the script that the characters are conforming to. Script recognition is an integral part of researching the anthropology of a region and understanding its geography and culture. Current research in handwritten script recognition focuses on character level recognition of at most two or three languages. It is also a lot harder to identify scripts in Indian languages due to the similarity between their characters. The aim of this paper is to be able to create a deep learning model that can classify up to twelve different languages, at document level and display the output based on the result by performing line-level segmentation, followed by word-level segmentation and finally with character recognition of the document.

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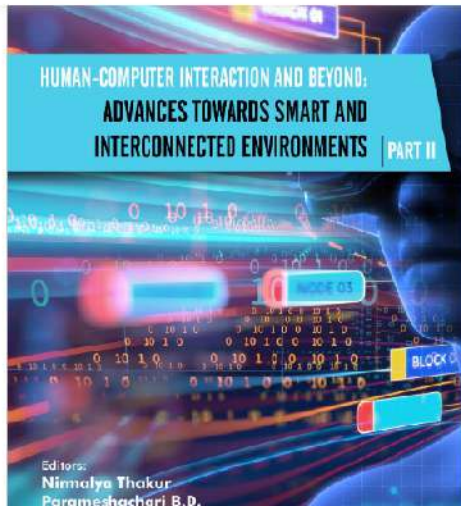
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Applications of Human-Computer Interaction for Improving ERP Usability in Education Systems

Author(s): Abhijit Banubakode*, Chhaya Gosavi, Dipali H. Patil and G.S. Mate

Pp: 177-192 (16)

Doi: 10.2174/9789815036398122010012

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Abstract

Human-Computer Interaction with a portable device is the latest trend in the education system that reinvented the wheel of learning by delivering learning in a new and small package, i.e., a Smartphone. New approaches and technologies have come into existence to enhance the effectiveness of teaching and learning. The current generation of learners has the flexibility to learn their subject online through devices such as iPad, mobile, and laptops. They can save their important notes online, submit

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Applications of Human-Computer Interaction for Improving ERP Usability in Education Systems

Abhijit Banubakode^{1*}, Chhaya Gosavi¹, Dipali H. Patil¹ and G.S. Mate²

¹ MET Institute of Computer Science Bandra(W), Mumbai, Cummins College of Engineering for Women, Pune, JSPM's Rajarshi Shahu College of Engg. Pune, India

Abstract: Human-Computer Interaction with a portable device is the latest trend in the education system that reinvented the wheel of learning by delivering learning in a new and small package, i.e., a Smartphone. New approaches and technologies have come into existence to enhance the effectiveness of teaching and learning. The current generation of learners has the flexibility to learn their subject online through devices such as iPad, mobile, and laptops. They can save their important notes online, submit their assignments, and perform numerous tasks daily. For academic purposes, Enterprise Resource Planning (ERP) saves time and reduces paperwork. It was also used to disseminate information to students for tasks such as sharing pre-post reading materials, assignments, mock tests, case study or other teaching resources. This research is based on mobile learning applications, i.e., Enterprise Resource Planning (ERP), and their usage among students in education and academic staff at the college and institutions. This research aims to use ERP software and identify if it is currently being used to enhance or upgrade the level of the education system for students and check whether it supports e-learning in the institutes. The Research analysis of the ERP software is performed by collecting data across Educational institutions. The results of the research share the module-wise details of ERP usage in education.

Keywords: Academic, Business, College students, *Enterprise systems*, ERP, ERP education, ERP implementation, HEI, Implementation model, Learning ERP, MET, Modules, Navigation systems, Online learning, Online learning, Questionnaires, Research methodology, Software, System evaluation, Staff, Usability.

INTRODUCTION

Over the past few decades, the influence of technology upon children and education has been immense. There are many applications available in Appstore;

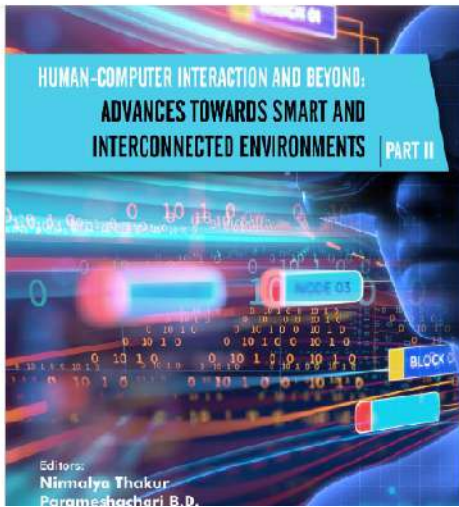
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Human-Computer Interaction and Beyond: Advances Towards Smart and Interconnected Environments Part II

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Helmet Violation Processing for Law Enforcement using CCTV Camera

Author(s): Chhaya Gosavi¹, Meenal Kamtekar, Abhijit Danubakode, Pranjal Gunjal, Apoorva Bhaskar, Abhinuchi Naware and Gayatri Rathod

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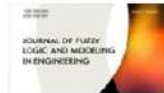
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Abstract

The rising number of traffic rule violators, as well as the resulting mishaps, has made road safety a major concern. Detection of traffic rule violators is challenging due to various difficulties such as occlusion, illumination, poor quality of surveillance due to various difficulties such as occlusion, illumination, poor quality of surveillance, weather conditions, etc. The existing surveillance systems are primarily

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CHAPTER 6

Helmet Violation Processing for Law Enforcement using CCTV Camera

Chhaya Gosavi¹, Meenal Kamlakar¹, Abhijit Banubakode², Pranjal Gunjal¹, Apoorva Bhaskar¹, Abhiruchi Naware¹ and Gayatri Rathod¹

¹ Cummins College of Engineering for Women, Karvenagar, Pune, India

² MET Institute of Computer Science Bandra (W), Mumbai, Maharashtra, India

Abstract: The rising number of traffic rule violators, as well as the resulting mishaps, has made road safety a major concern. Detection of traffic rule violators is challenging due to various difficulties such as occlusion, illumination, poor quality of surveillance video, varying weather conditions, etc. The existing surveillance systems are primarily dependent on the performance of human operators who are unrealistically expected to simultaneously watch many screens that show streams captured by different cameras. The task of these operators is becoming more difficult as the number of simultaneous video streams to watch increases. It is well-known that after twenty minutes of continuous work, the operator's attention degrades significantly. Thus, there is a need for an automatic detection system. This research aims to increase the installations of new cameras covering more areas. It will help overcome all the difficulties mentioned above and ensure motorcyclists' detection without helmets using the CCTV cameras' footage and machine learning algorithms. It will help law enforcement by police and eventually change the risk behaviors of motorcyclists. Consequently, the number of accidents and their severity will reduce.

Keywords: Avoid Accident, CCTV, Classification, CNN, CPR, Desktop application, Frames, Helmet Detection, Law Enforcement, License-plate Recognition, Machine Learning, Noise removal, Object detection, Object localization, Preprocessing, Segmentation, Surveillance, SVM, Traffic Rule, Video.

INTRODUCTION

Traffic rules are designed for the safety of people on the road. The government of every country plans traffic rules and regulations and applies them to the people of that country to make the transportation system better. This is in the best interest of


* Corresponding author Chhaya Gosavi: MKSSS's Cummins College of Engineering for Women, Karvenagar, Pune 411052, Maharashtra, India; E-mail: chhaya.gosavi@cumminscollege.in

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19 DWT and SVD-Based Robust Watermarking Using Differential Evolution with Adaptive Optimization

*Meenal Kamlakar, Chhaya Gosavi,
Vaidehee Salunkhe, Priyanka Bagul,
Aishwarya Keskar, and Shweta Barge*
Cummins College of Engineering for Women, Pune

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19.1 INTRODUCTION TO DIGITAL WATERMARKING

The security of digital media on the Internet is extremely important as it is very easy nowadays to duplicate, manipulate, and distribute digital information without any loss in quality. This creates problems regarding the authentication of ownership rights. Digital watermarking is a solution for this issue. It can be interpreted as embedding ownership information in the host multimedia data. A digital watermark has three properties: robustness, imperceptibility, and security. However, there is a

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Chapter 6 - Bamboo fibers, their composites and applications

Yashwant Munde^{*}, Abhilesha Penigrahi^{*}, Anirash Skinde^{*}, L. Siva^{*}

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Abstract

The larger devotion to creating usage of natural fiber-reinforced composites in a variety of application areas like building construction, locomotive, furniture, and packaging industry is in demand. Bamboo is one of the best natural fibers available at low cost, renewable and easy accessibility. It is widely available in Asia, Africa, some parts of North and South America, and Oceania. There has been extensive

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By V. Arumugaprabu, R. Deepak Joel Johnson, M. Uthayakumar, P. Sivaranjana

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ABSTRACT

6 Polymer Nanocomposites

Polymer Composites: Design, Manufacturing, and Applications

Onkar A. Deorukhkar

Dr. Vishwanath Karad MIT World Peace University

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MKSSS's Cummins College of Engineering for Women

M. B. Kulkarni

Dr. Vishwanath Karad MIT World Peace University

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6.1 INTRODUCTION

Nanocomposites are materials of the 21st century having a yearly development rate of 25% due to their multifunctional capacities with remarkable design and properties. Polymer nanocomposites (PNs) are characterized as a blend of two or more materials, where the matrix is a polymer and the dispersed stage has at any rate one measurement lesser than 100 nm [1]. PNs comprise a polymeric material (*viz.* thermosets, elastomers, and thermoplastics) and a reinforcing nanoscale material.

Nanoparticles have at least one measurement at nanometer scale. PNs show main enhancements in gas obstruction mechanical properties, fire retardancy properties, and good strength. Nanomaterials can be grouped into nanostructured materials and nanoparticle materials. Typically, it refers to dense mass materials made of agglomerates, with grain sizes in the nanometer size range, though the last are generally dispersed nanoparticles. The nanometer size covers a wide range from 1 nm to as extensive as 100–200 nm. To recognize nanomaterials from mass, it is critical to show one of kind properties of nanomaterials and their effects in science and innovation.

The use of inorganic nanoparticles as additives into polymer frameworks has brought made PNs multifunctional, high-performance polymers compared to customary filled polymeric materials. The transformation of these new materials will empower the circumvention of characteristic material performance by attaining new properties and using distinctive synergies among materials. This is only possible when the length size of morphology and the essential material science-related properties match well. Multifunctional highlights owing to PNs comprise enhanced thermal resistance and flame resistance, charge dissipation, moisture resistance, chemical resistance, and decreased permeability. In the course of modification of the additives at the nanoscale stage, one can improve properties of chosen polymer frameworks to surpass the necessities of business, military,

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Volume 62, Part 2,
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Abstract

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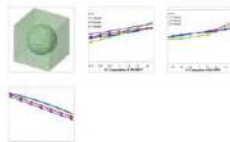
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5. Conclusion

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Micromechanical simulation of silicon rubber reinforced with MMT nanoclay

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This work investigates Silicon Rubber (SR) reinforced with Montmorillonite (MMT) nanoclay for its mechanical properties. A micromechanical numerical model, based on a representative volume element (RVE) method for silicon rubber/MMT is developed using a commercial finite element software package. The model uses elastoplastic material model with ductile damage for silicon rubber and a linear



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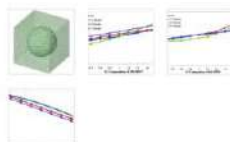
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Abstract: In diesel engines, the electromechanical fuel control (EFC) actuator plays a vital role to regulate the fuel flow rate and pressure. It uses electrical energy to actuate the fuel valve, usually mechanical valve and control fuel pressure injected into diesel engine. The rotary and linear actuators are most common in diesel engine and selected based on space constraints and its reliability. As EFC actuator plays critical fuel controlling function in engine, the issues with EFC during engine operation could cause engine dysfunction. This paper studies the major issues observed with EFC actuators which has led to engine operation failures in genset application.

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I. Introduction
 The IC engine has used various configurations such as automobile, marine, power etc. The main function of engine is to

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Cutting fluids are meant to reduce the frictional wear and to dissipate the heat generated at the tool–workpiece interface, during machining operations. Conventionally applied cutting fluids are mineral-based oils, which pose grave environmental and health hazards. The traditional flood cooling systems result in cleaning and disposal issues apart from a lot of water consumption. In recent years, research work is focused on exploring sustainable

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I. Introduction
 Backpropagation (BPN) is a multi-layer feed-forward neural network which can theoretically perform "any" input-output mapping and can learn to solve linearly inseparable problems. The learning in BPN is the same as that for a perceptron and based on gradient descent where the function is differentiated. The multi-layer network is propagated back to the nodes at all the layers. There are many use cases for backpropagation involving a combination of algorithms and parameter

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