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ONWARD TO GLORY

Criterion 3- Research, Innovations and Extension
3.3- Research Publications and Awards

3.3.2 - Number of books and chapters in edited volumes/books published and papers published in national/ international conference proceedings per teacher during last five years

AY: 2022-23

Sr. No.	Documents	Count	Page No.
Number of books/book chapters and papers published in conference proceedings			
1.	Electronics and Telecommunication Engineering	4	5
2.	Mechanical Engineering	5	9
3.	Computer Engineering	8	12
4.	Information Technology	5	16
5.	Applied Science and General Engineering	1	21
	Total	23	

AY: 2021-22

Sr. No.	Documents	Count	Page No.
Number of books/book chapters and papers published in conference proceedings			
1.	Electronics and Telecommunication Engineering	10	23
2.	Mechanical Engineering	7	34
3.	Computer Engineering	11	40
4.	Information Technology	2	50
	Total	30	

AY: 2020-21

Sr. No.	Documents	Count	Page No.
Number of books/book chapters and papers published in conference proceedings			
1.	Electronics and Telecommunication Engineering	7	74
2.	Mechanical Engineering	2	82
3.	Computer Engineering	4	84
4.	Information Technology	2	88
	Total	**15**	

AY: 2019-20

Sr. No.	Documents	Count	Page No.
Number of books/book chapters and papers published in conference proceedings			
1.	Electronics and Telecommunication Engineering	3	92
2.	Mechanical Engineering	3	96
3.	Computer Engineering	5	100
4.	Information Technology	7	106
	Total	**18**	

AY: 2018-19

Sr. No.	Documents	Count	Page No.
Number of books/book chapters and papers published in conference proceedings			
1.	Electronics and Telecommunication Engineering	3	114
2.	Computer Engineering	3	119
3.	Information Technology	5	122
	Total	**11**	

3.3.2.1. Total number of books and chapters in edited volumes/books published and papers in national/ international conference proceedings year wise during last five years

Year	2022-23	2021-22	2020-21	2019-20	2018-19
Number	23	30	15	18	11
Total	97				

Formula:

$$\frac{\text{Total number of books and chapters in edited volumes/ books published and papers in national/ international conference proceedings}}{\text{Number of full time teachers during the last five years (without repeat count)}}$$

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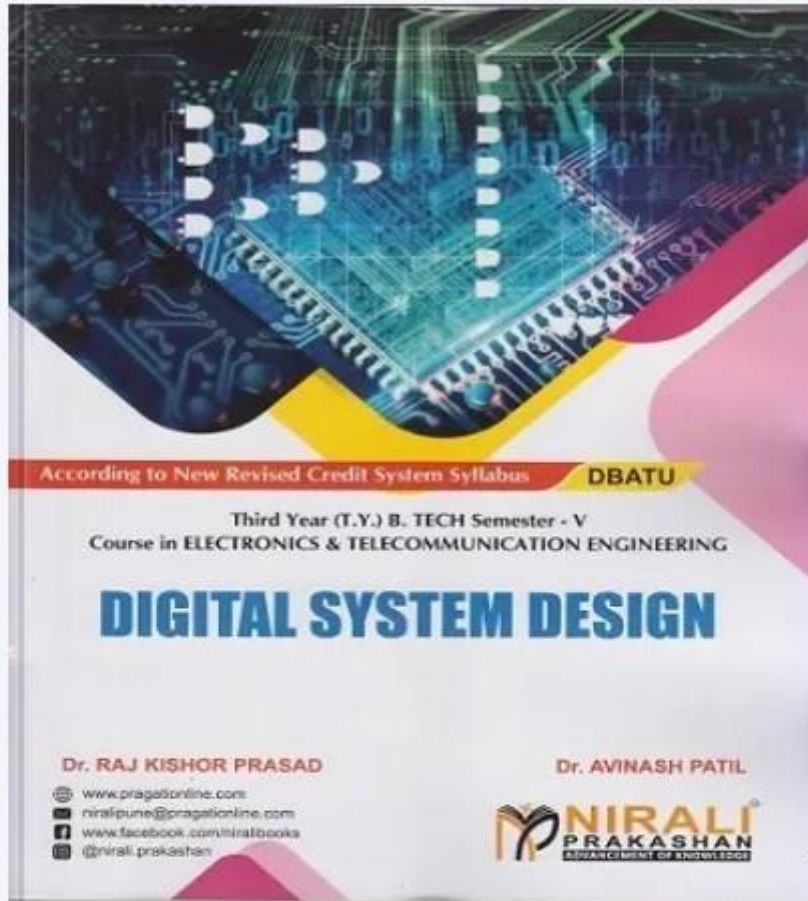
Overview   Features   Table of Contents

Author	:	Dr. Raj Kishor Prasad,Dr. Avinash Patil
ISBN	:	9789354519437

6

Deep Learning Watershed Algorithm to Calculate Cardiac Stroke Volume of The Left Ventricle for the Analysis to Detect Person Suffering from Cardiac Vascular Diseases using Cardiac MRI Data

Shilpa Devram Pawar [a], Shipra Wallis [b], Priyanka Singha [c], and Divya Singh [d]

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Abstract. The broadly used approach for cardiac image segmentation is deep learning. In deep learning, the watershed algorithm is a conventional procedure used for segmentation that is for segregating different regions in an image. This paper calculated the cardiac stroke volume of the left ventricle per heartbeat of a healthy person and patients having Cardio Vascular Diseases (CVD) using a magnetic resonance image (MRI) data set. This paper plots the graph of the cardiac stroke volume of the left ventricle of healthy people and CVD patients. The graph is a plot by taking the mean of 15 healthy persons and 15 CVD patients' cardiac stroke volume of the left ventricle. Finally, by using the watershed algorithm, the analysis can detect whether the person is suffering from CVD.

INTRODUCTION

The most delicate organ in our body which plays an important role is the heart, therefore, cardiovascular diseases(CVD) are related to heart function i.e. cardiac function. The major reason for death in the world is due to CVD according to the World Health Organization (WHO). Cardiac function can be explored well by using Magnetic Resonance Imaging(MRI) [1]. Conventional machine learning techniques such as model-based methods prove efficient in cardiac image segmentation before deep learning [2].

To date there is numerous research is being done on left ventricle segmentation. One method to implement this is by using a deep learning watershed algorithm [1] [3]. In this paper, we lay out an outline of deep learning techniques for cardiac image segmentation in the most general method which used modality (i.e. MRI) in clinical practice and takes over the pros and cons of current deep learning-based segmentation methods [4]. In this paper, we calculate the left ventricle parameter cardiac stroke volume by introducing a parallel watershed-based approach to segment the left ventricle. On every beat of the heart, we estimate the real value of left ventricle stroke volume to demonstrate the studying patient's MRI database.The dataset was collected from website www.cardiacatlas.org. The cardiac stroke is the difference between end-diastolic volume and end-systolic volume. We have used a database of 15 healthy people and 15 heart disease patients. Plot a graph of left ventricle stroke volume by taking the mean of 15 healthy people and 15 CVD patients. Analyse the difference in graph waveform of a healthy person and a heart-related problem person.

Cardiac left ventricle segmentation is an active research area since the introduction of MRI [2]. There are two methods to categorize left ventricle segmentation i.e. weak prior and strong prior. In the weak prior method [1] [3], one is an image-based method. In this image-based method, a three-dimensional model is generated using a set of two-dimensional models and then give some narrative sight of this scene present in a given idea and then analysing the three-dimensional models. The second one is the pixel classification method. In this case one-dimension segmentation, pixel categorization is performed on single-channel feature space i.e. Gray level. In multispectral images, each pixel is distinguished by a set of quality and the segmentation can be carried out in multidimensional i.e. multichannel feature space using clustering algorithms. In the prior method, one is the active shape method. Active Shape Model (ASM) is based on a model, which takes a preceding model of what is looked forward in the image, and generally tries to discover the best match location between the model and the data in a new image. It has been successfully tried on many issues and we try ASM to the face identification. The second one is the appearance model method. An active appearance model (AAM) is a machine vision algorithm for complementing a statistical model of object shape and aspect to a new image. These are constructed during a training period. A set of images, together with synchronization of indicators that seems in all of the images, is presuming to the training supervisor [3]. Last is an atlas-based method. Atlas-based methods normally require the

Remote Health Monitoring System using Secure Communication Techniques

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Abstract—Heart related diseases causes elevation to the fatality rate across the world especially post-Covid. Furthermore, high security cryptographic algorithms are used to provide confidentiality and availability to sensitive data collected from imbedded medical devices. To escalate the rapid and prior diagnosis of cardiovascular diseases especially if a person has a history of heart related ailment, an effective solution is to bring Machine Learning Models and Data Analysis for operative decision making and precise cum accurate prediction. In the proposed work, encountering numerous challenges around the machine learning models along with a sound and lightweight encryption technique to provide added security to the sensitive medical data of the patient for careful analysis by both the model and prescriptive doctor-patient interface using an IoT based cloud environment running in the background has been used. The sensor data will be used in two fronts - on one end the data will be uploaded to the ThingSpeak IoT platform where it will provide the analytics of the patient health status (both past and present) and a likelihood of chance of experiencing any heart-health abnormality to the patient there and then along with on the other end it is stored on the Fire-Base Cloud Storage space which is stored with encryption protocols to enhance the security of the patient's sensitive health data which can be reviewed by an expert doctor. Experimental outcomes show us that K-nearest neighbor algorithm achieves the best results among logistic regression, support vector machine, random forest tree and voting classifier with accuracy of 88.5% and 88%, 86%, 85.2% and 86.88%. Therefore, the suggested model is successful is achieving an effective accuracy by secure IoT data in cloud based IoT platforms.

Keywords—Cryptographic Algorithms, Machine Learning, Cloud

I. INTRODUCTION

Heart attack is one of the fatal causes of death worldwide and in India. 52% of all cardiovascular deaths in India occur before the age of 70, with demising one person in the country every 33 seconds according to Times of India. Also, the threats to using and involving technology in healthcare sector is much higher than ever. One of the most common threats today is digital theft to sensitive data such as medical data of patients. As reported from 2007 to 2021, the total number of individuals affected by healthcare data breaches was 249.09 million, out of which 157.4 million individuals were affected in last five years alone. Since this sector is still so much unexplored and various insurance companies have been researching on it and different results are there to showcase big of a problem it is. Using sensor technology in the form of a wearable medical device enriches the opportunity for smart remote health monitoring systems. Along with IoT platforms to provide careful real-time machine learning induced analysis and past diagnostic comparative analysis using cloud technology to back up the medical data with the authentication and privacy inculcation of patients using an application interface where on one end is the patient reviewing their own medical data in a layman's term while also given the feature to consult with an available doctor for another opinion so that time which is an essence in saving a patient suffering cardiovascular disease can be saved and utilized optimally. Thus, using encryption security techniques seems to be the necessity for a safe and secure medical and health data management in this critical system. On combining the hardware-oriented sensor data with software encryption blocks and IoT and cloud-storage we increase the efficiency of detecting cardiovascular diseases in a patient by the absolute use of machine learning prediction models thus becoming a go-to handy critical system for people who have had a history of heart-anomalies. Using handy data mining methods and inputting the sensor data in the format of csv (comma-separated-values), the data is put through supervised machine learning algorithms including random decision forest and support vector machine(SVM) and estimator algorithms like voting classifier which aggregates the findings of each base estimator. Thus, in summary, the proposed system consists of three main components: the sensor node, the gateway, the analytics platform and the cloud server. The sensor node is responsible for collecting the heart rate data and transmitting it to the gateway. The gateway is responsible for encrypting the

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Authors

Raviraj B.Gurav, Pritee Purohit, Sandeep P. Nalavade

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Dr. Sakthivel, G.
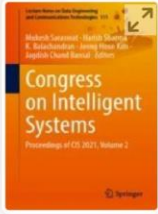Dy. Director, Centre for Automation,
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Sentimental Analysis of Code-Mixed Hindi Language

Ratnavel Rajalakshmi ✉, Preethi Reddy, Shreya Khare &
Vaishali Ganganwar

Conference paper │ First Online: 01 July 2022
214 Accesses │ **1** Citations

Abstract

Sentiment analysis is the task of identifying and
classifying sentiments expressed in texts. Sentiment
analysis of code-mixed data is a huge challenge for
the NLP community since it is very different from
the traditional structures of standard languages.
Code mixing refers to additions of linguistic units
like phrases or words of one language to another.
The mixing of languages takes place not only on
sentence level but also at the word level. It is

The mixing of languages takes place not only on
sentence level but also at the word level. It is

Facial Recognition Impact in Smartphone Sector

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Abstract— In recent times, technological advancement brings many benefits for people and facial recognition technology is one of them. Nowadays, S martphone users increasingly use facial recognition features that help in verifying identity of users for different purposes, for example, accessing their device before making any payment from their phones. This study paper has analysed impact of facial recognition systems in S martphone sectors by discussing its advantages and challenges to understand both its negative and positive impact. Literature review section has provided relevant information on selected topic as it has elaborated that different large organisation have their own face recognition software for Apple, Facebook, and Google. Additionally, it has mentioned that there are two different types of facial recognition software such as camera-based and infrared; however, regarding effectiveness, infrared works more appropriate rather than camera-based recognition technologies.

The paper has also elaborated that this technology offers automating time-tracking systems and it has touch less sign options, which help them in limiting physical contact with others. Result of this study showed that facial recognition helps to protect any type of unauthorised access in a S martphone as well as it could prevent cyber threats by recognising face of S martphone users. Additionally, due to this software's fast identification feature, it could successfully verify faces of people within a few seconds. However, as this software is based on artificial intelligence, unlike other applications, it is highly vulnerable as hackers can hack S martphones if strong algorithms are more used. Lastly, to prevent this issue a strong AI infrastructure and model security is required in future.

Keywords— *Artificial intelligence, Facial recognition, cyber-security, Smartphones, two-dimensional and three-dimensional*

I. INTRODUCTION

Research overview

Facial recognition has become a useful technology in electronic devices including laptops and Smartphones. This concept

seems downright futuristic upon surface and a few years ago, majority of users used password, PIN, and pattern for unlocking devices [1]. It analyses, captures, and compares patterns on basis of an individual's facial details. Facial recognition technology contains two-dimensional or three-dimensional sensors that "capture" any face. Next, it converts it into digital data through an algorithm prior to distinguishing captured image. Finally, this automated system checks individuals' identity within a few seconds on basis of facial features, such as bridge of nose, spacing of eye, contour of lips, chin, and ears [2]. Due to its strong algorithm, it can recognise faces in middle of any crowd or in any unstable and dynamic environment.
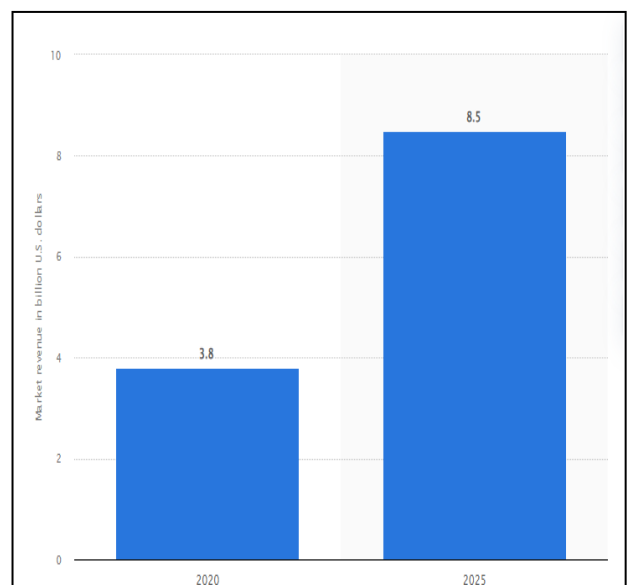

Figure 1: Market size of Facial recognition technology

(Source: [3])

Remote Health Monitoring System using Secure Communication Techniques

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Abstract— **Heart related diseases causes elevation to the fatality rate across the world especially post-Covid. Furthermore, high security cryptographic algorithms are used to provide confidentiality and availability to sensitive data collected from imbedded medical devices. To escalate the rapid and prior diagnosis of cardiovascular diseases especially if a person has a history of heart related ailment, an effective solution is to bring Machine Learning Models and Data Analysis for operative decision making and precise cum accurate prediction. In the proposed work, encountering numerous challenges around the machine learning models along with a sound and lightweight encryption technique to provide added security to the sensitive medical data of the patient for careful analysis by both the model and prescriptive doctor-patient interface using an IoT based cloud environment running in the background has been used. The sensor data will be used in two fronts - on one end the data will be uploaded to the ThingSpeak IoT platform where it will provide the analytics of the patient health status (both past and present) and a likelihood of chance of experiencing any heart-health abnormality to the patient there and then along with on the other end it is stored on the Fire-Base Cloud Storage space which is stored with encryption protocols to enhance the security of the patient's sensitive health data which can be reviewed by an expert doctor. Experimental outcomes show us that K-nearest neighbor algorithm achieves the best results among logistic regression, support vector machine, random forest tree and voting classifier with accuracy of 88.5% and 88%, 86%, 85.2% and 86.88%. Therefore, the suggested model is successful is achieving an effective accuracy by secure IoT data in cloud based IoT platforms.**

Keywords—Cryptographic Algorithms, Machine Learning, Cloud

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Heart attack is one of the fatal causes of death worldwide and in India. 52% of all cardiovascular deaths in India occur before the age of 70, with demising one person in the country every 33 seconds according to Times of India. Also, the threats to using and involving technology in healthcare sector is much higher than ever. One of the most common threats today is digital theft to sensitive data such as medical data of patients. As reported from 2007 to 2021, the total number of individuals affected by healthcare data breaches was 249.09 million, out of which 157.4 million individuals were affected in last five years alone. Since this sector is still so much unexplored and various insurance companies have been researching on it and different results are there to showcase big of a problem it is. Using sensor technology in the form of a wearable medical device enriches the opportunity for smart remote health monitoring systems. Along with IoT platforms to provide careful real-time machine learning induced analysis and past diagnostic comparative analysis using cloud technology to back up the medical data with the authentication and privacy inculcation of patients using an application interface where on one end is the patient reviewing their own medical data in a layman's term while also given the feature to consult with an available doctor for another opinion so that time which is an essence in saving a patient suffering cardiovascular disease can be saved and utilized optimally. Thus, using encryption security techniques seems to be the necessity for a safe and secure medical and health data management in this critical system. On combining the hardware-oriented sensor data with software encryption blocks and IoT and cloud-storage we increase the efficiency of detecting cardiovascular diseases in a patient by the absolute use of machine learning prediction models thus becoming a go-to handy critical system for people who have had a history of heart-anomalies. Using handy data mining methods and inputting the sensor data in the format of csv (comma-separated-values), the data is put through supervised machine learning algorithms including random decision forest and support vector machine(SVM) and estimator algorithms like voting classifier which aggregates the findings of each base estimator. Thus, in summary, the proposed system consists of three main components: the sensor node, the gateway, the analytics platform and the cloud server. The sensor node is responsible for collecting the heart rate data and transmitting it to the gateway. The gateway is responsible for encrypting the

Video Object Detection with an Improved Classification Approach

Sita Yadav ✉ & Sandeep M. Chaware

Abstract

Object detection is primary task in computer vision. The various CNN are majorly used by researchers to improve the classification and detection of objects present in video frames. Object detection is a prime task in self-driven cars, satellite images, robotics, etc. The proposed work is focused on improvement of object classification and detection in videos for video analytics. The key focus of work is identification and tuning of hyper-parameters in deep learning models. The deep learning-based object detection models are broadly classified into two categories, i.e., one-stage detector and two-stage detector. We have selected one-stage

KPSO: K-Mean and PSO based clustering algorithm for Wireless Sensor Network

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Abstract— Sensor networks are a wonderful tool for many applications, but saving energy in such networks is an important issue. Data aggregation between the sensor nodes can be overwhelming unless information flooding is in place. The sensor nodes clustering may provide a solution to this problem. To solve this problem, there must be the optimal distribution of sensors and CHs so that the network life span is improved while energy consumption is minimized. To progress the network performance of the WSNs, this paper discusses a hybrid clustering technique that relies on K-Means clustering and Particle Swarm Optimization (PSO). The evaluation of the proposed KPSO algorithm with traditional clustering techniques, such as Mod-LEACH and K-means clustering, has been done.

Keywords— *Clustering, network performance, data aggregation, WSN*

I. INTRODUCTION

In WSNs, typically hundreds or thousands of sensors watch over an area and provide data to users about target or event interests. The sensors attached to wireless sensor networks (WSN) measure the environment parameters in which they are placed and sent the information to the base station (BS). Large numbers of sensors are deployed in the field to ensure proper data transmission and network connectivity between each sensor and other nodes. To reduce energy consumption in traditional WSNs, information is usually transmitted in a multi-hop fashion to the sink node. Despite the fact that multi-hop communication can conserve energy, it can also have some unintended consequences. Hot spots are one example of this problem. In response to the sink node's data, the sensor node close to it sends its own data which results in faster energy consumption at sink node. The earlier death of nodes reduces the network lifetime.

The Particle swarm optimization is a specialized optimization approach of a swarm intelligence. This technique belongs to the artificial intelligence category. Predatory birds are the source of inspiration for the PSO algorithm. Basically, the PSO algorithm abstracts each bird as an individual particle, and its optimization results correspond to the positions of the particles in the search area. Each iteration ends with the particles revised local and the global best solution. This process and the swap of information between particles determine the future step of the flight speed and directions, making it gradually move towards the global best value. The fitness function determines the quality of the PSO solution based on the problem to be solved. Therefore, the introduction of PSO can make a substantial difference relating to load balance, energy expenditure, and so on.

In this paper, the nodes are clustered using k-mean clustering technique and optimal position of cluster heads is obtained through PSO based algorithm to improve network lifetime of WSN, which is short formed as KPSO. The figure (1) represents clustering of sensor nodes in WSN. The member nodes of a cluster transmit sensed information to cluster head (CH). The CH then send accumulated information to the sink node. The extensive simulation results indicate that KPSO is able to stabilize energy depletion, elongate the lifespan of networks, and mitigate the transmitting delay.

The organization of the paper is like, the related work is presented in section two. The section three highlights system model for KPSO. The illustration of extensive simulation results are presented in section four. The section five exhibits closing remarks of the work.
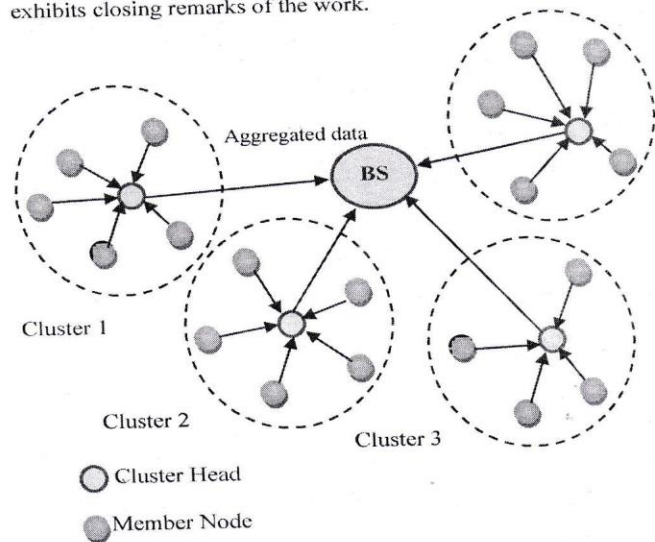
Fig. 1: The Clustering approach in WSN

II. RELATED WORK

In enhanced LEACH [1] cluster formation is based on minimum distance. It reduces the data transmission distance but it principally follows LEACH. ESO-LEACH [2] incorporates design of superior nodes in cluster formation. This makes the system expensive but helps in improving network lifetime. Modified-LEACH [3] improves energy consumption and focuses on network congestion. The key role is in modifying the threshold $T(n)$ setting. The fusion of LEACH and D- LEACH protocol is IH-LEACH [4]. This

Survey on Algorithmic Trading Using Sentiment Analysis

Rupali Bagate, Aparna Joshi, Abhilash Trivedi, Anand Pandey, and Deepshikha Tripathi

Abstract In recent years as the computation power and availability of the data has increased exponentially, there has been significant increase in study of human sentiment in various fields. This paper examines the use of sentiment analysis in algorithmic trading. Macroeconomic variables such as GDP, Internet consumption and various other socio-economic factors are also taken into consideration in this paper. The main aim of this paper is to determine all factors and technical indicators that would give us a proper analysis. Human sentiment affects human behaviour adroitly, and thus, market is also not acquitted from its effect. This survey presents current advances in natural language processing (NLP) and prerogative positions of algorithms in market.

Keywords Algorithmic trading · Sentiment analysis · Market indicator · Machine learning

1 Introduction

Sentiment analysis is the study of reverential effect of human emotions in various domains. In sentiment analysis, human emotions are quantified to create colloquial values for evaluation which then are used in concordance with other techniques and algorithm to compute their effect in respective domains [1].

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Survey on Accent Correction and Region Prediction

Rupali Bagate, Aparna Joshi, Narendra Kumar Yadav, Aman Singh, Gaurav Singh Dhek, and Naincy Rathore

Abstract Background: In recent years, speech recognition technology has become a dominant part of our everyday lives, and as most of the future technology being developed can easily be integrated with the help of speech recognition. To make a digital future, technological advancement of everyone is necessary, and to make this technological advancement not so technical, speech recognition serves its role. Although speech recognition has made significant advances at certain languages, what has been achieved is a drop and what is left is an ocean. This technology has failed miserably in recognizing different accents of a single language or a voice disorder, and this has led to various questions on the authenticity of progress of the process. This paper documents the drawbacks of this technology and the areas where its immediate progress is possible. It talks about the limitations of various existing and popular and under radar ASR technologies with insights of their flaws which need to be considered immediately to avoid various social dilemmas and insecurities.

Keywords Accent · Region prediction · MFCC · Naive Bayes classifier · Stemming and lemmatisation

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Batch Normalized Siamese Network Deep Learning Based Image Similarity Estimation

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Abstract— The assessment of how two distinct images are equal are indeed called image similarity and consistency. In other words, it measures how much the intensity patterns in two images are comparable to one another. In order to achieve this, researchers examine the image descriptors recursively in order to identify descriptor pairs that are comparable. The two images are deemed comparable if the number of related descriptors exceeds a predetermined threshold and both images exhibit the very same entity. The computation of image similarity is used for various applications which graves to be the mandatory process for production of the application. With this intent, the Fashion MNIST dataset from KAGGLE is used for implementing the image similarity estimation. This paper proposes Batch Normalized Siamese Network (BNSN) deep learning based model for computing the image similarity. The BNSN model is designed with two subnetworks that generates feature vectors of two input images. The lambda batch normalization is performed with single dense layer to predict the image similarity with label 0 indicating the identical images and label 1 denoting the different images. The 30,000 training images were fitted with BNSN and tested with 30,000 images. Python was implemented on a Geforce Tesla V100 NVidia Graphics card webserver with a batch size of 64 and 30 training epochs. The training images are also tested with traditional image similarity method and implementation of proposed BNSN shows the accuracy of 91.91%, Precision of 92.93%, Recall of 90.72% and FScore of 91.81%.

Keywords— *Siamese Network, deep learning, image similarity, normalization.*

I. INTRODUCTION

Siamese neural network, often described as a dual neural network, is a type of artificial neural network that employs the same weights to estimate equivalent output vectors from two distinct input vectors simultaneously. The contrastive loss method employs the final layers from both networks to determine how comparable the two images resemble. Siamese networks are capable of learning certain potent representations that you can then use to other computer vision tasks like object identification or image segmentation. A neural network architecture called SimSiam makes use of Siamese networks to determine how similar two data points are. To pull off the trick, make sure each of the photos you give the network go via the same embedding function. Therefore, weights must be shared between both network branches to make sure that this occurs. A single training sample is all that is needed for the one-shot classification model known as the Siamese network to make a prediction. Because it requires less knowledge, it is additionally resistant to class disparity. People are rather proficient at learning and recognizing different patterns. Researchers notice in particularly that when exposed to stimulation, people appear to have the ability to acquire novel ideas rapidly and subsequently distinguish variations on these ideas in upcoming perceptions. In the field of supervised machine learning known as resemblance acquisition, the objective is to develop a resemblance purpose that calculates the degree of similarity or relationship between two items and delivers a degree of similarity.

II. LITERATURE REVIEW

When the things are comparable, the similarity score is stronger; when they are distinct, the similarity score is lower. Simply by measuring the distance between these vectors, we may determine if they are similar or very distinct from one another. Determining the similarities between the two specified pictures, which may be easily done by learning a similarity criterion between the images, is one of the essential problems. With the help of Siamese Convolutional Neural Networks, this is easily accomplished. Siamese CNNs are capable of learning a similarity metric between different types of picture pairs [1]. It has been demonstrated that convolutional neural networks improve at stereoscopic estimation. Modern architecture, on the other hand, rely on Siamese networks that use synthesis and then additional processing layers, necessitating a minute of GPU computing for each pair of images. In comparison, the equivalent circuit was extremely generated accurate results in less than a second of GPU processing [2].

Recursive neural networks, which are capable of processing directed ordered acyclic graphs, are used in the graph-based image representation that shows the connections between different regions within the image. Recursive neural networks could find the best representations for exploring the image data, while the graph-based description integrates structural and subsymbolic aspects of the image [3]. Using a Siamese neural network-based gesture recognition paradigm, robust and discriminative gait characteristics are automatically extracted for human identification. The Siamese network, in contrast to typical deep neural networks, can use distance metric learning to make the similarity metric big for pairs of gaits from various individuals and small for pairs from

Insight on Human Activity Recognition Using the Deep Learning Approach

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Abstract—This work proposes a video understanding technique that primarily focuses on the individual action recognition appearing in the video. The state-of-the-art showed promising work in video understanding. Though, it's essential to require inclusive information on human action in real-time CCTV video surveillance, sports video analysis, health care, etc. This paper proposed a transfer learning deep neural network model designed for recognizing individual actions accomplished by multiple people in a video sequence.This research established a deep model which uses Region-Of-Interest (RoI) pooling layer to capture automated features from a specified video frame to recognize individual actions. The MobileNet model accomplishes this as the backbone to recognize individual actions from each video frame. The accuracy score of the model was compared with the CNN models VGG-19,InceptionV3, and MobileNet. The MobileNet is computationally low-cost and enhances the performance of individual action recognition performed by multiple humans in a video frame. The investigational results were evaluated by varying learning parameters, and optimizer of deep neural network. The experimental results of the proposed model for individual action recognition demonstrate the improved efficiency of the standard benchmark collective activity dataset. This research illustrates the progress of action recognition by employing the transfer learning CNN model along with RoI pooling layer.

Index Terms—CNN deep learning, Transfer Learning, RoI, Activity Recognition

I. INTRODUCTION

Individual activity recognition aims to understand human action from video and image. In the domain of computer vision, understanding human action is yet a challenging issue [1]. In surveillance videos [2], sports analytic, video retrieval, and video searches, there are inconsistencies within diverse human activity classes, background clutter, light illumination, etc. In video understanding, individual person action recognition is important to focus on higher-level group activity tasks. A specific challenge in multiple people activity recognition is sensitivity to creating inference among labels for a scene to context. For example, in Fig. 1 the action performed by multiple people as "taking" or "queuing" depends on the interrelated individual action in a scene [3].Owing this as

such a successful model it requires recognizing accurately individual actions.

This paper implemented CNN deep model for individual action recognition in a video sequence in which multiple people's collective activity is involved. This model is based on a transfer learning pre-trained model: VGG16 [7] , InceptionV3 [8], and MobileNet [9] in which the last layer is modified as Region-Of-Interest (RoI) pooling layer, unlike these models that use max-pooling subsequently to the last convolutional layer. For individual action recognition MobileNet is efficient as compared to another famous CNN model. In the interim, its efficiency is high enough for action recognition. The MobileNet model is optimized for features of individual action and achieves high efficiency and accuracy. Additionally, this research also tested other models such as VGG16 and InceptionV3. As a result, the MobileNet model with RoI pooling layer has improved performance and achieved the best efficiency and precision for individual action recognition.

The paper is prepared organized as follows: in Section 2 related work describes. In Section 3, describe framework of the transfer learning CNN model for feature extraction from individual person bounding box. In Section 4, illustrates the methodology, along with the dataset, and provided implementation details. Section 5 discussed experimentation and result of CNN deep models VGG16, InceptionV3, and MobilNet with RoI pooling layer. Finally, Section 6 concludes the effectiveness of the model for individual action recognition.

II. RELATED WORK

Human activity recognition in a video sequence [1] participating several categories of human activities like singular activity, collective activity as well as a crowd event activity. The action accomplished by multiple people illustrates as Collective activity recognition [3] as crossing together, waiting in groups at various places such as airports, railway stations, streets, etc. This collectivity activity involves applications such as sports analytic,surveillance systems, and human-computer

Biodegradable polymeric nanocomposite for Wound Healing Application: Synthesis andcharacterization

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ABSTRACT

For the utilization of different substances to wounds, it is attractive to discover a bearer material which is moderately modest in terms of medicinal behavior, which gets effectively connected to the injury, helps as a decent transporter for medicaments to be connected to the injury without disturbing its property of biodegradability . In this work biodegradable composites consist of chitosan, sodium alginate(SA) and gelatin with neem extract were synthesized. These polymeric films were characterised by FTIR,SEM and XRD analysis. The chitosan gel may likewise be acquired and utilized as a gel-like layer forthe motivations behind the present development along with other biodegradable wound-healing material for effective healing with their antimicrobial and antibacterial properties

Keywords: chitosan; sodium alginate; gelatin; nanocomposites; biodegradable, amtibacterial.

1. INTRODUCTION

Chitosan is used effectively for wound healing applications in biomedical fields .Chitosan is obtained from chitin by the expulsion of an extent of the N-acetyl bunches which is found in the hard shells of sea creatures . Its excellent dissolvable nature in numerous acids.The chitosan-containing polymeric films of the present innovation are fantastic bearers for various medicaments specially antibacterial applications(1-4).

Sodium Alginate is an extensively used polysaccharide which has significant application in drug delivery, tissue engineering , dentistry and cosmetics industry (5-6).

Gelatin is a mixture of peptides and proteins created by incomplete hydrolysis of collagen separated from the bones, tissues and skin of creatures.. It provides stable and smooth films which can be used for different applications food industry, tissue engineering , medicines etc.(7).

Azadirachta Indica which is commonly known as neem has been broadly utilized in different medicinal applications specially in Homeopathy, Ayurveda and Unani drugs. The way toward extricating neem oil includes separating the water-insoluble segments with ether, oil ether, ethyl acetic acid derivation, and weaken

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Review Paper for Comparison of Different Wireless Power Transfer Systems for Electric Vehicles

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Abstract—Electric vehicles (EVs) are gaining significant attention in a large domain of transportation in recent times. EVs are considered as one of the prominent alternatives to fuel-based vehicles because of their effectiveness in reducing the dependency of transportation domain on fossil fuels and thus effective contributing to the reduction of greenhouse gas emissions. However, there are some specific constraints which restrict the deployment of electric vehicles such as its ineffectiveness when deployed for short driving ranges and long charging times. In order to overcome these restrictions, the adoption of wireless power transfer (WPT) method has been proposed by various researchers. The significant advantages of WPT systems are that it does not require any manual connection between the charging station and electric vehicle. Additionally, WPT systems enhance the adaptability of electric vehicles for long range driving applications, while simultaneously reducing the size of the batteries and increasing the feasibility of charging the vehicles. This review presents an inclusive analysis of WPT technologies and its types and optimization techniques.

Keywords: Comparison of WPT, Electric Vehicles, Vehicle Charging, Wireless Power Transfer

I. INTRODUCTION

A. Background of the Study

The commercialization of electric vehicles has expanded prominently as a result of recent advancements in battery technologies, power electronic converters for effective battery charging and discharging systems, battery management systems and electric motors [1].

However, there are certain challenges concerning the effective applications of electric vehicles such as cost of batteries, battery lifetime, efficient charging systems, slow charging mechanism, restricted energy density, weight, and reliability, which needs to be resolved. Among these challenges, one of the significant issues restricting the growth of electric vehicles is constituted by the scarcity of feasible infrastructures facilities such as battery charging stations [2].

Ernst & Young conducted a survey for analysing the feasibility of charging stations in public places. The survey stated that one of the prominent problems faced by the public was related to lack of availability of charging stations [3]. Hence, the main constraints for increasing the feasibility of electric vehicles in public application are related to non-availability and safety issues concerning charging systems and their ease of access to the public.

Due to the emergence of wireless power transfer (WPT), it has been convenient for the users to charge their EVs without requiring any physical connection [4]-[6]. This study discusses various aspects related to wireless power transfer mechanisms in electric vehicles.

Electric vehicles (EVs) are regarded as an optimistic substitute for traditional fuel based vehicles, because of their effectiveness in reducing vehicular pollution and noise. The batteries and internal combustion engine (ICE) in EVs enact a prominent role in reducing vehicular emission thereby contributing towards a pollution free ecosystem. The battery is one of the significant components in electric vehicles, whose performance is evaluated with respect to OCV (Open circuit voltage), SOC (State of charge), battery resistance and power capacity.

B. Wireless Power Transfer

The significant advantages of WPT systems are that it does not require any manual connection between the charging station and electric vehicle also WPT systems are not affected by the changes in environmental conditions [7]. The primary coil of the inductor will be placed in the on ground (stationary base) whereas the secondary (receiver) coil will be positioned in the electric vehicle [8]-[10]. The basic block illustrating a WPT system is presented in figure 1.

Fig. 1: Illustration of Basic WPT System

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RTL Verification and FPGA Implementation of Generalized Neural Networks: A High-Level Synthesis Approach

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Abstract. Neural Networks (NNs) are used in numerous applications such as audio-video processing and image classification. NNs can address the limitations of the traditional computer algorithms. Recently, the research utilizing Field Programmable Gate Arrays (FPGAs) to implement NNs is on the rise due to low power dissipation, easy and fast reconfigurability offered by these platforms. This is due to the research and development efforts put into the design optimization to improve the throughput of FPGAs. The integration of appropriate hardware with advanced Artificial Intelligence (AI) software presents many challenges. This paper offers a generalized model of NNs on a FPGA device. In addition, it presents the design process for the High-Level Synthesis (HLS) tools to implement the project on FPGA. This paper shows results of latency, timing, pre and post synthesis, implementation, and hardware utilization on Xilinx FPGA target device. In this paper, NN for XOR logic gate operation is performed and verified by using HLS tool, and FPGA implementation is proposed. The NN and back propagation algorithm are developed in high level programming languages like Python, Java, C, C++. The training part of the NN has been done by using open-source software Dev C++ and tuned weights are taken to Xilinx Vitis HLS. Simulation, synthesis, and implementation are performed by using Xilinx Vitis HLS and Vivado 2020.1 Electronic Design Automation (EDA) tools. NN architecture with tuned weights is implemented on Xilinx ZYNQ FPGA target device. This paper shows that we were able to achieve latency in one clock cycle interval through pipeline and array partition.

Keywords: High Level Synthesis (HLS), Neural Networks (NNs), Register Transfer Level (RTL), Field Programmable Gate Arrays (FPGAs), Systems on Chip (SOC), Artificial Intelligence (AI), Graphic Processing Units (GPUs), Generalized NNs (GNN), Recurrent Neural Network (RNN), Feed-Forward Neural Networks (FFNNs).

1   Introduction

In AI, deep learning is getting a lot of attention from industry and academia. The

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Analysis of critical issues in retrofitting of ICE vehicles

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Analysis of critical issues in retrofitting of ICE vehicles

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Abstract. Vehicle population is increasing at an alarming rate causing cities, and towns to suffer air pollution due to inefficient engines. Every year millions of vehicles are being manufactured and scrapped. Disposal or scrapping of vehicles before their useful life is not a good option. All the parts and systems of a vehicle wear out at different rates. By employing this technology of retrofit for the next 10 to 15 years, the owners will be able to contribute to society by decreasing input energy for massive automobile industries. Based on the life span of automobile parts a range of age has been found in this research at which retrofit can be carried out. In this research, cost analysis of vehicles has been carried out which shows a decrease in performance with increased maintenance, repair, and replacement cost. A mathematical model has been created for performance and cost. The minima of this mathematical model are known as retrofit age. It has been shown in this research that the time has come to adopt this technology, due to inadequate recycling of automobile parts, limited processing plants, and limited scraps yard. For this study, Honda Activa 5G, Bajaj pulsar 500, and Maruti Baleno has been considered.

Keywords: Scrapping, Retrofit, Cost, Analysis

1. Introduction

Technology leads to many inventions. The automobile is one of the most important inventions. The present scenario depicts a rapid increase in vehicle population. Increased vehicle population occurs due to inadequate public transport, as a status symbol, to save time and provide a safe, comfortable ride, etc. NITI Aayog makes an effort to push up the Electric market by providing Rs 700 crore a year as subsidies to battery makers to overcome the biggest hurdle of high-cost batteries.

Growing up a population of vehicles lead to traffic congestion, severe air pollution, and other environmental effects [1]. Transition to e-mobility is focused due to severe air pollution, difficulties in oil imports, and the most important surplus solar energy to produce electricity for transportation. Due to the limited life span of vehicles, millions of cars are scrapped every year which demands huge lands for scrap yards and landfills [2].

Increased carbon emissions, finite oil resources emphasize transformation to electric and autonomous vehicles [3], [4]. Transition to retrofit and electric vehicles are due to zero emissions [5],[6]. In retrofitting, the addition of new technology to existing provides a striking balance between the cost of conversion, performance, range, and charging [7],[8]. Also, it saves a huge amount of energy required for recycling, production, and manufacturing of new components. Till 2030 electric vehicles will constitute 30 % of the total vehicle population.

Polypropylene as an innovative substitute for jar material of horizontal axis, multi-jar ball milling machine to grind electrode materials for energy storage devices

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Abstract. It is approximated that there will be a considerable amount of increase in worlds energy needs. So, there is a need of high energy storing devices when the load is low or moderate. Supercapacitors (SC) can be the competent options to serve this purpose. The paper recounts the performance of supercapacitors (SC) churned out from a horizontal axis multi-jar ball milling machine based on variations in material properties of ball milling jars. To store ample amount of energy, it is very essential to develop energy storing devices with large capacities and large ratings. The performance of energy storage devices is investigated using Manganese dioxide and Activated carbon as electrode materials. Majority of the times the granular size of raw-electrode materials is not enough fine to use them as electrodes directly. As a result of this, it is essential to crush the raw-electrode materials of the SC into fine powder. The energy storing capacity of SCs depends on size of particle, specific area, the of material and quantity to weight ratio of electrode material. In this paper an alternative material 'Polypropylene' is used as a substitute for Aluminum jars in horizontal axis multi-jar ball milling machine to crush the electrode materials. The effectiveness of both the jars is compared by evaluating the performance parameters of the SCs manufactured from electrode materials crushed in each of these jars. It is observed that the performance of SCs depends on type of ball milling machine, number of ball milling balls used, ball milling time, diameter of ball milling jars, speed of ball milling and material of ball mill jars properties. So, all other parameters are kept the same except the material of ball mill jars to scrutinize the effect of ball milling jars on performance of SCs.

Keywords: Ball Milling, Super-capacitors, activated carbon, Polypropylene, Manganese dioxide

1 Introduction

Energy storage devices can be possibly made of various materials like metal oxides, carbon and even with wood [1-5]. Electrode materials are the key element in determining the rating of an energy storage device [6]. Electrode materials should be crushed and grinded to fine powder for high effectiveness of the energy storage devices [7-9]. A lot of development has been observed in the field of energy storage devices for improving the effectiveness and capacity of these devices [10-16]. In today's era the developing advances in technology have also led to use of nanotechnology in the field of electrode material processing for energy storage devices [17,18]. Ionic bonds of electrolyte also play a vital role effectiveness of these energy storage devices [19,20]. There are two types of energy storing devices: Primary energy storing devices and secondary energy storing devices [21]. Primary cells cannot be recharged because chemical reaction in primary cells is irreversible and hence the primary cells cannot be reused. Example of

primary cell is mercury cell. But on the other hand, the chemical reaction in secondary cells is reversible. As a result of this, secondary cells can be recharged. Supercapacitor (SC) is an example of secondary cell. Ball mill is a machine which can be used to grind these electrode materials into very fine powder [22,23]. Although this field of ball milling to grind electrodes is very untouched field and hence, not considered much in most of researches.

Super-Capacitors can typically store 10 to 100 times more energy per unit mass than electrolytic capacitors and has much higher charge acceptance and discharge rate [9]. SCs are used in applications where there is demand for fast charge and discharge cycles like in EVs, Photovoltaic systems, Ultra-batteries, defibrillators, etc. It is observed that good performance capability and charge storing capacity of the SC is result of the electrode material having surface area less than 3500 m^2/g, pore sizes in the range of 1-3 nm and pore volumes of 2.5 cm^3/g [09].

Ball milling balls are very vital aspect to determine the effectiveness of ball mill machine. But it is observed that material properties of ball milling jars also play an

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Wireless Surveillance Robot for Industrial Application

Rishabh Singh, Anjali Kushwah, Preeti Warrier, and Shraddha Oza

1 Introduction

Surveillance has a significant role in security. In Industrial areas, continuous monitoring is required, making the job monotonous and strenuous. Security guards may get bored and become careless, compromising security. Using a robot for constant monitoring of an area will improve surveillance efficiency and ensure the safety of human resources as the robot can be operated from anywhere. Robots are usually miniature so that they can enter tunnels, mines, and tiny holes in buildings and even have the capability to survive in a harsh and challenging climate for a lifelong time without any harm [12]. Nowadays, a mobile robot with a camera is popularly used for surveillance. The camera used in making the robot can move to different locations. These sorts of robots are more flexible than fixed cameras. Primarily used surveillance robots are wheel-based robots. The wheel-based robots are more worthy of the leveled platform. With the advent of wireless communication and the Internet, the videos captured by a robot can be seen remotely on a PC/laptop.

The majority of private security forces are using Internet protocol Camera-based installation instead of the analog camera. Analog cameras are conventional cameras that are used in CCTV. It sends video with the help of cable to VCR and DVR. In the modern era, we also use a hybrid system consisting of both analog and IP camera-based installation. This is because IP-based system provides better picture quality, and it is also beneficial in terms of mobility, stability, and flexibility. An IP camera is a digital video camera that controls data and gives image data output through an IP network. Unlike analog cameras, they do not require a recording device. Here we are using an IP camera to store the videos over the Internet [11].

The purpose of this paper was to build a small, land-based surveillance robot that can be controlled over Internet communication through Raspberry Pi 3 Model B from

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Abstract— **AI is a versatile technology that allows us to combine data, analyze it, and make decisions based upon the results. It is already transforming our life in many ways. To respond to commands and carry out tasks, a virtual voice assistant software agent can be used. The major purpose of this paper is to create a local voice assistant that can perform human-like tasks and tasks that a human must perform on a daily basis. Users may ask their assistant's questions, listen to music, control home automation devices, and manage other basic tasks like calendars using voice commands, email, and to-do lists. The proposed system is constructed with open-source software components that can accept any future modifications. Because this system is modular, it is more adaptable and easier to add new features without disrupting existing system functionality. The entire system is based on verbal rather than textual input. The integrated voice assistant system can open YouTube, Gmail, and Google Docs and other websites like geeks for geeks, Google meet, Google classroom, can also open Notepad, Command Prompt, and switch the window of laptop. Predict current date and time, open camera, search Wikipedia to abstract required data, get top headline news, fetch jokes, play music on browser and from system and get IP address of the machine.**

Keywords— Virtual Assistant, Speech Recognition, Artificial Intelligence.

I. INTRODUCTION

Virtual assistants are software programmes that help you with daily tasks like weather forecasts, creating reminders, and making grocery lists, among other things. They can accept text (online chat bots) or voice commands. A human can no longer learn to speak with a machine; instead, a machine learns to engage with a human by analyzing his actions, habits, and behavior in order to become his personal assistant. Artificial intelligence (AI) systems that can arrange a human-machine interaction (through speech, discourse, gestures, facial expressions, and other means) are becoming more common. One of the most researched and widely used interactions, based on the machine's interpretation of natural human language. Natural Language Processing is used in Voice-Controlled Devices to process the language spoken by the human, interpret the question, process the query, and respond to the person with the result [5]. Understanding the gadget implies that Artificial Intelligence must be incorporated with the device so that it can function smartly and control IoT apps and devices, as well as reply to queries that will search the web for results and process them. In the previous decade, device accuracy has increased dramatically. Machine learning and classifying questions in specific result sets and applying

them in subsequent inquiries might improve the accuracy of the devices. The gadgets may also be programmed to take multilingual commands and reply in the same language as the user.[5]

The author [4] describes a novel approach to smart search. Many people use assistants all over the world. The paper discusses virtual assistant applications that aid in the provision of opportunities for humanity in a variety of domains and the use of virtual assistant technology as a provocation The initial stage of examining the possible function of remote assistants in programming development projects accomplished by virtual groups is discussed in this review article. The visually impaired and physically handicapped will benefit from this. We shall instead see the creation of a fragmented market. It will be a market where, based on the gear purchased, you may be obliged to utilize default AI suppliers [4] .

This system [7] is intended for usage on desktop computers. Personal assistant software boosts user productivity by managing mundane chores and giving information from web sources. Voice search is a two-stage search approach in which ASR-generated string candidates are re-scored to find the best matching entry from a potentially massive application-specific database. The virtual assistants of the future will be integrated with Artificial Intelligence, which encompasses Machine Learning, Neural Networks, and so on, as well as IoT. We shall be able to reach new heights with the adoption of these technologies.[7]

This paper [10] will assist in demonstrating that a virtual assistant has been attacked by a third party and will provide a remedy to the problem. Facial Recognition is used to improve the virtual assistant in this case. Using machine learning techniques,[11] the facial recognition system for virtual assistants identifies and recognizes faces. After recognizing their face, users may access the virtual assistant. The notice "unauthenticated person" will show if the individual is a third party. Unauthenticated users can obtain access to virtual help if they have the administer permission. This assistance may only send emails and take notes on personal information for the authorized person. It also shows standard information like the time, date, and weather.

In the future, all electronic devices will be controlled by a virtual assistant, [11] which is simple to use but requires security. The purpose of this research is to provide security for virtual assistants (VA) using facial recognition. Voice instructions can only be accessed by permitted individuals,

Chapter 3

Oxidation and Tribology of Al2O3-Induced LaTi2Al9O19/YSZ Double Ceramic Layer Coatings:
Tribo-Oxidation

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ABSTRACT

In the present work, the alumina-induced thermal barrier coatings with LaTi2Al9O19 (LTA) and yttria-stabilized zirconia (YSZ), LTA/YSZ double ceramic layer (DCL) are studied for oxidation and wear tests. Different coatings combinations with varying thickness of LaTi2Al9O19 (LTA) top coat layer are developed using plasma spray method and are tested for isothermal oxidation and wear test. An Alumina layer is induced after the bond coat layer to provide a readily available oxide layer. The activation energy is calculated using the Arrhenius equation. Arrhenius plots are developed using oxidation kinetics. Coatings are tested for wear performance also. The coating combination with a higher thickness of LTA proved best for both oxidation and wear performances. Surface characterization is done using EDS and XRD analysis.

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

Topology Structure Design of Fish-Based Propulsive Mechanisms

Gaikwad Pankaj Manik and Pankaj Dorlikar

Abstract The research presented here has its centre point on imitation of fishes and the kinematics of propulsive mechanisms to be used in efficient and versatile autonomous underwater vehicles (AUVs). Today's AUVs are based on submarine. The paper started with the analysis of topological structural attributes of 4–11 link mechanisms with 1–6 DOFs. Using Hong Sen Yan's creative design theory for mechanical devices, all the possible combinations of propulsive mechanism were synthesized to generate an atlas of 1149 new propulsive mechanisms subject to isomorphism, which will provide more inputs in the design and fabrication of the AUV models.

Keywords Autonomous underwater vehicle · Mechanisms · Kinematic chains

1 Introduction

Biomimetics is the study of shape of naturally existing biological living beings and their locomotion techniques employed especially for synthesizing similar things by the use of artificial mechanisms which can imitate actual mechanisms Sfakiotakis [1] and Salazar [2]. Fish along with other species like birds are ideal species to mimic. The different types of propulsion methods employed by fishes (see Fig. 1).

The fish swimming propulsion types mentioned above is being used by varieties of fishes in their daily locomotion. Available fish-based swimming propulsion is classified into different types, such as Thunniform, Anguilliform, Carangiform, Ostraciform, Labiform, Amiiform, Diodontiform, Gymnotiform, Rajiform, Balistiform and Tetradontiform. These locomotion techniques are employed by fishes which depend upon their body shape and also in accordance with the habitat in which they

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Crashworthiness of Bird Inspired Fuselage of Small UAV

Rohit Naryal ✉ & Pankaj Dorlikar

Conference paper | First Online: 01 January 2022

353 Accesses

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

Abstract

With the increasing demand for advanced UAVs in the market, high sustainability, reliability, and better workability are the most critical priorities. During UAV operations, accidents are common, leading to

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Convener

Prof. Dr. A.R. Ravikumar
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Prof. Arvind Pattamatta
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19 Deep learning-based wildfire detection from satellite imagery

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Abstract

Hundreds of forest fires burned over 9 million acres of land in 2015, causing millions of dollars in property damage and immeasurable loss and pain to those families affected. Understanding, tracking, and effectively fighting forest fires is crucial in terms of minimising this damage and loss. Using satellite imagery of potentially detected forest fires can greatly aid in this process considering the increased prevalence and severity of wildfires in recent times, the minimisation of response delay has become even more crucial for improved wildfire mitigation. In this paper, we tend to build a 'Satellite Imagery Based Wildfire Detection System' in order to detect the wildfire through a convolutional neural network-based model. The objective is to make a computationally efficient, stable and train the convolutional neural network with the help of the transfer learning method and use a window-based analysis approach to increase the fire detection rate. Using satellite imagery of probably detected forest-fires can greatly aid during this process considering the increased prevalence and severity of wildfires in recent times, the minimisation of response delay has become even more crucial for improved wildfire mitigation.

Keywords: wildfire, satellite imagery, deep learning.

Introduction

Wildfire is hit or miss and uncontrolled fire that burst call at forest naturally or by the act. This fire causes harm to both flora and fauna and should also result in human life loss per annum. There are several cases of wildfire causing severe destruction to nature and human lives. Last year Australia became the victim of a fire which is taken into account as the worst wildfire seen in decades. Over 28 people have died, quite 3000 homes got destroyed. A complete of 17.9 million acres of land got affected which approximately costs $100 billion dollars. The main cause of forest fires is that they are usually located at remote places, they are unmanaged areas with lots of trees, dry and parching woods and leaves, therefore these things are the source for wildfires. These segments all together form a highly flammable and are the most explanation for initial oxidisation and act as a propellant for later stages of the hearth. The hearth ignition could also be caused by human's unthoughtful behaviours like smoking or accidentally on camp fires or by elemental reasons like heat during a hot summer day. Once oxidisation starts, flammable material can easily act as a catalyst for the fire to spread which then becomes enormous, berserk and outspread. Then this results in prey on adjoining trees as a fuel and therefore the fire flame became more berserk. For

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Satellite-Based Wildfire Detection Using Deep Learning

Anant Kaulage, Sagar Rane, Sunil Dhore

Army Institute of Technology

AU: Please provide depart-ment name for the authors "Anant Kaulage, Sagar Rane."

CONTENTS

14.1 Introduction to the Proposed Chapter

Wildfire is hit or miss and uncontrolled fire that burst call at forest naturally or by act. This fire causes harm to both flora and fauna as well as human life. Every year, there are several cases of wildfire, which causes severe destruction to nature and human lives. Last year, Australia became the victim of a fire which is taken into account as the worst wildfire seen in decades. Over 28 people have died, and 3,000 homes got destroyed. A complete 17.9 million acres of land got affected which approximately costs $100 billion. The main cause of forest fires is that they are located in remote places, they are unmanaged areas with lots of trees, dry and perching woods and leaves, therefore these things are the source of wild-fires. These sources all together form a highly flammable and are the most explanation for initial oxidization and act as combustible and explosive for later stages of the fireside. The fireside ignition could also be caused by human's unthoughtful behaviors like smok-ing or accidentally on camp flies or by elemental reasons like heat during a hot summer day. Once oxidization starts, flammable material can easily act as a catalyst for the fire to spread which then becomes enormous, berserk, and outspread. Then this results in prey on adjoining trees as a fuel and therefore the fire flame became more berserk. For the most

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AR-Powered Computer Science Education

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13.1 Introduction

Regardless of the technologies used, field of the computer science and engineering data structures, and algorithms form the most fundamental part of any computer programming-related course. With programming courses now aimed at younger students, it is important to ensure that these critically important concepts are taught clearly. Since data structures and algorithms play a fundamental role in introductory computer science, this only seems to be the first step in creating a better education system for computer science.

Visual aids have proved themselves useful but the usual two-dimensional (2D) visualization proves to be a limitation in understanding complex structures that occur commonly in the field of data structures. To overcome this problem, this chapter looks at augmented reality (AR) as a possible solution.

This chapter aims to make modern computer science education more interesting and digestible for scholars through the use of AR. We feel that visual learning goes a long way in computer science and helps trigger a better response and understanding from the student. If we use AR to make visualizations of various algorithms, it will help both student and teacher at almost every level; AR is interactive and visually appealing, which will help teachers to explain a concept and students to understand it better [1]. Learners can download the tool from (https://argorithm.github.io/), and after updating their settings using the GitHub manual, they can perform the activities. This will enable the learners to visualize computer science concepts.

13.2 Augmented Reality

For quite some time now, AR has been considered to be the future of visualization. It brings an extra level of depth and appeal when compared to existing visualization.

Cyber Threats

Fears for Industry

Sagar Rane, Garima Devi, and Sanjeev Wagh

CONTENTS

4.1 INTRODUCTION

We greatly apologize for starting on a negative note, but 2020 was the worst year. Throughout the year we faced many calamities, some of which were natural and some were man-made. We witnessed an outbreak of the coronavirus, and the whole world was confined to the home. But the world cannot be stopped and it tends to digitalize. Digitalization to this large extent was not planned, and this raises the question of cyber security. It is not true that cyber threats only arose during this pandemic; the world faced a lot of cyber threats even before the pandemic. Cyber-attacks can create failures in government, business, and military equipment; they are very dangerous to a nation's security [1].

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AN INTRODUCTION TO AFFECTIVE COMPUTING

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Abstract

Affective computing is currently one of the most active research topics, furthermore, having increasingly intensive attention. This strong interest is driven by a wide spectrum of promising applications in many areas such as virtual reality, smart surveillance, perceptual interface, etc. Affective computing concerns multidisciplinary knowledge background such as psychology, cognitive, physiology and computer sciences. The paper is emphasized on the several issues involved implicitly in the whole interactive feedback loop. Various methods for each issue are discussed in order to examine the state of the art. Finally, some research challenges and future directions are also discussed.

Keywords: Creative+, affective computing, Extraordinary

1 Introduction

Creative+ is another way to say affective computing is the goal of incorporating human-like skills including observation, interpretation, and creation of emotional characteristics into computing. It is a crucial issue in order to achieve human-computer interaction harmony, strive to improve the quality of human-computer interaction to improve the intelligence of the computer, you must first increase communication. Research on emotions and affect has been going on for the past two centuries. Most of the time, "affect" has not been related to inanimate objects and was typically an object of study for psychologists. For the most part, it is relatively new in the recent years that the effect has been introduced trained and packaged by the computer, they were captured and processed.

Self-Mining Blockchain Mobile Unified Payment Interface

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Abstract— **In the last decade, the blockchain industry has solidified itself as one of the most secure forms of data storage. The emergence of extremely secure cryptocurrencies that have a plethora of advantages over regular internet banking has brought about a revolutionary change in the banking industry. The mobile payment users have skyrocketed with an estimated proximity mobile payment transaction user count of 1.31 billion in 2023. Therefore, there is a need for a cryptocurrency based unified payment interface (UPI) that would grant additional security and improve the transaction process drastically over the existing mobile payment system. We worked out on this aspect and proposed a scheme that would allow mobile devices to mine blocks themselves and generate their own transactions rather than depending on third-party services or bank servers.**

Keywords—blockchain, cryptocurrency, mobile payment, banking technology, unified payment interface, SegWit

I. INTRODUCTION

'Digital India'[10] is a leader program of the Government of India that imagines India as a carefully enabled information economy. As India moving towards the cashless so one of the most important way of towards this is by using UPI.

Unified Payment Interface [3], also referred to as UPI, is a system that supports instant transactions between multiple bank accounts using a single mobile platform. Developed in India, systems like UPI are currently only majorly being used in India and China. Some major features of UPI are:

1. Instant money transfer from one bank to another through mobile devices

2. Use of Virtual Payment Address (VPA) over bank account number.

3. Works on both Unstructured Supplementary Service Data (USSD) services and internet

4. Additional Security through Signed Intent and QR

The world has seen an increase in the usage of Unified Mobile Payments (UPI) using different mobile based applications in the last few years, more so during the Covid-19 pandemic as most people prefer to make non-contact transactions in stores and deliveries. In India, UPI has recorded a whopping transaction volume of 1000 million transactions in the last year. From paying for cab, food, and clothes to paying in government offices, UPI has found its use in every type of transaction in India. The high usage rate of mobile devices has naturally accelerated the adoption of

mobile payment systems worldwide owing to transactions being easy and convenient to use, being fairly low risk and saving the users from dealing with cash.

Through this paper, we have essentially improved upon the major flaws of the current UPI system and proposed an improved system completely based on blockchain for the world to benefit from.

The following are the flaws in the current UPI system along with our contributed solutions:

1. It involves a centralized system to handle the transactions. Most of the time it is the bank server that processes the transaction requests and carries out the transactions [1]. One of the major flaws is the huge delay in transactions or a frequent occurrence of failed transactions when the bank servers are down/slow that result in delayed payments and loss of funds. The system that we have proposed is completely decentralized over multiple bank servers and mobile devices that distribute the transaction ability to everyone, rather than a single body. Furthermore, we have worked on giving mobile devices the ability to mine their own blocks in their own blockchains to carry out transactions. This reduces a great amount of dependence on a centralized computer to carry out the transactions over the cloud and gives the users the advantage of using their own computational power and thereby making them self-reliant.

2. When the bank servers are down/slow, another issue which occurs is that the transaction amount is stuck in between the bank servers and the receiver does not get the money even after the money has been deducted from the sender's account. Due to issues in the central server, completed transactions may not be marked complete immediately and this causes ambiguity between the sender and the receiver in real time as to if the transaction has been successful or not. This ambiguity can always lead to multiple transactions being made by the sender due to the lack of a payment confirmation. Since our proposed system processes transactions locally on the device, the confirmation of the transaction is given immediately to the user as soon as a transaction takes place thereby eliminating uncertainty of transaction completion.

3. International money transfer is not possible in the current UPI system. UPI currently works only if the

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"ONE CLICK QUESTION BANK GENERATOR SYSTEM USING WEB SCRAPING"

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Load Balancing in Specific IOT Systems

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Abstract- **Load balancing is done to distribute network traffic across different servers efficiently using specific techniques, ensuring maximum speed, resource utilization and preventing overloading of any particular server. As in case of Data Streaming IOT systems, we can determine the frequency of traffic coming to our servers beforehand, static algorithms are good for such systems but they suffer from few drawbacks like uneven distribution of load among servers and requirement of dedicated hardware for load balancing. Here we have proposed a new hybrid approach for balancing the load on IOT Applications where we are already aware of the incoming traffic to our system from a specific device in a specified interval . We have found that static algorithms work better than dynamic algorithms for certain applications, so we have tried to combine features of dynamic load balancing with static to achieve optimum performance on various parameters. We propose this approach because it is easy to implement and its performance is very comparable to dynamic algorithms considering desirable features of both have been used to create the algorithm and minimize the drawbacks.**

Keywords- Load Balancing;Dynamic;Static;IOT; Hybrid; Multiple Servers;Cloud Computing

I. INTRODUCTION

With the surge in the number of users, the quantity of data being processed in server systems has become massive. Since the requests of the clients can be random, therefore the load on each node may also vary and some of them may get overloaded hampering the performance while some might not get used at all. Therefore, some kind of mechanism for evenly distributing the load is needed to ensure that the available computing resources are distributed for the proper utilization of the resources and to ensure that the system doesn't go down due to excessive traffic. Such a mechanism is called Load Balancing. To ensure an efficient, reliable and optimum system irrespective of flow of traffic, load balancing is done to distribute the tasks and traffic on available servers in the best way possible. Objective of load balancer is to render service even if any of the components of the service fails, with optimal utilization of the available resources. It also focuses on minimizing the response time for incoming load and to improve the way resources are used, which further enhances system's efficiency at an affordable cost. Load balancing also helps in making systems scalable and flexible and also provides priority based execution of jobs if required.

Load balancing algorithms are comprehensively classified in two kinds: Static algorithms and Dynamic algorithms. In static scheduling algorithms, the allocation of tasks to the processing units is done before the execution of the program begins and these methods are non-preemptive in nature. The objective of a static scheduling method is to diminish the overall time required for execution as much as possible. Dynamic load balancing algorithms, whereas, is based on the distribution of incoming load among the processors during the run time of the algorithm. This is possible by relegating tasks to the lightly loaded servers from the heavily loaded ones. It is especially useful when the requirements of clients are unknown beforehand and the primary objective of these algorithms is the maximization of the resource utilization. The significant downside of the dynamic load balancing algorithms is that it incorporates huge runtime overheads caused by sharing information about load among the processors, long decision making processes being done for the selection and the communication delays arising because of load distribution and allocation.

There is a need for mapping the work load properly and the load balancing techniques should also consider different metrics. Literature survey of existing algorithms in this domain has been presented based on performance metrics and our own proposed algorithm is discussed which is a combination of static and dynamic algorithms along with trigger and error handling mechanism in our proposed system.

TABLE I.   LIST OF ABBREVIATIONS USED IN THE PAPER.

Abbreviation	Fullname
NL	New Load
CS	Current Serverless
TL	Total Load
N	Load on serverless
AL	Average Load
ASTD	Allowed Standard Deviation
NR	New Serveless Requirement

Improvement in video object detection methods using classification

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Dr. Sandeep M. Chaware, Professor, MMCOE, Pune

Abstract:--

In the field of computer vision, 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 etc. 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 objects is called localization and task of assigning label is classification. The object detection from video sequences can be feature based, template based, classifier based and motion based. Current paper focus on factors involve in classification improvement for object detection. The experimentation is done using CIFAR 100, Pascal and COCO dataset, it is observed that the accuracy of CNN changes with change in training data and epochs. The CNN used as image classifier with Keras. The experimentation proved that there is linear relation between the training data and accuracy of classifier.

Key words:

Object detection, Deep Learning, Classification

An Organized Study of Congestion Control Approaches in Wireless Sensor Networks

<div style="text-align:right; font-size:2em;">**1**</div>

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1.1 INTRODUCTION

Wireless Sensor Networks (WSNs) find applications in intelligent homes, transportation services, precise agriculture production, environment, habitat surveillance, smart industries, structures, critical military missions, and disaster management [1]. The sensor network supervises and tracks an environment by sensing all the available physical parameters. The various challenges arising during use of WSNs are energy-aware clustering, node deployment, localization, dynamic topology, congestion control, power management, and data aggregation.

Congestion occurs when a packet appearance rate outstrips packet convenience rate [2]. The congestion arises in sensor network due to deterioration of radio link quality, multiple data transmissions over the links, fickle traffic densities, unpredictable and irregular links, and biased data rates. Hence comprehensive analysis of network congestion and local contention is required to attain maximum link usage, to increase network lifetime, to provide fairness among flows, to decrease data loss due to buffer overflow, and to diminish overhead on the network.

Congestion is broadly classified into two types—packet-based and location-based congestions, as shown in Figure 1.1. Packet-based congestion is further divided into two categories. Node-level congestion: This occurs when input load goes beyond the existing capacity, resulting in node buffer overflow. Consequently, the rate of packet service is smaller than the rate of packet arrival, which leads to increase in loss of packet and power wastage. Link-level congestion: This arises when multiple nodes use the same wireless channel, resulting in packet collision. Location-based congestion is classified into three types. First is source congestion: In this case, during the ongoing events the sensor nodes covering the same sensing field sense the event spot simultaneously. All the nodes in that

Keyword spotting in historical document collections withoutsegmentation using the Siamese Network

Ashwini Sapkal, Chhavi, Shashank Sharma, Pradeep Kumar and Sachin Yadav

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Abstract :- Keyword spotting is the method of estimating whether the text query occurs in the document or not. The query- by-example model is used in this paper to present an efficient segmentation-free keyword spotting approach that can be applied in historical document collections. For image de-noising and binarization, we use an autoencoder network in our approach. We are using a patch-based system to create patches for the binarized image, followed by a Siamese network. To determine the degree of similarity between two input word images, a Siamese network employs two identical convolutional networks. Once trained, the network can detect not only words from different writing styles and contexts, but also words that are not in the training set. The method proposed is evaluated on the Bengali Handwritten dataset..

Index Terms-**Historical documents; Keyword spotting; Segmentation-free; Autoencoder; Siamese Convolutional net- work; Deep learning.**

I. INTRODUCTION

Libraries and archives worldwide are digitizing their collections so as to succeed in a bigger audience in today's world. Making handwritten texts searchable and browseable will be extremely beneficial to both researchers and also the general public. Manual searching is often very hectic. Its like looking for a needle in a haystack. As a result, an Efficient search in digital records may be a must for retrieving information. Due to the deterioration of historical documents and variations in styles, using OCR (Optical Character Recognition) is inefficient for manuscripts. Word spotting is an effective method for gaining access to the contents of historical documents.

In this context, this paper proposes a de-noising method and binarization of the document image using an autoencoder network, which is a network of convolution and deconvolution layers. Once the image is binarized, patches are created for the images and using a query-by-example paradigm, we search for our query word in these patches using a convolutional siamese network.

The Siamese network will compare two input images and rate their similarity. The network will generalize to predict words from a vocabulary after being conditioned to learn image representations in a supervised manner. The results of the Bengali handwritten dataset are highly comparable to the related work.

II. RELATED WORK

Retrieval based on recognition may be done at the word or character stage. OCR stands for optical character recognition and has no restrictions on vocabulary. Character recognition in historical documents has been successful even with a limited vocabulary. Methods based on recognition frequently rely on neural network [1], and Markov model [2] learning models. Manmatha et al. coined the term "word spotting" [3] to describe OCR-free retrieval. It determines if two given words are identical to recognize a word. It accomplishes this by segmenting the words from the document images and then using pair- wise distance calculations to match each word against all of the other word images. This matching can be done pixel by pixel or feature by feature [4].

Pixel by pixel matching is a technique for pixel-by-pixel comparison of two images using Euclidean distance mapping [4], Mean Squared Error(SSD) [4] or the XORing method [4]. Feature-based matching deals with extracting image features and comparing these features using Dynamic Time Wrapping, Scott and Longuet-Higgins (SLH) algorithm [5] or corner feature correspondence algorithm (CORR) [5]. Feature-based matching outperforms pixels-by-pixel matching in general, and Dynamic Time Wrapping outperforms all of these algorithms in particular.

Image features in word spotting applications are classified into two types: global and local features.

The height, width, aspect ratio, moments of black pixel distribution, and number of foreground pixels are all global features. [6]

1

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Abstract

The wireless sensor networks are composed of miniature power sensors that reach in remote regions. Sensors are alienated into diverse clusters. Among the randomly deployed cluster, one node is elected as cluster head (CH) and all other nodes act as member nodes (MNs) of that cluster. The foremost purpose of cluster head is to aggregate the sensed data from the member nodes to the sink node. Energy expenditure is a vital challenge in WSN as the sensor nodes are equipped with the batteries that are not replaceable. This paper put forward a relative revision of the LEACH protocols for wireless sensor network. The study starts with the review of preceding surveys of LEACH-based protocols. The assessment is carried out on the basis of use of location information, energy efficiency, hop count, base station centralized control, work distributed, self-organization and scalability. Further advantages and disadvantages of these protocols are also mentioned.

Keywords

LEACH EE-LEACH C-LEACH WSN

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A Multiple Stage Deep Learning Model for NID in MANETs

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Abstract – **A MANET is an entirely devoid-of-infrastructure network. This network is made up of nodes that randomly move around. Since MANET has no central supervision, it can be formed anywhere using randomly moving nodes. This network faces numerous security issues as a result of MANET's vulnerable behaviour. There are numerous security threats to MANET that do not have a solution. It is also difficult to detect these issues. Some security threats are extremely serious. These threats have the potential to bring the network to its knees. Researchers are attempting to determine how to respond to these threats. The NID system is an important tool for protecting MANETs from vulnerabilities and malicious activities. A slew of new techniques have recently been demonstrated; however, due to the continuous launch of the various threats that existing systems are unable to detect, these techniques face significant challenges. The authors have proposed two stage deep learning (TSDL) model in this publication. For efficient NID, a stacked auto-encoder (SAE) with a softmax classifier (SMC) is used. There are two decisive phases in the model: A first phase in the system traffic classification process that uses a possibility score value to determine whether system movement is regular or irregular. This is then used as a bonus feature during the last stage of the decision-making process. Both the normal state and various types of attacks are to be detected, the suggested framework can automatically and efficiently gain knowledge and categories of beneficial feature representations from large amounts of unlabelled data.**

Index Terms – *NID, Stacked Auto-encoder, MANETs, Two-Stage Deep Learning Model, SVM*

I. INTRODUCTION

We are living in an era of technological advancement. In today's world, MANET is one of the most advanced technologies. It has simplified a lot of non-viable tasks for us. MANETs are self-organizing systems of mobile nodes. A MANET is a network of mobile nodes that communicate via radio waves. There are numerous security issues in MANET. Such as packet dropping attacks, data traffic attacks, black-hole attacks, jellyfish attacks, control traffic attacks, and so on. We have concentrated on two critical security attacks on MANETs: the Black-hole attack and the Jellyfish attack. Both of these attacks are highly hazardous to the MANET and can result in a

significant security disaster in any confidential work, which is being carried out with the assistance of the MANET.

MANETs are being used in a wide range of arenas and applications, so network security becomes more and more essential. Several organizations use traditional intrusion detection techniques to safeguard against malicious activities, such as firewalls, anti-spam strategies, antivirus, and so on. Unfortunately, these systems are unable to identify the latest technological attacks. NIDSs are a new type of security system that monitors network activity and detects malicious activities. They're now widely regarded as effective defensive tools that can fend off even the most sophisticated attacks and threats.
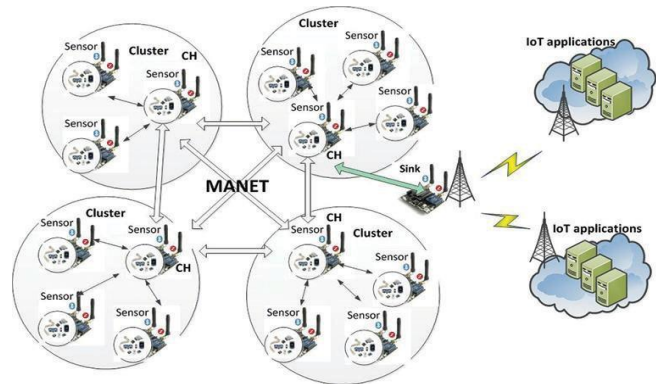

Fig. 1. Overall Scenario in the MANETs

Approaches for detecting network intrusions face a number of glitches and challenges in effectively detecting anomalies. The first difficulty has to do with the wide range of mischievous attacks and intimidations. Current intrusion detection methods are unable to keep up with the evolving cyber threat landscape and the appearance of new threats. As a result, many businesses have difficulty achieving high detection rates or reducing false alarms. The second challenge is that conventional NID machine learning methods have a number of flaws. Overfitting and high bias due to irrelevant or redundant features, as well as an unbalanced network traffic class distribution, are just a few examples.

The third issue is the difficulty of labelling the traffic dataset in order to develop a NIDS. To produce such labelled

Image Retrieval through sketches based on Descriptor with Data Retrieval using Reversibility Method

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Abstract—**The various analysis of Image retrieval makes the Query by sketches as an important branch of image retrieval. It also acts as supplementary to Content Based Image Retrieval. Whereas Sketch based image retrieval plays a vital role in critical applications like military and crime systems, as accuracy becomes the major factor. Here loss can be any data or information hidden in images. The data hiding technique uses reversibility to extract the data, as well as the real images, which can be extracted from sketches. The message embedding and extracting process uses all 3 color channels and a difference histogram. The proposed work of SBIR adopts different processes like pre-processing for extraction of strong edges, feature extraction by descriptor, and constraint's application for the selection of shaping edges. In the proposed work, the framework will significantly improve the SBIDR performance by exploring the method: Image Retrieval with Data Retrieval simultaneously.**

Keywords—grayscale, color images, edge extraction, descriptor generation, data hiding, data extraction, feature extraction.

I. Introduction

Image retrieval is a traditional and very common method of searching the images from a huge Image Database. Different Image Retrieval techniques have been developed by scientists and researchers. The retrieval of images has some variations in the retrieval system like query by image content, named as CBIR (Content Based Image Retrieval). CBIR analyses the image content like its shape, texture, color, etc., rather than the traditional Metadata Searching. The term "Metadata" in this context might refer to tags, keywords or any other description of image; such systems are known as Text Based Image Retrieval (TBIR). The limitations to the scope of queries still exist with the use of keywords.

Query by freehand sketches is introduced and nowadays it is a very emerging trend of image searching named as Sketch Based Image Retrieval (SBIR). In SBIR, queries are given as sketches to search real and color images from the database. The highlighted part of such a system is that "Pictures are more expressive and representable" as compared to keyword based search. Apart from this, the freehand sketches make the image searching more powerful in every means. With this consideration, wide research is going on SBIR with its application in military and crime investigation purposes. As the sketches are represented with Black and White colors & other comparable images are colorful, the grayscale invariance becomes incredibly important while searching an image using sketches. This paper emphasis on the assimilation of data and image retrieval with its grayscale invariance.

II. Related Work

A system that carries out searching, navigating and fetching of images from a enormous database of digital images or text is popularly know as Image Retrieval System. Evolutionary growth in Image retrieval starts from Text Based Image Retrieval (TBIR), where text or keyword plays a crucial part in the retrieval system. It is purely built on the textual description of images and to carry out retrieval, it is solely depends on the annotation of words. A process of Addition of metadata like captions, keywords, descriptions or tags to the images is nothhing but annotation. Searching the images by metadata only; is not sufficient due to the limitations on the feature description by keywords or text. It leads to the next generation of Image Retrieval termed as Content Based Image retrieval.

Images containing compound background may incorporate with a diversity of pictorial aspects and therefore CBIR utilizaes different feature descriptors to show the pictorial aspects of images. The descriptor is invariable to image transformations like rotation, scaling and illumination changes. Descriptors are categorized in two descriptors according to their extraction methods as Global descriptor and Local Descriptor. Local descriptors are extracted from a part of an image and global descriptors are derived from the visual content of full image; both are called as RBIR and GCBIR respectively. These descriptors represent the color, texture, shape etc. of an image. Both TBIR and SBIR are very user instinctive and limited due to large time consumption. The most expressive and interactive way of Image retrieval came into picture named as Sketch Based Image Retrieval (SBIR), in which images are explored by query sketches. The Sketch depicts the freehand drawing of something that can be an object or any imagination. The real life images have various aspects like color, shape, texture, gradient, size etc. and sketches are informative in shapes. So CBIR cannot be inherited here to bridge such a large presentation gap in between sketches and real images.

One of the approaches of image retrieval is Patch Hashing [3], which segregates an image in the overlying parts named as patches and computes a Histogram of Gradients (HoG) feature descriptor for each and every extracted patch. This methodology develops a system to

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1   Implementation of Predictive OEE (POEE): System engineering approach

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Abstract

Due to the era of Industry 4.0, the management of various manufacturing companies tries to be a competitor. They always look for possibilities to improve the assembly line system. To fulfil the special requirements of the manufacturing industries is necessary to adapt new tools. With time a new tool has evolved named Overall Equipment Effectiveness (OEE). OEE applied after data analysis to improve the productivity in manufacturing plants. Productivity can increase through faster decision-making, faster response, and faster problem resolution techniques. Hence, it takes important consideration of OEE within various manufacturing processes. Corporates are very likely towards taking vast advantages from OEE monitoring. This paper was reviewed through many illustrative case studies. The case studies are based on the environment of OEE. A case study has been implemented using Matlab (MATLAB stands for MATrix LABoratory) and results showed insufficient improvements in manufacturing structures with existing OEE practices. The manufacturing frameworks have provided their guidelines, rules and regulations. Various methodologies do not take their full advantages. The renewal of an integrated OEE structure is necessary. That can remove key obstacles from the OEE structure improvements in manufacturing frameworks.

Keywords: total productive maintenance, overall equipment effectiveness.

Introduction

The economic revolution has considered being a pandemic change. Nowadays the information exchange in manufacturing industries became a vital part of digital trans-formation. This revolution in the era has been named as Industry Evolution 4.0. To change the economy, work, and society, Industry 4.0 is a crucial part of the manufacturing sector. On the basis of Industry 4.0, manufacturing industries have taken a step towards knowledgeable automation as well as in data exchanges [1]. Industry 4.0 can be driven by the use of IoT that has led the way to a pandemic shift in wireless communication [2, 3]. Now there is a possible communication not only in Human–Machine interaction but also a machine can communicate with other machines [4]. This led to the new way to the appearance of automation.

It is proven by several researchers that maintenance plays a crucial role to boost production performance [5]. Maintenance 4.0 is nothing but maintenance with the help of Industry 4.0 techniques, comes with new techniques that will fulfil all the necessary demands [6]. The current maintenance techniques have their own benefits and

3 An insight on methodologies used for predictive machine health monitoring: A review

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Abstract

Many standards related to new technologies have already been published, existed and presented by different researchers, institutions and countries. The prominent technologies are not yet introduced in the environment of smart manufacturing, or within the environment of the 4th Industrial Evolution. Hence, it's absolutely obligatory to look forward to technologies in predictive maintenance (PdM). Machine health monitoring (MHM) and PdM with much greater importance. We created a fast review on the basis of the information and the method used for data analysis. Literature study of machine learning (ML) and deep learning (DL) discussed from more than 100 papers. These approaches are applied to various industrial systems equipment. Hence, with this review study, we have tried to describe all the approaches. Discussion is based on the theoretical as well as practical approaches of an intelligent MHM and PdM system. Without a doubt, DL can have a big impact. That impact helps in upgrading manufacturing firms.

Keywords: Industry 4.0, internet of things (IoT), machine health monitoring (MHM), predictive maintenance (PdM), computer algorithms.

Introduction

The world is now highly competitive. Manufacturing industries embrace a replacement strategy. That strategy will help to enlarge product contribution. And also to suggest increasing in customised products. The appliance of strategy drives businesses to rework manufacturing production line systems. That will be a far more adaptable, flexible and sprightly manufacturing system. There are fortune solutions available for factories to survive for the longer term.

The solutions are applicable for upcoming challenges [1–5]. These solutions are smart manufacturing systems and 4th Industrial Evolution. These production line systems were introduced since the 4th Technological Revolution. Thirty years ago, computers were introduced all over the environment. The use of digitalisation allowed possession of decentralised decisions. Besides, it was not implemented at the time. This

4 Support vector clustering for face-based emotion predictions

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Abstract

A person's face is an extremely essential biometric trait. Automatic recognition and analysis of face-based emotions in the field of research have initiated great inquisitiveness. A human face is multi-faceted, multi-dimensional, and contains a variety of important visual messages. The lack of unique classifiers for individuals due to the lack of dataset remains a big challenge. The performance of several classifier techniques like SVC and single-layer neural network, with principal component analysis (PCA) used for dimensional reduction in the paper using F1 score, is evaluated using labelled faces from the wild dataset. The ratio 70/30 of the train and test set requires less time for execution as well as a number of iterations.

Keywords: face-based emotion, MLP, SVC, PCA, LFW dataset.

Introduction

A person's face is an extremely essential biometric trait. Automatic recognising and analysing of the face is one of the challenging tasks in object recognition which is used in human–computer interaction applications. Computer vision systems are becoming increasingly crucial in our lives as Human–Computer Interaction (HCI) evolves. Gender detection, face recognition, facial expression, body tracking, and ethnicity identification are some of the most common computer vision applications. In larger datasets, automated data analysis approaches to aid in the discovery of regularities and hidden relationships. Human facial emotions play a vital role in behavioural communication, which can be verbal or non-verbal [1] way. While communicating only 7% of the message is contributed by verbal part, 38% by vocal part and 55% is the contribution by facial expression. Social signal processing and behaviour-medics are some of the applications of automatic analysis and synthesis of facial expression and emotion detection. By using facial expression and emotion detection one will be able to enhance small expressions which can be missed by normal vision.

Moreover, enhancement in computer vision facial emotion detection and prediction can help in applications like driver state surveillance, personalised learning, health monitoring for studying the state of mind at a faster rate. Many potential applications for facial expression recognition exist, including the identification of psychological diseases, communal communication, understanding human deeds [2, 3]. The image resolutions, age factor, gender, light effects and the intensity of any expression define

6 Transfer learning approach for multi-disease classification using chest X-ray images

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Abstract

A large portion of deaths in the world is caused by thorax diseases. They are caused by fungi, bacteria and viruses. Radiologists find it hard to identify the disease just by seeing the X-ray images as a patient may have multiple diseases which may be overlapped over other diseases. The main aim of this study is to help radiologists to detect the disease with the probability of other diseases. We proposed the architecture of a deep learning (DL) model which is used for identifying the thorax diseases using the transfer learning model which would reduce the vast time and model complexity. National Institute of Health Chest X-ray dataset is used for image pre-processing which contains more than 1 lakh images of around 30,000 unique patients with 14 different types of thorax diseases, downscaled to 256*256*3 which are further augmented and fed to different neural network models pre-trained on ImageNet dataset. We prepared three different models DenseNet121, MobileNet, and InceptionV3, and we analysed the performance. We used an ensemble model – voting classifier, for combining the output from all pre-trained models. A voting classifier model named soft voting is used which gets trained on a group of numerous models, here three models. The outputs of all neural networks which are pre-trained are summed into a prediction vector by taking the mean of probabilities of all the three models and it then outputs the majority of three diseases probabilities into the final prediction vector associated with that X-ray image.

Keywords: ImageNet, DenseNet121, InceptionV2, MobileNet, ensemble model, voting classifier.

Introduction

In a year 450 million people get infected by respiratory diseases out of which 4 million people die from the disease [1]. There are quite 50 million folks who struggle with respiratory organ diseases. The respiratory organ which is vital viscous is most

18 KACO: k-mean clustering and ACO-based data transmission in wireless sensor networks

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Abstract

A wireless sensor network (WSN) is an assortment of sensor nodes proficient in environmental information sensing, refining it and transmitting it to the base station in a sovereign manner. The minute sensors communicate themselves to sense and monitor the environment. The main challenges are limited power, short communication range, low-bandwidth and limited processing. The power source of these sensor nodes is the main hurdle in the design of energy-efficient network. The main objective of the proposed clustering and data transmission algorithm is to augment network performance by using the swarm intelligence approach. This technique is based on k-mean-based clustering and ant colony optimisation-based data forwarding. The proposed algorithm KACO is divided into two parts: (1) Clustering of sensor nodes using k-mean technique and (2) using the shortest path for data transmission based on ant colony optimisation (ACO) technique. The performance is evaluated in terms of throughput, packet delivery ratio, energy dissipation and residual energy analysis.

Keywords: clustering, routing, wireless sensor network, network lifetime.

Introduction

Wireless sensor networks (WSNs) is a self-organised and auto configured wireless network. It consists of diminutive, low-cost, sovereign nodes that can sense, process, and transmit sensory data over the wireless medium. The dynamic wireless sensor node design is analogous to the standard sensor network design. The localiser, mobilisation and power generation unit are the additional units for the dynamic wireless sensor network. The localiser provides location information by means of x–y co-ordinates of nodes. The movement of nodes is tracked by mobiliser unit. The power is generated by the power generator unit for fulfilling further energy requirements. One or more sink nodes serve as the ultimate destination of the data. The sink node retrieves essential data from the source nodes through queries and source nodes acknowledge by answering queries. The radio signal provides communication among the nodes. The typical node architecture consists of sensor and actuator, transceiver, memory and power supply. The bandwidth, speed of operation and storage capacity constitute the key challenges of nodes due to which network faces resource constraints.

5 Malware classification using neural network

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Abstract

The massive growth of malware attacks is a major threat to information and data security. Most of the malware detection systems and anti-virus software use signatures and anomaly detection methods for classifying a file as malware or a genuine file. These signature-based methods have great accuracy for the well-known malware that have been previously encountered by the system but fail in detecting the new type of malware. In this paper analysis is done on two approaches which are used for this classification on a dataset available in 'Microsoft Malware Classification Challenge (BIG 2015)'. The first approach is using grey-scale images that are formed by reading the assembly file of malware as a binary file and converting that binary file to grey-scale image. We apply a Convolutional neural networks (CNN) model on these images for classifying them in different classes of malware. The second approach is based on text classification using the assembly files of malware and extracting features like count vector and n-gram. We built a deep neural network model on these features for classification.

Keywords: malware classification, machine learning, n-gram, count vector, convolutional neural network, grey-scale image.

Introduction

As recorded in a survey of 2017 around 57% of the world population is now connected over the internet. Internet is used for different commercial and non-commercial activities like banking, communication, entertainment, shopping. Albeit making everyone's life convenient, Internet has exposed us to the possibility of getting attacked by different means and sources.

Malware are the malicious software that cause damage to users' data in some or the other way [1]. Malware contains malicious programs like worms, backdoors, Trojan horses, etc. According to a Kaspersky Labs survey, 58% of computers have been hacked, and 29% of businesses have been hacked. Almost thousands of new malware found every day, but most of them are created from the existing malware and only differ very little from these well-known families.

Most of the malware detection systems and anti-virus software use signatures and anomaly detection methods for classifying a file as malware or a genuine file. These signature-based methods have great accuracy for the well-known malware that have

15 Study of tourism recommendation system

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Abstract

We are living today in the era of technology. Automation in every field is the need in today's world. Recommender systems help people to select the right item from an available large set of choices. Web services in every field begin to introduce IT for development. If we take our country India, tourism has a major contribution to the economy. The use of new technologies in tourism is expected. A recommender system in tourism helps people to be self-capable. This paper focuses on studying various recommender systems for tourism. In this different recommender systems like TIP, GeoNote, MacauMap, Proximo, etPlanner, mobiDENKu, AccessSights, etc. were studied in detail. This paper will help the new researcher to understand the tourism recommender system.

Keywords: tourism, recommendation, places-of-interest, profile, recommender system.

Introduction

The tourist recommender system is a web-based application that recommends the best places in the nearby location based on previous data of tourists. The recommender system designed combines both recommender techniques i.e., content-based filtering and collaborative filtering [1].

User modelling is an important process in the composition of an application.

There always exists an alternative to the decisions that we take and most of the time we are unaware of the same. Nowadays people depend on third-party applications to take decisions and also have trust. Awareness, a large amount of information, such as the Internet, supply results in importance filtering and methods of selection that provide efficient decision-making. Nowadays people are confused with homogenous information. The recent tools are helping hand to overcome this more effectively. These tools provide users particular direction which helps them make more informed decisions and also utilise the information present more efficiently.

The purpose of the recommender system is to contribute to the field of tourism, contribute to the GDP Gross domestic product of India. In literature, the recommender developed by combing both recommender techniques i.e., content-based filtering and collaborative filtering.

23 Performance analysis of routing protocols for Ad Hoc networks

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Abstract

In Ad hoc networks, there are no centralised access points. These are useful when there is a need to set a network fast e.g., times of emergency, relief operation, etc. In this, packets are transmitted to the next nearest hop and pass towards the direction of the destination. Nodes act as routers to forward other nodes' packets. In this paper, various routing protocols are simulated and analysed against performance metrics under variable load conditions. Performance of the network due to increasing density of nodes and also the mobility are evaluated and compared using the graphical results and table summary.

Keywords: Ad hoc network, mobile network, ad hoc on demand distance vector, dynamic source routing, destination sequenced distance vector routing.

Introduction

Wireless networks are classified into two networks – infrastructure-based networks and infrastructure less networks. In an infrastructure based network, the base station is fixed and centralised just like cellular networks and wireless local area network.

In infrastructure-less networks, there are no centralised access points. Topology changes dynamically due to the mobility of nodes. The network is 'ad hoc', where nodes come together, forms a network, communicate with each other and go. All the nodes are self-organising and self-configuring like ad hoc networks. Packets are transmitted to the next nearest hop and pass towards the direction of the destination. Mobility is one of the most important characteristics which specify the mobile users to communicate.

These networks are useful in emergencies and when there is no access to the network infrastructure in desert areas.

The MANET uses a transmission control protocol (TCP). In this, there is a frequent movement of nodes. Nodes act as routers to forward other nodes' packets. MANETS follow the self-CHOP properties like configurability, healing, optimising and protecting. MANET includes features like zero administration, low power, multi-hop, high variable network conditions, Wireless medium, dynamic and auto-configured [1].

Packet transmission consists of two basic steps – forwarding routing. Challenges of MANET include energy efficiency – short battery lifetime and limited capacities,

7 Smart attendance system

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Abstract

Recent advancements in the performance of automatic face recognition (AFR) systems have made them widely applicable for a variety of uses, most of which are done in real-time. Face recognition in real-time for smart attendance is thus a practical application. Managing employees on a daily basis necessitates the use of a system like this. Real-time image background subtraction is still a challenge, making this operation difficult. Recognition of a human face in real time. Both basic and fast methods are used, and an analysis method known as principal component analysis (PCA) is a very useful thing that helps us with face matching while maintaining accuracy. The employee's face is used to track their attendance. Employee attendance is automatically tracked by the technology. Manual data entry into logbooks quickly becomes time-consuming and difficult. As a result, we were able to create a useful module that includes face recognition and is used to track employee attendance. There is a module that includes the employee's face. You're finished once you've completed the enrolment form. They will be photographed and stored in the database. We need some data in our system as part of the application procedure because this is a one-time event. Every worker will have a roll number, which will be their own employee id. When compared to automatic performance, manual performance was found to be inferior. The time an employee spends at work is recorded after they have been identified. There are a lot more choices with this product. With this approach, correct results are provided in a user interactive manner, as opposed to traditional systems for managing attendance and leave.

Keywords: Haar cascade, pre-processing, feature extraction.

Introduction

In all institutions, tracking employee attendance is critical for evaluating staff performance. Thus, each university takes a unique strategy. Others take attendance automatically utilising biometric technologies, while others take attendance manually using outmoded paper or file-based methods. On the other hand, employees entering the office through these routes will have to wait an extended period of time to form a line. While several biometric authentication methods are available, the most critical

14 Augmented reality-based application for interactive shopping experience

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Abstract

Advancements in new technologies such as augmented reality (AR) and virtual reality (VA), it has provided us with a new world to explore and make most applications out of it. These technologies are still developing, and many researchers are trying to develop new applications every day. Encouraged by the recent advances in augmented reality, we propose a real-world application of augmented reality which provides an interactive in-store shopping experience. The mobile application will let users see all the essential product details in his/her real-world environment in a very interactive and effective way using graphs, pie charts, 3D models. Our idea is to utilise an already present efficient convolution neural network such as AlexNet for recognising the product from the image taken and then getting all the essential product details that are stored in the database, and then project these details out in user's real-world environment.

Keywords: augmented reality, applications, in-store grocery shopping, fast image retrieval.

Introduction

Definition

Augmented reality (AR) is a way of 'Augmenting' elements of a real-world environment with the use of computer and sensor's generated information onto a user's device. In simpler terms, AR can be regarded as a new developing technology, which puts the user's experience to a whole new level of interactivity by putting virtual objects in real-world [1].

Augmented reality adds compute-generated perceptual information in such a way that users see them as a natural, non-artificial object.

Figure 14.1 shows reality virtuality continuum which demostrates the presence of AR between real world and a complete virtual world [2].

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affiliated to Dr. Babasaheb Ambedkar Technological University (DBATU), Lonere, During 26-27 June,2021

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Road Extraction Techniques from Remote Sensing Images: A Review

Dhanashri Patil and Sangeeta Jadhav

Abstract Road detection from remotely sensed images is a fundamental task in the geographic information system. On account of applications like urban management, traffic control, and map updating, road extraction from remote sensing images has significant research importance in recent times. Road extraction from satellite images is a crucial task as these images are noisy and contain lots of information. So it becomes difficult to process large amount of data. The important parameters for road detection are road features and its corresponding classification methods. These parameters decide the performance accuracy of the road extraction system. The systematic analysis of existing road detection techniques is elaborated in three important sections: different features of road, supervised, and unsupervised classification techniques. The main objective of this comprehensive survey is to render the analysis of different classification methods like mathematical morphology, SVM, CNN, etc. By using multiple features of the road, the system performance can be improved.

Keywords Remotely sensed images · Mathematical morphology · SVM · CNN

1 Introduction

The first earth observation satellite was launched by America in 1978; this revolution further led the research in different remote sensing applications like weather forecasting, consistent global measurement of the earth including sea measurement, oceanic plant life, and ozone layer [1]. Remote sensing is defined as measuring physical parameters of objects at distance through emitted or reflected energy. In this field, information is collected by employing acoustic waves or electromagnetic

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Implementation of OFDM System and Analysis of BER using Lab-View

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Abstract— Wireless technology is one of the most interesting domains in the communication domain. We can send information from one place to another using air as medium. It is extremely fast technique. However, in wireless technology reliability of transmission is always a worrying factor because of various objects interfering with signal thus causing fading. Thus, it becomes important to study techniques which improve the reliability and reduce interference. One of the techniques used is OFDM (Orthogonal Frequency Division Multiplexing) which aims at preventing frequency selective fading thus improving the reliability of the system. It allows transferring of data in parallel by dividing carrier signals into multiple subcarriers thus reducing bandwidth for each subcarrier and increasing the total Bandwidth to increase the data rate. The IFFT and FFT techniques used ensures overlapping of data thus keeping information in various subcarriers orthogonal and preventing the information from interference. OFDM is a key wireless Broadband Technology i.e., supports long Bandwidth. Earlier the GSM systems supported Bandwidth of 200 kHz. However, OFDM supports Bandwidth of 20 MHz implies data rate becomes fast with OFDM in 3G and 4G systems.Not only cellular standards, if we look at WIFI or WLAN networks e.g.: 802.11 a/g/n/ac, they all enable high data rate because are based on OFDM.Implementing OFDM with actual hardware will require more investment of money, time, and effort.The performance of system is released if different realistic environment and parameters change to study the change in performance parameters of the systems.

Keywords- Orthogonal Frequency Division Multiplexing (OFDM), Laboratory Virtual Instruments Engineering Workbench (LabVIEW), Fast Fourier Transform (FFT), Inverse Fast Fourier Transform (IFFT), Inter Symbol Interference(ISI), Inter Block Interference(IBI), Bit Error Rate (BER).

I. INTRODUCTION

Communication system is a system in which there exists information exchange between two or more points. Process of transmission and reception of information is called communication. Communication system involves transmitter, channel, and receptor [1]. Depending upon signal specification communication system can be classified as analogue or digital communication system. Depending upon communication channel communication system can be classified as wired or wireless channel. Electromagnetic transmission and reception of information between two or more points that are not connected by an electric conductor is called wireless communication. Most used technology in wireless communication is radio waves [2].

For any SDR system, all the processes which happen in a given wireless communication system are defined by software, like the process of modulation, demodulation and then all other signal processing. While in the hardware realm many specific hardware components are being used for all the above-mentioned processes here the software does it all, which will help in reducing the time and components required in the developmental stage. It also provides greater flexibility to researchers and developers for the implementation of new protocols, methods, or techniques. SDR technology is open source which means everyone can build, develop, and modify their systems.

In this project, we will be implementing orthogonal frequency division multiplexing (OFDM) using

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Wi-FI Cloud server based User Operated Billing System in Mall

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Abstract— In today's world due to the increasing population, the shopping malls are fully crowded and billing is a time-consuming process. The time spend for every customer for billing, because of existing billing technology at the billing counters is more. Human resource required for billing and re-checking work is more. To reduce the time in queue for customer and mall management costs, the idea called "User Operated Billing System in Mall" is originated. The proposed system consists of application software connected with the supermarket web online cloud server. The barcode on every product helps in retrieval of information associated with a particular product by scanning and displaying the same on the smartphone screen. Facility to calculate the total bill amount is done by the server. Customers are provided with the option to pay the bill at the billing counter by cash or directly pay using online payment methods. RFID tagging with each product is providing security. When the customer makes the payment for a particular product, the RFID tag of that product is disabled. But if a customer is checking out without paying for the product, then that product is detected by the RFID reader at the exit.

Keywords— Barcode, Barcode Reader, Cloud Server, Wi-Fi

I. PROBLEM STATEMENT

IoT based embedded system design prototype optimized to reduce billing time and facility of displaying intermittent total amount using Raspberry Pi 3 Model B controller and smartphone with barcode scanner.

II. INTRODUCTION

As the name "User Operated Billing System in a mall", indicates to create an automatic system for billing process in malls. This system will restrict overcrowding at the billing counters which helps in maintaining social distancing and eliminating billing time. Barcode Reader is used to scanning the Barcode which is present on every product available in the shopping mall. The customer's smartphone plays a vital role to accomplish this task. It is used to scan every product before putting it into the basket. The installed web mobile app will make the total count of products and the total amount which will be displayed on the phone's screen and then for making payment via different online payment gateways. Local servers will be used to provide a web app to our customers for maintenance and carrying out CRUD (create, read, update, and delete) operations in the Database [2]. The security system is designed by using RFID tags and Readers to prevent shoplifting in the stores [3], [4]. This system will help to avoid long waiting time in queues and it will enhance the shopping experience of our customers [5], [6].

III. METHOD

The cloud-based Internet of Things is employed to send cart data to the cloud and that data used by our hardware [7]. For using our system each customer needs to have a smartphone that will read the barcode associated with each product. Our application uses the user's smartphone camera so customers have to allow the application to access their smartphone camera as a barcode scanner [8]. When the customer starts shopping in a mall then they have to log in to our mobile application. The system provides information about offers and discounts available on the products bought by a particular customer by their previous shopping history using Data Analytics and displays on the customer's mobile phone dashboard as recommendations [9]. Shown in figure 1below;

Fig.1 Server Database (cloud)

Deep Learning Watershed Algorithm to Calculate Cardiac Stroke Volume of the Left Ventricle for the Analysis to Detect Person Suffering from Cardiac Vascular Diseases Using Cardiac MRI Data

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The broadly used approach for cardiac image segmentation is deep learning. In deep learning, the watershed algorithm is a conventional procedure used for segmentation that is for segregating different regions in an image. This paper calculated the cardiac stroke volume of the left ventricle per heartbeat of a healthy person and patients having Cardio Vascular Diseases (CVD) using a magnetic resonance image (MRI) data set. This paper plots the graph of the cardiac stroke volume of the left ventricle of healthy people and CVD patients. The graph is a plot by taking the mean of 15 healthy persons and 15 CVD patients' cardiac stroke volume of the left ventricle. Finally, by using the watershed algorithm, the analysis can detect whether the person is suffering from CVD.

Keywords: *Cardio Vascular Diseases (CVD), magnetic resonance image (MRI), watershed algorithm.*

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Mechanisms for Improving the Productivity of the Existing Photovoltaic Panels: A Review

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Abstract— Increasing the productivity of the photovoltaic panels is a major problem in recent developments. An existing operative solar panel is far from being optimized, because of the critical problems like weather changes, dust deposition and stains deposited over it. Weather changes are due to temperature, humidity, and cloudy atmosphere, dust deposition due to plants, traffic, air pollution and stains due to birds shit. Brief overview of different existing methods to boost the capacity of these panels is given in this paper. These available existing methods are: tracking system with panel, anti-reflecting coating for solar panels, dust cleaning by various methods and cooling of the panel.

Keywords— Solar Panels, Efficiency, Solar Tracker, Anti-reflecting coating, Dust cleaning, Phase Change Materials

I. INTRODUCTION

In physics, energy has been defined as the property that must be transferred to an object to do work and primarily exists in the forms of a) mechanical b) heat c) electrical d) chemical and e) nuclear energy [1]. Energy sources and its various forms have become an integral part of our daily life and vital for the sustainability of our current world order [2].

The energy sources in nature range from solar, wind, tidal, and thermal, to name a few and based on their renewability they are classified into two categories;

i) Non-conventional energy resources: Solar, Wind and Tidal.
ii) Conventional energy resources: Coal, Petroleum, Nuclear and Fossil fuels etc.

Generating power from renewable sources like sunlight (using solar panels) is a promising, inexhaustible, and non-polluting method [1][2].

Even though the solar energy is unlimited, the PV panels absorb only the ultraviolet and visible light to convert it into electricity. Thus, reaping this energy is a challenge, as the efficiency of the solar panel ranges from 12% to 20%, which is very low [3].

Further even though sunlight is a combination of ultraviolet light, visible light, and infrared light. Only high frequency radiations due to ultraviolet and visible light are converted into electricity, whereas infrared whose emission is less, is converted into thermal radiation [4]. The photovoltaic panels receive maximum solar radiations when kept perpendicular to the sun rays. In this context of solar panel, efficiency is an important parameter which compares the incoming radiations to the converted electrical output.

Thus in this review, different ways for increasing the efficiency of the panels are discussed.

The paper is classified into four sections; first section discusses tracking systems. In the second section, different anti-reflecting coatings are mentioned which reduces reflection of light as well as avoids dust accumulation over the panel.

Third section consists of methods used to make the panels dust free either manually or automatically using a robot , further improving the output. Rise in temperature reduces the panel output, thus in the fourth section, methods to keep the panel cool are discussed to maintain the temperature constant.

Among these mechanisms, the efficient method is using anti-reflecting, anti-dust coating over the panel which has greater potential to be adopted in solar energy industry.

II. SOLAR TRACKING SYSTEMS

A) DAI Qinghui, et al. [5] represented an automatic sun tracking arrangement for the solar PV panels. The system included sensors and actuators. As the sun changes its direction, the sensors become imbalance changing the position of the panel, further deflecting the system output. Then the actuators correct the angle of tilt of the solar panel, making it perpendicular to the sun rays. Thus, continuous tracking of sun is done automatically using a closed loop feedback system. This experiment achieved 44.2% increase in electrical output even in low light conditions.

B) Md. Rashed, et al. [6] implemented four algorithms in Matlab/ Simulink to follow the peak point, which measures the highest power. The system included a dc-dc converter, board with solar cells mounted in the array fashion and a load to track this power point. The converter was connected in the middle of the solar panel and load. The algorithms were

- Perturb and Observe
- Incremental conductance
- Fractional Open Circuit Voltage
- Artificial Intelligence based Fuzzy Logic algorithm

Percentage wise efficiency of the photovoltaic panel system with and without algorithms is shown in Fig. 1.

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This is to certify that Dr./Prof./Mr./Ms. _Snehal Marathe_ Affiliation _Army Institute of Technology_ has presented _Performance of Solar Panel in Presence and absence of Dust_ in 2021 International Conference on Intelligent Technologies (CONIT) during 25th to 27th June 2021.

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Performance of Solar Panel in Presence and Absence of Dust

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Abstract— Over the years, solar photovoltaic panels have become the important source for utilizing the solar power, due to their characteristics of being renewable, safe and pollution free. Producing electricity using these photo voltaic panels is comparatively a profitable method. But the aggregation of dust over the panels reduces the output power of the solar cells further lowering the efficiency of the solar panels specifically in the regions having high rate of dust, low frequency and high rain. This blocks the sunrays from reaching the panels, decreasing its performance. In this paper, an experimental setup, built to measure the output power of the solar panels is explained. Experimental setup for testing the solar panels in different parameters is prepared. Testing is done with and without dust on the solar panels at different intensities. The experimental results indicate a comparable study of how the output of a dusty panel is reduced in comparison with a clean panel. Also increase in temperature of the panels reduces the output of the photo voltaic cells is projected through the results.

Keywords: Solar Photovoltaic Panels, Efficiency, Dust, Temperature

I. INTRODUCTION

As the pressure on energy resources is increasing, the energy cost will rise continuously for the next decennium. Along with this as the ignition of fossil fuels is leading to drastic change in atmosphere, destroying the environment, researchers are focusing on some other sources for producing secure and efficient energy.[1] One alternative source is using the renewable energy source i.e., the solar energy and increasing its efficiency.[2]

Irrespective of the size, in open circuit conditions and under no load, the solar cell produces 0.5-to-0.6-volt DC.[3] These solar cells are mounted in an array serially and parallelly forming solar panels, to produce the electrical energy from the sunlight received by it [6]. But the efficiency of the solar cell is affected due to many factors like rise in temperature, humidity and dust [4]. The efficiency of solar cell is affected by the rise of the cell temperature, especially in hot climates. The rise in the temperature of the solar cells causes the reduction in their electrical efficiency. But the performance of these solar panels degrades in cloudy weather or during sand or snow storms. Thus, it is always required to check the solar panels regularly so as to maintain the electrical output.[5]

The experiment performed below shows the impact of dust on the solar panel, which results in reduced power output further decreasing the efficiency of solar cells and the production of electrical energy.

II. EXPERIMENTAL SETUP

Experimental setup is made as shown below in Fig.1. Two Halogen lamp and a five-socket bulb fitting arrangement is made. Halogen lamp is having the rating of 230V, 5A and 500W. Two such halogens lamps are connected as an artificial light source replacing the sunlight. The light obtained from these lamps is converted into electric wattage. As the heat generated from halogen lamps is very high, a fan is connected on the top to cool the solar panel. Arrangement to connect different solar panels is made in the setup.

Fig. 1. Entire Experimental Setup

A. Light Intensity Control Using Arduino

The setup is built using ATMEGA 328 P-PU microcontroller and 4N25 opto-isolator with a diode rectifier to detect the zero-crossing level. Using 3021 optocoupler and TRIACBT136 the AC voltage is chopped at the primary side of the step-down transformer. The function of 3021 IC and detection of the zero-crossing level are controlled by the microcontroller. The micro controller programming is done using Arduino.

B. Circuit connections

The circuit is built around ATMEGA 328 P-PU microcontroller. The following circuit sections are assembled together -

2. Mechanical Engineering A.Y. 2020-21

Dynamic Behaviour of Laminated Composite Beam Undergoing Moving Loads

Lalit Babu Saxena, Appaso M. Gadade, and Sanjiv M. Sansgiri

Abstract This study is about dynamic response of laminated composite beam undergoing moving loads. Rotary inertia and shear deformation effects are considered by using Timoshenko Beam Theory (TBT). Finite Element Method (FEM) is applied to discretize the structural element into space and for time discretization Classical Midpoint Rule with Midpoint Acceleration (MPR-MPA) is employed which is a part of Generalized Single Step Single Solve (GSSSS) family of algorithms. A MATLAB code is developed to obtain dynamic responses such as dynamic magnification factor and maximum dynamic deflection at the mid-span of simply supported isotropic and laminated composite Timoshenko beam. Numerical results are obtained and validated with the literature available and it shows good agreement.

Keywords Timoshenko beam theory · Midpoint rule with midpoint acceleration · Moving loads · Laminated composite beam · Dynamic magnification factor · Finite element method

1 Introduction

Moving load problems is of great interest to engineers. Dynamic deflection, vibrations and stresses effects vary greatly in structures as compared to effects due to static deflection, vibration and stresses. Bridges subjected to moving vehicle loads, railway tracks subjected to moving train loads, landing aircraft on carrier are some of the common moving load cases. In 1905, Krylov [1] examined the simply supported

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Response of a Layered Composite Beam Subjected to Static Loading Using Point Interpolation Meshless Technique

Kunal S. Shah, Appaso M. Gadade, and Sanjiv M. Sansgiri

Abstract The present work proposes a meshless model to analyze the response of laminated composite beam under different types of static loading. The point interpolation method based on polynomial basis function is used for solving 1D higher-order beam theory equations. The distribution of transverse shear strain and stresses along thickness are obtained using Reddy's shape function. A displacement response of a laminated beam is obtained for several lamination schemes, aspect ratio, and boundary conditions. The authenticity of the present algorithm is confirmed by comparing results with different cases from literature.

Keywords Laminated composite beam · Higher-order beam theory · Meshless method · Point interpolation method

1 Introduction

The requirement of composite materials is growing continuously in most of the industries. Composite materials can be formulated mathematically using different types of shear deformation theories. Computer-based analysis for solving problems in solid mechanics, fluid dynamics or thermodynamics, etc. has increased due to ease, accuracy, and time efficiency. In the last two decades, many authors have shown keen interest in the numerical approach based on the meshless method, which differs from finite element methods on the basis of approximate techniques. The domain representation in the finite element method depends on the mesh of elements. The

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Securing Trustworthy Evidences for Robust Forensic Cloud in Spite of Multi-stakeholder Collusion Problem

International Conference on Hybrid Intelligent Systems

HIS 2019: Hybrid Intelligent Systems pp 376-386 | Cite as

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Conference paper
First Online: 13 August 2020

Abstract

Many organizations are widely using cloud for their day to day business activities. But several attackers and malicious users are targeting cloud for their personal benefits. It is very important to collect and preserve admissible evidences of various activities happened in cloud securely in spite of multi-stakeholder collusion problem. Logs are one of the utmost vital elements to trace the malicious activities happened in cloud computing environment. Thus, forensic investigations involving logs face a grave challenge of making sure that the logs being investigated are consistent and not tampered with. A lot of research has been performed in this field; however with the advent of blockchain and Interplanetary File System (IPFS) new innovative approaches can be applied to secure trustworthy evidences in cloud. In this paper, we used blockchain and IPFS to build a system which stores the logs of cloud users' activities and assurances the trustworthiness and recovery of such logs to aid in forensic investigation. The integrity of the trustworthy log evidences is assured with the help of blockchain. Using versioning nature of IPFS our system can track the modification of log files. In earlier work, the systems could assure whether a log has been altered with or not, but none provided a mechanism to recover metadata of tampered logs to their original state. With the help of IPFS our proposed technique extend the existing work by providing the original logs for interfered logs.

Keywords

Cloud forensics Forensic investigation Cloud security Blockchain
Interplanetary File System (IPFS)

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References

Effective use of Big Data in Precision Agriculture

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*Abstract —***Precision Agriculture is the key terminology in agriculture Engineering. Precision agriculture can make the use of legacy data of agriculture to make the farming better in terms of quantity and quality. To enhance the production of the agriculture, technologies such as big data analytics along with data mining tool can use the legacy agricultural data to make the future prediction. This prediction can help to enhance the Agro-Economy.**

Index Terms – Big Data Analytics, data analysis, Seasons, Agriculture crops data, Linear Regression, Multiple Linear Regression.

INTRODUCTION

Agriculture plays a pre-eminent part in Indian economy. Over 58% of the rural economy depend on agriculture as their principal means of income. Agriculture, along with fisheries and forestry, is one of the largest suppliers to the Gross Domestic Product. The stake of agriculture in the GDP in 2012 was 18% and in employment 50% [1]. Indian farmers are not getting estimated yield of crops due to various factors like changes in temperature, rainfall, soil condition, pest and diseases etc. There is strong need in India to predict the crop production against the ecological and soli factors. In recent years several efforts had made to developed simulation or predictive models using the data for atmospheric parameters and crop performance.

A. Agriculture in India

Agriculture is the primary source of Indian economy. It servers the 75% employment to the population such as food and clothe. It also generates the employment to all those who supplies the necessities for the farming, it includes employments, equipments, pesticides, transportation. It helps for economic growth. In the early periods of green revolution helps to increase in crop yield production. But due to the lack of technical knowledge it can't be increased beyond certain level [2].

The increasing use of technology in the domain of agriculture helps to expand the production, quality of the crops.

Indian economy mainly based on agriculture, it offers direct employment to 2/3rd of our population and it is a provider of food, clothing and other basic provisions of life for the entire population. The agriculture sector is important for food security, employment generation and economic growth.

There is a constant degradation in agricultural growth, which is the worried factor. There is enhancement growth in food grain production in the early years of green revolution. But due to the lack of knowledge of science and digital information, the growth of food grain production cannot be increased beyond certain level [2]. Technology is growing faster and faster day by day. It has been penetrated vastly from urban to rural region. Government and farmer go hand in hand for the betterment of the crop production and its supporting small scale businesses based on the farming. Government has taken many initiatives by providing the agriculture apps to help the farmer. Mobile messaging services helps the farmer to get the information about their queries related to agricultural. It will provide the agro-vendor's information to farmers. It also provides the weather information, soil contents information, market near to them to supply the crop items [20].

B. Issues in Agriculture

Eventually, there is ecological impact on the production practices used by farmers. Some of the negative environmental impact includes: [3]

Weather: Uncertainty and non-uniformity in Indian weather affects badly on crop yield production. Prediction on weather certainly helps farmer to save their crops in terms of money and efforts. Weather prediction can be done on historical data. Crop selection based on the weather forecasting information [14].

Soil: Degradation of soil parameters due to excess use of pesticides like urea, endosulfan etc. If the soil parameters are known prior of sowing, this will help the farmer to take the decision about the crop selection [15].

Crop cutting: With the help of image sensing data, farmers can take the decision when the crop cutting needs to be done. Prior information helps to saves the cost of machinery or labor required for crop cutting [15].

Pests Management: Prior weather information and soil analysis data helps the farmer to use fewer amounts of pesticides. Lesser the amount of pesticide leads to more organic crop. It gives good profits to farmer [16].

Intercropping: Experts can suggest the farmer to use intercrops based on long term and short term crop production. It gives profit to farmers. This can be done by analyzing the pattern of crops based on legacy data for varying the crop [16].

C. Problem statement

Early research has done on few crops ,few regions ,few season , some of the parameters such as temperature, soil contents, weather conditions ,raining situation etc. This may help to the respective regions. If the study has been enhance further for many regions, maximum seasons, crops which may affect directly to the farmers economy, number of crops, more parameter, this in term benefits more number of people. This may help to reduce food grain problem. [19]. If the span of the

Optical Charater Recognition using Tesseract and Classification

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Abstract— **Optical Character Recognition (OCR) is a process or technology in which text within a digital image is recognized. It is mainly used for converting the transcribed, handwritten or any printed text to the text data that can be edited and reused. With rapid pace of technology, people want quicker, handy and reliable tools, which can fulfil their daily needs. With this moto we had gone forward and analyzed the existing tools and made up this WebApp, which provides seamless experience (No ads and easy-to-use), and great accuracy. While OCR technology was originally developed for recognizing the printed text, it can be used to recognize and verify handwritten text as well. The objective of this project is to allow automatic extraction of the information that a user wants from the paper document and using it wherever it is needed. This leads to reduction or sometimes eliminating the work of costly data entry. We also aimed to enable a way in which processing of the documents will lead to eliminate the human touches and therefore dramatically reducing the process time and the cost.**

Keywords— **Optical Character Recognition, Tesseract, Handwritten Text Recognition, Image to Text**

I. INTRODUCTION

Optical Character Recognition is the technology used for converting the transcribed, handwritten or any printed text documents such as scanned pages, images taken by any camera or phone into the text data that can be edited and reused. [1]. In other words, OCR takes a look on the photo of the text document (therefore it is called as "optical" process) and then recognizes the different alphabets, numbers or any other characters. This sub process is called as character recognition, which is used to fetch the characters from the image, and then these characters will be converted to text sentences for further use. This mainly aims to reduce the human workload, and it achieves the same as it is handy and it also saves the time as it provides all the text that the user was supposed to be retyping [2]. Our OCR WebApp is capable of giving out the output text quickly, but the handwritten text recognition takes little longer as it uses CUDA cores the operations. Generally the process of OCR has three stages, that are: Access (Scan) the image document, Recognize the text data and then save it into any convenient format or display it directly to the user for further use. [3]. With this in our context, the paper presents the design and procedure of the OCR WebApp, which consists of three sections that are: Image-to-Text, Real-time OCR (using webcam), and Handwritten Text Recognition. In this project, OCR uses Tesseract as an engine to display the text to the user and HTR uses a Deep learning model to classify the letters and display them to the user.

Following is the Figure 1, which shows the classic workflow model of OCR system that follows nine steps (excluding first and the last step) to extract the text from the document. These steps can be classified to main five steps that are, preprocessing, segmentation, feature extraction, classification and recognition.
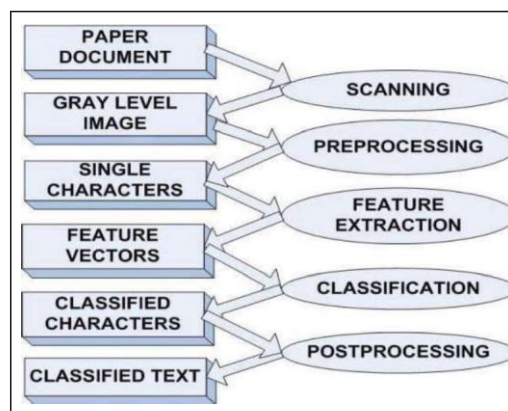
Fig. 1. Classic OCR procedure model

II. OBJECTIVES

Our project was made-up having following objectives in mind. It mainly aims to:

- To allow automatic extraction of the information that a user wants from the paper document and using it wherever it is needed. This leads to reduction or sometimes eliminating the work of costly data entry.

- To enable a way in which processing of the documents will lead to eliminate the human touches and therefore dramatically reducing the process time and the cost.

- To take an image as input and give the editable text to the user which is recognized from the image document.

- Provide the text with more than 95% accuracy for any document with standard quality.

III. ADVANTAGES

Following are some of the advantages of Optical Character Recognition:

Video Compression Engine using Auto Encoders

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Abstract— **Content consumption in the form of video has held more than 80% share of the internet traffic. Every minute approximately 500 hours of videos are been uploaded on YouTube. With increase of video consumption, video storing and delivery has become an overhead. Conventional video and image compression have codec type architecture but with changing volume and format of data they prove to be less efficient and are less adaptable. But with the advancement of DNN techniques, all the above problems can be overcome.**

In this paper deep neural network-based compression technique is proposed which will hopefully surpass the standard compression algorithm as calculated with Multi-Scale Structural Similarity Index (MS-SSIM).

This proposed Neural Net Model comprises of Encoder and Decoder modules. We will be training both Encoder and Decoder together using UVG Dataset. We will use Autoencoder neural network to compress the motion vector and residual loss.

Index Terms— *Video Compression, Auto Encoders, Neural Network, Video Compression Engine, Encoder, Decoder*

I. INTRODUCTION

Currently, video controls the large percentage of traffic on internet [1]. We can precisely say, its more than 80% and will rise even more. Therefore, designing an effective video compression model while preserving sufficient video quality is crucial. Furthermore, most computer vision (CV) tasks that deals with video processing, like object detection, face recognition or object tracking, and many more are susceptible to the quality of compressed images (or frame). Thus, Effective video compression can prove to be advantageous for them and as well as for other CV tasks.

In recent years, however, video compression algorithms [8,9] have focused on conventional methods to mitigate the loss of video sequences. For Example, Discrete Cosine Transform. The compression framework, using these algorithms, as a whole is not designed end-to-end although each module is well constructed so it is beneficial to further enhance the efficiency of video compression by mutually improving the entire compression method. DNN based autoencoder for image compression [3, 6, 4, 16, 17, 2, 18, 19] has showed better efficiency and performance than any other conventional or standard image codecs like JPEG [21]. And the reason behind DNN achieving better efficiency and

performance is because DNN based models go through costly training over massive amounts of training data.

However, applying these techniques to the development of full-fledged video compression is not an easy task. There are few challenges to making that work: like, learning the method of creating and compressing motion data customised to video compression. There is a lot of temporal redundancy in any video sequence. One quick solution is by using optical flow for estimation of motion in video. Furthermore, the amount of data of the optical flow grows considerably in contrast to the motion estimation in conventional compression systems, and when the current compression methods are applied directly to the compression optical flow values, the amount of bits required for the storage of the motion information will increase significantly.

In this paper, we came up with video compression using deep leaning approach. We've been exploring a DNN architecture for video compression. The encoders produce a stream of bit based on input frame and the role of decoder is to reconstruct the frames based on streams received.

Autoencoders are a sort of neural network that endeavours to imitate the given information as closely as conceivable to its output. The goal to take the given data and convert it to lower dimensional code and this code can be used to regenerate the output (in this case original input). One thing to keep in mind when designing a autoencoder that we don't want our autoencoder to remember all of its data but it can recognize and prioritize the data and know what to keep and what to eliminate.

We use MS-SSIM [14] for assessment purposes. This measuring system is used to identify the degree of resemblance between the images. In this context, the uncompressed video frames and its counterparts which is generated after the compression at the decoder end. So, the general MS-SSIM is calculated by integrating the SSIM index of many versions of the image in different scales.

II. RELATIVE WORK

A. Conventional Approach

Here we discuss briefly about the conventional video compression approach using encoder and decoders. Here Encoders produce a stream of bit based on frame input.

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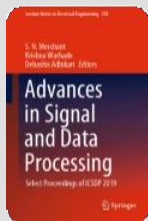
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Smita S. Kulkarni ✉ & Sangeeta Jadhav

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Abstract

Group activity recognition is becoming more important day by day for video surveillance, sports analytics, etc. Monitoring various cameras manually through human resources is a

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A Comprehensive Survey of Different Phases for Involuntary System for Face Emotion Recognition

Dipti Pandit ✉ & Sangeeta Jadhav

Conference paper │ First Online: 26 February 2021

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Abstract

Involuntary recognition of basic and non-basic emotions has started great curiosity in research area. Developing a fully automated computational model for face emotion analysis is quite difficult a human face is complex, multidimensional and has different meaningful visual messages to pass. A big

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A Discriminative Model for Multiple People Detection

Authors: Smita S. Kulkarni, Sangeeta Jadhav

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Abstract

Group activity recognition is becoming more important day by day for video surveillance, sports analytics, etc. Monitoring various cameras manually through human resources is a complex job; due to this, computer vision algorithms are being developed to perform lower and higher level tasks. This paper presents multiple people detection using the histograms of oriented gradients (HOG) feature descriptor algorithm through a support vector machine (SVM) based on the different group action class of persons. Multiple people detection for group action identification is a complex problem as accurate detection of individual persons requires extensive computation. To achieve multiple people detection for group activity, HOG feature extraction is proposed. HOG is precise and accurate person detection algorithm in the recent computer vision application. In addition, thresholding algorithm is implemented to collect the HOG feature vectors of definitely detected windows and firms the pathway followed by a person in the video frames. The proposed algorithm is evaluated through different aspects like group action categories and existence of occlusion over Haar and HOG features.

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Research Article

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

Seema Mathew · , Parashuram Balwant Karandikar, Neelima Ravindra Kulkarni

Abstract

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.

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Diabetic Retinopathy is a treatable disease throughout the disease progression, if diagnosed in time, to avoid the final vision loss. The relevance of microaneurysms counts in diabetic retinopathy and their close correspondence to the severity of the disease is well documented. As a result, the detection of Microaneurysms is vital to avoid further complications. Non- invasive way to analyze the retinal illness is fundus photographs. The factors like low contrast images, variable sizes of MA's and similarity to blood vessels awakes the need for reliable MA detection system. A novel method for the detection of MA's is proposed using a powerful combination of High Boost Filtering, Line detectors, and Single Class- SVM. Input Retinal image is pre-processed in terms of illumination Equalization, noise and object enhancement using unsharp masking, MA with Blood vessels are further enhanced by modified high boost filtering, to an extent such that single optimal threshold is sufficient to extract them all from image, further effective removal of major blood vessels has significantly reduced FPR. The geometric, intensity and region descriptors fed to OC-SVM for classification of objects as MA or outlier. The proposed approach is evaluated on the DiaretDB1 database and achieved a sensitivity of 72%. Results at MA enhancement and segmentation are better than methods in the literature.

Published in: 2020 International Conference on Industry 4.0 Technology (I4Tech)

Date of Conference: 13-15 February 2020　　　**DOI:** 10.1109/I4Tech48345.2020.9102677

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Abstract:
Super-capacitor is an emerging energy storage device and it has high potential to meet energy storage requirements for many applications in combination with batteries. Super-capacitors can be charged at faster rate than batteries and its output current delivering capacity is much greater than other energy storage devices. The storage in super-capacitor is much higher in terms of capacitance in comparison to traditional capacitor. But, the efficiency of current super-capacitor is less so there has to be high level of research in this field. In presented paper, electrode materials like Norit, Vulcan, PICA and YP50F and electrolyte materials like Potassium Sulphate, sodium sulphate, hydrochloric acid and lithium sulphate has been tested. The combinations of the above super-capacitors have been taken to make super-capacitor and then the supercapacitor giving the optimum result has been tested.

Published in: 2019 International Conference on Power Electronics Applications and Technology in Present Energy Scenario (PETPES)

Date of Conference: 29-31 August 2019
Date Added to IEEE *Xplore*: 20 February 2020

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Abstract:

With increase in demands of electronic devices there is a spike in the field of power management and effi ciency. For this development of low power consuming devices with maximum efficiency is necessary. One of the major components of major electronic devices is capacitor. To enhance the charge storing capabilities we use super-capacitors instead. Though this holds a major drawback of high resistance. Researches are being carried out to increase the efficiency of super-capacitors. This paper presents the effect of various binders on the working of super-capacitors. Binders play roles of binding active material and conductive agent together and also cohering with electrode. The role of the binder should provide enough strengthen during the electrode formation and appropriate pore sizes. Hence effects of various percentages of binders on capacitance and equivalent series resistance values is studied in this paper.

2. Mechanical Engineering A.Y. 2019-20

Tribological behaviour of Fluorocarbon Coating under Dry and Lubricated Sliding Conditions

A. J.Bodhale, R. B. Patil

(Mechanical Engineering Department, Army Institute of Technology Pune, India)

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 Tribologicalbehaviour of fluorocarbon coated and fluorocarbon uncoated components in aggressive conditions. In this work, fluorocarbon coated on HSS M2 and fluorocarbon uncoated components were tribologically evaluated using Ducom friction and wear machine under specific conditions, which included rotating sliding conditions. The coatings showed good to excellent tribological performance, and in general fluorocarbon coating exhibited better friction and wear behaviour than uncoated specimen. The Fluorocarbon coating has ability to reduce the 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 $1.0610 \times 10^{-5} mm^3/Nm$.

Keywords: Fluorocarbon coating, Friction, Wear, Wear rate, Coefficient of friction, Regression equation.

I. 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 excessiveCO_2emission specifically in case of vehicles. It is a huge problem and it is also necessary to overcome the friction and limit the $CO_2$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 have been developed successfully to reduce the damage of machine from friction and wear. Now a days 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 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 far away from actual scenario where the friction coefficient as well as rate of wear can be precisely calculated for specific an experimental, working condition which is totally based on theoretical evaluation and studies of calculation. Practically a harder component coated by soft thin coating shows the probability of decrease in sliding friction.But the main issue of soft thin coating is their wear out time and life span is critical and the coating on the substrate is not executed 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

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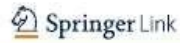
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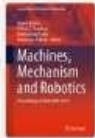
Machines, Mechanism and Robotics pp 1055–1065

Topology Structure Design of Fish-Based Propulsive Mechanisms

Gaikwad Pankaj Manik ✉ & Pankaj Dorlikar

Abstract

The research presented here has its centre point on imitation of fishes and the kinematics of propulsive mechanisms to be used in efficient and versatile autonomous underwater vehicles (AUVs). Today's AUVs

are based on submarine. The paper started with the analysis of topological structural attributes of 4–11 link mechanisms with 1–6 DOFs. Using Hong Sen Yan's creative design theory for mechanical devices, all the possible combinations of propulsive mechanism were synthesized to generate an atlas of 1149 new propulsive mechanisms subject to isomorphism, which will provide more inputs in the design and fabrication of the AUV models.

Keywords

Autonomous underwater vehicle   **Mechanisms**

Kinematic chains

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Experimental Study of Heat Transfer Enhancement in a Novel Padma Heat Sink Minichannel

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ABSTRACT

Experimental and numerical investigation was conducted for the fluid flow and heat transfer in minichannel with a novel Padma heat sink. The minichannel heat sink is consisting of a novel Padma design (Flower shape) engraved on a rectangular plate. The dimension of a rectangular plate is 30 x 30 x 6 mm and that of the Padma is a cylinder having 15 mm diameter with 5 mm depth of the channels. Padma heat sink made of aluminum is having 10 channels with fluid inlet at the center and radial outlet. Water is used as a working fluid with the Reynolds numbers ranging from 50 to 250. The experimental results consisting of the heat transfer enhancement and friction factor, for minichannels are compared with the parallel channels with the same surface area. It is observed that the Performance Enhancement Factor of Padma heat sink is in the range of 1.71 to 3.02. The flow behaviour is analyzed using numerical method. It is observed that the fluid mixing rate is enhanced in case of Padma heat sink due to secondary flow generation at divergent sections. The experimental and numerical results obtained are in reasonably agreement with the experimental data.

Keywords — Heat Transfer, mini/microchannel

NOMENCLATURE

A	Amplitude, m
a	Channel width, m
A_c	Cross-section area , m^2
b	Channel depth, m
C_p	Specific heat at constant pressure, J/kg K
D_h	Hydraulic diameter of 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
m	Mass flow rate of cooling water, kg/s
n	Number of parallel microchannels
Nu	Nusselt number
Pr	Prandtl number
Q	Heat rate, W
Qf	Volume flow rate, cm^3/s
$Qout$	Heat output, W
q	Heat flux, W/m^2
s	Fin thiness, m
Tm	Mean Fluid temperature, °C
Tw	Wall temperature, °C
Tin	Temperature at inlet, °C
$Tout$	Temperature at outlet, °C

Greek symbol

α	width of channel to wave length
ρ	Density of water, kg/m^3
μ	Dynamic viscosity, N s/m^2
v	Kinematic viscosity, m^2/s
Δp	Pressure drop across the mini channel, Pa

INTRODUCTION

The Fast development in information technology (IT) industry, the air cooling technology for heat flux in integrated circuits reached its limits of 100 W/cm2. More research was carried out in microchannel with liquid cooling due to available more surface area and heat transfer coefficient. But microchannels has a limitation in implementation because of higher pressure drop. This higher pressure drop needs to pump the coolant fluid through the microchannels. This motivate researcher to go for Minichannel which is used for higher heat flux and mild pressure drop as compared to microchannels. The minichannel heat sink with foot print size 20 mm x 20 mm was analysed numerically with water as working fluid. The constant heat flux was used as boundary condition. The channel dimensions like wall thickness,

Design of a Forensic Enabled Secure Cloud Logging

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ABSTRACT

Adoption of cloud computing services greatly reduce the cost of managing businesses and increase the productivity. But, due to complex network configurations of cloud, it is a vector for various malicious attacks. Logs are the most valuable element which can be helpful in revealing the insights of any activity happened in cloud. Experienced attackers and malicious users always targets to destroy logging service first, after their attacks to remain untraceable. The existing logging techniques, which consider logger as a trusted stakeholder cannot be applied in cloud as there is possibility of collusion in between logger of cloud i.e. cloud service provider and fraud cloud service consumer or cloud forensic investigators to falsify the logs.

CCS CONCEPTS

• **Security and privacy** → *Virtualization and security* ; • **Applied computing** → *Network forensics*; • **Computer systems organization** → *Cloud computing*.

KEYWORDS

Cloud Forensics, Forensic Investigation, Cloud Security, Blockchain, Interplanetary File System (IPFS)

1 PROBLEM STATEMENT

Design of a Forensic Enabled Secure Cloud Logging

2 PROPOSED SECURE CLOUD LOGGING

In our work, we analyse the threats on cloud logging service[1], looking attentively at cloud multi-stakeholder collusion problem [2]. On the basis of threat analysis, we propose forensic enabled secure cloud logging service, which preserves the integrity and confidentiality of cloud service consumer logs. We employed blockchain for building forensic enabled logging scheme, which provides proof of log manipulation to cloud forensic investigator. InterPlanetory File System(IPFS) was used to remove the storage overhead of logs on blockchain. Cloud service consumers CSC send an event E to request R with the help of request attributes RA to data file objects O in cloud to perform their day-to-day business activities which generates logs $L = \{l_1, l_2, l_3, \ldots l_n\}$. **Step 1:** Log File Creation: $E_i - L_i <$ time, First event in the cloud system will get recorded into log say L_1. Let's say $E_i \rightarrow L_i$ where i=1; for every first event of the day. $E_i \rightarrow L_{i+1}$ where i is an index of previous log. Each time CSP assigns an index i to each event E and appends it to the log file. **Step 2:** Partial Proof Generation: In this step we are creating proofs of ten events in one file. $LF.insert\{E_0, E_1, \ldots E_{10}\} \rightarrow PP_1$; where PP_1 is a Partial Proof of events E_1 to E_{10}. **Step 3:** Partial Proof Encryption: $Encrypt_{CSC}\{PP_i\} \rightarrow EP_i$ where EP(Encrypted Proof) bound to its version number i and signed. Thus, versions of partial proof will be consistent. **Step 4:** Add Encrypted Proofs on IPFS Network: Finally, versions of proofs $P_0 \ldots P_i, P_{i+1}, P_{i+2} \ldots$ which are mutually consistent and encrypted are added on IPFS network. After every day, hash of all proofs is stored on blockchain.

3 RESULTS

After any malicious incidence cloud forensic investigator can anytime verify the integrity and confidentiality of logs. Our results shows integrity verification of 10K logs in just 1660 seconds. Thus, our technique makes cloud more secure and transparent.

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Securing Trustworthy Evidences for Robust Forensic Cloud in Spite of Multi-stakeholder Collusion Problem

Sagar Rane ✉, Sanjeev Wagh ✉ & Arati Dixit ✉

Abstract

Many organizations are widely using cloud for their day to day business activities. But several attackers and malicious users are targeting cloud for their personal benefits. It is very important to collect and preserve admissible evidences of various activities happened in cloud securely in spite of multi-stakeholder collusion problem. Logs are one of the utmost vital elements to trace the malicious activities happened in cloud computing environment. Thus, forensic investigations involving logs face a grave challenge of making sure that the logs being investigated are consistent and not tampered with. A lot of research has been performed in this field; however with the advent of blockchain and Interplanetary File System (IPFS) new innovative approaches can be applied to secure trustworthy evidences in cloud. In this paper, we used blockchain and IPFS to build a system which stores the logs of cloud users' activities and assurances the trustworthiness and recovery of such logs to aid in forensic investigation. The integrity of the trustworthy log evidences is assured with the help of blockchain. Using versioning nature of IPFS our system can track

Decentralized Logging Service using IPFS for Cloud Infrastructure

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Abstract

In any shared space of resources it is very important to have a trustable way to record how and when the resources have been used and by whom. Similarly, in any cloud-based platform, collection of logs is an important activity required to have a trustable record of the activities performed by the users and pin point any malicious deeds performed. Forensic investigations however face a grave challenge of ensuring the integrity of the logs. The activity of collecting logs and ensuring their integrity becomes a necessity with regulations like SOX enforcing it on financial institutes. In this paper, IPFS has been employed to create a system which preserves all the meta- data of logs generated by the network activity of the virtual machine and guarantees the confidentiality, integrity and availability during any forensic investigation. The integrity of the logs is guaranteed by the IPFS system which creates a content-based hash for the logs and stores them securely. As files in IPFS are indexed by their hash, tampering with a log will result in creation of a new hash which won't exist in the index. Index will still point to the original hash, hence integrity is achieved. In previous research, the systems could guarantee whether a log has been tampered with or not, but none provided a mechanism to recover meta-data of tampered logs to their original state. Using IPFS, this paper aims to make the system more secure and takes it a step forward by providing the meta- data of the original logs for the tampered logs.

Keywords- IPFS, Cloud Forensics, Content-based hashing

1. Introduction

With the advent of cloud servers in the IT world, more and more companies are opting for cloud servers to launch their application into the real world. With cloud servers gaining more and more users, it has lead to a necessity to increase the security of one's account and usage in the clouds. With more users comes greater difficulty in managing those customers. To better manage their resources and ensure that they are not used for malicious activities, it is important that the CSPs keep a secure and trustable logging service to map the network activities performed by their customers using the VMs provided. Currently all the CSPs have their own database and a set of parameters that are stored. And whenever there is a case where the logs are needed the CSPs provide with the logs. In the current situation, during a forensic investigation, there are three involving parties: Cloud service provider (CSP), User, Cloud Forensic Investigator (CFI). During the investigation, while referring to a log, the investigator must blindly assume the credibility of the logs and

Smart KYC Using Blockchain and IPFS

Nikita Singhal, Mohit Kumar Sharma, Sandeep Singh Samant,
Prajwal Goswami and Yammanuru Abhilash Reddy

Abstract Know your customer, also known as know your client or simply KYC, is the process that businesses and financial institutes must employ to identify their clients and assessing any kind potential risk due to illegal intentions and foul play for the business relationship in compliance with a national regulating body. The term KYC is often used to refer the bank regulations and the anti-money laundering regulations which are in place to govern such activities. Also due to bribery and foul play, companies of all sizes are compelled to employ KYC for the purpose of ensuring their consultants, agents, or distributors follow rules set by anti-bribery compliant. With population of India around 1.3 billion, a secure and faster system for sharing sensitive information like KYC document which may contain personal document, capable of handling this vast amount of this data is of high demand. While the implementation of such a system isn't new, the present systems have drawbacks. The proposed system will replicate the functionality of the legacy KYC system. By using the immutable property of Distributed Ledger Technology (DLT) and Inter Planetary File System (IPFS), a tamper-proof system can be formed. This paper aims to address some of the shortcomings of the current system and propose implementation of innovative features to develop a more secure and comprehensive system. The proposed system will allow customer and business institute to verify and record the customer KYC document into the DLT. The proposed system will use IPFS which will greatly improve the storage efficiency of DLT.

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Cultivar Prediction of Target Consumer Class Using Feature Selection with Machine Learning Classification

Shyamala Devi Munisamy ✉, Suguna Ramadass, Aparna Shashikant Joshi & Mahesh B. Lonare

Abstract

Recently, Industries are focusing on cultivar prediction of customer classes for the promotion of their product for increasing the profit. The prediction of customer class is a time consuming process and may not be accurate while performing manually. By considering these aspects, this paper proposes the usage of machine learning algorithms for predicting the customer cultivar of Wine Access. This paper uses multivariate Wine data set extracted from UCI machine learning repository and is subjected to the feature selection methods like Random Forest, Forward feature selection and Backward elimination. The optimized dimensionality reduced dataset from each of the above methods are processed with various classifiers like Logistic Regressor, K- Nearest Neighbor (KNN), Random Forest, Support Vector Machine (SVM), Naive Bayes, Decision Tree and Kernel SVM. We have achieved the accurate cultivar prediction in two ways. Firstly, the dimensionality reduction is done using three feature selection methods which results in the existence of reasonable components to predict the dependent variable cultivar. Secondly, the prediction of customer class is done for various classifiers to compare the accuracy. The performance analysis is done by implementing python scripts in Anaconda Spyder Navigator. The better cultivar prediction is done by examining the metrics like Precision, Recall, FScore and Accuracy. Experimental Result shows that maximum accuracy of 97.2% is obtained for Random Projection with SVM, Decision Tree and Random Forest Classifier.

Optimization of Network Functions Using Static and Heuristic Approach in Software-Defined Network

Mahesh B. Lonare and M. Shyamala Devi

Abstract The software-defined network is nowadays playing important role in achieving dynamicity and flexibility in network resource optimization. The software-defined networking (SDN) using network function virtualization (NFV) and Open-Flow architecture is supporting this evolution. There by drastically user driven services to guarantee low latency and fast access of user applications on laid network on one hand, and the trend to support personalization of services on the other. The static linear and dynamic heuristic estimation of multimedia data services towards the edge nodes can be helpful in optimization of resources. The software-defined network optimization is useful in new policy decisions, to scale up the network media availability and help network administrator at local network. At present, these facilities are available with enterprise network administrator only.

1 Introduction

The limitations in accessing of network functions have led to resource optimization of wasted network resources. The network resources have been laid with state-of-the-art infrastructure in many organizations, which are being utilized by users, and on many instances, it is found underutilized. The better utilization and monitoring of these resources will help service providers/system admin to increase their efficient utilization without any kind of enhancement in network infrastructure. This paper presents a software-defined network approach on network resource optimization by

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Fast Converging Magnified Weighted Sum Backpropagation

Ashwini Sapkal and U. V. Kulkarni

Abstract In backpropagation (BP), Neuron's output drops either into weakly committed or strongly committed zone. Neuron's weighted sum, referred as a net, if close to zero, neuron is weakly committed, otherwise it is strongly committed. To push the weakly committed neurons in strongly committed zone, additional iterations are required, which causes the poor convergence rate. In this manuscript, the weighted sum entity of the backpropagation is magnified. This variant of the backpropagation is referred as a magnified weighted sum backpropagation (MNBP) algorithm. This net enlarging process of the MNBP makes sure that the neuron produces output in strongly committed space. As the net is magnified, it is gradient and is also magnified. It is noted here that MNBP needs lesser number of epochs for convergence unlike standard backpropagation. But, it may arise the flat spot issue. Hence, the flat spot problem is also studied and the appropriate majors are taken in the proposed algorithm to solve this problem. The implementations are carried out on parity (two bit, three bit and five bit) problem, encoder problem and standard benchmark problems. The outcomes are matched with the standard BP and its two variants named Fahlman approach and MGFPROP. Based on experimentation carried out here, it is concluded that the MNBP needs small amount of epochs for its convergence dissimilar to the standard BP and its two variants.

1 Introduction

The backpropagation [1] algorithm is used effectively in various fields like remote sensing, agriculture, mechanical, robotics, medical and many more. Inspite of the huge success of the BP, its convergence speed is very low. Tremendous efforts are

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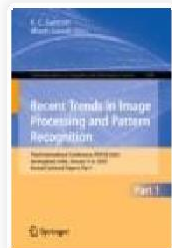e-mail: asapkal@aitpune.edu.in

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A Comprehensive Survey of Different Phases for Involuntary System for Face Emotion Recognition

Dipti Pandit ✉ & Sangeeta Jadhav

Abstract

Involuntary recognition of basic and non-basic emotions has started
great curiosity in research area. Developing a fully automated
computational model for face emotion analysis is quite difficult a

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A Discriminative Model for Multiple People Detection

Authors: Smita S. Kulkarni, Sangeeta Jadhav

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Abstract

Group activity recognition is becoming more important day by day for video surveillance, sports analytics, etc. Monitoring various cameras manually through human resources is a complex job; due to this, computer vision algorithms are being developed to perform lower and higher level tasks. This paper presents multiple people detection using the histograms of oriented gradients (HOG) feature descriptor algorithm through a support vector machine (SVM) based on the different group action class of persons. Multiple people detection for group action identification is a complex problem as accurate detection of individual persons requires extensive computation. To achieve multiple people detection for group activity, HOG feature extraction is proposed. HOG is precise and accurate person detection algorithm in the recent computer vision application. In addition, thresholding algorithm is implemented to collect the HOG feature vectors of definitely detected windows and firms the pathway followed by a person in the video frames. The proposed algorithm is evaluated through different aspects like group action categories and existence of occlusion over Haar and HOG features.

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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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A Reinforcement Learning Approach for Evaluation of Disaster Relief

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Abstract —**Ad hoc networks are considered more suitable for disaster scenarios due to infrastructure-less feature. Existing routing algorithms used on such mobile ad hoc networks are non-adaptive routing algorithms and based on shortest path algorithms. But shortest path may not give optimum path. If the network is heavy loaded with traffic, shortest path may not give better results. Various reinforcement algorithms are used to design such adaptive routing where the routing takes place based on the actual traffic present on a network. One of the reinforcement routing algorithms is Q routing and various variants of Q routing like CQ routing, CDRQ routing etc. In this paper, Q routing and CDRQ routing are implemented and compared using disaster area mobility model in disaster area scenario.**

Keywords — QR, CR, DRQ, CDRQ, MANET

I. INTRODUCTION

Rescue operations at real time are very important in case of natural disasters such as earthquake, typhoon and tsunami which will save numerous lives. Information need to be available quickly as soon as possible, between various resources involved in rescue operations. Ad hoc networks are much suitable for such disaster scenarios due to their infrastructure-less feature.

Movements of nodes inside ad hoc network are described by mobility models. Random Waypoint mobility model and Manhattan mobility model is widely used mobility model in ad hoc networks. In Reference Point Group Mobility Model, one Reference point is used where all nodes are randomly distributed [1, 2]. This model is used in military battlefield communications as well as in disaster relief where various rescue crews from different groups and work cooperatively [2, 3]. In disaster area model (DM), different action areas are classified for disaster scenarios [4] and every person belongs to any of the areas and represented by nodes. [5]. Thus the disaster scenario is divided into different areas like incident site, casualty's treatment area, transport zone, and hospital zone. Communication among different areas is represented by the movement of nodes and various data packets.
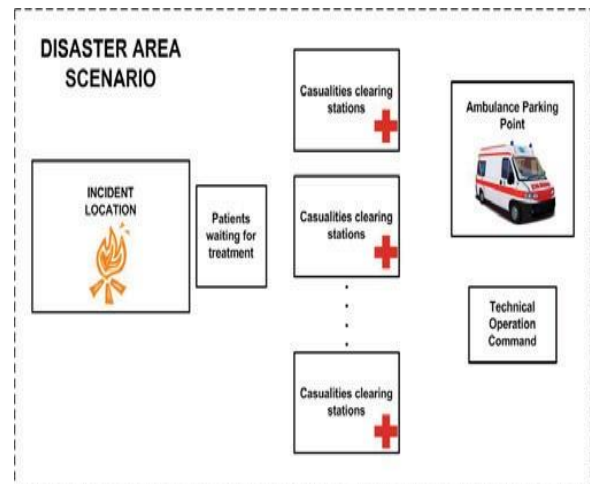

Fig. 1. Disaster Area Scenario

II. REINFORCEMENT ROUTING APPROACH

Shortest path used in existing routing algorithms may not be optimum path. If the network is heavy loaded with traffic, shortest path may not give better results. This is because all packets follow the shortest path and congestion occurs on shortest path. In such situation, some alternate path may be selected which delivers the packets in shortest amount of time thus alternate path becomes the optimum path [6, 7]. In reinforcement learning, the complete network is represented in terms of Q values which indirectly represent the estimated delivery time of the packets to reach to the destination [11]. Thus every node in a network contains Q table instead of routing table which contains Q matrix. These Q values are always updated based on the traffic present of the network thus represents real state of the network. Thus every time the packet receives Q estimate and using this estimate, it updates the corresponding Q value. In transmission, node thus checks its Q table and select the best route having minimum Q value, thus the packet reaches to the next node [8, 11]. Every node participating in the transmission of packets always consults Q table and shortest path is selected. Sample Q routing table at node 2 is shown in fig 2.

Different Approaches in Sarcasm Detection: A Survey

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Abstract. Sarcasm is an unwelcome impact or a linguistic circumstance to express histrionic and bitterly opinions. In sarcasm single word in a sentence can flip the polarity of positive or negative statement totally. Therefore sarcasm occurs when there is an imbalance between text and context. This paper surveys different approaches and datasets for sarcasm detection. Different approaches surveyed are statistical approach, rule based approach, classification approach and deep learning approach. It also gives insight to different methodologies used in past for sarcasm detection. After surveying we found deep learning is generating a good result as compare to other approaches.

Keywords: Sentiment analysis · Sarcasm detection · Machine learning · Deep learning

1 Introduction

Sentiment analysis is field of study to analyze and extract the sentiment or opinion of people toward product or topic mentioned in text, facial expression, speech or music. In natural language processing, big data mining and machine learning sentiment analysis is one of the research area. Researchers use opinion mining in place of sentiment analysis. Sentiment analysis (SA) identifies sentiments in text and analyzes its polarity as neutral, positive or negative. SA identifies a state of mind of a person from his emotions expressed in text [1]. This field focuses to obtain opinions, sentiments, emotions based on observations of one's actions that are involved in written text, music, speech, utterance etc.

As per the survey sentiment analysis can be carried out at four respects such as document, sentence, aspect, and lexicon level. Document level considers a full document for sentiment analysis for e.g. blog of specific topic. As name suggests sentence level takes sentence into consideration i.e. paragraph has many sentences. In sentence majority of the polarity decides the person's sentiment towards the topic. Aspect level and lexicon level consider a word from sentence for sentiment analysis. Figure 1 shows a visual taxonomy of sentiment analysis as described above. One step ahead challenge in sentiment analysis is detecting sarcasm. Therefore, sarcasm is one of the prominent

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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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Bit Error Rate Analysis of 16 X 16 MIMO - OFDM in Downlink transmission for LTE - A

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Abstract

**The fourth-generation (4G) cellular systems are assisted by radio access technologies comprising 3rd Generation Partnership Project (3GPP) Long-Term Evolution (LTE), and its improved version, LTE-Advanced (LTE-A). Generally speaking, Release-10 of 3GPP standards is referred to as LTE-A, furthermore, its achievable execution makes it a genuine 4G innovation as per the definitions are given by the International Telecommunication Union (ITU). LTE/ LTE-A are rising communication technologies in transit toward 5G communication systems. The LTE-Advanced system uses multiple input multiple output (MIMO) and orthogonal frequency division multiplexing (OFDM) techniques in order to achieve a high data rate transmissions. In LTE maximum data rate expected is 100 Mbps for downlink transmission and 50 Mbps for uplink transmission. MIMO-OFDM realizes the utmost spectral efficiency and hence, delivers the maximum data throughput and capacity. This research work is dealing with the investigation of execution dependent on release 10 of the 3GPP standard and investigates the performance analysis of Turbo coded MIMO-OFDM in LTE-A networks using 64-QAM modulation technique and 256 subcarriers. Bit Error Rate (BER) and downlink throughput are evaluated in terms of Signal to Noise Ratio (SNR) with 16 X 16 MIMO configurations in downlink using MATLAB simulation.
Keywords: LTE-A, LTE, MIMO-OFDM, QAM, Downlink.**

1. Introduction

Multiple-input Multiple-output (MIMO) works with multiple antennas at the transmitting end as well as at the receiving end. This structure helps to create sub-channels which are parallel over the common time and frequency axis. As a result of this, within the same bandwidth, the high transmission rate can be achieved [1]. In contrast to this, OFDM is a promising technique in terms of high spectral efficiency, bandwidth efficiency, robustness against frequency selectivity and simple implementation. With the help of this, the available spectrum will get divided into a number of orthogonal and narrowband subchannels which are overlapping on each other. So it increases its demand in a next-generation wireless communication system as one of the promising modulation schemes for higher data rate transmission. MIMO combines with OFDM in order to offer high diversity as well as multiplexing gain with the help of multiple antennas [2], [3] and achieves the potential of both techniques and produces frequency flat MIMO channels. So in the downlink of LTE commercially MIMO-OFDM has been used [4].3GPP uses LTE–Advanced - LTE Release10 as a cost-efficient technique. It provides a high data rate, as well as a, fulfills the requirements of IMT Advanced set by ITU completely.

MIMO-OFDM joins the real parity of OFDM regulation through the limit, uniqueness, and cluster grow of MIMO correspondence. Presently, MIMO-OFDM is used as a connection in disparate multiuser structures, Wireless local area networks, and prospective development cell structures. Thus, the correspondence in MU MIMO OFDM schemes involves controlling a blend of the premise of prevention. The MIMO-OFDM bars multiuser obstacle, together with co-receiving wire prevention, which relies upon the space time encryption. Deterrent since connecting besides self-obstacle after the moment assortment besides channel scattering is likewise barred

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Denoising System for MR Image Using Speckle Degradation Index

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Shraddha Oza ; Kalyani R. Joshi   **All Authors** •••

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Denoising plays a crucial role in generating a good quality MR image which is necessary for the process of diagnosis. Bilateral filter is the most suitable candidate for ... **View more**

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Abstract:
Denoising plays a crucial role in generating a good quality MR image which is necessary for the process of diagnosis. Bilateral filter is the most suitable candidate for medical image denoising for its ability to retain contours of soft tissue structures. The proposed denoising system includes bilateral filter in non-iterative as well as iterative form to achieve efficient performance at all the noise levels. The work here implements a selection mechanism based on speckle degradation index which chooses to apply bilateral filter for low noise while the one in iterative form for noisy MR image. The results indicate that the proposed system outperforms the individual filters for denoising. The paper further suggests a total quality analysis by using edge based Pratt's Figure of Merit (PFOM) metric along with PSNR and mean SSIM. This can be helpful to assess and benchmark the system performance as well as may be helpful in analysing the extent of abnormality in tissue structures. The system is developed using OpenCV as it provides a notable speedup in execution.

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Performance Evaluation of Large MIMO

Rajashree A. Patil[1] · Maflin Shabby[2] · B. P. Patil[3]

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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Bit Error Rate Analysis of 16 X 16 MIMO - OFDM in Downlink transmission for LTE - A

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Abstract

The fourth-generation (4G) cellular systems are assisted by radio access technologies comprising 3rd Generation Partnership Project (3GPP) Long-Term Evolution (LTE), and its improved version, LTE-Advanced (LTE-A). Generally speaking, Release-10 of 3GPP standards is referred to as LTE-A, furthermore, its achievable execution makes it a genuine 4G innovation as per the definitions are given by the International Telecommunication Union (ITU). LTE/ LTE-A are rising communication technologies in transit toward 5G communication systems. The LTE-Advanced system uses multiple input multiple output (MIMO) and orthogonal frequency division multiplexing (OFDM) techniques in order to achieve a high data rate transmissions. In LTE maximum data rate expected is 100 Mbps for downlink transmission and 50 Mbps for uplink transmission. MIMO-OFDM realizes the utmost spectral efficiency and hence, delivers the maximum data throughput and capacity. This research work is dealing with the investigation of execution dependent on release 10 of the 3GPP standard and investigates the performance analysis of Turbo coded MIMO-OFDM in LTE-A networks using 64-QAM modulation technique and 256 subcarriers. Bit Error Rate (BER) and downlink throughput are evaluated in terms of Signal to Noise Ratio (SNR) with 16 X 16 MIMO configurations in downlink using MATLAB simulation. Keywords: LTE-A, LTE, MIMO-OFDM, QAM, Downlink.

1. Introduction

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snehal marathe

Methods for Improving the Solar Panel Efficiency : A Review

Authors	B. P. Patil Snehal Marathe
Publication date	2019
Conference	International Conference on Electrical, Communication, Electronics, Instrument~tion and Computing 9'(diill«tts,,oa~~ (ICECEIC) - 2019
Pages	65

3. Computer Engineering A.Y. 2018-19

Hybrid CAT Using Bayes Classification and Two-Parameter Model

Nikita Singhal, Amitoz S. Sidhu, Ajit Kumar Pandit,
Shailendra Pratap Singh Sengar and Tutu Kumari

Abstract Much research and implementation has been done in the field of adaptive learning, while many such platforms exist almost none of them have tackled the problem of maintainability of such high demand systems. This paper proposes a new system using naive Bayes classifier and two-parameter model of IRT to develop a low cost, easy to maintain, self-evolving test platform. The proposed model harnesses the knowledge of the community while implementing powerful test theory. The paper discusses in detail the major modules of the system along with the related theory. The proposed model incorporates machine learning and IRT to provide a state of the art system while still being a community powered platform. The scope of the proposed model is visited. This paper provides a direction and precedent for the development of a new breed of low maintenance high capability test platforms.

Keywords Item response model · Naive Bayes model · CAT
(Computer adaptive Test) · Two-parameter model · Recommendation system

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Mixed Reality in Smart Computing Education System

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Abstract— **One of the technologies that has been showing possibilities of application in educational environments is the Mixed Reality (MR) comprising of both Augmented Reality(AR) and virtual Reality(VR), in addition to its application to other fields such as tourism, advertising, video games, among others. The primary reason for this research work is to depict and condense trials with production training and education applications utilizing mixed reality gadgets. The entry of new and further developed mobile devices opens up more opportunities for the applications to develop and be circulated. This paper tries to build upon the current state of mixed reality and its application in education. The first segment describes basic structure of mixed reality and its different parts. Following segments give a definitive structure of some experimental applications that were developed for the mixed reality, with the inference taken from the data of experiment done by the National university of Columbia on secondary school students and lastly, the paper shows the benefits of those applications over the traditional teaching methods and the basic user reactions to them.**

Index Terms— **Mixed Reality, Augmented Reality, Virtual Reality, Mobile Devices, High-End, Teaching-Learning Processes, Virtualization.**

I. INTRODUCTION

Mixed Reality (MR) which includes Augmented and Virtual Reality (AR and VR) is an emerging technology and that is being driven and included in modern Education. The most noteworthy purpose behind the applications is that individuals discovered MR plays a basic and fundamental part in making the experience of any object virtually. In any case, MR gadget was excessively costly as of not long ago, the MR equipment is sufficiently cheap enough these days to be connected all the more widely [6]. Mixed reality is the result of blending the physical world. Mixed reality is the next evolution in human computer interaction (HCI) and hence unlocks possibilities by advancements in mobile technologies and new mixed reality devices. The term *mixed reality* was originally introduced in a 1994 paper by Paul Milgram and Fumio Kishino, "A Taxonomy of Mixed Reality Visual Displays." Their paper introduced the concept of the *virtuality continuum* and focused on how the categorization of taxonomy applied to displays. Since then, the application of mixed reality goes beyond displays but also includes environmental input, spatial sound, and location [4]. In real time applications, users concentrate on the both real and virtual conditions. Comparted to the existing approaches, virtual reality compelled in the virtual environments. These interactions mimic our natural behavior

of interaction, such as objects getting bigger as you get closer and the changing of perspectives as you move around an object [3].

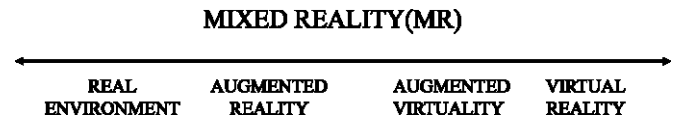## II. REALITY-VIRTUALITY CONTINUUM

Fig. 1. Mixed Reality (MR)

Augmented reality (AR) is an emerging technology that is being driven and included into different environments education. In the Horizon 2017 report, which reported that performs to identify and describe emerging technologies that will have an impact on learning, teaching and creative research in education, he reality is highlighted increased as a key trend since 2016 for improve digital literacy. Augmented reality innovation has been utilized as a part of a few fields, for example, pharmaceutical, mechanical autonomy, fabricating, machine repair, flying machine reenactments, diversion, gaming and training. Enlarged the truth is an innovation that interfaces the PC world to the human world. Other than that, increased the truth is additionally characterized as an innovation that enables clients to see this present reality with PC created objects superimposed. As indicated by, at first, the enlarged the truth was utilized for military reason to build up a propelled pilot training program. These days, enlarged the truth is additionally executed in the instruction field [2].

A few investigations demonstrate that expanded the truth can improve the instructing and learning background. Coordinated increased reality in the instruction field draws in the student to investigate this present reality by utilizing media components, for example, writings, recordings and pictures as supplementary components to lead examinations of the surroundings. Increased the truth is likewise ready to expand the coordination of this present reality with advanced learning assets in three measurement (3D) frame. For instance, the utilization of expanded reality empowers student to learn troublesome logical wonders in Chemistry, for example, synthetic bond. Science is a reasonable subject that requires dynamic ideas for inside and out comprehension.

Disrupting Insurance Industry Using Blockchain

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Pridhvi Krishna Meduri ✉, Somesh Mehta, Kartik Joshi & Sagar Rane

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8th International Conference on Advances in Computing and Communication (ICACC-2018)

Modified Backpropagation with Added White Gaussian Noise in Weighted Sum for Convergence Improvement

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Abstract

The impact of the noise injection in backpropagation is studied since last two decades. In this manuscript, a brief review is done on noise injection techniques used in the backpropagation. Here, the modified backpropagation algorithm is proposed, in which the white Gaussian noise is added in the weighted sum entity of the backpropagation. The experimentation is carried out on different standard benchmark problems such as 2 bit parity and iris dataset. It is observed that the proposed modified backpropagation requires less number of epochs as compared to the standard backpropagation for the convergence when applied on 2 bit parity and Iris dataset.

Keywords: Backpropagation; White Gaussian noise; Convergence;

1. Introduction

The backpropagation algorithm [1] is the most powerful and popular algorithm of the neural network. It is used in many other disciplinary for the pattern recognition purpose [2, 3, 4, 5, 6, 7, 8]. According to the research carried out in [9] and [10], the backpropagation (BP) convergence rate is very poor due to local minima and the flatspot problem. Since last three decades, many efforts are taken to increase the performance of the backpropagation [10]-[14]. In [15], Gibb Johndar has surveyed the different variations of the backpropagation. He mainly categorized modifications made in BP in five categories, such as *Algorithmic modifications*, *Heuristic change*, *Regularizer*, *Techniques on networks* and *Generative Networks*. In *algorithmic modifications* category, the original BP algorithm is changed which contains

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Ganga Water Quality Monitoring System IoT Based

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Abstract—**Water an important resource gifted to us in many forms. One such is holy river Ganges. Ganges water plays a major role in Indian mythology. But due to setting up of different industries in and around Ganges basin, its water quality is deteriorating day by day. And civic authorities are not able to have the real time pollutant status of water and cannot carry out a necessary raid on industries and treatment before it affects aquatic as well as human life. This paper consists of a wireless river water quality monitoring method which can be useful for monitoring Ganges water. Our proposed method is a system of interconnected cloud storage, raspberry pi, temperature sensor and a website to show real time status. Sudden increase and decrease in temperature plays a major role in affecting water resource which happens when waste is executed from an industry which consist a lot of harmful chemicals, when the water molecules come in contact of these chemicals they show a sudden rise in temperature and drastic change in pH level we can sense these changes through the sensors connected through Raspberry Pi and push them on the cloud. This paper also consists of an approach to alarm civic authorities if the concentration of pollutants increases. By this approach not only civic authority, but common man will have a pollutant status around them.**

Keywords—raspberry pi; IoT;water quality monitoring; river Ganges

I. INTRODUCTION

India is a country which has more than 15 rivers flowing through it and catering for the needs of urban as well as rural India. Up to 60% of the human body is water [5]. One of such river is the holy river Ganga. Ganga is one of the longest river in India. Its water is used in industries, agricultural fields, for water pumps and household uses. But due to lack of responsibilities, industries are discharging their waste and untreated products directly into the river. Also Indian government lacks in real-time monitoring of river water. Traditional methods involve manual collection of river water sample from different locations and taken to the laboratory to check its quality. Traditional methods of monitoring water quality generally lacks in accuracy and real-time status also few parameters have different sensor values when measured at different time [6].

There are many factors on which water quality can be monitored like turbidity, pH, Temperature and presence of heavy metal ions, concentration of different ions, dissolved oxygen and nutrients

In this paper, we will mainly focus on sudden changes/ increase in water temperature that is harmful to aquatic as well as human life. Sensor module, explained later, is changed when different parameter is to be monitored, rest of system architecture remains same. Due to the sudden change in temperature cold blooded animals like reptiles, amphibians and fishes have problem in survival and they may die. Temperature influences enzymatic reaction, different enzymatic reactions take place at a comparatively higher temperature. It affects digestion, respiration and general performance and behavior of aquatic life. Increased water temperature is an important factor of consideration if toxic substance is there in the water. Many chemical substances like cyanides, phenol and xylene exhibit increased toxicity at high temperature. On the basis of LE CHATELIER'S PRINCIPLE, temperature and dissolved gases are inversely proportional thus increase in temp will reduce dissolved oxygen levels in water. The higher the temperature lower will be amount of oxygen in water. Also high temperature favors growth of fungus. This paper consists of a cost efficient system for real time it based water quality monitoring system. In our proposed design Raspberry pi-3 acts as a base controller, which read the sensor data and transmit it to the cloud.

The rest of the paper is organized as follows. Section II consists of overview of related work in this field. Proposed system architecture is explained in detail in section III along with alarming module. Section IV consists of deployment strategy. Experiment results and setup are shown in section V. The paper is concluded in section VI with future scope.

II. RELATED WORK

For real time monitoring of water a novel approach to design a pH sensor node is explained in [1]. In this paper data obtained from pH sensors of sensing node is in the form of voltage and the voltage is comparatively low (approx. 50mV). A voltage amplifier is used to amplify the sensed voltage and level shifting using a full adder circuit for negative voltage results. The amplified data acts as input to processing unit and the results are transmitted via wireless with the help of ZigBee. Use of PIC micro controller PIC16F877 in processing is taken.

Another water quality monitoring system is explained in [2]. Where real time monitoring of the water quality in IOT

Simulation and Evaluation of Different Mobility Models in Disaster Scenarios

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Abstract— **Peoples trapped in the disastrous areas may have chances to survive if they are rescued in seventy two hours. Ad hoc networks are considered more suitable for such scenarios due to infrastructure-less feature. Two different mobility models – Reference group Mobility Model and Disaster Area Model are generally used in such scenario. 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 and ad hoc on demand multipath routing protocol are discussed and analyzed using reference group mobility models and disaster area model. Also these protocols are compared using various performance metrics such as packet delivery ratio, delay, throughput, control overhead, average energy consumed etc.**

Keywords— **MANET, DSDV, DSR, AODV, AOMDV, RPGM, RM, DM**

I. INTRODUCTION

Various natural disasters such as earthquake, typhoon and tsunami occur every year. In such situations, rescue operations need to be carrying at real time which will save numerous lives [1]. Many people rescued in 72 hours have a large chance to survive. For this, proper communication systems need to be established for various rescue and relief operations. Information need to be available quickly as soon as possible, between various resources involved in rescue operations. Ad hoc networks are much suitable for such disaster scenarios due to their infrastructure-less feature. Mobile ad hoc network is a wireless network that uses wireless connections for exchanging information [2]. Routing Protocols are typically subdivided into two main categories: Proactive Routing Protocols which includes DSDV, OLSR etc and Reactive Routing Protocols such as AODV, DSR etc.

Movements of nodes inside ad hoc network are characterized by mobility models [3]. Random Waypoint mobility model [4] is the most widely used in ad hoc networks. Manhattan mobility model also allows nodes to move determined paths like vehicles [5]. In Disaster area model, various action areas such as incident location, transport location, casualty's treatment area and hospital zone exists [6, 7]. Every person participating in the rescue operation belongs to any of the above areas and each area represents a different scenario

where node's density or node's speed are different from one to another [7].

II. MOBILITY MODELS IN DISASTER SCENARIO

Reference Point Group Mobility Model (RPGM) model is used to simulate group behavior in [8], where each node belongs to a group and follows a group leader which decides the group's motion behavior. One Reference point is used where all nodes are randomly distributed [9, 10]. This model is used in military battlefield communications as well as in disaster relief where various rescue crews from different groups and work cooperatively [11-12].
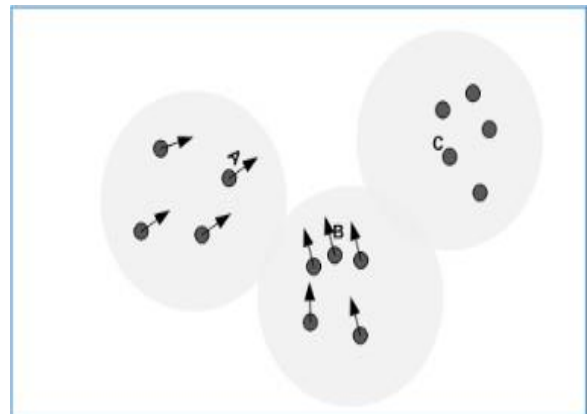

Fig. 1. Illustration of RPGM Model

In disaster area model (DM), the disaster scenarios are divided into different action areas [13] 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. Separation of room method is used in this mobility model. Thus the disaster scenario is divided into different areas. There areas are: (1) incident site, (2) casualties treatment area, (3) transport zone, and (4) hospital zone.

Above two models are generally used in disaster area scenario for faster communication among all nodes in a network. Complex movement pattern of nodes in disaster area scenario are not supported in other mobility models hence above two mobility models – Reference Point Group Mobility Model and Disaster area models are only considered here.

Text Extraction from videos using MapReduce

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Abstract—**Due to recent outbursts in the number of point and shoot devices. The data generated in the form of raw video has also increased exponentially. On YouTube alone, 300 hours of video alone is added every minute. This brings up the need of coming up with a long term solutions to tackle such behemoth tasks. The solution should be flexible, robust with ability to scale up and down dynamically as and when required. Needless to say, such system have a high cost and it is also of utmost importance to consider the cost factor and feasibility. Hadoop is one such framework which met all our requirements. It provides facility to distribute a big and complex task to low as well as high end computers to achieve a common goal. Hadoop is a highly scalable storage platform, because it can store and distribute very large data sets across hundreds of inexpensive servers that operate in parallel. Another advantage of using a Hadoop cluster is that it is fault tolerance as copies of the data are made and can be used in case of failure of a node. etc**

Index Terms—**Text extraction, Hadoop, Distributed Computing, Image Processing**

I. INTRODUCTION

With the advent of modern technology there has been a dramatic increase in the amount of video data generated. Because of this the need for a system arises that is both scalable and robust but unfortunately no current application stands up to this task. Hadoop is an open source framework designed for robust and scalable distributed computing and storage.Hadoop is composed of different components for storage as well as processing. For storage, Hadoop provides HDFS (Hadoop Distributed File System) which is designed to run on commonly found commodity hardware; it is highly fault-tolerant and is designed to be deployed on low-cost computers. It can various applications ranging from identifying vehicles from a huge log traffic footage to processing billboards on the road, traffic signs on streets and roads etc. [12] HDFS works on a master/slave architecture. The master component is the Namenode which serves as the central manager for the file system namespace and regulates access to files by clients. Operations like opening, closing and renaming of files are performed by the Namenode. The multiple Datanodes serve as the slave nodes. A file is split into blocks and these blocks are stored in Datanodes. In this paper we have not only discussed why Hadoop is a suitable match for the need of text extraction from videos but also the problems that could arise in such a system and the solution thereof. HIPI (Hadoop Image Processing Interface) is a Hadoop MapReduce library designed to provide efficient image processing in the Hadoop distributed computation system. HIPI [8] provides a solution for storing the large number of images on HDFS while also providing integration with OpenCV [10].

After the video decomposition phase we are left with a large number of files with small size [7]. Typically a small file is described as one with size significantly smaller than HDFS block size. This results in two major problems:

1) High access cost: The Mapper function usually takes a block of input. When the file size is small very little work gets done in each mapper task and the number of mapper

Design of IoT Blockchain Based Smart Agriculture for Enlightening Safety and Security

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Abstract. The Internet of Things is evolving as a complete matured technology to be used in all the Smart applications and it establishes itself in the future generations of internet. As like Internet of Things, Blockchain is the blooming technology in which each node involved in the blockchain contains the distributed ledger which enhances the security and data transparency. Illegal users are not able to perform any fault transaction in the blockchain network due to its ability of performing smart contract and consensus. The Internet of Things can be merged with the blockchain to improve the performance of the application in real time. However, managing the devices connected to the sensors in IoT environment and mining the block chain remains the technical challenge forever. With this background, we make an attempt to survey the core details of blockchain technology and its features. In this paper, we have proposed design architecture by merging IoT and BlockChain for Smart Agriculture and ended up with some new architectural framework.

Keywords: Blockchain · IoT · Mining · Distributed ledger · Sensors

1 Introduction

Blockchain consists of any number of nodes, which individually has distributed ledgers that allow multiple nodes to access and update a single edition of a ledger along with shared control maintenance. The nodes in the Blockchain contain a distributed ledger that can record transactions between the nodes in a secure and permanent way. By sharing the databases between the nodes, blockchain [1] technology avoid the existence of third party intermediate that were previously required to act as trusted agents to authenticate, trace, store and synchronize the transactions. By progressing the technology from centralized systems to a decentralized and then to distributed network system, blockchain successfully release data from the ledger [2] that was previously kept in secured way as shown below (see Figs. 1, 2). Blockchain technology can be used in business networks. A business network portrays any group of association or individuals that connect with a desire to transfer or share the assets. Those assets can be tangible, such as food, raw materials, equipment's or manufactured goods, or digital,