Recent Challenges and Applications of Machine Learning and Data Science

V.Sowjanya

CONTENTS

Title of the Book
Recent Challenges and Applications of Machine
Learning and Data Science

Applications of Artificial Intelligence Techniques in Electrical Engineering

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Article Info

Abstract:

Nowadays Artificial Intelligence (AI) is widely used in the recent era of all engineering applications. AI Technology using in Electrical Engineering is known as controlling Electrical appliances to get desired or required performance. Different types of conventional control techniques were available till now. Those are the Proportional (P), Integral (I), and Derivative (D) controller, and different combinations like PI – Controller, PD – Controller, and PID – Controller. The major requirement from these controllers is to improve steady-state stability of the system, mitigating the unwanted offsets introduced by the system, controlling of maximum overshoot of the system, reducing the noise signals generated by the system, and also can help to speed up the slow response of an over-damped system.

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Introduction

P – Controller must have the two conditions and those deviations should not be large between input and output signal and it will not be a sudden deviation. It helps in reducing the steady-state error and fastened the response of the over-damped system. Even though the system gets some offsets with the presence of this controller and increases the maximum overshoot of the system. I – Controller has a unique property while compared to P – Controller. In this, the output signal is directly proportional to the

RECENT CHALLENGES AND APPLICATIONS
OF
MACHINE LEARNING AND DATA SCIENCE

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OF
MACHINE LEARNING AND DATA SCIENCE

DATA SCIENCE   MACHINE LEARNING

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Title of the Book
Authentication and Access Control for Secure
Communication in Mobile Cloud Computing

A Framework for Secure Data Storage and Retrieval in the Cloud

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Article Info

Abstract:
In Cloud computing, user can remotely store and fetch their data based on-demand service, without the burden of local data storage and preservation. However, the protection of the private data processed and generated during the computation is becoming the major security concern. The main objective of cloud computing enables customers with limited computational resources to outsource their large computation workloads to the cloud, and economically enjoy the massive computational power, bandwidth, storage, and even appropriate software that can be shared in a pay-per-use manner. The main concern of this paper is optimal storing, retrieval of data with effective security in cloud computing. The proposed methodology suggests the encryption of the files to be uploaded on the cloud. The integrity and confidentiality of the data uploaded by the user is gaurd doubly by not only encrypting it but also providing access to the data only on successful authentication. The proposed system takes care of data security while it is in transit and also has mechanisms to support confirmation of data for correctness.

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In Cloud computing, user can remotely store and fetch
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of data security while it is in transit and also has
mechanisms to support confirmation of data for
correctness.

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ACNNADDP: An Adaptive Convolutional Neural Network Algorithm for Diabetic Disease Prediction

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Abstract:
India today stated that nearly 98 million people in India might be suffer with Type-2 diabetic in India by 2030. In the proposed system, the model is developed using convolutional neural network for early detection of type-2 diabetes and the model is compared with traditional and ensemble algorithms to prove the efficiency of the system. The designed network considers the optimized hyper parameters with cross validation. The system also considers the other evaluation metrics to compare with other models. The proposed system gives more efficiency than the ensemble algorithms.

Keywords: Soft and Hard Voting Ensemble Algorithms, CNN, Heatmaps, Activation Functions.

Introduction

Now days, Diabetes has become most common problem among any age group people. There are 3 types of diabetes namely Type-1 DM, Type-2 DM and Gestational diabetes and most of the surveys reported that Type-2 DM occurs more than other two types. The main reason for Type-2 DM is obesity and lack of physical exercises. If Type-2 DM is not identified or not treated for a long time, it may cause severe problems that may lead to life risk situation for a patient[4]. The persons suffering with Type-2 diabetes

Deep Learning Neural Network for COVID-19 Detection based on Chest X-Rays

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Abstract:

Nowadays, the entire world is suffering from a novel virus known as "COVID-19", because of which recently around Millions of people across the globe are being hospitalized. To identify COVID-19, doctors are using polymerase chain reaction test (PCR), a golden standard test to identify the infection in the human bodies. But this is very time-consuming process to identify the victims and it is also an expensive mechanism that is not affordable by underdeveloped countries. So, it is better to develop a system with an AI-based mechanism. In this proposal, we want to develop an Artificial intelligence-based COVID-19 Predictor System using a multi classifier.

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Introduction

COVID-19 is an epidemic disease that made the people across the globe to fear about their lives. The identification of the disease is done by using Positive PRC polymerase chain reaction (PCR) test. These test kits are available in limited amount and it takes lot of time to get the result. So, to over come this problem our proposed system takes X-ray as an input, because research studies proven that COVID-19 patients also suffer from lung infection. Since COVID-19 attacks the epithelial cells that line our respiratory tract, we can use X-rays to analyze the health of a patient's lungs. Imaging of X-rays takes less time to perform and it is more widely used technique in medical applications. So to improve its

A Comparative Study on Restaurant Recommendation System Based on Machine Learning Algorithms

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Abstract:
Now-a-days Social networking sites have become a daily routine for most of the people. The social networking sites act as sources for generating millions of data by people who share their views and reviews using E-commerce sites related to shopping, food, movies and others. In the present scenario, Twitter provides more and more information about different aspects that occur through out the world. In order to classify people's perspective on food in a restaurant we are designing sentiment analysis. Sentiment Analysis is mainly concerned with identifying and classifying sentiments that are expressed within a text and analyses the tweets into positive and negative. These social media-based predictions will then be used for a various purposes, including customizing online services to improve user experience. This paper proposes the efficient machine learning algorithm by comparing different traditional algorithms based on evaluation parameters.

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Introduction
Recommendation systems make the life of users easier by analyzing their behavioral patterns and

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Hybrid Multi-Level Segmentation Based Ensemble Classification Model for Multi-Class Diabetic Retinopathy Detection

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ABSTRACT

Multi-class disease prediction plays a vital role in the diabetic retinopathy (DR) detection process due to high dimensionality and sparsity problem. As the size of the number of dimensions increases, it is difficult to segment the multi-class severity regions in the diabetic retinopathy images. Most of the conventional segmentation-based classification models predict the binary classification in the diabetic retinopathy images. Also, these models have high multi-class detection error rate and true negative rate due to noise and sparsity issues. In order to solve these multi-class issues, an advanced multi-class segmentation-based classification model is proposed in order to improve the efficiency for the DR multi-class prediction. In this work, a hybrid expectation maximization (EM) and hybrid ensemble classification techniques are proposed for the CNN network. Experimental results proved that the multi-class DR segmentation-based classification model has high computational precision, recall, F-measure and runtime (ms) on the DR databases.

Keywords: Diabetic Retinopathy, Segmentation, Classification, Multi-Class Features.

Convolution Neural Network Based Enhanced Computerized Technique for Brain Tumour Detection

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Abstract: **Recent years have witnessed how medical imaging is growing these days. Brain Tumour is considered as the world's 10th largest fatal human disease. In this perspective, it is a challenging task for the neurosurgeons to reduce the death rates that occur due to brain tumour. For reducing the death rates, it is the primary duty to identify the tumour cells in their early stage. It is very difficult for the tumour cells to be identified with naked eye for by looking to the MR images. In this paper, an automatic cancer cell detection system is proposed to minimize the burden of the neurosurgeons to identify the cancer cells. Here, CNN (Convolution Neural Network) based system with Median filtering and texture feature extraction is proposed and it gives results with 93% accuracy and at present it has been proved as the better model for brain tumour cells detection.**

I. INTRODUCTION:

As of date with the statistical reports of the Health department, around 25429 adults are diagnosed with brain tumours. Not only adults, these days there is an increased percentage of children, who are diagnosed for brain tumours. Brain tumours are to be identified in their early stages itself, failing which lead to the death of patients affecting the tumour. Actually non detection in early stage is remaining as one of the main reason [1] behind many deaths. Medical imaging is the only source used by many neurosurgeons to identify the tumour cells present in the brain. MRI is a major source, which detects and identifies the tumour cells in the

brain. Even for neurosurgeons, it is very difficult to find out the tiny cells of tumour with naked eye. Hence there is much necessity of automatic detection [2] system for tumour cells.Fig.1 shows the clear steps, which are used in the proposed methodology.
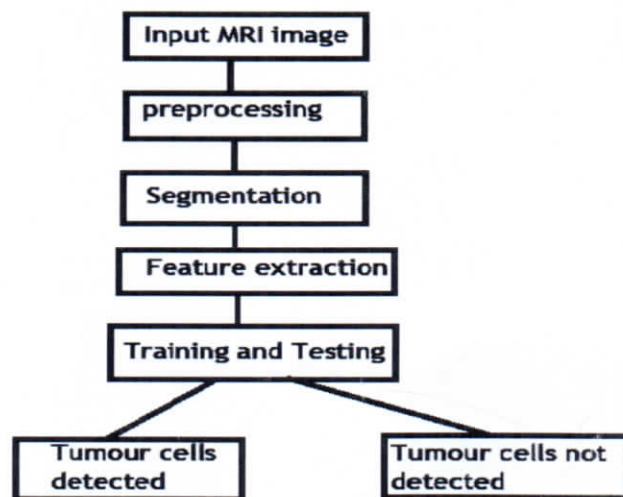

Fig.1 Image Processing Steps in the Proposed Methodology

II. LITERATURE SURVEY

Authors in [3] have proposed the necessity of utilizing the pre-processing techniques for removing the unnecessary noise which are from the images. Authors in [4] mentioned the use of a mean filtering technique

Super Resolution and Demosaicing based self learning Adaptive Dictionary Image Denoising framework

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Abstract— It is an effective technique that can be applied to visual diversity such as editing, visual criticism and the so-called fragmentation of painting images. Creativity, image-based optimization and high-resolution frame work were showcased based on the record-breaking success of a minority representation process. The proposed structure for reconstructing the image is learned from a complete dictionary and much of the image input used for two important problems. It was first used by creating a Gaussian noise figure and then blaming the rain. Special structures using conventional methods suggest that the production environment is grappling with artistic solutions and problems. The proposed method was implemented in rich color using ultra-resolution and demo techniques with removing sound and craftsmanship.

Keywords— Image denoising; super resolution; Gaussian noise; rain removal; demosaicing; self-learning adaptive dictionary.

I. Introduction

Image, the "two-dimensional equation $f(x, y)$" representation of an image is x and y, defined as plane and spatial co-ordinates. The image intensity or grey level of the image is determined at a given point by the amplitude of "f" in each coordination pair (x,y) such that the smallest variations in the image intensity are known as the intensity resolution.

Image types.: This image is fundamentally categorised into I binary pictures, (ii) colour pictures and (iii) grey images. Next, two possible values for a pixel represent binary images and colour black and white represent. Object in the picture is a backdrop colour for the front and the rest. The entity is referred to as a binary representation on the two or two levels (0 or 1). Secondly, each pixel with 24 bits is coloured and has a primary code of three: Red, Green and Blue. The last one is the grey picture, which contains only details about the strength of the values of each pixel. Images seen in black and white are of grey shades only (0-225), which differ from black (0), as their strength is strongly indicative of vulnerability to white (255),[1].

Noisy sound. Random image density variations are called sounds which occur as details in a picture. The effects of photons (the form of light) during propagation and heat are responsible for this (thermal energy) The image sensor is created. The exact pixel value of the image varies due to different amplitude values as sound is applied to the original image.

Denoising. - Denoising. One means by which the noise of the polluted version is silenced is used to recover the original image. This approach is both linear and non-linear. Linear is a simple process, but the small specifics of the images are not preserved; non-linear methods are retained, but more complicated.

Demosaicing is a digital imaging technique used for rebuilding a full-color picture from the output of the unfinished colour sample. The nearest average value of the surrounding pixels is the true colour of a single image.

Super Resolution. The key concept is to increase the resolution of an image, an image restoration branch [1]. This method focuses on improving low resolution (input LLR images) and mapping it to an image with high output resolution. Super-resolution algorithms are classified into subclasses given below.

• Multi frame Methods used to create a high-resolution image using the aliasing presence of different frames of a same scene

• Methods of interpolation as New-edge interpolation and up-sampling of lanczos;

The dictionary teaching technique uses a patch or a function based approach to give the relationship between the specifics of the original image in the low resolution and high resolution images of the same scene.

Most modern digital cameras generate images with a single colour filter image sensor (CFA). In order to improve resolution, the processing line required for the conversion of images into a visible format is thus used for image degradation[2].

II. LITERATURE SURVEY

Imagery is a known domain and scientists have developed different algorithms and noise management methods. The following papers form the basis of this analysis among the various approaches and models created to denoise images.

A new case-

By evaluating the high resolution variant of Dinh-Hoan Trinh et al[1], the basic approach for super-resolution and denouncing medical images was suggested. This method is focused on the identification of a non-negative, linear display of the input patch through low-database patches. The

Computer Based Classification of Diseased Fruit using K-Means and Support Vector Machine

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Abstract— Fruits play a major role in both the agriculture and industrial sectors. Many farmers in India depend on fruit farming. As exporting fruits to other countries make huge profits in the industrial sector, many industries export fruits to other countries. Diseased fruits can spread its disease to other fruits and leads to damage to other fruits. During the export of fruits, if diseased fruits get packed along with fresh fruits then other fruits also get damaged and leads to a huge loss. Classification of diseased and non-diseased fruits should be done to avoid losses. Manual classification of fruits is a very difficult task and also consumes more time. Here, an automatic detection of diseased fruits with Sobel edge detection and support vector machine proposed, which gives an accuracy of 92% in classifying the diseased and non-diseased fruit.

Keywords— Classification, BPNN (back propagation neural network), support vector machine (SVM), sobel edge detection, accuracy, automatic, detection.

I. INTRODUCTION

For any person to be fit and also healthy it is very important to eat fruits regularly. Fruits keep humans away from hospitals. Fruits are rich in mineral, calcium, citrus, and vitamins. Heart related diseases, diabetic diseases, gastro problems; kidney-related diseases like kidney stones can be avoided with daily eating habit of different kinds of fruits [1]. Many industries depend on the fruit-related business. Exports of fruits are large scale industry business in India. Occurrence of diseases in fruits is common and fruits get damaged if fresh fruits are kept along with diseased fruits, which may lead to huge loss in business [2]. It is compulsory to automate the classification of diseased fruits. In this work, a k-means clustering with BPNN is proposed for identification of diseased fruit. Here, in this paper section 2 discusses about the literature survey done, section 3 discuss about proposed methodology, section 4 discusses about results and discussions and section 5 discusses about the conclusion[4] . Fig.1 shows the architecture of the proposed work, where initially pre-processing is done to remove the noise, later fruits are segmented to find the region of interest (ROI). Further, feature extraction is done by using

Efficient Data Transmission in Wireless Vehicular Networks

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Abstract- Vehicular ad hoc networks (VANETs) are a subset of mobile ad hoc networks (MANETs). These networks do not have a specific structure, in which network-forming nodes are moving vehicles. In the recent development of vehicular Adhoc network, the consumption of energy by its nodes is a major problem now a day. To overcome this problem many algorithms are proposed. The two main aspects that can resolve this issue is by having proper routing and network design. In this project we discuss the issues which are associated with the cooperative transmission in wireless vehicular networks. The cooperative transmission includes the use of cellular terminals as relay stations to develop the transmission high-quality and to growth the community overall performance and reduce energy intake.

Keywords- cooperative transmission, vehicular Ad hoc networks, mobile terminal; relay station.

I INTRODUCTION

Vehicular Ad-hoc Network (VANET) is a subclass of an ad hoc network. Vehicles in VANET communicate with close by vehicles or road side units that are mounted in centralized locations such as intersections and parking lots. There are two types of communication: vehicle-to-vehicle (V2V) and ve to-infrastructure (V2I). In V2V communication nearby vehicles exchange data by using short range wireless technologies, Wi-Fi and WAVE. Vehicles have a special electronic device that allows them to receive or relay messages. In V2I, vehicles are connected to the nearby road infrastructure via continuous wireless communication through Wi-Fi hotspots or long/wide range wireless technologies for exchanging information relevant to the specific road segment.

Several works in mobile ad hoc networks have shown that nature inspired (bio inspired or swarm intelligence) algorithms inspired by insects such as ant colony based optimization (ACO), can be successfully applied for developing efficient routing algorithms. These algorithms have a quantity of advantages compared to other routing algorithms. For example, they reduce the routing overhead by sharing local information for future routing decisions. They also offer many paths enabling selection of another route in case of link failure on the previously selected path.

ACO algorithm is a hybrid routing algorithm that makes effective use of the bandwidth. This algorithm is scalable and robust to link failures. We subdivide the nodes into zones with each vehicle belonging to one or two overlapping zones. We use proactive approach to find a route within a zone and reactive approach to find routes between zones using the local information stored in each zone thereby trying to reduce broadcasting and congestion [2]

Land Use/Land Cover Change Analysis using NDVI,PCA

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Abstract - **Human activities made on land use shows an impact on the land cover spatially and temporarily in the long run on the environment. Amendments made within Land Use/Land Cover (LULC) are anticipated in the direction of the need of increasing population through cultivation step-up for edibles. Perceiving the places, broadcasting of LULC changes is significantly intended for launching associations among leading activities, policy pronouncements, and consequent LULC activities. Change detection is a practice used in funding estimation in which multi-date images are correlated in order to determine the nature and volume of transformation that has occurred. Remote sensing and Geographical Information System (GIS) provide fundamental tools for studying LULC change detection. Reliable data scheduled the grade of nature using diverse techniques is essential in solving ecological snags. The main objective of this paper is to assess land cover changes using Normalized Difference Vegetation Index (NDVI) as well as PCA. Landsat 8, OLI/TIRS images from 2014 and 2020 are used to illustrate the concept of Land Cover Change in Vijayawada, Krishna district, Andhra Pradesh. A total of four LULC classes are identified to harvest the statistics of Dense vegetation, vegetation, water bodies, and urban. Results disclosed that dense vegetation is diminished about 28% where vegetation, built up, and water is improved by 10%, 23%, and 1%, and overall accuracy (OA) and kappa coefficient are increased.**

Keywords— **Change in Land Use /Land Cover, NDVI, Classification, Remote Sensing, PCA, GIS .**

I. Introduction

Human actions will determine the climate of the future, not systems beyond our control. With the consistent growth of the human brain, people began to understand how to use natural resources, such as water, land, food items, and so on, as required. With the increase in population, the exploitation of land is getting increased at a higher rate. As a consequence, Land quality is getting deteriorates gradually. Due to this Global surface, the regular temperature will increase extremely and climate variations emerged as a key challenge for sustenance safety, agronomy, and the pastoral maintenance of billions of individuals in the entire ecosphere [1-3]. The physical condition of the land is known as Land cover [4,5], where Land Use signifies amendments done in Earth's terrestrial surface [6-8]. LULC consequences can be detected by making use of Multi date RS images [9,10]. Land use and land cover (LULC) change has been exposed to have vital consequences taking place in the environment over several alleyways that control land surface temperature and rainfall [11]. The reputation of remote sensing was accentuated as a 'limited view' of the spatial and temporal changing aspects of the progressions in urban evolution in addition to land-use change [12]. Multi-temporal, multi-sensor satellite imageries are aimed at long-standing LULC inclination investigation, that can be approved as additional satellite datasets [13,14]. Hasty inhabitants' growth, an internal immigration, policy changes, and administration change are recognized as the crucial lashing services of LULC changes [15]. Ancient land uses land cover and the aforementioned deviations that are being rehabilitated using anthropological actions take substantial influence on the Earth's landscape, disturbing energy, moistness, and biochemical fluidities that influence the Earth's environment [16]. Previous studies illustrated the spatial land use/land cover discrepancies and their allegations on climatic variables. Vegetation indices remain envisioned in the direction of highlighting the vegetation ethereal performance relative to the soil and supplementary telluric surface goals [17]. The normalized difference vegetation index (NDVI) takes possible capability towards categorizing the vegetation landscapes of numerous eco-regions also affords treasured info using remote sensing tools in learning vegetation phenology cycles [18]. NDVI is one of the best analytical vegetation indexes abused to perceive LC changes campaigned through human activities, i.e. constructional changes, changes in vegetation extent, etc. [19-21]. NDVI can be deliberated using RED, NIR bands of multispectral Landsat images [22,23] as shown in equation 1.

$$NDVI = \frac{NIR - RED}{NIR + RED} \tag{1}$$

Vegetation and crop coverage are designated using NDVI. Theoretically, the values of the NDVI range between −1.0 and +1.0[24]. Low NDVI standards are communal for external resources, and high NDVI standards are for the green vegetation. Negative NDVI values signify the water bodies [25]. This article predominantly deals with land cover changes of Vijayawada city availing the NDVI method with the use of multispectral multi-date images.

The rest of the article is organized into four sections : Section II describes the study area, Section III analyzes the methodology used, and experimental results are accessible in Section IV. Finally, Section V concludes with a summary.

II. Literature Survey

Jovish John et. al [26] ascertained LULC classification of Wayanad district. The area is located in six classes using the Maximum Likelihood Classifier. Foremost LULC deviations are detected in the water body and urbanized classes. LULC has a perceptible impact on LST using an adverse correlation amongst vegetation cover besides LST of AOI.

Real Time Driver Fatigue Detection and Smart Rescue System

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Abstract— **Now-a-days population has been increasing rapidly, which results in 6.5 Lakh of accidents every year and many are leading to death due to unavailability of medical services on time. This paper proposes an automatic real time driver fatigue detection system based on image processing technique along with cloud based management platform. The proposed system internally comprises Alert system and Rescue system using Raspberry pi. Alert system uses image processing techniques and detects the driver fatigue using Eye Aspect Ratio (EAR) which is precise and accurate in real time analysis and alert when driver detected as drowsy with an alert buzzer to get back to active state thereby avoiding occurrence of accidents to some extent. Even if an accident happen by any means then the employed vibration sensor detects it and the location details of the accident place are obtained from GPS Receiver Module. Simultaneously these details are made available in the form of map in Ubidots platform which is utilized by ambulance drivers' to monitor and to reach the location immediately and the same details are sent as notification message to victim's parents using IFTTT. A MSS app is used for internal communication of driver. In this way this system helps in declining death rate and also saves families not only lives.**

Keywords— Image Processing, Multi SMS Sender (MSS) mobile application, Push bullet mobile application, Ubidots, IFTTT, Raspberry pi.

I. INTRODUCTION

The major issue that every country facing today in our present society is road accidents. Due to rapid increase in vehicles more accidents are taking place. Accidents happen in short span of time but it creates lot more damage not only to them and also to their family. As per the report of National Highway Traffic Safety Administration (NHTSA) [5] 55,926 vehicle collisions are occurred in United States in 2007. However there is high number 9,979 accidents caused due to fatigue and inattention. Moreover 416,000 accidents are occurred due to fatigue detection during 2005 to 2009.

India records first in worldwide accident rate around 1.5 Lakh deaths taking place every year especially during peak times (12 PM -6 AM). Approximately 6-7 Lakh accidents are taking place every year in country wide and 20% of them are caused due to fatigue. For every minute around 5 people are facing death in worldwide.

Fatigue detection systems have been widely studied and developed to reduce occurrence of accidents, although some

have been developed which are not efficient and successful in real time. Further there are more systems which are inconvenient and cause some health problems to driver. Till now systems developed are used only to detect the fatigue for the prevention of accident but none are helpful to provide any service to the victim if accident occurred.

Therefore to provide an efficient solution to all the above problems a Real Time Driver Fatigue Detection and Smart Rescue System is proposed to detect the drowsiness in real time system thereby avoiding accident. And also rescuing the victim if by any chance of accident is occurred. And accident is detected, located in cloud based platform which is utilized by ambulance drivers to provide medical service on time to the victim and the same information is sent as a notification message containing geographical values to victim's parents.

II. RELTAED WORK

Drowsiness detection has now become a main researchable element and many techniques have been implemented to detect fatigue using various methods.

Wan-Jung Chang [1], [7] objective is to detect the drowsiness using smart wearable glasses and implemented the approach of IR Light sensor which is especially designed for the wavelength ranging from 810-890 nm, to avoid the nature of contexture light image with more noise around, which impacts the detection accuracy. The disadvantage of this paper [1] is each and every component is placed on the glasses a lot of weight is to be carried on face which produces heat and radiation which effects the central nervous system. Also the light rays of IR Light sensor effects the retina.

Dajeong Kim [2] objective is to detect drowsiness by the electrical activity of brain. And they implemented the approach of alpha power spectrum analysis to determine the drowsiness. Their study involves considering different types of waves like Delta Waves, Alpha Waves, Beta Waves and Theta Waves which are generated by the brain. Generally, alpha waves become evident with movements of eye and high amplitude occurs whenever the eyes are closed and low amplitude occurs when opened are taken into consideration. When drowsiness forces to close eyes then alpha2 waves of range 11 to 13 Hz contain electroencephalogram EEG signals

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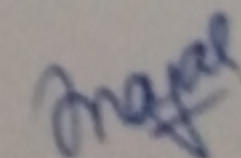
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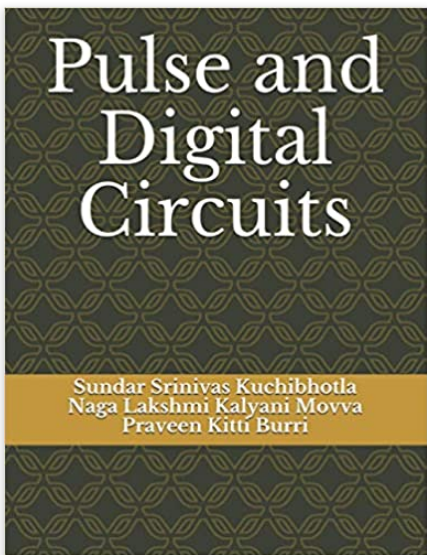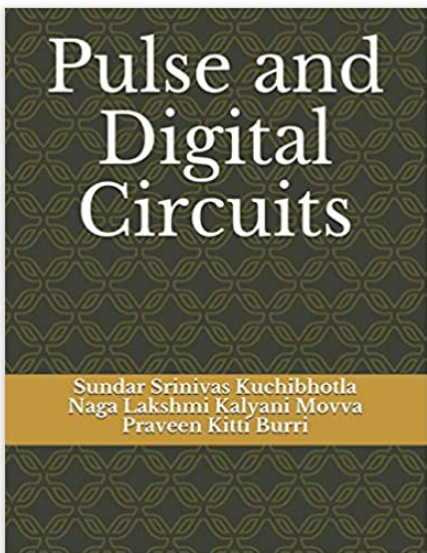
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An Integrated Approach by Using Various Approaches for a Green Supplier Selection Problem

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Sivakrishna

Abstract

With developing overall attention of ecological guard, green production has turned into a vital problem on behalf of practically each maker and will decide the maintainability of a producer in the long haul. An exhibition assessment framework for green providers is important to decide the appropriateness of providers to collaborate with the dense. Many MCDM methods have provided valuable factors in selection of green suppliers. The objective of this work is to evaluate a hybrid algorithm for evaluating the significance of the chose standards and the exhibition of green providers. Six standards are contemplated for assessing provider's presentation. By using DEMATEL approach will be able to categorize the cause-and-effect relationship between criteria. Entropy is used to find out the virtual decision-making criteria condition weights, and TOPSIS is used to give the ranks their alternatives.

Keywords

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A Framework for Secure Data Storage and Retrieval in the Cloud

[1]Dr.Shaik Akbar, [2]B Hanumantha Rao, [3]Anand Thota

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Article Info

Abstract:
In Cloud computing, user can remotely store and fetch their data based on-demand service, without the burden of local data storage and preservation. However, the protection of the private data processed and generated during the computation is becoming the major security concern. The main objective of cloud computing enables customers with limited computational resources to outsource their large computation workloads to the cloud, and economically enjoy the massive computational power, bandwidth, storage, and even appropriate software that can be shared in a pay-per-use manner. The main concern of this paper is optimal storing, retrieval of data with effective security in cloud computing. The proposed methodology suggests the encryption of the files to be uploaded on the cloud. The integrity and confidentiality of the data uploaded by the user is gaurd doubly by not only encrypting it but also providing access to the data only on successful authentication. The proposed system takes care of data security while it is in transit and also has mechanisms to support confirmation of data for correctness.

Keywords - Cloud Computing; Cloud security; Fully Homomorphic Encryption [FHE]; Resource outsourcing; Advanced Encryption Standard [AES]

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