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Thyroid Diagnosis Using Multilayer Perceptron

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Thyroid Diagnosis Using Multilayer Perceptron

B. Nageshwar Rao, D. Laxmi Srinivasa Reddy & G. Bhaskar

Abstract

Thyroid disease is one of main origin of serious medical issues for human subsistence. Therefore, proper diagnosis of thyroid disease is treated as an important issue to determine treatment for patients. A new approach on Multi-layer Perception (MLP) using back propagation learning algorithm to classify Thyroid disease is presented. It consists of an input layer with 4 neurons, 10 hidden layer with 3 neurons and an output layer with just 1 neuron. The relevant choice of activation objective and the number of neurons in the hidden layer and also the number of layers are achieved using MLP test and error method. The proposed

COVID-19 Time Series Forecasting of Daily Cases, Deaths Caused and Recovered Cases using Long Short Term Memory Networks

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Abstract— Novel Coronavirus (COVID-19) outbreak that emerged originally in Wuhan, the Hubei province of China has put the entire human race at risk. This virus was declared as Pandemic on 11th March 2020. Considering the massive growth rate in the number of cases and highly contagious nature of the virus, machine learning prediction models and algorithms are essential to predict the number of cases in the coming days. This could help in reducing the stress on health care systems and administrations by helping them plan better. In this paper the datasets used are obtained from the John Hopkins University's publicly available datasets to develop a state-of-the-art forecasting model of COVID-19 outbreak. We have incorporated data-driven estimations and time series analysis to predict the trends in coming days such as the number of cases confirmed positive, number of deaths caused by the virus and number of people recovered from the novel coronavirus. To achieve the estimations, we have used the Deep learning model long-short-term memory network (LSTM).

Keywords— *Deep learning, Artificial Neural Networks, Long-Short-Term Memory (LSTMs), Pandemic, COVID-19, Corona-virus.*

I. INTRODUCTION

The World has been affected by a highly contagious virus called the Corona virus or SARS-COV-2. This virus originated in the wet markets of Wuhan, Hubei province of China during December 2019. This virus quickly spread to more than 160+ countries within a span of 3 months causing over 400,000 deaths with more than 8.9 million people affected globally[7]. This virus has caused very distressing times across all the countries and significant disruptions in global economies. Several intervening measures have been taken by the affected countries such as quarantining people to stop the spread of the virus.

Coronavirus being a contagious and infectious disease like the flu with certain growth patterns, such patterns are noted to be non-linear and dynamic in nature. Data is Dynamic in nature as the cases might differ based on the seasons, populations etc. [2]. Thus a deep learning model based on long short term memory networks using Pytorch framework can be used to predict the data accurately.

Deep learning power in the field of Artificial Intelligence can be established by recurrent neural networks (RNNs) and LSTMs. These models are one of the best dynamic models that are used to generate sequences in multiple domains such as recognizing speech and music, emotional tone prediction for a piece of text (sentiment-classification of text), caption generation and machine translations [3]. There are different methods to achieve the task for time-series analysis, Machine learning algorithms like Linear and Logistical Regressions, SVM etc., are at the center of these applications [6]. While these tools are great in examining observations and reaching to conclusions, they come with some serious limitations. In most cases the data is skewed and relativistic. Considering this a robust new method using deep learning models are inevitable to gain time series forecasting results with higher accuracy.

II. CONCEPTS

A. Artificial Neural Networks (ANN)

ANNs are programmed to try and simulate a human brain by modelling the neural structure on a smaller scale [3]. ANN consists of interconnected web of nodes joined by edges known as neurons. The main function ANN is to perform progressively complex calculations on a set of inputs, then use the output to solve a problem [2]. ANNs are used for lots of different applications. An ANN typically consists of 3 layers namely input, hidden and output layers. Neural net can be seen as a result of spinning classifiers composed in a layered web; this is because every node in the hidden layer and output layer has their own classifier.

B. Recurrent Neural Networks (RNN)

Recurrent neural networks (RNN) find their best usage when the patterns in data vary with time. This deep learning model is a simple structured model with a built-in feedback loop that allows it to act as a forecasting-engine [15]. In the feed forward neural network signals have unidirectional movement from input to output one layer at a time, In RNN the layer's output is added to the next input and fed back into the same layer. Contrary to feed-forward neural nets, an RNN can accept a sequence of values as input and produces a sequence of values as output, the capability to operate in sequence unfolds RNN to a wide variety of applications [13]. It is possible to obtain a capable net of more complex outputs by stacking RNNs one on top of another [20].

Cloud-based Internet of things for Smart Water Consumption Monitoring System

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Abstract - The levels at which groundwater is depleting around the world is alarming and there is an impending necessity to be judicious with water usage. This led to the formulation of a consolidated architecture to monitor water consumption at the household level. Internet of Things (IoT) is combined with the Thingspeak Cloud Computing platform and Android Studio to facilitate an efficient dashboard for consumers. The proposed model aims at imbibing a sense of responsibility in the citizens as it helps keep a track of water usage periodically using visually appealing charts, lays down the monthly water utility costs as well as provides tips with all in the form of a compact android application in their phones that is needed to be proactive and conserve resources. This paper presents a tested prototype and the pipeline connecting the hardware and software components responsible for streamlining the process of data transfer from IoT to cloud and from cloud to the android application. An overview of the promising technologies and frameworks that have been orchestrated in the development of the system as well as results obtained are thus provided.

Keywords - Water Consumption Monitoring System, Internet of Things(IoT), Thingspeak Cloud, Android Studio

I. INTRODUCTION

Water is one of the primary sources of survival for all life forms on earth. A lot of our day to day activities such as bathing, cooking, washing is dependent on the use of water. The community needs water for various activities beginning with the production of food [6] and irrigation. But now the world is heading towards a water crisis due to the excessive and uneconomical use of water by the large human population[8]. The World Economic Forum has announced in 2015 that the water crisis ranks the eighth global risk with the highest likelihood of occurring within 10 years[4]. This has left many fearing that the shortage of water is probably going to be the most important cause of conflict in the coming years[1]. The importance of groundwater conservation practices has undergone a gradual increase as it can lessen wastewater discharge which can further result in improved water quality. They also diminish the necessity to search for or create new water sources, leaving them in reserve for future use. Hence it is extremely important to conserve groundwater by constantly monitoring and regulating usage starting at the individual household level. The designated system strives to achieve just that. One of the main objectives of the system is to imbibe a sense of responsibility in the citizens by preaching the importance of water and its conservation. The monitoring dashboard provides tips for being conservative with the daily usage consumption and also allows them to set limits on the same. Once the limit is approached or has reached, the consumer receives an alert regarding the same, leaving room for usage reduction.

Some of the real-time applications of the system in the domestic/household-front include -

i. Track units of water consumed hourly/daily/weekly/monthly.

ii. View live analysis of consumption statistics in the form of interactive charts.

iii. Set limits on water consumption and receive alerts when the limit approaches or has reached.

iv. Receive monthly water utility cost bills and log reports based on the units consumed.

v. Be mindful of the usage by receiving tips on conservation timely.

vi. Educate residents as well as house help personnel.

The organization of the rest of the paper is as follows. Section II briefly overviews the technology involved

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Multi-Functional Blind Stick for Visually Impaired People

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Abstract— One of the biggest problems faced by the visually impaired is navigating from place to place, be it indoors or outdoors. Further, the adverse conditions of the roads make it even more difficult for them to walk outdoors. They have to be alert at all times to avoid consequences like colliding with stable or moving obstacles, ascending or descending staircases, slipping down wet terrain. Also, at times they may be in distress and might want to send an alert message to their relatives or friends about their whereabouts. These problems of blind people can be addressed with the intervention of technology. The proposed solution employs the Internet of Things (IoT) paradigm to provide a medium between the blind and the environment. Several sensors can be used to detect anomalies like obstacles, staircases and wet terrains respectively. The prototype discussed here is a simple, sophisticated and affordable smart blind stick equipped with various IoT sensors and modules. Also, this solution provides a way to send a message about the whereabouts of the user to the concerned people. Adding to the above, a software application is designed to help the acquaintances of the blind to manage the stick's configuration ex: add or delete phone numbers to which alert messages have to be sent. Misplacing the stick indoors can also be a substantial issue. This solution also addresses this problem.

Keywords— *smart blind stick using IoT, obstacle detection, wet terrain detection, alert messages, finding misplaced stick.*

I. INTRODUCTION

According to the World Health Organization, there are nearly 285 million people with some form of visual impairment out of which 86% people have low vision and 14% people are blind. Vision is one of the most important senses to humans to survive. Vision helps to connect with the surroundings. People deprived of vision rely on other dependencies like a simple walking cane or other people. In familiar places like the interiors of a house, they memorize the site directions, obstacles on their way and navigate according to them. However, it is not always safe for the blind to rely on their memory to move from one place to another. Especially when they are out-doors. Not all the times blind people are offered help from others and hence there is a need for a device, such as a stick, which can assist the visually impaired people in all forms of life.

The main characteristics for the stick to be useful to every visually impaired per-son is for it to be efficient and cost effective. The obstacles such as people, vehicles, stones in the outdoors and stairs, walls, furniture in the indoors hinder the way of the blind. The blind stick developed, alerts the user about various obstacles through a vocal sound from a speaker on the stick. The stick can also detect wet and damp surfaces and raise a vibratory alert to the user.

To a person who is visually impaired, a mobile phone doesn't effectively serve the purpose to send a panic message whenever the person ends up at a location unknown to him. A simple button on the stick will do the job of sending a message to the acquaintances of the blind person. A software application is designed to let the acquaintances change, add or delete the phone numbers. The user can also set up the phone numbers with the help of the supplier, who has admin access to change the phone numbers. To assist the user if a stick is misplaced, a remote with button is provided, which when pressed, makes a buzzer sound on the stick.

II. RELATED WORK

Smart blind stick is an innovative stick which is designed for visually impaired people for improved navigation. The smart stick proposed by M. P. Agrawal [1] can identify all obstacles in the path using a water sensor, ultrasonic sensor, RF module and GPS-GSM module installed in it and pass it on as vibrations to notify the user about hurdles on the way. A blind stick named iWalk by R. F. Olanrewaju [2] has a water sensor integrated therein that activates a distinct buzzer if it detects water. The system also has a wireless RF remote control that produces a sound when pressed, which helps in locating the stick. A stick guide model was proposed by K. B. Swain [3] which consists of GPS and GSM which sends SMS whenever the person needs help. It uses an ultra-sonic sensor to detect obstacles and an infrared sensor for level detection. Nadia Nowshin [4] proposed an Arduino Nano based stick which detects the obstacles using Ultrasonic sensors and an android mobile application to help a blind person. Radhika R [5] developed a model which can detect obstacles within the distance of about 3m with the help of infrared, ultrasonic and water sensors sensors. The blind person can also communicate his location to his guardian using GPS and GSM modules. A blind stick by Manikanta K [6] is integrated with an ultrasonic sensor along with light and water sensing. It sends a signal to sound a buzzer if an obstacle detected is close enough. O.B. Al-Barrm [7] proposed a 3D ultrasonic walking stick in which buzzer and vibration motors are activated when any obstacle is detected. The stick is also equipped with GPS and GSM to communicate the location of blind people. The main component of P. Sharma [8] is the ultrasonic sensor which is used to scan a predetermined area around blind by

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Forex Exchange using Big Data Analytics

Forex exchange using big data analytics

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Abstract. Analysis and Prediction of forex has gained immense value in today's economy. The stock price prediction is a difficult process owing to the irregularities in stock prices. Every trader wants to know if the pattern has been repeated in past to know what the possible output of the current situation will be. The primary objective is to propose a methodology that will use a historical dataset and provide a more accurate prediction on stock price. In this paper, we will be using machine learning pattern recognition algorithm on forex tick dataset. The learned model then will produce pattern from the given dataset and on the pattern of increasing or decreasing, the buyer will initiate a buy or sell the stock respectively. We will use python coding to execute the algorithm in jupyter notebook. Matplot library will help us to perform graphing in the process and Numpy will be helpful in doing statistical analysis of data.

1. Introduction

Every trader wants to find out the pattern of the forex before he makes any decision of making small or big investment in that forex. These changes in forex market reflect directly to the economy of the area. There is abundance of algorithms that could be found on the Internet that allows the user to predict the next change in forex market. Most of these are just a hoax and a way to manipulate people. We are going to find out patterns by plotting together the lines of those patterns on graph, which are very much similar to on another. Then we will perform back test on these results. A forward test can be performed on the upcoming data that has been produced after the prediction of the data but that data cannot be back tested to give the guarantee that it is indeed a suitable prediction.
We are using python here because it is a single threaded language, it uses single core of CPU, which means one script will use only one CPU (see ref. [8]-[14]).

We have many variables to be accounted for, not just the explicit ones but implicit ones too. Some of the explicit variables are percent change as pattern recognition, start point to current location percent change, fixed pattern length, fixed value/weight of pattern irrespective how old or new the data is.

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Data Engineering and Communication Technology pp 449–460   Cite as

A System for Efficient Examination Seat Allocation

Charitha Tuniki ✉ Vanitha Kunta & M. Trupthi

Abstract

Examination seating arrangement is a major issue faced by an institution. A university consists of a large number of students and classrooms, which makes it difficult for the university authorities to design seating arrangement manually. The proposed solution provides an efficient set of algorithms for examination seating allocation problems. It also gives the best combination of rooms to be utilized for the examination and dynamically organizes seating based on the orientation of the room and students. The described solution encompasses methods to address some common issues like eliminating students who are ineligible to write

Applying data mining technique to predict trends in air pollution in Mumbai

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Abstract. Prediction of air quality is a topic of great interest in air quality research due to direct association with health effect. The prediction provides pre-information to the overall population of the area about the status of pollution on which they can take precautionary measures and can protect their health. The problem arises when the level of SO2, NO2 and residual suspended particulate matters in the air increases than that of theirs restricted level. In this paper, the Prophet Algorithm, open source software, is applied to predict the trend of air pollution in the city of Mumbai, Maharashtra. The Prophet is machine learning algorithm to forecast and also to predict time series data. It is based on additive model where non-linear trends are fit with yearly and weekly seasonality. The graphical results are generated after using this algorithm which shows the trending pattern of the pollutants in the air of Mumbai.

1. Introduction

Nowadays, the continuous and strict monitoring of air pollutants is of great importance in the process of evaluating regulatory control measures related to air quality [1]. Many countries are installing and actively monitoring the air pollutant matters in order to keep them under control. Air quality reports for the various region of the country are published regularly [2][3]. As a result, data are getting accumulated and this results in generating various reports, including statistical one in order to find different pattern among those data.

In our paper, two hazardous gas, sulphur dioxide and nitrogen dioxide are considered because both of these gases are most harmful and we have collected the dataset containing these two gases [4][5]. Scientific research has proven that these gases have many negative effects on human health. Sulphur dioxide is significantly a toxic gas that can cause inflammation and irritation of the respiratory system, whereas Nitrogen dioxide, another toxic gas for human beings, can form nitric acid with water in the eyes, lungs, mucus membranes and skin [6]. Exposure to high concentrations of NO2 can cause lung

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Estimating Savings Potential of Solar Energy

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Abstract: The climatic conditions in India are among the best that can be used maximise solar energy potential and are capable enough to make solar energy serve the purpose as an alternative source of electricity to Thermal and Hydro electricity. However, the high installation costs of the solar panel coupled has prevented solar energy growth in the country. But when looked at from a broader perspective, solar energy can decrease the costs for electricity as well as help to reduce the adverse effects of using non-renewable energy resources like Thermal electricity. The proposed system determines a mechanism to estimate the amount of savings that an individual could make by using a solar panel on their rooftop. Deep Learning is applied to process and segment the rooftop images while removing obstructions such as trees, electric poles etc. and estimate the area of the rooftop. The solar radiation values and weather patterns of a region are considered and the calculated area is used to predict the amount of energy that can be produced by installing a solar panel on the roof.

Keywords: Solar Energy, Deep learning, Image Segmentation, RoofTop Detection, Cost Estimation, Area Estimation, Solar Panel, Energy Savings

I. INTRODUCTION

Research studies have stated that solar energy could be used to produce electricity that could serve the requirements of the present human population. However, most of the human population is either still not aware of that fact that solar energy can serve as a reliable source of energy or assume that it is a costly process to install a solar panel. So, this paper proposes a model that can give an estimate of the amount of savings that a consumer can make if he uses solar energy to meet his electricity needs. This model considers various factors such as the solar radiation factor of the region, weather conditions, the efficiency of the solar panel etc. This paper aims to convey the importance and feasibility of a renewable source of energy to serve the purpose while saving the non-renewable sources from extinction.

II. RELATED WORK

The research by Sara Najem[1] discusses the usage of Solar Analyst of ArcGIS to estimate Beirut's potential solar power gains from the installation of photovoltaic panels (PV) and calculate the number of benefitting subscribers. [2] discusses the extraction of rooftop images by integrating four co-relative priors namely depth cue, uniqueness, shape and transition surface in order to overcome the issues like different rooftop sizes and heights and provide more accurate results. In [3] the authors propose a system that calculates the distance between two points using Haversines formula from the Google Maps data. In [4] the authors propose a solution to calculate the solar potential using latitudes and longitudes of the building. The authors in [5] propose a system that is used to detect rooftop images from satellite imagery and also

helps to identify the areas of vegetation and shadows using color invariants. In [7] the author discusses an example system that provides a utility to predict the power generated from wind and solar resources based on the real time observations while addressing the Big Data needs.

III. EXISTING SYSTEM

In the existing system, there is no mechanism to detect, analyse and estimate the power savings from a rooftop image. While there is a system that used to detect the rooftop alone, there is another system that uses a different mechanism to predict the area of the rooftop. However, a system was built by using solar panels manually and put the region under observation for a period to estimate the savings. There are several disadvantages to the existing systems. Few of them are listed as follows:

- Requires excessive manual efforts
- No system to determine the solar potential directly
- Not considering the weather conditions of the region

IV. PROPOSED SYSTEM

As electricity is becoming one of the basic necessities for mankind and a major part of it is being generated using non-renewable sources of energy, there is a need to make humans realise that solar energy can serve as an alternative to serve their purpose. This paper proposes a system that can be used to estimate the savings that an individual can make by installing a solar panel on their rooftop. The model developed takes a rooftop image as the input and gives an estimate of the amount of money one can save by installing a solar panel. This model also considers the solar potential of the region, the irradiation factor and the weather patterns that are determined based on the location of the user. The fundamental tasks involved in determining the savings potential of the region are RoofTop detection and Extraction, Estimation of Area on Rooftop available to install a solar panel and calculation of Units that are generated using those panels.

A. Flow Chart

The flowchart of the proposed system(see fig 1.) represents the various steps involved in determining the solar savings potential of the region. In the first step, the model takes a rooftop image as the input which is processed and in the second step, the rooftops are detected and extracted using Hierarchical RGB-D priors as shown in [2]. In the third step, the extracted rooftop area is processed and the area up to which solar panels can be installed on the roof is estimated. The resultant area along with the irradiation factor, the solar potential of the region and efficiency of the solar panel are fed to the next step where the solar savings potential of the region is calculated.

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Influence of titanium oxide fillers on the tensile and flexural properties of E-glass fabric/epoxy composites

Balu Maloth [a] ⚇ ✉, N.V. Srinivasulu [b], R. Rajendra [c]

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Recent Trends in Mechanical Engineering pp 65–79

Non-premixed Combustion Analysis on Micro-Gas Turbine Combustor Using LPG and Natural Gas

Ch. Indira Priyadarsini ✉, A. Akhil & V. Srilaxmi Shilpa

Conference paper | First Online: 12 January 2020

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Abstract

Gas turbine effectiveness is mainly having an effect on design of combustor; in this work, studies have been made on different parameters of a typical micro-gas turbine (MGT) that changes the flow inside the burning area. A combustion room is created by utilizing SOLIDWORKS modeling tool and exported to workbench design modeler where computational fluid dynamics analysis is performed by ANSYS fluent. We considered a probability density function (PDF) of

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Non-premixed Combustion Analysis on Micro-Gas Turbine Combustor Using LPG and Natural Gas

Ch. Indira Priyadarsini, A. Akhil and V. Srilaxmi Shilpa

Abstract Gas turbine effectiveness is mainly having an effect on design of combustor; in this work, studies have been made on different parameters of a typical micro-gas turbine (MGT) that changes the flow inside the burning area. A combustion room is created by utilizing SOLIDWORKS modeling tool and exported to workbench design modeler where computational fluid dynamics analysis is performed by ANSYS fluent. We considered a probability density function (PDF) of LPG fuel with non-premixed combustion mode and activated in radiation model of P-1. Design criterions of chamber height and number of holes on flame tube are varied to get the optimum performance and also considered as two dead zones in between the combustion and dilution zone. The optimized design chamber resulted in a turbine inlet temperature (TIT) of 1301 °K with a velocity of 620 m/s and also is provided with low NOx emission below 54 ppm.

Keywords Micro-gas turbine · Radiation P-1 · CFD fluent · Non-premixed

1 Introduction

Energy is a crutial property in order to run any machine, one of the highest forms is an electrical mode which is easily transferred over a long stretch and can be generated almost anywhere by using proper technology. Solar PV cells or lense, windmills, turbines, both steam and gas, nuclear and hydro are some of mechanisms that produce energy. Out of all, gas turbine has its own merits over other types; therefore, it focuses on this aspect; it gives electrical power from the burning of inflammable fuels such as petroleum products, hydrogen gases, and air mixture; when the mixture burns, the

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An Experimental Investigation of Self Compacting Concrete containing Recycled Concrete Aggregates

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ABSTRACT:

There is an increasing demand for production of Self-Compacting Concrete (SCC) now in the present construction industry, which has its roots in the early 1980's. As everyone in the construction industry are searching for an alternative to traditional concrete, this SCC has been providing best solution and rectifying all the problems that were faced by using traditional concretes. The application of recycled aggregate in Self Compacting Concrete (SCC) is influenced by the quality of the concrete from which the recycled aggregates are generated. In recycled aggregates, mortar gets attached to it. The physical and mechanical properties of the recycled aggregates relate to the quality and quantity of the Recycled Aggregate Concrete (RAC) produced.

This paper highlights the properties of recycled concrete aggregates produced in Hyderabad (India) in comparison to the properties of Natural Aggregate prescribed in Indian Standards. It briefly discusses about some of the guidelines/specifications of recycled concrete aggregate adapted for structural applications in various countries, and also describes the outcome of tests carried out on the use of Recycled Concrete Aggregate in Self Compacting Concrete. Recycled aggregates used in this study were produced by crushing of Construction and Demolition Waste (CDW) collected from buildings being dismantled for renovation. Seven different concrete mixes were produced; five recycled concrete aggregate percentages viz. 0%, 25% 50%, 75% and 100% with varying fly ash content. Investigation on Utilization of RCA in M30, M50 and M70 grade Self Compacting Concrete based on the experimental studies carried out at Research center JNTUH–Hyderabad. on Self compacting concrete(SCC) made of recycled concrete aggregate(RCA), conclusions are drawn on their utilization for making concrete with the help of modified Nan Su mix design, regular mixing technique and with the addition of mineral admixtures. Tests were carried out for compressive strength, split tensile strength and flexural strength. The findings from the study show that the recycled concrete aggregate may be useful for construction industry as an alternative for natural aggregates. However, further research is needed particularly on the long term field performance of the recycled aggregate concrete before it can be used with confidence.

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Performance Characteristics of Self-cured Recycled Aggregate Concrete with SCM's

Lakshmi Thotakura, Sankar Kumar Reddy Pullalacheruvu, Ganesh Babu Kodeboyina & V. Krishna Rao Mupparisetty

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Abstract

Self-cured recycled aggregate concrete with shrinkage reducing admixtures is one of the pioneering researches in the construction industry. There is a possibility of depletion of natural resources due to prolonged consumption over a period of time in our modern civilization. In this research, characteristics of recycled aggregate concrete with supplementary cementitious materials (SCM) like powdered limestone and fly ash with self-curing agent PEG6000 were investigated along with the

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Mechanical and durability studies on blended pozzolonic concretes with fly ash & recycled aggregates

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ABSTRACT

This paper reports mechanical and durability studies of blended pozzolonic concretes. Blended concretes were produced by partially replacing the cement by 25 percent fly ash and the Natural Coarse Aggregates (NCA) were replaced by Recycled Coarse Aggregates (RCA) in different fractions of 0, 25, 50, 75 and 100 percentages. Mechanical properties like Compressive Strength, Stress Strain behavior, and Modulus Of Rupture (MOR) of concrete and durability studies like carbonation depth and accelerated corrosion are reported. Experimental studies revealed that the compressive strength, Stress Strain Curves, Modulus of rupture of blended concrete having a resemblance to conventional concrete with NCA, at an optimum replacement level of 25 percent of Fly ash by weight of cement and 75 percent RCA by weight of NCA. It is observed that the carbonation depths were increased with increased content of RCA. Charge Deterioration Factors (C_aDF) for a given effective cover, at a given duration of charging for NCA are lesser than that of RCA, which demonstrates corrosion resistance of NCA when compared to other mixes.
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1. Introduction

Mechanical properties of concrete governs the performance of concrete under various structural loading conditions. It has been reported in the literature that the compressive strength decreases generally from 10% to 20% than that of natural aggregate concrete with increase in RCA amount at the same w/c ratio [4,5]. The shape of the stress–strain curve for of Recycled Aggregate Concrete (RAC) was correlative to that of the Natural Aggregate Concrete (NAC), regardless of the RCA content, which leads to the denouement that there would be no objection in the design modus operandi and exercising the theory of plasticity [6]. The flexural strength of RAC has been found to decrease with increase in RCA replacement ratio [7].

This present study investigates compressive strength of concrete, Stress-Strain behaviour, and modulus of rupture with fly ash partially replacing cement and RCA replacing NCA. Experimental studies affirms that the compressive strength, elastic modulus and modulus of rupture are having a close similitude to standard concrete with NCA at an optimum replacement level of 25 percent of Fly ash and 75 percent RCA.

2. Experimental details

Two types of Concrete mixes i.e., M35 and M45 grades were proportioned with different replacement ratios of Natural Coarse Aggregates (NCA) to Recycled Coarse Aggregate (RCA) (100:0%, 75:25%, 50:50%, 25:75%, 0:100%) respectively. Fly Ash content is 25% by weight of cement in all the mixes.

Mechanical properties like Compressive strength, stress strain characteristics, modulus of rupture were evaluated on standard cubes, cylinders and prism specimens as per IS 516. Durability properties like carbonation depth and Charge deterioration factors were evaluated on Cylindrical specimens of size 150 mm diameter and 300 mm height and prism specimens of size 150mmx150mmx500mm respectively.
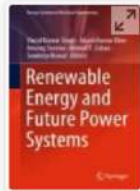
3. Materials

OPC 53 Grade conforming to IS 12269-2013 [8], and Class F fly ash conforming to IS 3812 (Part 2)-2013 [9], were used. Local river sand conforming to Zone II of IS 383:2016 [11] was used as fine aggregate. Natural Coarse Aggregate (NCA) considered for the

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Converter/Inverter Topologies for Standalone and Grid-Connected PV Systems

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Abstract

Selection of a suitable power electronic converter to meet the desired outcome for any sort of application is a major step. In the case of solar photovoltaic (PV) systems, the right selection of a converter has a significant impact on its efficiency. Over the past few decades, scholars have carried out a great deal of analysis to satisfy load specifications. The electronic power converters produced vary from several milliwatts to megawatts of power depending on requirements. A thorough analysis of these

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Dehaze Model to Improve Object Visibility Under Atmospheric Degradation

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Abstract—Optically captured images from the outdoor scenes will be humiliated by natural occurrences of Fog, Mist and Haze. This is due to atmospheric absorption and scattering of visible information, resulting in poor object visibility. It is necessary to estimate the quantifiable parameters of this atmospheric degradation to improve the visibility. Dehazing models attempt to estimate scattering parameters. Single image dehazing models are observed to possess estimation of inaccurate textures, thereby leading to blocking artifacts. The imbalances in the concentration of atmospheric particles and air-light are crucial, that should be mitigated. The available models have to be improved in terms of image parameters such as contrast, saturation and color information. The work reported in this paper emphasized the model that estimates intensified transmission map from the hazy images with color distortions and thereby exploiting scattering parameters for dehazing.

Index Terms—Semi-inverse image, Hue Disparity, Contrast, Depth map.

I. INTRODUCTION

Visibility is a measure of clarity of the atmosphere. A clear scene is obvious for low-level image analysis as well as for high-level object recognition. Outdoor image captured by the satellite or drone has large structured objects relatively represented by less number of pixels. The visibility degradation in aerially captured images is because of the terrible medium which consists of the particles and water droplets in the atmosphere.

The international definitions of visibility range for different weather conditions is depicted in Figure 1 [1]. Due to atmospheric absorption and scattering of the light from source to observer due to haze, fog, smoke, mist, etc., effects the information in the outdoor images. As a result, the contrast and color fidelity is lost in the outdoor images acquired under various weather conditions. The presence of different sources of interference in imaging makes its modeling very challenging. Therefore, recovering from degraded image is always a challenging task and it is ongoing interest in the image processing and computer vision fields.

Developing image dehazing techniques helps many real world applications like intelligent vehicles, remote sensing, under water imaging, etc. In security systems, detecting suspicious objects like aerial/balloon bombs, airdropping of

Figure 1: International definitions of visibility range [1]

weapons, small explosive devices lying on the ground, landmines, etc., is a cumbersome issue, when the scene radiance is degraded due to the atmospheric conditions. Apart from this, when the color of these objects is similar to the atmospheric background then it is a cumbersome task to identify them.

Scattering effects pose new challenges in the form of degradation on the computational aspects of image analysis [2]. The path radiance is the main contribution for hazy image and the haze transmission can be estimated using the dark pixels. Searching the dark objects locally in the whole scene can be used to construct haze thickness map [2]. Upon subtracting the haze thickness map from the hazy image, allows one to recover the haze-free image at the sensor. Therefore, there is a need to model a framework for enhancement of images which is insensitive to environmental conditions. The overview of dehazing models is discussed in the next section.

II. OVERVIEW OF DEHAZING MODELS

The dehazing models are of two kinds- non-model based and model based. The restoration performance of non-model based approaches such as Gamma-correction and Histogram equalization is not that effective when compared to model-based approaches to address all types of haze levels. The model-based restoration algorithms are classified based on the number of input images used for restoration. In multi-image haze models, images captured at different degrees of polarization using a polarizer [3], [4], [5] or a special imaging

Correlation Factor-based Fault-Phase Detection for Series Compensated Transmission Line

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Abstract— **Distance relays are designed to perform correctly on a resistive/inductive power system. If series capacitors are introduced, the voltage and current relationships deviate from their normal way especially when the fault levels are not sufficient to flash-over the gaps or to produce significant conduction in the Metal Oxide Varistors (MOV). A compensated line imposes problems to directional relaying schemes due to voltage and current inversion situations, operation of MOV which protects series capacitor and reactance modulation issues. In this paper, a novel methodology is proposed to identify faulty phases based on correlation factor computation. The presented method is tested on series capacitor compensated transmission lines (SCCTLs) for the IEEE-14 and IEEE-57 test systems. Simulation results show that the proposed method has identified the correct fault zone. Simulations are done using PSCAD/EMTDC platform.**

Keywords— Distance Relay, Series Capacitor, Series compensated transmission line, MOV, PMU, wide-area monitoring system(WAMS), supervise zone of protection, adaptive out-of-step relaying.

INTRODUCTION

The series capacitor protection unit may affect the accuracy of fault location in transmission line. Its location in the middle or end of the line can affect the accuracy of the result [1]. Without phase of the fault detection, the fault detection problem is incomplete. If any communication link fails in the network, then information required to obtain fault detection will be incomplete. Fault direction estimation is also an important part in a fault detection algorithm. The Estimated fault direction may be either upstream or downstream should be investigated.

A phasor-based technique for fault location is described in [1]. Paper [2] has described a fault location technique on double-circuit series-compensated lines using two-end unsynchronized measurements. Here MOV is considered in its natural environment without having any modeling inaccuracies. A nutshell about introduction to a phasor-based fault location algorithm is presented in [3]. In Ref. [4] MOV is considered in the natural environment and it is avoiding any modeling inaccuracies.

The presence of a series capacitor and its overvoltage protective devices (metal–oxide varistor (MOV) and/or air gap) create problems to distance relaying based transmission-line protection. Different problems associated with relays have been discussed in [5, 6] that include phenomena like voltage/current inversion, sub-harmonic oscillations, transients etc.

But, the above literature has failed in considering the impact of the series capacitor protection unit, detection of Phase of the fault, considering the communication link failure and, in fault direction estimation.

In this paper, the behavior of series compensated EHV transmission lines during faults is simulated. The importance is given on the impact of capacitor protection on modern techniques (MOV protection). A novel methodology is proposed to identify faulty phases based on correlation factor computation. Under various fault conditions, the proposed method is tested for its validation. The presented method is tested on series capacitor compensated transmission lines (SCCTLs), IEEE 14 bus and IEEE 57 bus test system with their various configurations and contingency combinations and performance is observed with transmission line both end voltage profiles. Distance characteristics are also drawn for various zones of protection. This faulty phase identification algorithm gives better results compared to the detection of faulty phase by imposing the tolerance limit method and the polar plot analysis gives more insight about the zone of the fault and chance of mal-operation.

I. SINGLE AND MULTI-PHASE FAULT PHASE DETECTION

In the proposed work, a novel methodology is proposed to identify faulty phases based on correlation factor computation. Linear correlation coefficient r is a measure of how similar the two signals or variables are. The mathematical expression for computing r is as follows:

$$r = \frac{n\sum AB - (\sum A)(\sum B)}{\sqrt{n(\sum A^2 - (\sum A^2)}\sqrt{n(B^2) - (\sum B^2))}} \quad (1)$$

Here, n indicates the number of pairs of data. The value of r varies between -1 to +1. The positive and negative signs indicate positive linear correlations and negative linear correlations, respectively.

Positive Correlation: A and B vectors are said to have a strong positive linear correlation if r value is near to +1. If r value is exactly +1, then it indicates a perfect positive fit. A Positive

A Modified H-Bridge TransformerlessPhotoVoltaic Neutral-point-clamped inverter with constant common mode voltage"

A Modified H-Bridge Transformerless PhotoVoltaic Neutral-point-clamped inverter with constant common mode voltage

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Abstract—Nowadays, transformerless PV inverters (TPVI) are more popular due to its excellent features such as lower in size, cost and higher in efficiency, as compared with conventional inverters. Undoubtedly it leads dangerous leakage current via stray capacitors to the ground, which results higher current ripples and problems related to electromagnetic interference (EMI). Therefore, a several configurations have been proposed with reduced leakage current and constant common-mode voltage (CMV). In this paper a modified H-bridge structure is proposed with rectifier circuit at mid-point of the dc-link capacitor to keep constant CMV in the whole grid cycle namely M-HB topology. The theoretical findings of the M-HB inverter are tested through simulation results. At the end a fair comparative analysis is presented.

Keywords— Transformerless PV inverter, H-bridge inverter, stray capacitors, common-mode voltage and leakage current.

I. INTRODUCTION

In present market, photovoltaic (PV) energy is more favourable due to increased population and industries [1]- [2]. Recently, PV installations are incorporated with the grid connected systems due to its robustness, decreased cost and high in efficiency. In grid connected PV applications inverters are enormous role to convert the direct current (DC) to the alternating current (AC). Based on the operating principles, it can be classified into two types namely with transformer inverter and without transformer inverter or transformerless PV (TPV) inverters. Due to the demerits of with transformer such as an additional transformer is required for isolation purpose, which leads to increased size, weight, cost and poor efficiency [3]. Aforementioned issues can be overcome via TPV inverters but issues related with galvanic isolation are highlighted due to absence of the transformer between the PV to the grid [4].

In the literature, several topologies and corresponding control strategies have been introduced and published [5]-[7] to incorporate a super-junction metal-oxide-semiconductor field-effect transistors (SJ-MOSFETs) in TPV inverter design. The MOSFET solutions are extremely dominating in the present industry as compared with IGBT because the turn-off loss caused by tail current is mitigated. Here a few basic H4 based configurations are reviewed first to observe the common-mode behaviour and leakage current performance in grid-tied applications. By placement of the decoupling switches into the basic H4 structure, SMA H5 topology becomes more popular in the market, as shown in Fig.1. (a). So that it can realized with three MOSFETs (S2, S4, S5) and two IGBTs (S1, S3) for high efficiency applications. The decoupling switch S5 is used to isolate the PV and the grid during freewheeling periods.

Another attractive structure for high efficiency application is Heric topology by sunways, as shown in Fig.1(b). It can be realized with four MOSFETS (S1-S4) and two IGBTs (S5, S6), which are placed on the grid side to provide the galvanic isolation during freewheeling periods. Another topology namely a hybrid-bridge (HB) [8] structure is realized with six MOSFETs and two diodes by using decoupling scheme, as shown in Fig.1. (c). However, the major issues in H5, Heric and HB structures are floating CMV and hence higher leakage current. It can be confirmed that only galvanic isolation is not able to eliminate the complete leakage current due to the effect of switches' junction capacitances and stary parameters.

Further, a neutral-point-clamped (NPC) structures are introduced to overcome the issues in decoupling topologies (H5, Heric and HB), namely H-bridge zero voltage rectifier (HBZVR), H-bridge zero voltage rectifier diode (HBZVR-D), as shown in Fig.1. (d) and Fig.1. (e). In HBZVR, the clamping branch is made with a rectifier bridge (S1-S4, D1-D4) including one additional diode (D5) at midpoint of the dc-link and hence oscillating CMV during the freewheeling periods. As a result, leakage current is not eliminated completely. Similarly, in HBZVR-D the structure is similar to HBZVR except in the clamping branch such as adding a one extra diode (D6) at midpoint of the dc-link and hence constant CMV with low leakage current.

An improved HB (I-HB) structure, which is similar to the HB except in clamping branch such as realized with two switches (S7, S8) at mid-point of the dc-link, as shown in Fig.1(f) [9]. Nonetheless, it has a higher switching count during the freewheeling periods and hence poor system efficiency. So, from the above discussions, it is revealed that, CMV clamping structures are more versatile and leading in the present market PV applications [10].

Hardware Implementation and MATLAB Simulation of Automatic power factor correction

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Abstract: Power factor is one of the major important concerns in the field of power quality engineering. Power factor is a measure of how we are using our electric energy in more efficient way. Since it plays critical role on every electrical appliance, many researches are going on to improve power factor. Low power factor leads to high capital expenditures and operating cost for distribution utilities which in turn may impose penalty charges in the form of higher tariff charges on electric consumers. This paper presents the automatic power correction by installing real time hardware by automatically switching on the required capacitive banks on observing the phase difference between voltage and current and also comparing the results with MATLAB/SIMULINK.

Keywords: automatic Power factor correction, capacitive banks, choosing capacitor capacity.

1. INTRODUCTION:

In the field of power system engineering, it is mandatory requirement to have voltage regulation and power factor in permissible limits. Power factor is defined as the ratio of active power to the apparent power in any electrical installations. It is also defined as the phase difference between voltages and currents in ac systems which are expressed in the fig.1. It acts as one of the good indicators in the load current on the efficiency of the supply system.

Suppose, if a system is running with lower power factor, it draws heavy current than required normal current and causes voltage drops which results to the excessive heating of electric components over the system and thus causes damage to the equipment. The main cause of lower power factor is increase in power electronic loads, evolvement of larger industries with growing demand.
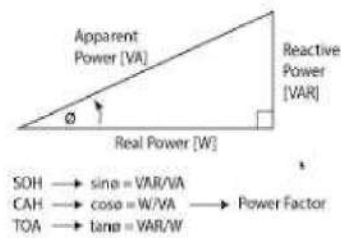

Fig.1 Power triangle

Improvement in power factor not only gives efficient power, but also decreases the cost and increase the durability of equipment. The benefits of improving power factor[1][2] are 1. Avoiding power factor penalties-As most of the industries use high capacity induction motors, conveyors and other machinery equipment. 2. Chance of getting low power bill-since distribution utilities are imposing penalties for recording lower power factor. 3. Increase in load carrying capabilities in electric circuits- as some loads are capable of drawing reactive power. 4. Improved voltage- by installing required capacitor banks across the loads improves power factor. 5. Reduced losses in power system.

2. POWER FACTOR CORRECTIONS

There are some standard techniques for improvement of power factor. Of course many techniques are published in various papers[3][4][5].

Static Capacitors- This method is mostly used in factories by connecting capacitors in parallel with the equipment operating at lagging power factor. The static capacitor draws a leading current or neutralizes the lagging reactive component produced by the

Present Day Lithium Ion Battery

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Abstract—Lithium-ion battery is potentially to be adopted as energy storage system for green technology applications due to its high-power density and high energy density. An accurate battery model in simulation platform is very important to design an efficient battery-powered system. In this paper, an electrical battery model is developed in MATLAB/Simulink.
Keywords—Li-ion Battery, BMS, SOC, Matlab/SImulink

I. INTRODUCTION

A battery is a device that converts the chemical energy into electrical energy by means of an electrochemical reaction called oxidation - reduction (redox). Each oxidation and reduction reactions are associated with the standard cell potential E^0, which can be calculated from the thermodynamic information as follows,

$$E^0 = (-\Delta G)/zF$$

Where, ΔG standard Gibbs fiee energy, z - number of electrons exchanged and F- faraday constant. The overall theoretical cell voltage ΔE^0 is obtained by subtracting the negative electrode potential $E^{0(-)}$ from the positive electrode potential, $E^{0(+)}$.

$$\Delta E^0 = E^{0(+)} - E^{0(-)}$$

Although the term "Battery" often used, the basic unit is called electrocl~emica l cell.

Batteries are one of the earliest technologies in the field of energy storage. A battery consists of several cells which is called electrochemical cells. A battery consists of anode, cathode and electrolyte. The process consists of flowing of electrons from cathode to anode and ions from anode to cathode across the cell through the electrolyte. A battery may contain "n" number of cells. The storage capacity of battery is expressed in Ampere hours (Ah).

The important parameters of batteries are state of charge (S.o.C), state of discharge (S.o.D), Voltage, Current, Power density, Energy Density etc. The capacity of a battery is expressed as

$$Q = I^*t \qquad (1)$$

Where I= Current and t = time of charge /discharge.

TABLE I. COMPARISON OF PB-ACID, NI-MH AND LI-ION PERFORMANCE:

|	Pb-acid	Ni-MH	Li-ion
Theoretical			
Voltage (v)	1.93	1.35	4.1
Specific Energy (Wh/Kg)	166	240	410
Practical			
Specific Energy (Wh/Kg)	35	75	150
Energy Density (Wh/L)	70	240	400
Coulometric efficiency	0.80	0.65-0.70	>0.85
Energy efficiency	0.65-0.70	0.55-0.65	~0.80
Power density (W/L)	450	>300	>800

In recent years, the rechargeable battery market further expanded and tends to increase continuously. The worldwide sales for Li ion portable batteries is 63% and it is larger than those of Ni-Cd (23%) and Ni-MH (14%), which indicates that lithium battery technology receives most attention. Ever growing demand for batteries lead the industry and government liberally invest in battery research and development. The investment of industry is focused on improving battery technology for communication, mobile electronics and computer technology, whereas majority of government funded research is for military, spacecraft, transportation, etc. Requirement for improving the battery properties included cyclability, reversibility, high energy, power density, safety, environmental impact, lower cost, etc. Hence, a wide range of materials (anodes, cathodes and electrolytes) have been developed and investigated for the improved lithium battery technology.

II. LITHIUM BATTERIES

Lithium is the lightest of metals and it floats on water. It also has the greatest electrochemical potential which makes it one of the most reactive of metals. These properties give Lithium the potential to achieve very high energy and power densities permitting batteries with very long useful life and small cell packages.

Li-ion batteries are commanding a greater market share owing to their high energy density, which makes them attractive for applications where weight or volume are important (e.g., HEVs). They have a long cycle life (>500 cycles) and low self-discharge rate (<10% per month). High initial cost has limited their use in price-sensitive applications, but new chemistries and economies of scale promise to reduce the cost of Li-ion batteries in the future.

Fig 1 shows a schematic diagram of an Li-ion cell. A lithium metal oxide (LiMO2), where M stands for a metal such as Co, and lithiated carbon (Li_xC) are the active materials in the positive and negative electrodes, respectively. The metal in the positive electrode is a transition metal, typically Co. The active materials are bonded to metal-foil current collectors at both ends of the cell and electrically isolated by a microporous polymer separator film or gel-polymer. Liquid or gel-polymer electrolytes enable lithium ions (Li+) to diffuse between the positive and negative electrodes. The lithium ions insert into or de insert from the active materials via an intercalation process.

In the positive electrode during charge, the active material is oxidized and lithium ions are de-intercalated as follows:

$$Li_{1-x}CoO_2 + xLi^+ + xe^- \underset{charge}{\overset{discharge}{\rightleftharpoons}} LiCoO_2. \qquad (1)$$
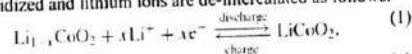
In the negative electrode during charge, the active material is reduced and lithium ions that migrate from the positive electrode and through the electrolyte and separator are intercalated in the reaction

Control of Two Level Converter based STATCOM with Battery and Ultracapacitor

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Abstract — Integration of renewable energy based Distributed Generation (DG) units into the Electrical Distribution Network (EDN) has attained significant interest to utilize the locally available resources. But, these DGs injects fluctuating power into the network which affects the voltage/frequency instability of the EDN. Thus, an energy storage system and reactive power compensating devices has to be employed in the EDN, to improve the voltage/frequency stability. A configuration for E-STATCOM has been presented in this paper, which has the ability to provide active and reactive power support together. The E-STATCOM is formed by distributing Hybrid Storage System (HSS) into a two-level Voltage Source Converter. To meet the high energy/power density requirements, battery and ultracapacitor have been employed as HSS. The issues related to integration of HSS with the two-level converter and the control methods to extract E-STATCOM features like active power support, voltage regulation are discussed in this paper. A super-twisting sliding mode control has been employed for the battery fed DC-DC converter to provide the required energy support. The performance of the proposed system and the associated control methods are verified through PSCAD/EMTDC simulation for a wind energy-based DG connected to EDN and the results show effectiveness of the E-STATCOM.

Keywords— Bi-directional DC-DC converter, Fractional order sliding mode control, Hybrid storage system, STATCOM, Ultracapacitor, Wind energy generation.

I. INTRODUCTION

The increase in demand for energy and reduction of fossil fuels necessitate the generation based on Renewable Energy Resources (RER). Also, it is serving as an effective solution to use the locally available resources to meet the energy demands. Among the different types of renewable energy resources, wind and solar energy based generations are increased at double fold rate due to high conversion efficiency, ease of operation and low installation cost, etc. However, these resources generate fluctuating power due to stochastic nature of solar insolation level and wind velocity. The voltage and frequency stability of the existing EDN are affected by injecting the variable power generated by the DGs. Hence, for the improvement of system stability, strict grid codes have to be followed [1]. The following list presents some of the requirements during integration of large renewable energy resources into the grid [2],

- Reactive power support
- Harmonic filtering
- Active power smoothening
- Unbalance mitigation

To integrate the DG into the electrical distribution network, an interfacing converter is employed. They injects variable power into the grid due to MPPT operation. Due to limitation in their ratings, these converters are unable to provide the required grid codes at common coupling point. So, they are dedicated for active power injection only. Thus, to provide the above listed features, ancillary systems are to be employed [3]. The features, like reactive power support, harmonic filtering, etc. can be provided by a STATCOM [4]. An Energy Storage System (ESS) is also to be employed for active power support [5]. The use of two different systems (i.e, ESS and STATCOM) results in reduction of overall efficiency. At the Point of Common Coupling (PCC), an 'E-STATCOM' can be can be connected to supply the required grid codes [6].

An E-STATCOM can be formed by connecting an ESS with STATCOM, which has the capability to support active power for definite duration and also caters the power quality issues. In [7], the battery-based storage system is employed to smoothen the power generated by a Wind Energy Generation System (WEGS). The battery storage system is lumped at the dc-link of two-level converter and the systems supplies only active power at the PCC. Ultracapacitor based storage system to smoothen the wind power has been studied in [8]. Apart from the control of storage system in E-STATCOM, the most desirable features of an ESS are to support loads with high energy/power density. Also, they should have the other qualities like high operation efficiency, longer life span, low installation cost and less maintenance. Among the available storage systems like batteries, ultracapacitor (UC), pumped storage, fly-wheels, etc. [9], none of them alone is capable to deliver the features as state above. So, it is effective to combine two/more types of energy storage system to obtain the desired features. This kind of storage system is termed as HSS [10]. One such combinations of HSS is battery and UC. The performance of battery and UC based HSS for active power support in electric vehicles has been studied in [11]. The same configuration has been employed to improve the frequency regulation of a stand-alone microgrid, and its performance has been presented in [12].

Hybrid Flying Squirrel Search Algorithm for solving the single objective optimization power flow problem in power system

85. HYBRID FLYING SQUIRREL SEARCH ALGORITHM FOR SOLVING THE SINGLE OBJECTIVES OPTIMAL POWER FLOW PROBLEM IN POWER SYSTEM

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In this paper, a novel and recently developed algorithm which is inspired by natural foraging phenomenon of the flying squirrel named as Squirrel Search Algorithm is used and it is hybridized with arithmetic crossover operation to enhance its effectiveness and being used for solving the single objectives optimal power flow problem (OPF) of power system. So, the proposed algorithm is named as Hybrid Flying Squirrel Search Algorithm (HFSSA). The capability and performance of the proposed algorithm is observed on benchmark test functions and on IEEE-30 bus system. Generation fuel cost, emission and transmission losses are considered as objectives of optimal power flow problem. The obtained results will be compared with the existing literature to justify the supremacy of the proposed method.

Performance Enhancement of Isolated Forward Converter using PI Controller

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Abstract

Isolated Forward Converter is designed using standard topology, and commercially available application specific Integrated circuit. Methodology of choosing components, selection of values, design of magnetic like Inductors, Capacitors, and transformers has been expounded. The design is simulated on MATLAB software and tested. Mathematical Model for the above DC-DC converter is derived and a transfer function is obtained. The frequency response of the converter is plotted using MATLAB. Additional components for compensation based on frequency are also designed. The above design has been successfully tested on the hardware and waveforms at various points have been measured practically. Keywords: Forward Converter, PI Controller, TL3843.

I. Introduction

Modern electronic systems require high quality, small, light weight, reliable and efficient power supplies. Linear regulators can provide a very high quality output voltage. Their main area of applications is at low power levels as low drop-out voltage regulators. Electronic devices in linear regulators operate in their active (linear) mode. At high power levels switching regulators are used. Switching regulators use power electronic semiconductor switches in ON and OFF states. Since there is a small power loss in those states, switching regulators can achieve high energy conversion efficiencies. Modern power electronic switches can operate at higher frequencies resulting in smaller size of the transformer. A forward converter is discussed here as it is more energy efficient and used for higher power output applications ranging from 100W to 200W. The dc-dc converters can be classified into two categories:

- Isolated dc/dc converters
- Non-isolated dc/dc converters

A. Isolated Converters

This "isolation" refers to the existence of an electrical barrier between the input and output of the DC-DC converters. Isolation describes the electrical separation between the input and output of a dc-dc converter which uses a transformer to eliminate the dc path between its input and output and will have a high frequency transformer providing that barrier. This barrier can withstand anything from a few hundred volts to several thousand volts, as is required for medical application. A second advantage of an isolated converter is that the output can be configured to be either positive or negative.

B. Non-Isolated Converters

Non-isolated dc-dc converter has a dc path between its input and output. The non-isolated converter usually employs an inductor, and there is no dc voltage isolation between the input and the output. Battery-based systems that don't use the ac power line represent a major application for non-isolated dc-dc converters. For lower voltages (12V) non-isolated buck converters can be used. Non-isolated dc-dc converter designs usually employ ICs specifically intended for that purpose.

II. Isolated Forward Converter

In this the source ground and load ground are electrically separated but magnetically coupled then the circuit is said to be isolated one. The output voltage in forward converter depends on the duty ratio and also on the turn's ratio of the transformer.

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Optimized Control Technique of Active Power Filter in 25KV Electric Traction System

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Abstract

AC railway traction systems undergoes to armonic distortions due to unbalanced voltages nd currents. These single-phase networks have CR-based electric locomotive drives which ontinually change their point of connection on the etwork. Active power filters are the only effective ontrol strategy is to inject harmonic compensating urrents derived from harmonic voltages measured the point of common coupling. This paper shows ow synchronously rotating frames helps us to xtract individual harmonic voltages to act as urrent injection references. This paper discusses ie evaluation of performance of control strategy sing MATLAB/ Simulink.

Keywords-Active power filter, Harmonic oltages, Electric Locomotive Drive

Introduction

In industrial, commercial and residential applications, nower electronic equipment's connected to the cr systems, such as switched power supply, cyclo- nverters, inverters for driving AC motors, controlled id non-controlled rectifiers for driving DC motors, nong are widely used.

AC electrified railway systems consist of a 25KV edicated 1-phase supply network from which the comotives draw power. In early days electric comotive are driven by DC motors which requires a comotive are driven by DC motors which requires a hyristor-based rectifier converters to provide voltage ontrol. These types of locomotives, which are still in rvice not only draw a significant amount of lagging ad current at the fundamental frequency but also inject ad current at the fundamental frequency but also inject vere levels of harmonic current. The currents enerated by these nonlinear loads can degrade the

power quality (PQ) in the electrical power systems by distorting utility of voltage. The harmonic currents injected by electric locomotives can result in a range of traction system problems, including trackside over- voltages, increased voltage form factor and excessive low order harmonic currents being fed back into the HV supply. Figure.1 illustrates the pantograph voltage waveform obtained at the end of a 35km feeder section loaded with four 2.5MW locomotives operating at full power. The voltage waveform shows a resonant over- voltage and an increased voltage form factor.

The increasing of non-linear loads makes the use of active power filters an interesting way to eliminate harmonic currents as well as reactive power compensation. The harmonic currents injected by electric locomotives can result in a range of traction system problems, including trackside over-voltages, increased voltage form factor and excessive low order harmonic currents being fed back into the HV supply. Figure.1 illustrates the pantograph voltage waveform obtained at the end of a 35km feeder section loaded with four 2.5MW locomotives operating at full power. The voltage waveform shows a resonant over-voltage and an increased voltage form factor.

Resonant over-voltages may leads to failures of equipment connected to the system, while an increase in form factor means that the maximum power available to each locomotive is reduced. To reduce this voltage distortion, some form of filtering action is required. The topology proposed in this paper is to use a shunt active filter.

Geothermal Power Generation: Global Updates

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Abstract— The demand for electric power is increasing day-by-day with the population in the world. The supply of power is unable to meet the demands. So, in order to bridge the gap between supply and demand switching over to alternate sources of energy is inevitable, that too renewable. Geothermal energy is one of which the world can rely on. Geothermal is the natural heat of the earth and is derived from the decay of radioactive elements in the earth's crust and transferred to the subsurface by conduction and convection. This paper presents the global status of geothermal energy and contributions from various countries. This paper also emphasizes the merits of geothermal energy over other renewable, which generate electricity.

Keywords— Geothermal Power, Installed Capacity, Global

I. INTRODUCTION

The word 'geothermal' is derived from the Greek words 'thermal' which means heat and 'geo' which means earth. This energy comes from deep inside the earth where the earth's core is hotter than the sun's surface. Geothermal energy is generated in the earth's core almost 4000 miles underneath the earth's surface. It is called a renewable energy source, because the water is replenished by rainfall and the heat is continuously produced deep within the earth. The slow decay of radioactive particles in the earth's core produces geothermal energy. This process is natural in all rocks. Due to this process, very high temperatures are continuously produced inside the earth. Wells can be dug and hot water can be pumped to the surface. People around the world use available geothermal energy to maintain the temperatures inside the homes warm and to produce electricity. Geothermal electricity generation requires hot water or steam at high temperatures of the order (300°F to 700°F) range to be drawn from deep inside the earth. This requires deep well to be drilled which may act as a reservoir of energy.

The geothermal power plants all over the globe use the naturally available hot water and steam from the earth's interior to turn turbine generators for producing Electricity.

For centuries, geothermal springs have been utilized for bathing, heating and cooking. Only in the early 20th century, people started to consider geothermal energy as a practical source of energy with huge potential. Apart from heating, geothermal energy is now used to produce electricity. Some other applications include cooling buildings as well as for other industrial purposes like fruit and vegetable cultivation.

World energy demand increased by 2.1% in the year 2020 relative to 0.9% in the year 2019[1]. This rise is mainly supported by fossil fuels, but these fuels are depleting day-by-day. In addition to this, CO_2 emissions are not contained which is resulting in Global Warming. Temperature increases with depth in the earth at an average of 25°C/km. If the average surface temperature is 20°C, the temperature at 3km depth would be in the order of 95°C. Among all the energy sources, geothermal energy presents one of the most eco- friendly and clean energies. This is due to its lowest emission of greenhouse gases and also because it is a cost-effective energy source with the potential to replace conventional fossils for electricity generation and heating [2]. Most of the world's energy potential of geothermal sources account for the deposits with a fluid temperature below 130°C [3]. Volcanoes, hot springs, geysers and fumaroles are some of the visible features of geothermal energy. The most active geothermal resources are usually found along major tectonic plate boundaries where earthquakes and volcanoes are concentrated. Most of the geothermal activity in the world occurs in an area called the Ring of Fire [4] as shown in Figure.2. This area borders the Pacific Ocean.

The sequence of steps involved in building a large geothermal power project is represented in the block diagram as shown in Figure.1.

There are three types of geothermal power plants: (i) dry steam power plants (ii) flash steam power plants and (iii) binary cycle power plants. Among all these types, flash steam power plants are widely used to generate geothermal fueled electric power.
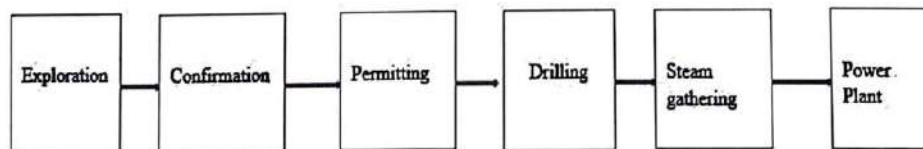

Figure 1. Block diagram representing various steps.

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Compressed Sensing Based Mixed Noise Cancellation in Passive Bistatic Radar

D. Venu ✉ & N. V. Koteswara Rao

Conference paper | First Online: 18 January 2020

481 Accesses

Part of the Learning and Analytics in Intelligent Systems book series (LAIS, volume 9)

Abstract

This paper proposes a unique compressed sensing based pathway to improve mixed noise cancellation in Passive Bistatic Radar (PBR). Mixed noise is considered as Additive White Gaussian Noise (AWGN) including Impulse Noise (IN). The proposed technique applies a best sparsifying basis that adapts to the structure of the problem and reduces the size of the measurement matrix drastically. According to simulation results, it has been confirmed that the proposed system gives higher state estimation

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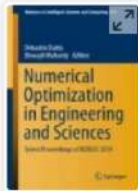
Numerical Optimization in Engineering and Sciences pp 583–589

Predictive Data Optimization of Doppler Collision Events for NavIC System

P. Sathish & D. Krishna Reddy

Conference paper | First Online: 08 April 2020

442 Accesses

Abstract

Navigation with Indian Constellation (NavIC) is satellite-based navigation system developed by Indian Space Research Organization (ISRO), India. It consists of seven satellites, among them, three are geostationary (GEO) satellites, and the rest are geosynchronous satellites. There are several factors that effect the positional accuracy of the NavIC system, and among them, one of the important parameter is Doppler collision (DC). The occurrence

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Improving Response Time of Ambulance using Machine Intelligence

Publisher: IEEE | Cite This | 📄 PDF

Jawad Mohiuddin Syed ; Dhana Lakshmi Namburi   **All Authors**

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Abstract

Document Sections

I. Introduction

II. Methodology

III. Results and Discussion

IV. Conclusion

Authors

Figures

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Keywords

Metrics

Abstract:

To become one of the best countries in the world, India must have one of the best health services across the globe. The quality of health services of a country surely depends a lot on the doctors and facilities available but an important aspect which is not taken into consideration is the response time it takes for an ambulance to reach its patient. In this project, I aim to improve that response time by trying to eliminate the time wasted in traffic as much as we possibly can by placing cameras to detect an ambulance in range and then assist its passage smoothly out of the traffic jams. Detecting objects in images is quite trivial but to detect objects in a video is challenging. By applying this approach, we can hope to improve the health services of our country.

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"Preliminary Analysis of Doppler Collision Occurrence in Various Kinematic Conditions for NavIC System"

Preliminary Analysis of Doppler Collision Occurrence in Various Kinematic Conditions for NavIC System

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Abstract: India has designed it's own regional navigational system, NavIC(Navigation with Indian Constellation) which is the operational name of Indian Regional Navigation Satellite System(IRNSS) developed by ISRO. It consists of seven satellites out of which four are geosynchronous and three are geostatiomal satellites. All the satellite based navigation systems are prone to errors induced by troposphere, ionosphere, difference in timing clocks used and relative motion between the satellites and user. One such phenomenon that introduces tracking errors due to geostationary satellites is 'Doppler Collision'. The impact of Doppler Collision(DC) is significant for precise user position estimation in static and various dynamic conditions. The aim of this paper is to analyze the Doppler Collision occurrence in kinematic conditions for various DLL(Delay Locked Loop) bandwidths. An efficient algorithm needs to be developed for the analysis of Doppler Collision in order to minimize the tracking errors. It is found that DC occurs for 33.4 minutes in 1C and 1G whereas 5.88 minutes in between 1C and 1F and for 6.416 minutes in between 1F and 1G satellites.

Keywords: Doppler Collision(DC), NavIC, dynamic conditions, geostationary satellites(GEO)

I. INTRODUCTION

Global Navigation Satellite System(GNSS) is a satellite based navigation system that estimates the position, velocity and timing of the user anywhere on the globe. This term is a combination of GPS, Galileo, GLONASS, Beidou, NavIC and other regional systems[1] Indian Regional Navigation Satellite System (IRNSS) is an independently developed satnav system, designed controlled by the Indian Space Research Organization (ISRO). NavIC provides precise real-time positioning services covering India and extend upto 1,500 km around it. The system presently consists of a constellation of seven active satellites. Three of those seven satellites in constellation are geostationary satellites (GEO) and four are geosynchronous satellites(GSO) [2] The main difference between GSO and GEO is in their inclinations with respect to the equator of the earth. Geosynchronous satellites will have more inclination where as geostationary satellites will have very less or no inclination at all with respect to the equatorial plane of the earth. An
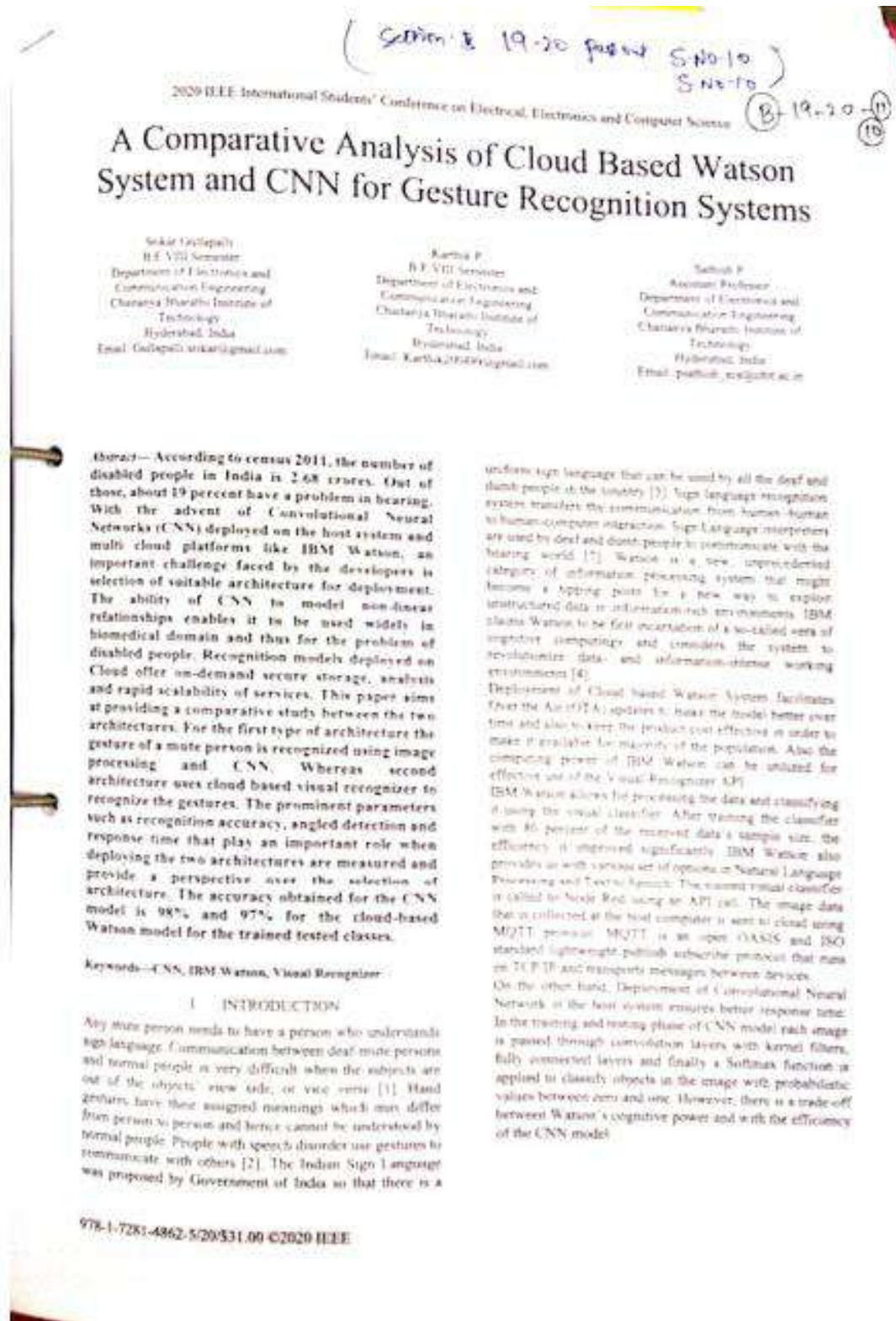
IGS(IRNSS GPS SBAS) receiver has been established in the NCRC laboratory, ECE department, CBIT, Gandipet, Hyderabad. The IGS receiver operates on two frequencies L5(1176.45MHz) & S1(2492.028MHz) The receiver also operates with GPS & SBAS(GAGAN) signals in L1(1575.42MHz).

One of the main errors to which all global and regional satellite systems are prone to is Doppler Collision Doppler Collision is a phenomenon seen in code-division multiple access(CDMA) systems. The code measurement errors which are developed in GNSS as a result of cross correlation between two or more satellites is due to the occurrence of Doppler Collision. When the relative Doppler between two satellites is less than the receiver DLL bandwidth then Doppler Collision may occur. When the difference in distance between the auto correlation and cross correlation peaks is less than 24dB, then the receiver cannot distinguish between them resulting in Doppler Collision[6] Thus the receiver views one satellite to be another and tracking errors are caused. In NavIC geostationary satellites are used due to which Doppler Collision will happen twice a day and last several minutes and even more. The lower the relative doppler will be, the longer the interference will be significant and more will be the error in position[4] The important parameters that contribute to Doppler Collision is Relative Doppler and the other parameters are Relative code delay, Signal power, Relative carrier phase, Cross Correlation function and Message data[8] Occurrence of DC depends on the mentioned six parameters but the necessary condition for it's occurrence will have to be the relative Doppler being less than the receiver code loop bandwidth When the Doppler of two satellites are equal, it is possible to introduce a multipath-like error into the tracking of the correlation peak[9]

The receiver position is not significantly effected in low dynamic conditions because of less doppler shift. But in high dynamics, the receiver position is highly erroneous because the Doppler shift value changes rapidly. In high dynamic true receiver position can be found by controlling the performance parameters of the receiver. In low dynamics the typical Doppler range for standard GPS receiver is ±7KHz and in high dynamics, the variation of doppler frequency will be in the range of ±100KHz with a doppler rate of 1Hz/s and 100Hz/s respectively. Precise point positioning applications

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A Comparative Analysis of Cloud Based Watson System and CNN for Gesture Recognition Systems

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Abstract— According to census 2011, the number of disabled people in India is 2.68 crores. Out of those, about 19 percent have a problem in hearing. With the advent of Convolutional Neural Networks (CNN) deployed on the host system and multi cloud platforms like IBM Watson, an important challenge faced by the developers is selection of suitable architecture for deployment. The ability of CNN to model non-linear relationships enables it to be used widely in biomedical domain and thus for the problem of disabled people. Recognition models deployed on Cloud offer on-demand secure storage, analysis and rapid scalability of services. This paper aims at providing a comparative study between the two architectures. For the first type of architecture the gesture of a mute person is recognized using image processing and CNN. Whereas second architecture uses cloud based visual recognizer to recognize the gestures. The prominent parameters such as recognition accuracy, angled detection and response time that play an important role when deploying the two architectures are measured and provide a perspective over the selection of architecture. The accuracy obtained for the CNN model is 98% and 97% for the cloud-based Watson model for the trained tested classes.

Keywords—CNN, IBM Watson, Visual Recognizer

I. INTRODUCTION

Any mute person needs to have a person who understands sign language. Communication between deaf mute persons and normal people is very difficult when the subjects are out of the objects view side, or vice versa [1]. Hand gestures have these assigned meanings which may differ from person to person and hence cannot be understood by normal people. People with speech disorder use gestures to communicate with others [2]. The Indian Sign Language was proposed by Government of India so that there is a uniform sign language that can be used by all the deaf and dumb people in the country [3]. Sign language recognition system transfers the communication from human-human to human-computer interaction. Sign Language interpreters are used by deaf and dumb people to communicate with the hearing world [1]. Watson is a new, unprecedented category of information processing system that might become a tipping point for a new way to explore unstructured data in information-rich environments. IBM credits Watson to be first incarnation of a so-called new of cognitive computing and considers the system to be revolutionize data- and information-intense working environments [4].

Deployment of Cloud based Watson System facilitates Over the Air (OTA) updates to make the model better over time and also to keep the product cost effective in order to make it available for majority of the population. Also the computing power of IBM Watson can be utilized for effective use of the Visual Recognizer API.

IBM Watson allows for processing the data and classifying it using the visual classifier. After training the classifier with 80 percent of the trimmed data a sample size, the efficiency is improved significantly. IBM Watson also provides us with various set of options in Natural Language Processing and Text to Speech. The current visual classifier is called to Node Red using an API call. The image data that is collected at the host computer is sent to cloud using MQTT protocol. MQTT is an open OASIS and ISO standard lightweight publish subscribe protocol that runs on TCP IP and transports messages between devices.

On the other hand, Deployment of Convolutional Neural Network at the host system ensures better response time. In the training and testing phase of CNN model each image is passed through convolution layers with kernel filters, fully connected layers and finally a Softmax function is applied to classify objects in the image with probabilistic values between zero and one. However, there is a trade-off between Watson's cognitive power and with the efficiency of the CNN model.

Smart Farming System using IoT for Efficient Crop Growth

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Abstract— Smart agriculture is a farming system which uses IoT technology. This emerging system increases the quantity and quality of agricultural products. IoT devices provide information about nature of farming fields and then take action depending on the farmer input. In this paper, an IoT based advanced solution for monitoring the soil conditions and atmosphere for efficient crop growth is presented. The developed system is capable of monitoring temperature, humidity, soil moisture level using NodeMCU and several sensors connected to it. Also, a notification in the form of SMS will be sent to farmer's phone using Wi-Fi about environmental condition of the field.

Keywords—IoT, NodeMCU, agriculture, sensors

I. INTRODUCTION

Agriculture is the primary occupation in India and is the backbone of Indian economic system. Agriculture provides employment opportunities to rural people on a large scale in underdeveloped and developing countries in addition to providing food. It is the process of producing food, fiber and many other desired products by the cultivation and raising of domestic animals. Agriculture is the primary source of livelihood for about more than 58% of India's population.

Climate changes will have significant impact on agriculture by increasing water demand and limiting crop productivity in areas where irrigation is most needed. Irrigation system, rain fed agriculture, groundwater irrigation are some of the methods introduced to produce healthier crops which may not use water efficiently. In order to use water efficiently a smart system is designed. In the system farmer need not make the water flow into fields manually, but the system automatically does that efficiently.

The traditional methods practiced by people may result in huge wastage of water. Hence, the concept of robotized farming with mix of IoT has been developed [1]. The farming with mix of IoT has been developed [1]. The technological advancements began to increase the efficiency of production remarkably thus, making it a reliable system. The knowledge of properties of soil determines the water supply to be driven in a smart way. The practice of agriculture in a smart way helps to acquire knowledge of soil and temperature conditions. Developing the smart agriculture using IoT based systems not only increases the production but also avoids wastage of water [2]. The soil moisture sensor, humidity and temperature sensor continuously

monitors the soil and environmental conditions, sends the live data to smartphone via cloud service.

While raining, the moisture content may increase several times. A rain-drop detecting sensor intimates the controller if there is rainfall, making the water supply to reduce or stop depending upon the moisture content at the moment. The crop requirements such as amount of humidity, temperature and moisture content are to be studied and can be installed again in the controller to meet its circumstances.

In this paper, the system uses few sensors which gives the amount of moisture in the soil, the humidity and temperature of the region, and a rain detecting sensor which and can be used in deciding whether the crop is suitable for growing. All these sensors along with NodeMCU are connected to the internet and a smartphone.

II. PROPOSED SMART FARMING SYSTEM

The system proposed uses a microcontroller (NodeMCU) which has a Wi-Fi module (ESP8266) over it. Smartphone with blynk is used as user interface. Soil moisture sensor, humidity and temperature sensor (DHT11) and rain detection sensors along with DC motor and deck robot are used. This DC motor is connected to a water pump which pumps water to the crops when the DC motor is ON. The soil moisture sensor senses the moisture level in the soil [3]. Depending on the level of moisture, NodeMCU decides whether to water the crop or not [4]. By using appropriate functions and conditional statements in the code written for the NodeMCU functioning, the watering of the crop starts by NodeMCU making DC motor ON when the moisture content is below a threshold value and is made OFF when there is enough moisture content in the soil. The humidity and temperature sensor gives the humidity and temperature values of the atmosphere which determine whether the crop is suitable for growth [5]. Some crops grow only in particular weather conditions and some give better yield only for a particular temperature range. The raindrop sensor measures the intensity of rain. If there is enough rainfall to provide soil with required water, the crops are not watered. Even after raining, if the crops are not having sufficient water then water is pumped again by making DC motor ON. Data reaches the blynk cloud from NodeMCU through Wi-Fi from Wi-Fi module present on NodeMCU [6]. The data then goes to blynk app in smartphone where the user can see the humidity, temperature, soil moisture levels and get the notifications if there is rainfall and if the DC motor is ON.

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"Design and Simulation of FinFET based digital circuits for low power applications"

Design and Simulation of FinFET based digital circuits for low power applications

S. Greeshma sai ; N. Alivelu Manga ; P. Chandra Sekhar   All Authors

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Abstract

Document Sections

I. Introduction

II. Finfet

III. Combinational circuits

IV. Johnson ring counter

V. Simulation results and discussion

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Keywords

Abstract:

The power and delay play a vital role in the design of integrated circuits(IC). Though, the scaling of transistors leads to reduction in size of IC, also results in short channel effects if the scaling is done beyond nanometer. These short channel effects make leakage power to increase and hence power. For reducing the short channel effects and to obtain low power dissipation, FinFETs are used. In this paper, an effort is made to design and simulate various digital logic circuits using FinFETs. For this, BSIM-CMG models of 22nm technology for FinFET are used and simulated in Cadence Virtuoso tool. Also, these circuits are compared in terms of power dissipation and delay with 45nm based digital logic circuits. From the results, it is observed that the power dissipation has reduced to a larger extent in 22nm FinFET technology when compared to 45nm CMOS technology.

Detection of Multiple Closely Spaced Targets in Low SNR Conditions using MUSIC Algorithm

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Abstract: Radar is an electromagnetic system used for detecting, locating and tracking targets. To enhace the multi target detection capability of digital receivers in Electronic Warfare applications, high resolution algorithms are required. Multiple signal classification (MUSIC) is one of such prominent algorithm, but its performance is degraded in the presence of noise and when the targets are in close proximity.Therefore, in this paper MUSIC algorithm is modified at two stages.In the first stage Savitzky Golay filter is used as Pre-processing filter and at next stage noise removal technique is used for estimating the target eigenvalues and frequencies. The results showed that proposed algorithm is capable of distinguishing 3 targets with Signal to Noise Ratio (SNR) of upto -12 dB and 4 targets with SNR of -9dB with good range resolution compared to available literature. Optimized computation complexity of the proposed method is making it as superior compared to other methods.

Keywords—MUSIC; Savitzky Golay filter; Range resolution; Eigenvalue Decomposition;Spectrum estimation; Electronic Warfare.

1. INTRODUCTION

Today's electronic warfare scenario has become very complex and many users of radar are employing (Low Probability of Intercept) LPI as tactical requirement. In order to intercept and process the LPI signals, advanced signal processing techniques are required. LPI Radar plays a major role in the Electronic Warfare field [1]-[3]. It also determines the range, altitude, direction or speed of both stationary and moving objects such as aircrafts, ships and motor vehicles. High Resolution Range profile (HRRP) is one of the important features used in Automatic Target Recognition (ATR)[4]-[6]. FFT is the initial signal detection algorithm to identify the frequencies which are in fine range, but if the two input signals are close in frequency, it is difficult to separate them by using FFT. In that case, high resolution spectrum estimation techniques should be employed for that particular portion of data.Several types high resolution approaches such as Linear prediction,Prony's model,MUSIC and ESPRIT methods are used to estimate frequencies from input data[7]-[9].To identify the correct frequencies using high resolution algorithms , the actual input should be processed. In linear prediction method (all-pole method) selection of correct filter order is the main issue. When the order of the filter is not proper, the spectrum does not produce the peaks at the input signal frequencies correctly.For digital receivers, it is very important to identify the number of target signals without

"Multiply-Accumulate unit for Binary Arithmetic using high speed adders and PIPO Accumulator"

"Performance Analysis of LDPC Coded Massive MIMO-OFDM System"

Performance Analysis of LDPC Coded Massive MIMO-OFDM System

Publisher: IEEE | Cite This | PDF

Aravinda Babu Tummala ; Deergha Rao Korrai   **All Authors**

Abstract

Document Sections

I. Introduction

II. MASSIVE MIMO SYSTEM

III. LDPC CODE

IV. SIMULATION RESULTS

V. CONCLUSIONS

Authors

Figures

References

Citations

Keywords

Abstract:
Multiple Input Multiple Output Orthogonal Frequency Division Multiplexing (MIMO OFDM) wireless communication is well known in the literature. However, the problems occur in classical MIMO system can be overcome with large number of array antennas such systems, termed as Massive MIMO. But, the latency may be more for these systems using traditional equalizers such as Zero Forcing (ZF) and Minimum Mean Square Error (MMSE). Hence, this paper proposes LDPC coded Massive MIMO OFDM system using Approximate Message Passing (AMP) equalizer. The performance of the proposed system is analysed through simulations. In this simulation, different transmit and receive antennas (64,128), (64,256), (64,512) and (64, 1024) and 16QAM are used. Finally, the performance of LDPC coded and uncoded massive MIMO OFDM using AMP equalizer is analyzed in comparison with ZF and MMSE equalizers using BER and latency as performance measures.

"Turbo code with Hybrid interleaver in the presence of impulsive Noise"

Turbo Code with Hybrid Interleaver in the Presence of Impulsive Noise

V. V. Satyanarayana Tallapragada ✉, M. V. Nagabhushanam & G. V. Pradeep Kumar

Abstract

In this paper, a numerical density function of impulsive symmetric α-stable noise was presented and simulated in the turbo coding environment. The impulsive symmetric α-stable noise has no closed-form expression, making it difficult to realize in its original form. The impulsive symmetric α-stable noise can be used to approximate many kinds of noise sources when all the parameters of the function are well optimized to a specific value. In this paper, one of the parameters is set to a specific value so that the stable distribution approximates Cauchy distribution. Correspondingly, it is applied on turbo codes. In addition, an improved interleaver structure is presented where the multiple interleavers of smaller capacity replace a single epic interleaver. Simulation results show that the proposed hybrid interleaver

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Mixed image denoising using weighted coding and non-local similarity

V. V. Satyanarayana Tallapragada ✉, N. Alivelu Manga, G. V. Pradeep Kumar & M. Venkata Naresh

Abstract

Denoising an image is a heuristic and objective process. Still, underlying noise that is predominant in the images reduces the quality. Additive white Gaussian noise (AWGN) and impulse noise are the most exploited types of noise. For a specified amount of density, a combination of AWGN and impulse noise may distract the entire signal causing a loss in the magnitude. This paper presents a denoising model by exploiting such a combination that uses an overcomplete dictionary by sparse based denoising scheme with suitable regularization terms. A weight matrix is defined to optimize the operation at specific locations of the image. Finally, the use of non-local similarity features improves the quality of reconstructed images. The weight matrix maps the regions where the effect of multiple noise sources is present. The results proved the superiority of the proposed technique. Simulation of the proposed technique on many images with different quantities of noise produced an improvement of up to 2 dB when the noise effect is more when compared to the state-of-the-art techniques.

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Significance of festivals and understanding Cultural heritage

Nagadevi Darapureddy

Abstract

Festivals are impalpable cultural assets maintaining the past and passing them to the future generations. Festivals are eloquent to indicate culture, traditions, and heritage. Festivals are celebrated irrespective of caste and religion in the country. It creates relations and a strong bond in humanity. It builds social relations and social communication which leads to unity among the people. The present generation will come to know about our customs and old-age practices during these celebrations. Various festivals have religious inchoation and entwine cultural and religious paramountcy in traditional activities. Festivals can accommodate tourism advantages such as increased visitation and development of a destination's image. Communities experience arrange of benefits from festivals. These benefits include building social cohesion, providing a specific time and place for families and friends to show their commitments to the area, and to provide a socially acceptable area for publications. The main aim of this article is to represent the significance of festivals, the main festival which is celebrated grandly in every state

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Proceedings of the Fourth International Conference on Microelectronics, Computing and Communication Systems pp 799–813

Diabetes Diagnosis Prediction Using Ensemble Approach

Kavita Agrawal ✉, G. Bhargav & E. Spandana

Abstract

Diabetes is considered as one of the most dangerous diseases in the world. It may also aid in causing heart attacks, blindness, etc. So, instead of taking medication for a long time after it has occurred, it is better if we can predict its occurrence at an early stage so as to prevent it. In this paper, we have used an ensemble approach using multiple classifiers to predict the result. We have trained the dataset using a number of classifiers. The dataset used in this paper is based on the parameters that are likely to cause diabetes in India. We got accuracies of each model

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Security tool for IOT and Image compression techniques

Security tool for IOT and IMAGE compression techniques

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Abstract

A new era of computation has began with wide spread because of its ease of use and advantages in human kind that is IoT(Internet of Things). IoT is used in many applications like greenhouse, telemedicine monitoring, smart farming etc.

Construction of IoT systems requires a perfect infrastructure planning. Moreover, management and security of these systems are considered to be the most primary and vital challenges by system developers.

IoT is the interconnection of electronic devices and software. The devices which are connected in the network will have different sensors which are used for data collection. Each sensor will monitor a specific condition such as location, vibration, motion, temperature and visual data. Sensors of a device communicate over an IP Network with other devices. IoT-enabled devices will share information about their conditions with software systems, and other machines. This information can be shared in real time or they can be collected and shared at desired intervals. Due to IoT enabled devices, everything will have a digital identity and connectivity, which means that, one can identify, track and communicate with the devices.

Machine-to-Machine (M2M) communication is drawn from the IOT-enabled devices in the network to allow business to automate certain basic tasks without depending on central or cloud-based applications and service. The number of devices, or nodes, that are connected in the network are bulk in IoT than in traditional systems.

This paper presents the Security solutions for overcoming the challenges faced in storage and transmission of big data images through compression which are used for IoT networks through a lightweight protocol called as MQTT (Message Queuing Telemetry Transport) protocol.

KEYWORDS : Compression , Big Data, Images, Internet of Things (IoT), Machine-to-Machine Communication, MQTT

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Interactive Learning in Mixed Reality (May 2018)

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ABSTRACT

Mixed reality is the result of blending the physical world with the digital world. It is the next evolution in human, computer, and environmental interaction and unlocks possibilities that before now were restricted to our imaginations. It is made possible by advancements in computer vision, graphical processing power, display technology, and input systems. Microsoft HoloLens is the first self-contained, holographic computer, enabling to engage with the digital content and interact with holograms in the world. Specialized components—like multiple sensors, advanced optics, and a custom holographic processing unit—enable to go beyond the screen. We present a method of utilizing the HoloLens for advanced learning in Mixed Reality. One methodology of achieving this goal is, when a user is reading a book while wearing the HoloLens, if the user comes across a word which he/she has no idea about, then the user taps on the word using a tapping gesture, this will be recognized by the HoloLens. It then uses Optical Character Recognition (OCR) tools to recognize the word. The next step is to use the word and look up using Google search APIs to get relevant results. The most relevant result will be chosen and is prepared to be rendered as a hologram. The user can interact with the hologram to understand more about it, to have a look from all angles etc.

Keywords: Annotations, HoloLens, Mixed Reality, Optical Character Recognition, User interfaces

1. INTRODUCTION

The purpose of this project is to understand and make use of the HoloLens' sensual and natural interface commands, interface with them and connect them to make learning interactive. The entire system is categorized under Mixed Reality [1], implying that the application is superimposed onto the real world. The underlying idea behind the project is to interface with a standalone wearable system, and to develop an application for the HoloLens, using Unity and Visual Studio. The main contribution would be to detail how an application for the HoloLens can be built with the use of available resources.

1.1. Problem Definition

The problem definition is as follows, Interactive Learning in Mixed Reality is to make learning interactive by leveraging the Microsoft HoloLens[2]. Interactivity is achieved by letting the user of the application

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ICDSMLA 2019 pp 778–786

Concatenated Global Average Pooled Deep Convolutional Embedded Clustering

Morarjee Kolla ✉ & T. Venugopal

Conference paper | First Online: 19 May 2020

55 Accesses

Abstract

Deep Clustering learns cluster friendly salient features in embedded space. In our previous work of Global Average Pooled Deep Convolutional Embedded Clustering (GAPDCEC) algorithm, the last convolution layer feature maps are pooled to build the embedded space. This considers only spatial information retains in the last convolution layer of the encoder, which unable to capture discriminative features from entire convolutional layers. To address this issue, we propose a solution using concatenation of all convolutional layer outputs and then Global Average

Assoc. Prof. Vinit Kumar Gunjan

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Applications of iot for soil quality

International Conference on Intelligent Computing and Communication Technologies

ICICCT 2019: **ICICCT 2019 – System Reliability, Quality Control, Safety, Maintenance and Management** pp 277–286

Applications of IoT for Soil Quality

K. Spandana ✉ & Suresh Pabboju

Conference paper | First Online: 28 June 2019

Abstract

The farming industry has become more important than ever before in the next few decades. Farmers and agricultural companies are turning to the Internet of Things (IoT) to meet demand. Since we need to continuously take measures manually it requires large amount of time. So using this Smart Agriculture we can effectively take the measurements in less amount of time. In this Smart Agriculture sensors can provide continuous measurements with respect to climate changes. Using Internet of things we can produce different ways to cultivate soil. Smart Agriculture and Smart Farming applications will help

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Smart Computing Paradigms: New Progresses and Challenges pp 245–257

Image Filter Selection, Denoising and Enhancement Based on Statistical Attributes of Pixel Array

Vihar Kurama ✉ & T. Sridevi

Abstract

The choice of image filters in computer vision has a significant effect on the image reconstruction and feature extraction. Currently, the most filters are used to enhance images for human consumptions, programmed operations and to reduce the noise, frequency levels in the image. Though it is hard to select an optimal set of filters for a given series of images, in this work, we propose to choose the best assortment of different filters for a given image as the input. By generating the pixel array of the input image, we compute all the image attributes such as

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Phishing URL Detection Using Machine Learning Techniques

Authors: A. Sirisha, V. Nihitha, B. Deepika

Publisher: Springer Singapore

Published in: ICCCE 2020

Abstract

A criminal act performed online by impersonating others to obtain confidential data like passwords, banking details, login credentials, etc., is known as phishing. Detecting such websites in real-time, is a complex and dynamic problem, which involves too many factors. This work focuses on identifying the important features that distinguish between phishing URLs and legitimate URLs. To detect significant features, statistical analysis is done on the phishing as well as legitimate datasets. Based on the statistical exploration, certain features based on the URL, HTML, JavaScript and Domain were extracted. The prominent and most relevant features to identify the phishing URLs are identified using correlation. The identified subsets of features are then used to train different machine learning based classifiers and the accuracies obtained have been compared. From the experimental analysis it is observed that the extracted features have efficiently detected phishing URLs and the Decision Tree classifier has found with highest accuracy for making the predictions.

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V. Hyndavi ; N. Sai Nikhita ; S. Rakesh   **All Authors**

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Abstract: The crimes against women have been rising significantly and often
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Abstract:

The crimes against women have been rising significantly and often hear about
molestation, eve-teasing and rape cases in the public places of the society. The
security of women is the most important concern these days and to build a
safety device to act as a rescue and to prevent from harm at the time of hazard
is highly necessary especially for women. In this paper, a smart device for
women's safety which automates the emergency alert system by using
pressure sensor,pulse-rate sensor and temperature sensor to detect a possible
atrocity automatically using outlier detection is proposed. This system detects
and sends the alerts for the dear ones with the location coordinates of the
women without the requirement of her interaction in critical times. It sends an
emergency message automatically to the relatives and nearby police station.

Abstract

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SECTION I.
Introduction

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Women are the most integral part of any economy primarily responsible to shape the future of the country. Many crimes against them are not being reported because of society's hypocritic point of view. Various types of humiliations and mistreatment are being faced by the victims who try to report their assaults from society. Only one of four cases lead to conviction trails in India.

Proper precautions should be taken to to build the best solution to this problem This paper proposes an IoT based smart wearable for the safety of women. The device is used to automatically detect such situations and inform the related persons. It not only helps women escape critical situations but also ensures to provide justice to the women by helping them in times of need.

SECTION II.
Related Work

The research of S. A. More [1] discusses using temperature sensors and pulse rate sensors to automatically detect a chance of a possible situation and notify family and friends using a mobile application. [2] discusses the usage of image processing to detect any possibility of danger and proposes various solutions to protect herself. In [3] the authors developed a device which employed PIC16F876A microcontroller and a SIM808 module, which has GPS, GSM and GPRS support which are used to notify the friends and family when the emergency button is pressed. In [4] a system based on the facial features is developed. If the facial expression is a threat-based expression then a report is filed. About [5], GSM and GPS are used to build a safe device. In this system, the message is sent to pre-stored mobile numbers which consist of the body posture of the victim along with her location. In [6] independent triggering of android application and arm device takes place with the help of synchronized Bluetooth connection. The audio and video that have been recorded are sent to the phone numbers which are pre-set in the application along with the location in the form of a call and also a message to alert them In [7], an android app is developed which

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CBIR using SIFT with LoG, DoG and PCA

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CBIR using SIFT with LoG, DoG and PCA

Katta Sugamya ✉, Pabboju Suresh, A. Vinaya Babu & Rakshitha Akhila

Abstract

Content based image retrieval using scale invariant feature remodel (SIFT) is employed to discover stable keypoint locations within the scale-space. The extraction of image options can be done by exploiting SIFT or K-means cluster. In the proposed work we can find feature extraction and locating scale-space extrema through SIFT-DoG & SIFT-LoG ways. Finally, planned ways, SIFT-DoG, SIFT-LoG, and PCA are compared.

Keywords

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Advances in Decision Sciences, Image Processing, Security and Computer Vision pp 293–300

Load Balancing in Cloud Through Multi Objective Optimization

S. Jyothsna ✉ & K. Radhika

Conference paper | First Online: 13 July 2019

566 Accesses

Part of the Learning and Analytics in Intelligent Systems book series (LAIS, volume 3)

Abstract

The Scheduling and Load balancing in cloud is considered as NP complete problem where the tasks are assigned to the cloud are dynamic in nature so the heuristic approach can be followed to find the solution. Load balancing directly affects the reliability, response time, through put and energy efficiency of a server. The optimized solution for load balancing should consider various objectives like minimizing energy consumption and minimum execution time so that reduced cost. Balancing the load across cloud servers is possible through virtual machine (VM)

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ICCCE 2020 pp 1093–1103

A Mining Framework for Efficient Leakage Detection and Diagnosis in Water Supply System

P. Vasanth Sena ✉, Sammulal Porika & M. Venu Gopalachari

Conference paper | First Online: 12 October 2020

995 Accesses

Abstract

A smart city smart meter water grid have to be reliable and capable to safeguarding the 24 * 7 trustworthy water distribution network that guarantees less wastage by leakages in the pipeline. Distributors and Consumers are turning to the Internet of Things and deep learning to meet requirement. Continuously monitoring the system and taking requirements manually is tedious job. Smart nodes with hall sensors provide continuous measurements and warehoused in database captured

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Interviewee Performance Analyzer Using Facial Emotion Recognition and Speech Fluency Recognition

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Abstract—**Analysis of the performance of an interviewee is a complex and challenging task. Our proposed system automates this process by building two multiclass classification models. Video captured during an interview is given to the proposed system which extracts frames and Audio from it. Frames are given to the first model which is a facial emotion recognition model it uses HaarCascade classifier, Gabor filters, and Convolution Neural Network for classification of facial emotion as one of these seven emotions like Happy, surprise, angry, disgust, neutral, fear, sadness. Audio is given to the second model which uses Mel frequency cepstral coefficient features and logistic regression for speech classification as four classes Fluent, Stuttering, Cluttering, and Pauses. Predictions of these two models can be combined to give a performance rating for the interviewee. Compared to only CNN based and Deep Neural Network based facial emotion recognition, the Gabor Filter based approach which we have used gave better accuracy with a smaller number of hidden layers and less training time.**

Keywords—*Gabor Filters, Convolution Neural Networks, Deep Neural Networks, Logistic Regression, HaarCascade Classifier, Mel Frequency Cepstral Coefficients*

I. INTRODUCTION

The traditional way of interviewing candidates is a costly, time taking process and leads to interviewer biases. The interviewer needs to investigate the facial emotions, fluency, gestures, etc. Using an automated system for the process of interviewing candidates doesn't lead to any kind of biases. Even after the candidate is selected for a role, we can still access the candidate performance while he/she is interacting with customers, clients, and teams. Facial emotion recognition is used in different applications like analyzing the performance of a candidate in an interview, drowsiness detection in cars which is used for safe driving, apathy detection, customer reviews link analyzing the emotional state of a person while playing a newly developed video game.

There are different approaches for performing facial emotion recognition but the approach which we are using in this research gives very good accuracy compared to existing techniques because we are using Gabor filters and CNN based approach which is very efficient in performing emotion recognition by training model in very less time which even requires very few hidden layers.

We aim to develop an automated system that can analyse performance of an interviewee. Facial emotion recognition alone is not sufficient for this task along with it we need to perform speech fluency recognition, which tells whether the speech is fluent, Stuttering, Cluttering, has pauses, etc. Speech fluency recognition is performed by extracting a kind of features called as MFCC features, after extracting these MFCC features classifications of speech can be done using one of the algorithms like logistic regression, support vector machine, MLP networks.

II. LITERATURE SURVEY

We have referred several research papers for Facial Emotion Recognition but out of all the techniques involved in Facial Emotion Recognition and Speech Fluency Recognition only Gabor filter-based Techniques [6], MFCC based Audio Classification [3] [8] gave good accuracy. Gabor filters are used in image processing techniques and are used for texture analysis and edge detection [4]. Gabor filters can be used in face recognition, emotion recognition which results in good accuracy compared to other techniques in face detection and discovered that it has various applications and can also used in image recognition [1],[6]. Speech Signal Can be classified by Artificial Neural Networks, Logistic Regression, Support Vector Machine [9]. We have found that Human emotion recognition is used in various domains like job interviews, education, Market Research, Medicine [10]. Facial emotion recognition using CNN [2] is got at recognizing emotions accurately compared to Gabor Filter based technique. MFCC features can be used for classification of music into three classes Rock, Pop, Classic [3], so it can also be used for speech fluency recognition. PyAudio library can be used to extract MFCC features easily and these features can be used for Classification of speech using Classification Algorithms [2].

III. DATASETS

The datasets used for Facial Emotion Recognition are FER2013 dataset and ck+ dataset. FER2013 dataset contains nearly 35800 images, it is distributed as 4953 images- anger, 547 images- disgust, 5121 images- fear, 8989 images- happy, 6077 images- sad, 4002 images- surprise and 6198 images- neutral. ck+ dataset contains around 700 images and it is distributed as 100 images for each emotion type. 80% of images from each dataset are used for training and the remaining 20% of images are used for testing the Facial Emotion Recognition model.

For Speech fluency recognition we have collected fluent speech data from 2 datasets Speech Accent Archive,

A Study on IoT Applications Towards Impact of Loss of Data

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Abstract-- In IoT environment, the data will be collected from multiple sensors and then it is processed by using data processing workflows and transform these data as per the requirements of the application. New ways should be devised to handle the continuation of data that is to be delivered to applications without having the applications wait for the sensor to recover throughout the data transformation process if one of the sensors is unable to create data due to an environmental / technical problem. This is the way to minimize the time gap of retrieving the loss data from sensor. It's like in networks if a packet is lost in internet, the destination system asks for the retransmission of packet, which consumes more time. Instead of that, a mechanism should be devised to handle the lost data from sensors. In this perspective, the proposed research work discusses about some applications of IoT and also the impact of data loss.

Keywords: Linear Discriminant Analysis [LDA], multi sensor structure, data fusion, Internet of Things [IoT], real-time traffic monitoring, GPS navigation system, hybrid systems.

I. INTRODUCTION

IoT is a platform, where it contains the global network with connected devices, which can collect data and share the information to be used by the applications. A formal definition of Internet of Things (IoT) is a growing network of physical objects and devices, called "Things," as well as individuals. IoT enables many sensors to interconnect with each other for transmitting the data without human intervention, due to which it influencing the nations by various applications like smart cities, smart meter, smart home, healthcare monitoring systems, intelligent cars, smart manufacturing plant, and real-time traffic monitoring, air quality detection in environment, forecasting applications etc. [1] Every one of the above applications have a unique thing to achieve, based on the domain application need sensors are deployed and they are called as sensing applications mentioned in figure 1 which have the ability of sensing the devices that are associated with the sensors to monitor by capturing the data.

we can have many IoT home automation benefits like control on smart energy management, controlling remote home appliances, even in the areas like agriculture we can do live stock monitoring and higher crop quality and better yields in the case of smart cities we can enhance the energy efficiency, traffic management and elimination of crime.

Figure 1: IoT Applications in different fields

Rest of the paper is organized as follows In section 2 related work proposed by different authors and in section 3 loss of data in some applications are discussed, where loss of data is not an issue for GPS navigation system on the other hand health care systems in medical field the loss of data matters and we have shown with a simple case study of regression analysis to predict home ownership based on age and educational background and Pima Indians Diabetes Dataset analysis in section 4, In section 5 conclusion.

The main Objective of these paper is to emphasize how missing data leads to different problems in data analysis and the motivation is to describe the problems with missing data and how if we have multiple sources to collect same type of data gives a better performance.

II. RELATED WORK

Sensor Management for IOT in Smart Home discussed by Prafulla Kumar Choubey [8] proposed an idea of how to do sensor management and reduce the power and bandwidth is given good accuracy. The methodology described here is when They introduced an architecture on small scale and found that output of some sensors can be predicted from the other sensors because instead of keeping all the sensors active if we able to find the dependency between physical factors. Also, this model provides fault tolerance to certain degree as the value of faulty sensor can be predicted until it is replaced and decision can be taken based on that.

Evolution of Permafrost: An Impact on The Socio-Economic Conditions

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Date Written: February 7, 2020

Abstract

In the present technological era, climate change has become the word of the hour. Since 1970, Climate Change has been in discussion and that its adverse effects should be reduced by 2100. But these climate change effects have been observed and felt predominantly since the past 10 years. One such effect is the thawing of permafrost. Permafrost, being an integral component provides stability to the land around the Arctic regions. But, due to thawing of 2,000-43,000 years old permafrost structures around Alaska and Siberia, has resulted in instability triggering in loss of millions of dollars. Due to the unstable nature there has been a historic, economic and cultural revolution in the regions present around the arctic. The permafrost has also been considered as the last remnants of the Ice age and is also a prominent source of the Paleontological remains. Permafrost depletion is a dynamic effect which results in a misnomer to regular people. Due to such changes in permafrost, nature of water, ecosystems and also communities living on the permafrost land will be primarily affected. Therefore, this resulted in release of greenhouse gases and also caused bubbling effect in 72 lakes around Alaska. Thawing of permafrost creates a staggering impact as they

Evolution of Permafrost: An Impact on The Socio-Economic Conditions

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Abstract:

In the present technological era, climate change has become the word of the hour. Since 1970, Climate Change has been in discussion and that its adverse effects should be reduced by 2100. But these climate change effects have been observed and felt predominantly since the past 10 years. One such effect is the thawing of permafrost. Permafrost, being an integral component provides stability to the land around the Arctic regions. But, due to thawing of 2,000-43,000 years old permafrost structures around Alaska and Siberia, has resulted in instability triggering in loss of millions of dollars. Due to the unstable nature there has been a historic, economic and cultural revolution in the regions present around the arctic. The permafrost has also been considered as the last remnants of the Ice age and is also a prominent source of the Paleontological remains. Permafrost depletion is a dynamic effect which results in a misnomer to regular people. Due to such changes in permafrost, nature of water, ecosystems and also communities living on the permafrost land will be primarily affected. Therefore, this resulted in release of greenhouse gases and also caused bubbling effect in 72 lakes around Alaska. Thawing of permafrost creates a staggering impact as they contain 1600 billion tons of carbon dioxide and methane stored globally within which 150 billion tons of carbon dioxide and methane is expected to be released by 2100 which is tantamount to the amount of greenhouse gases released by USA alone by the burning of fossil fuels. Acceleration of the adversity of climate change is being observed due to the effects caused by nature and fossil fuels which in turn results in difficulties in sustainability of living beings. Depletion of permafrost also results in land sliding into the sea simultaneously resulting in erosion of 2-5 meters of land per year.

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Online Education: Challenges in Rural Areas of India

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Abstract: *The pandemic COVID-19 has paralyzed the traditional classroom teaching-learning process in India since March 2020. As soon as it is realized that it takes moths to get normalcy in education sector, everyone looked for an alternative, i.e., online classes. Starting from primary schools, high schools, colleges, higher education institutions and universities geared up to meet the needs of the enthusiastic learners. In towns and cities, conduction of online classes is receiving moderately good response. On the other hand, the scenario in rural and remote areas is quite different and needs to be addressed. Most of the rural people are under financial crisis due to loss of their employment or meagre earnings during this period. As the most of the educational institutions started direct online classes, the students need at least medium range smartphones or tabs or laptops. As these gadgets are expensive, the parents are unable to buy them for their children. This has been the main hindrance for online education in rural areas. Further, network connectivity issues also add to their woes.*

As-deposited sol-gel made TiO2-SiO2 films as protective coatings for silver

As-deposited sol-gel made TiO₂-SiO₂ films as protective coatings for silver

B. Manikya Pratima, K. Uday Kumar, and A. Subrahmanyam

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As-deposited sol-gel made TiO$_2$-SiO$_2$ films as protective coatings for silver

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Abstract. Silver surface is prone for tarnish when exposed to sulfide and sulfate environments. Present work reports protection of silver surfaces with sol-gel derived mixed oxides of titanium-silicon (TiO$_2$-SiO$_2$) thin films prepared at room temperature (300K) by dip coating technique without any post annealing. 0.1M and 0.3M titania and silica individual sols are mixed in fixed volume to prepare 0.1M (TS1) and 0.3M (TS3) titania-silica mixed oxides. The corrosion measurements of the coated and un-coated silver surfaces have been evaluated by conventional electro-chemical measurements; alkaline Na$_2$S and Na$_2$SO$_4$ are the electrolytes. The corrosion rates have been estimated from Tafel plots. The titania-silica protective thin films have shown significant decrease in the corrosion rates: bare silver from 1.06mmpy to protected silver surface 0.07mmpy. Ti-O-Si covalent bonds are revealed in Raman spectra of the mixed oxide films. The present investigation shows that sol-gel derived titania-silica films protect the silver surface from alkaline sulfide and sulfate environment very effectively.

INTRODUCTION

Silver surface tarnishes when exposed to the sulphide[1] in the environment[1,2]. There are several inorganic and organic[3] materials used for the protective coats on silver: polymers, lacquers, Al$_2$O$_3$, silica and TiO$_2$ etc[4-7]. Titania (TiO$_2$) and silica (SiO$_2$) thin films, depending on the composition and the degree of homogeneity[3] exhibit unique optical, chemical and mechanical properties[8-12]. The earlier reports[13] on sol-gel titania-silica thin films indicate desired optical and mechanical properties; it is proposed in the present study to employ these titania-silica mixed oxide thin films as protective coatings on silver. Probably, ours is the first report on the use of these mixed thin films of titania and silica as protective coats on the silver surfaces [Indian Patent application number 201841035409 dated 21.09.2018].

The aim of the present work is to evaluate the barrier/protection properties of titania-silica thin films prepared by sol-gel technique (at 300K) on the silver surfaces exposed to sulfide and sulfate environments. Among the various techniques employed to prepare these titania-silica thin films, sol-gel has the advantage of relative ease of process control and the capability of large area coatings even on complex surfaces and is relatively cost-effective[14-18]. In general, the sol-gel derived thin films are subjected to post-deposition treatments, like, annealing at elevated temperatures and extended times to enhance the adherence, optical and mechanical properties[19,20]. There is a vast literature on this sol-gel derived titania-silica thin films; the literature cited is only indicative but not exhaustive. The novelty of the present work is that (i) sol-gel derived titania-silica thin films are used for the first time on silver surfaces and (ii) no post-deposition heat treatment has been conducted on the thin films.

EXPERIMENTAL

The precursors for the TiO$_2$ and SiO$_2$ sols are reagent-grade titanium tetraisopropoxide (TTIP) Ti(OC$_3$H$_7$)$_4$ (Spectrochem) and tetraethylorthosilicate (TEOS) Si(OC$_2$H$_5$)$_4$ (Sigma Aldrich), HCl (Merck) and ethanol (99.99% Merck). Briefly, the individual TiO$_2$ and SiO$_2$ sols (500ml) of 0.1M concentration are prepared by adding (with continuous stirring) 14.9ml of TTIP and 11.1ml of TEOS to ethanol respectively.0.3M individual TiO$_2$ and SiO$_2$ sols are also prepared in the same way. To prepare the mixed titania-silica sols, the individual sols of TiO$_2$ and SiO$_2$ in

030259-1

Assessment of Water Quality Index and Monitoring of Pollutants by Physico-Chemical Analysis in Water Bodies: A Review

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Abstract:- Water is said to be polluted when it is changed in its quality or composition directly or indirectly as a result of waste disposal and other human activities so that it becomes less suitable or harmful for drinking, domestic, agricultural, fisheries or other purposes. Water is never pure in a chemical sense. Even in the most unpolluted geographical areas, rainwater contains dissolved carbon dioxide, oxygen and nitrogen and may also carry in suspension dust or other particles picked up from the atmosphere.

The existence of human society depends on water. The quality of water should be monitor regularly due to its necessary for good human health. If water will be contaminated and frequently used by living being for drinking purposes, then human population suffers from different of water borne diseases. The availability of good quality water is an indispensable feature for preventing diseases and improving quality of life, therefore it is necessary to know details study about different Physico-Chemical parameters such as temperature, Transparency, hardness, pH, sulphate, chloride, DO, BOD, COD, alkalinity nitrates phosphates used for analysis and testing of water quality. It is necessary to address water quality issues with respect to different water bodies. In addition, since the advent of industrial era, there has been a dramatic increase in the demand for water, commensurate with population growth and improved living standards. In the present study, a review of literature on the quality of natural waters from different parts of Indian sub-continent, in particular, and the globe in general has been discussed briefly.

Keyword: Physico - chemical Parameters, Transparency, Hardness, Human health

INTRODUCTION

Modern civilization is dependent on water for irrigation, industry, domestic needs, shipping, sanitation and disposal of waste. Most of our water bodies such as ponds, lakes, streams and rivers have become polluted as a consequence of increasing industrialization, urbanization and other development activities. Water is said to be polluted when it is changed in its quality or composition directly or indirectly as a result of waste disposal and other human activities so that it becomes less suitable or harmful for drinking, domestic, agricultural, fisheries or other purposes. Temperature, turbidity and total suspended solids in water bodies can be greatly affected by human activities such as agriculture, deforestation and the use of water for cooling. The release of untreated domestic or industrial wastes high in organic matter into water bodies results in a marked decline in oxygen concentration and a rise in ammonia and nitrogen concentrations, downstream of the effluent input.[1] Industrial activities which discharge large organic loads include, pulp and paper production and food processing.

Uncontrollable discharge of industrial waste water often causes pollution due to toxic metals. Other sources of metal pollution are leachates from urban solid waste landfills and mining waste dumps. Under certain hydrogeological conditions, unsewered domestic waste can cause severe ground water contamination by pathogenic bacteria, nitrate and other pollutants. Pumping of industrial waste water into ground water has resulted in high nitrate, arsenic and iron content.[2] Many pollutants may also be found in solution form in water. These may be phosphates, fluorides, nitrates and certain metals or may be unnatural materials such as pesticides[3]. Many causes of pollution including sewage and fertilizers, contain nutrients such as nitrates and phosphates. In excess levels, nutrients over stimulate the growth of aquatic plants and algae. Excessive growth of these types of organisms consequently clogs our water ways, use up dissolved oxygen as they decompose, and block light to deeper waters. This in turn proves very harmful to aquatic organisms as it affects the respiration ability of fish and other invertebrates that reside in water.

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Recent Advances in the Fabrication of ZnO Based Nanostructures for Opto-Electronic Devices

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Abstract

In recent years, there has been increasing interest in ZnO nanostructures due to their variety of shapes and availability of simple and cost effective processing. While there are still unanswered questions concerning fundamental properties of this material, in particular those related to defects and visible luminescence lines, great progress has been made in synthesis methods and device applications of ZnO nanostructures. In this review, we will provide a brief overview of synthesis methods of ZnO nanostructures, with particular focus on the growth of oriented arrays of nanorods/nanoarrays which are of interest for optoelectronic device applications.

Keywords: ZnO, Nanostructures, Fabrication, Opto-electronics, DSSC

1. Introduction

Semiconducting oxide nanostructures such as ZnO, TiO_2, SnO_2, CuO_2 and so on are the focus of current research efforts in nanotechnology due to their special shapes, compositions, chemical, and physical properties. They have now been widely used in the fabrication of energy saving and harvesting devices such as solar cells [1, 2], Lithium ion batteries, fuel cells, transistors, Light emitting devices (LEDs), hydrogen production by water photolysis and its storage, water and air purification by degradation and adsorption of organic pollutants and toxic gases, environmental monitoring by their applications in the fabrication of gas, humidity and temperature sensors, UV screening, and photodetectors [1-3]. Instead of

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Synthesis and thermal expansion of Yttrium doped Ceria based nanomaterials for SOFC

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Abstract
A kind of electrolyte materials for intermediate temperature solid oxide fuel cells (IT-SOFCs) were prepared by sol-gel method. Thermal expansion of the yttrium based electrolytes was studied by dilatometry. Thermal expansion measurements on the sintered samples were carried out from room temperature (RT) to 1000^0C. The average linear thermal expansion coefficient range was found to increase with increasing Y. The thermal expansion curves for all values of x displayed rapid increase in slope at high temperatures.
Keywords: Solid Oxide Fuel Cells, Sol-gel, Electrolytes, Thermal Expansion

1. Introduction

The solid oxide fuel cell (SOFC) is an electrochemical device that can be used for either stationary or mobile generation of electrical energy as a clean, reliable and flexible power production [1]. SOFC is regarded as a highly efficient power-generation system with future application. A typical high-temperature SOFC uses 8 mol% Yttria-Stabilized Zirconia (YSZ) as the electrolyte, which is usually operated at temperatures as high as 800^0C–1000^0C.

Effect of Poly Ethylene Glycols for the Conversion of Organic Acids to β –Nitrostyrenes underConventional and Non-Conventional Conditions

International E-Conference on Materials Processing & Characterization-2020

Effect of Poly ethylene glycols for the Conversion of Organic acids to β – nitrostyrenes under conventional and Non-conventional Conditions.

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Abstract

Poly ethylene glycols (PEG-200, 300, 400, 600, 4000 and 6000) supported reactions were conducted with certain α, β-unsaturated acids in presence of metal nitrates under solvent free (solid state) and mineral acid free conditions. The reactants were ground in a mortar with a pestle for about 30 minutes. The aromatic acids underwent nitro decarboxylation and afforded β-nitro styrene derivatives in very good yield while α, β-unsaturated aliphatic carboxylic acids gave corresponding nitro derivatives. Addition of PEG accelerated rate of the reaction enormously. Reaction times substantially decreased from several hours to few minutes followed by highly significant increase in the product yield. Among the several PEGs, PEG-400 has been found to be much more effective than other PEGs.

Keywords: Poly ethylene glycols (PEG); rate accelerations; α, β-unsaturated acids; metal nitrates;   solvent free (solid state); β-nitro styrene derivatives; α, β-unsaturated aliphatic
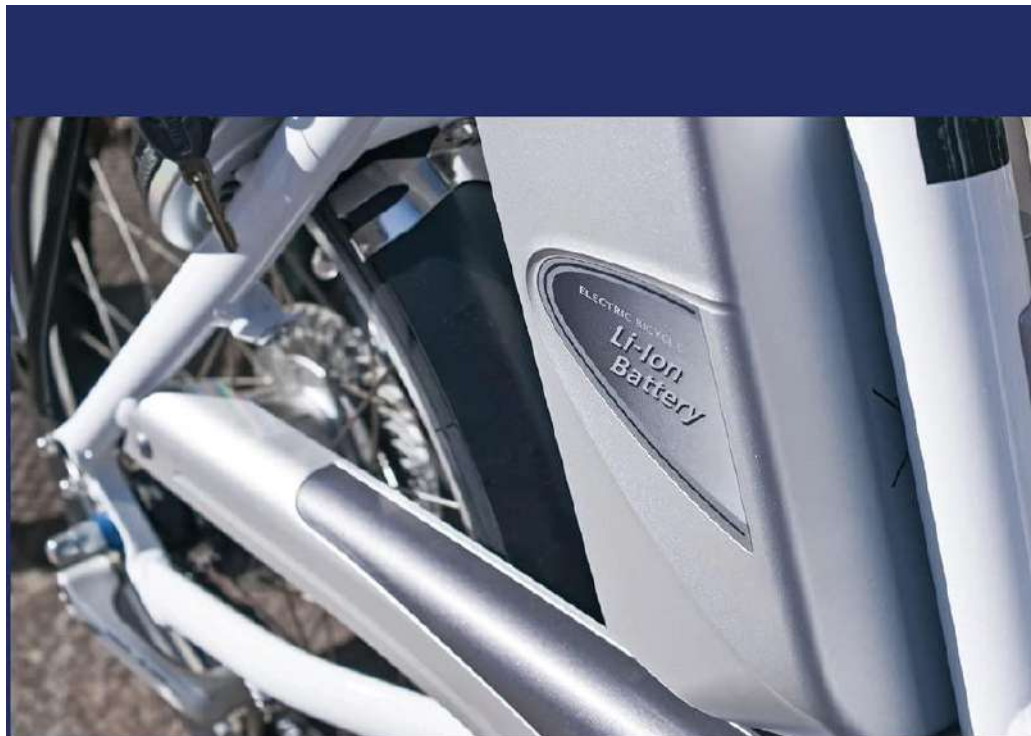
Saritha D.

Structurally connected Vanadates and Molybdates as Electrode materials

Electrode materials for Li ion batteries

This book presents the Electrochemical performance of three structurally related compounds MVMoO7 (M= Fe3+, Cr3+, Al3+) as electrode materials for Li-ion batteries. It is observed that the voltage corresponding to the redox couples V5+/V4+ and Mo6+/Mo5+ are significantly different for AlVMoO7 vis-à-vis the Fe and Cr analogues. This study provides conclusive evidence that the presence of different counter cations in the lattice (trivalent ions in the present case) does affect the energetics of the redox process of the electrochemically active species. FeVMoO7, CrVMoO7 and AlVMoO7 react with 3.5 Li, 2.5 Li and 3.3 Li per formula unit, respectively of which reversible extraction of 2.2 Li, 1.3 Li and 2.6 Li respectively, is possible. The results of cycling studies show that FeVMoO7 and AlVMoO7 phases exhibit a reversible capacity of 160 mAhg-1 and 180 mAhg-1 without any noticeable capacity fading even after 20 cycles. Reversibility of reaction of Li is more facile in AlVMoO7 vis-à-vis the other phases.

I have completed my MSC in Chemistry in 2006 from Andhra University Vizag. I have done my Ph.D. in Material science on SYNTHESIS, CHARACTERIZATION AND STUDIES ON ELECTROCHEMICAL LI INSERTION IN SELECT TRANSITION METAL COMPOUNDS WITH CHANNEL STRUCTURES from Indian Institute of Technology, Madras (IITM). Working as Assistant Professor at CBIT, HYD.

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Insertion Type electrodes for Li-ion Batteries

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Insertion-Type Electrodes for Li-Ion Batteries

D.Saritha

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Abstract

Li-ion battery research enormously spotlight on progression in the fabrication, optimization, and categorization of electrode resources. They became popular as energy storage resources particularly owing to energy and power densities, life span, price and protection. The brisk expansion of electronic devices and electric vehicles stress a great energy density. Consequently, metals, alloys and transition-metal oxides have been employed as anodes for Li-ion batteries. Transition-metal oxide anodes further organized into alloying-category, conversion-category insertion-category materials. The extensive enlightenment on contemporary comprehension of insertion-type resources as anodes for Li- ion batteries will be offered in this paper with few instances.

Keywords: Insertion, electrode, Li-ion battery, anodes

1. Introduction

The research society is currently paying interest on well-organized energy storage approaches intended for the progress of optional energy for the substitution of fossil fuels [1]. Electric vehicles replaced by gasoline driven transport vehicles reduces the release of greenhouse gases. Li-ion batteries take part in a major task owing to their superior energy, power density, extensive cycle existence and small self-discharge [1]. These batteries are employed in several versatile devices as cellular phones, laptops and digital electronics [2]. The enhancement of Li-ion battery energy density can be accomplished by advancing either superior capacity anode and cathode electrode resources. The novel anode materials can be categorized into three chief types supported on their reaction procedure 1) Insertion/de-insertion materials with few instances carboneous materials $Li_4Ti_5O_{12}$, TiO_2, etc; 2)

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2D Layered Structure of Bismuth Oxyhalides for Advanced Applications

Muvva D. Prasad, Gubbala V. Ramesh, and Sudip K. Batabyal*

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SUBJECTS: Chemical structure, Electrical conductivity, Layers, Sensors, Two dimensional materials

Abstract

Development of two-dimensional (2D) layered nanomaterials of bismuth oxyhalides (BiOCl, BiOBr, and BiOI) has attracted considerable interest due to the renewable energy conversion. A new class of 2D layer semiconductor materials and tunable morphologies enhance the photocatalytic reactions. The dominant {001} facet engineering structures and bandgap controlling can be achieved by changing the stoichiometry ratios of the precursor solution. Synthesis of polymer composite thin films and fabrication methods involve free-standing flexible films, which are used as a dip photocatalyst for degradation of pollutants. 2D nanomaterials and surface-interaction engineering modification with noble metal nanoparticles establish hybrid nanostructures. The hybrid nanostructures enhanced the light absorption property through the plasmonic effect-induced "hot electrons" that improve the conductivity of the materials and are used in photodetector and surface-enhanced Raman scattering applications. The bandgap of the 2D layer nanomaterial was controlled by modulating the thickness and concentration of the precursor element. 2D layer structures of bismuth oxyhalides are a promising avenue for featured diverse technologies and wide applications in electronics, optoelectronics, photodetectors, and photovoltaics.

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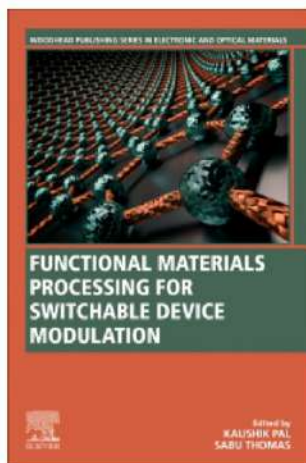
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Recent advances in functional materials: Bioelectronics-integrated biosensor applications

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12.1 Introduction

Bioelectronics has emerged due to expeditious advances in the fields of nanotechnology, biotechnology, information, and communication technology (ICT) [1]. The term bioelectronics was first proposed in 1968. Back then, the term was defined as the inter-molecular electron transfer found in biological systems, although its current meaning is somewhat different [2]. In 2005, Tony Turner defined it as "a recently coined term for a field of research that works to establish a synergy between electronics and biology" [3]. Bioelectronics integrates biomolecules and electronic elements in the development of functional devices; it has been a major research initiative for future practical applications. Ever-expanding technologies allowed small biomolecules, such as proteins and nucleic acids, to use intrinsic electronic features to design and fabricate complex bioelectronics. Understanding the principles of charge transfer inside organic material is exceedingly beneficial in the development of sustainable instruments such as electro-cardiograms, cardiac pacemakers, and blood pressure and flow monitoring. Bio-electronic technologies have benefits in terms of miniaturization, new features, or implantability, and will replace future devices based on silicon.

A biosensor is a unique type of bioelectronic device used for bioanalysis; it usually contains physiochemical transducers and biological sensing materials (bioreceptors). The basic function of a sensor is to convert the input variable into a suitable measurement signal. In the past decade, the materials and resources needed to create biosensing devices have been developed. These have improved the sensitivity, selectivity, and multiplexing capacities of today's biosensors through significant technological

Rayleigh-Bénard Convection in the Presence of Synchronous and Asynchronous Thermal Rigid Boundary Conditions.

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Rayleigh-Bénard Convection in the Presence of Synchronous and Asynchronous Thermal Rigid Boundary Conditions

Palle Kiran ✉

Conference paper | First Online: 20 October 2021

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Abstract

This paper investigates the effect of time-periodic temperature modulation on Rayleigh-Benard convection using rigid isothermal boundary conditions. The time-periodic temperature modulation has been considering in three different modes, out-of-phase (OPM), lower boundary (LBMO), and in-phase modulation (IPM). Heat transfer results are calculated in terms of the Nusselt and mean Nussult numbers through the finite amplitude of convection which is derived from the Ginzburg-

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Nonlinear Thermal Instability of Couple-Stress Fluids in Porous Media Under Thermal Modulation

S. H. Manjula & Palle Kiran

Abstract

Temperature modulation effect on chaotic convection in a porous media saturated with couple stress fluid has been investigated. Three different profiles of thermal modulations, OPM (out of phase modulation), LBMO (lower boundary modulation), IPM (in phase modulation) have been investigated. The Darcy-Brinkman model has been employed for the porous media. The transition from stable mode to the unstable mode in terms of chaos analyzed with modulation and couple stress parameter. Lorenz system of equations Lorenz (Deterministic non-

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The Time Periodic Solutal Effect On Oscillatory Convection In An Electrically Conducting Lluid Layer

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Abstract. The present article is to study mass transfer in an electrically conducting Newtonian fluid layer subject to imposed time-periodic solutal modulation. The mass transfer coefficient is calculated by complex Ginzburg Landau (CGLE) amplitude equation. It is a cubic equation involving oscillatory finite amplitude and obtained using solvability condition. A weakly nonlinear analysis is applied to investigate mass transfer in the layer. The oscillatory convection is discussed in the presence of oscillatory solutal Rayleigh number. The amplitude equation (CGLE) is solved numerically to evaluate mass transfer in terms of the various system parameters. The effect of individual parameter on mass transport is discussed in detail. Further the mass transfer is more for oscillatory mode than the stationary mode. Finally it is also found that, solutal modulation can be effectively applied in either enhancing or diminishing the mass transfer.

Keywords: Weakly nonlinear theory, Oscillatory magneto-convection, Complex Ginzburg−Landau model, Solutal modulation.

INTRODUCTION

Thermal convection is the flow of fluid induced by a temperature difference, or gradient. Rayleigh-Benard convection (RBC) is a particular type of thermal convection problem heating a bottom and cooling top of a horizontal fluid layer creates a vertical temperature gradient. And by the laws of thermal expansion, the fluid on the bottom is less dense than that on the top, and creates an unstable situation. The effect of gravity imposes a downward force on the fluid, while the heat transfer imposes an upward force. A variation on this problem was originally studied by Lord Rayleigh in the early (1900), with an attempted explanation of the problem published in a 1916 article.

Study of Rayleigh B´enard convection (RBC) gained lot of attention due to its prominent applications in thermal and engineering sciences. Instability in a fluid layer is to understand the nature of convective flow under some physical constraints. Numerous applications can be drawn related to convective flows where saving energy is a key point. Study of magnetoconvection in a fluid layer is motivated by Thomson (1951), and Chandrasekhar (1961) and numerous applications such as: astrophysical, geophysical, and in particular sunspots. Convection in the earth metallic core and stellar interiors often occurs in the presence of strong magnetic fields. Nakagawa (1957,1959) studied megneto-convection experimentally and reported that at high strength of magnetic field determines the effect of Chandrasekhar number Q on critical
Rayleigh number to stabilize RBC.

Rudraiah (1984), the effect of externally imposed vertical magnetic field on double diffusive convection is investigated. Both linear and nonlinear theories are examined and the stability criterion as well as heat and mass transport presented. It is observed that magnetic field enhances stability criteria and diminished the heat mass transfer. It is pointed that magnetic field can be used to control stability criteria as well as reduce heat mass transfer. Another interesting concept to regulate stability criteria or heat mass transfer is modulation. This modulation concept is either gravity, thermal, rotational, magnetic and solutal etc. The gravity modulation is given by Gresho and Sani (1970), thermal modulation by Venezian, (1969), rotational modulation by Bhadauria and Kiran, (2014) and magnetic modulation by

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Young Citizen's Political Engagement in India: Social Media Use by Political Parties

Mandakini Paruthi (School of Management Studies, Chaitanya Bharathi Institute of Technology, India), Priyam Mendiratta (School of Business Studies, Sharda University, India) and Gaurav Gupta (School of Business Studies, Sharda University, India)

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Abstract

Social media has emerged as a dominant digital medium platform in contemporary society. The quick development of social media has instigated changes concerning the way publics to interact with a group of people with similar ideologies, the quality of information they share, or the opportunity to acquire and share ideas. Social media use has a major influence on public relations, marketing, and political communication. Therefore, politicians are formulating their strategies to reach increasingly networked individuals. The chapter defines political engagement concept, focuses on excessive use of social media to understand how the emergence of digital citizenship is changing political engagement. In addition to this, the chapter also examines whether the use of social media exercise any effect on 2014 and 2019. General elections outcome or not and discuss the proposed conceptual framework for future empirical testing. The chapter highlights the various concerns needed to be taken care of while using social media as a marketing tool for promoting political participation and engagement.

Chapter Preview

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Introduction

Social media has emerged as a dominant digital platform in the present-day digital society (Kumar & Nanda, 2019b). It has become an essential part of community discussions and communication. The quick development of social media has instigated changes concerning the way publics interact with group of people with similar ideologies, the quality of information they share or the opportunity to acquire and share ideas. Social media platforms are increasingly being accessed and used at all times and places, resulting in major impact on public relations, marketing, and political communication. Therefore, politicians are also utilizing the social media in formulating their strategies to reach increasingly networked individuals (Pradhan & Kumar, 2015). They are giving more preference to social media attention of the public in driving political engagement.

Viability of an Uncomplicated IoT SaaS Development for Deployment of DIY Applications Over HTTP with Zero Investment, Advances in Decision Sciences

Viability of an Uncomplicated IoT SaaS Development for Deployment of DIY Applications Over HTTP with Zero Investment

Sujanavan Tiruvayipati ✉ & Ramadevi Yellasiri

Abstract

IoT administrations are ordinarily conveyed of IoT as physically disconnected vertical arrangements, in which all framework segments running from tangible gadgets to applications are firmly coupled for the prerequisites of each explicit venture. The productivity and versatility of such administration conveyance are naturally constrained, presenting noteworthy difficulties to IoT arrangement developers. In this context, we propose a novel SaaS structure that gives basic stage administrations to IoT arrangement suppliers to productively convey and constantly expand their administrations for DIY applications over HTTP with no investment required. This paper initially presents the IoT SaaS engineering, on which IoT arrangements can be conveyed as virtual verticals by utilizing figuring assets and middleware benefits on free cloud services. At that point we present the itemized instrument, usage of area intervention, which helps arrangement suppliers to productively give area explicit control applications by designing their own SaaS for IoT. The proposed methodologies are exhibited through the implementation of a sample experiment for building the need. A prototype proposed method is discussed in this paper.

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