A Comparative Study of Data Mining Techniques for Predicting Disease Using Statlog Heart Disease Database

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Abstract:- Data Mining (DM), frequently treated as synonymous to Knowledge Discovery in Databases (KDD) is actually a part of knowledge discovery process and is the process of extracting information including hidden patterns, trends and relationships between variables from large databases in order to make the information understandable and meaningful. The ultimate goal of data mining is prediction of unknown patterns and predictive data mining is the most common type of that which has the most direct real life applications. The process basically consists of three stages: (1) the initial data exploration, (2) model building or pattern identification with validation/verification process and (3) deployment of the data mining model. Therefore, in this research paper data mining techniques will be compared using the benchmark datasets. The different types of data classification methods and techniques are available such as Statistics, Visualization, Clustering, Decision Tree, Association Rule, Neural Networks, K-Nearest Neighbor Method and Genetic algorithms. The objective of this research paper is to do the comparative study and evaluation of decision tree, artificial neural network with the help of Statlog Heart Diseases Database collected from UCI machine learning repository. The advantages and disadvantages, of the data mining techniques depend on the capability and efficiency of the data mining techniques or algorithms to classify the large volume of database and predicting the relevant patterns for decision making process. The consequences of choosing any technique and the methods of implementation is very important factor. Data mining techniques such as Decision Tree and Artificial Neural Networks are used for the classification of Statlog heart disease datasets. These supervise machine learning algorithms are compared on the basis of classification accuracy and performance matrices.

Keywords- Data Mining, Knowledge Discovery in Databases, Statlog Heart Disease Database, K-nearest Neighbor Method, Genetic Algorithm.

I.   INTRODUCTION

Progress in digital data acquisition and storage technology has resulted in the growth of huge databases. This has occurred in all areas of human endeavour, from the mundane (such as supermarket transaction data, credit card usage records, telephone call details, and government statistics and Electronic Health Records) to the more exotic (such as images of astronomical bodies, molecular databases, and medical test records). With the rapid development of advanced computing resources, Internet technology and information processing tools and techniques in the last several decades, an enormous amount of data in science and engineering has been and will continuously be generated in massive scale, either being stored in gigantic storage devices or owing into and out of the system in the form of data streams.

Data mining is an essential step in the knowledge discovery in databases (KDD) [18]. The terms of KDD and data mining are different; KDD refers to the overall process of discovering useful knowledge from data. Data mining refers to discover new patterns from a wealth of data in databases by focusing on the algorithms to extract useful knowledge [18]. In information era, knowledge is becoming a crucial organizational resource that provides competitive advantage and giving rise to knowledge management (KM) initiatives. The goal of pattern mining is to find item sets, sub sequences, or substructures that appear in a data set with frequency no less than a user-specified threshold. Pattern analysis can be a valuable tool for finding correlations, clusters, classification models, sequential and structural patterns, and outliers.
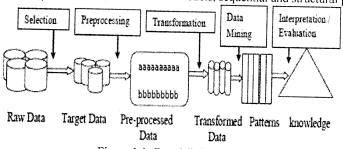

Raw Data   Target Data   Pre-processed   Transformed   Patterns   knowledge
                              Data   Data

Figure 1.1: Data Mining Process

Performance Evaluation of Decision Tree and Neural Networks for Classification of Hematology Databases

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Abstract:-Clinical databases are playing the major role for prediction of many types of diseases. Through many types of clinical processes very large volume of pathological datasets are generated for the care of patients. Pathologists analyze these data or test results obtained with the help of many clinical processes and take cares according to the predicted symptoms of disease. These datasets are more helpful for the doctors and health care centers to predict the relevant cause of diseases and to provide better medical treatment. To analyze and classify all these datasets is a very tedious process. Clinical datasets are very complex and require more efficient and accurate algorithms and data analyzing tools. Machine learning algorithms are used in many fields for the classification of large volume of data to generate the rules for building the knowledge base system. These machine learning algorithms are widely used in the medical field to build the disease diagnosis support system. This has become the emerging field of medical research. Many types of machine learning algorithms has been developed and deployed. In this research paper Hematology datasets which are very important for the pathologists to predict symptoms of many diseases. These datasets are classified as normal samples and abnormal samples using decision tree and neural networks. These machine learning algorithms are used for the classification of Hematology datasets. The classification performance of the decision tree and neural networks are evaluated on the basis of classification accuracy and performance matrices.

Index Terms:-Clinical databases, Pathological databases, Hematology datasets, Disease Diagnosis, Classification, Neural Networks, Machine learning

I. INTRODUCTION

Decision tree is a tree-shaped structure that represents sets of decisions. These decisions generate rules for the classification of a dataset. Decision Tree is a popular classifier which is simple and easy to implement [1]. It requires no domain knowledge or parameter setting and can handle high dimensional data. Hence it is more appropriate for exploratory knowledge discovery. It still suffers from repetition and replication. Therefore necessary steps need to be taken to handle repetition and replication. The performance of decision trees can be enhanced with suitable attribute selection. Correct selection of attributes partition the data set into distinct classes. A decision tree is a classifier expressed as a recursive partition of the instance space. The decision tree consists of nodes that form a rooted tree, meaning it is a directed tree with a node called "root" that has no incoming edges. All other nodes are called leaves (also known as terminal or decision nodes).

Neural networks process information in a similar way the human brain does. The network is composed of a large number of highly interconnected processing elements (neurons) working in parallel to solve a specific problem. Neural networks learn by example. They cannot be programmed to perform a specific task. The examples must be selected carefully otherwise useful time is wasted or even worse the network might be functioning incorrectly. An Artificial Neural Network (ANN) is an information processing paradigm that is inspired by the biological nervous systems, such as the brain. [2].

The key element of this paradigm is the novel structure of the information processing system. It is composed of a large number of highly interconnected processing elements (neurones) working in unison to solve specific problems. ANNs, like people, learn by example. An ANN is configured for a specific application, such as pattern recognition or data classification, through a learning process. Artificial Neural Networks (ANN's) have been used widely in many application areas in recent years. Most applications use feed forward ANN's and the backpropagation (BP) training algorithm. There are numerous variants of the classical BP algorithm and other training algorithms. All these training algorithms assume a fixed ANN architecture.

II. DECISION TREE ALGORITHM FOR THE CLASSIFICATION OF HEMATOLOGY DATASETS

Before constructing and using the Decision Tree algorithms to classify the databases, a Relevance Analysis of the features of collected databases is performed. Relevance Analysis aims to improve the classification efficiency by

Predicting Consumer Behaviour Using Artificial Neural Network

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Abstract: Artificial Neural Networks (ANNs), a computational model inspired by the architecture of the human brain, exhibit certain features such as the ability to learn complex patterns of information and generalize the learned information They are used for a number of data analysis tasks such as prediction, classification and clustering. They can operate even with partial and noisy information. In this paper, an application of ANN for predicting consumer behaviour has been discussed. It helps marketers to understand how consumers behave from alternatives (like products, brands and the like) and how consumers are influenced by their environment (reference groups, their family, salespersons and so on). Consumers' buying behavior is influenced by their cultural, social, personal and psychological factors. Most of them are uncontrollable and beyond the hands of marketers, but they have to be considered while trying to understand the complex behaviour of consumers. This paper is focused to understand the behaviour of consumers towards the purchase of two-wheelers by using an artificial neural network.

I. INTRODUCTION

Neural Networks are massive parallel distributed processes that have a natural propensity for storing experiential knowledge and making it available for use. Neural Networks are powerful data mining and modeling techniques that are capable of capturing and identifying complex relationships by input/output mechanism. The greatest advantage of Neural Networks is its ability of learning both linear and non-linear relationships in the modeling dataset. Since the development of ANNs is inspired from the human brain, it resembles the brain in two respects:

- Knowledge is acquired by the network from its environment through a learning process, i.e. learn from examples.
- Inter - neuron connection strengths, known as synaptic weights, are used to store the acquired knowledge. The accuracy of the acquired knowledge increases as the number of examples increases.

Based on connection methods among the neurons and the information flow directions in the network, neural network models can be divided into two kinds. Firstly, the feed forward neural network that has only forward information transfer but no feedback information. Second, the feedback neural network that has not only forward transfer of information but also reverse transfer (feedback) information. In this paper, a feed forward and back propagation neural network is used.

II. PREDICTING CONSUMER BEHAVIOUR USING NEURAL NETWORK

For predicting purchase behaviour of the consumers of two-wheeler companies, a survey was conducted which involved 400 consumers from different areas of Jodhpur city. The questionnaire used for the survey consists of 26 questions for collecting detailed information about consumers and five leading two-wheeler companies. For the survey data, a neural network has been developed which takes the 26 variables as input and predict the choice of the consumer. The variables considered for predicting the consumer behaviour are monthly income, profession, source of purchase, decision maker for purchase, purchase by cash or loan, availability of service provider, after sales service, before sales service, infrastructure, price satisfaction, less maintenance requirement, style, durability, mileage, easy driving, brand reputation, colour, special offer, exchange offer, special gift, cash discount, mileage after purchase, availability of service provider after purchase, price satisfaction after purchase, after service satisfaction, on road pickup and maintenance service.

The descriptions of the variables including their role, type and code are shown in Table 1.

Table 1: Description of Variables

Research Issues in Object Distance Estimation Using a Laser Pointer and a Webcam

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Abstract—The depth perception of objects in a scene is the primary research objective of the machine vision system. It has many industrial applications, such as robot navigation, scene understanding, metrology, etc. In this paper, some issues of low cost image processing based distance estimation systems are described. The low cost systems use commonly available laser pointer pens and a web camera. These systems are based on the principle of triangulation along with the perspective projection and the fact that light travels in a straight line. The paper presents a prototype system of a laser range estimation system consisting of a laser light pen and a webcam. The main contribution of the paper is a simple procedure for the system calibration and the camera parameter estimation. The system is implemented in the Matlab environment and gives good results.

Keywords-depth; camera calibration; perspective projection; laser spot.

I. INTRODUCTION

Distance estimation of various objects around us is essential for our daily activities, especially for our collision free navigation. There are currently three leading principles used for distance estimation: (1) time of flight, (2) stereo vision, and (3) monocular vision. In the time of flight system, the travel time of a wave from the source to the object and back to the receiver, for example the ultrasonic wave, is used to estimate the distance between the source and the object. This method is sensitive to the surrounding noises. The stereo vision system, which imitates the human vision system, evaluates the distance using the spatial disparity of an object point in two images (captured using a pair of cameras) with the triangulation method. The method is capable to work in any environment, but it is computationally very expensive. Further, the point correspondence problem, i.e. finding the locations of the projections of a scene point in both images, is practically very difficult to solve for real life stereo images in varying lighting conditions [1].

Humans successfully use various clues, such as texture variations, texture gradients, occlusion, known object sizes, haze and defocus, to judge depth from monocular images [2]. However, it is not possible to estimate distances from a single image without additional assumptions and information. For example, in an image of a clear blue sky with a patch, it is difficult to tell if this patch is infinitely far away (sky), or if it is a part of a blue object[2].

Due to ambiguities like these, one needs to look at the overall organization of the image to determine depths [2]. As observed by [2], the further difficulty with the monocular clues is that most of these monocular cues are global properties of an image and cannot be inferred from small image patches. For example, occlusion cannot be determined if we look at just a small portion of an occluded object.

To overcome the above difficulties in estimating depth from a single image, many researchers proposed to use some sort of projections of known structures before capturing the image [3]. These projected structures work as additional clues to estimate the distance of objects in a scene.

The present work extends the work presented in [3] by incorporating a low cost solution to calibration of the system and a simple procedure to calculate camera constant. The work presented in [3] is specific to the underwater distance measurement system, hence uses a sophisticated camera and high power laser rays. In contrast to [3], present work uses a commonly used webcam and a laser pointer pen used in our daily power point presentation.

The remaining part of the paper is organized as follows. Section 2 explains the working principle of the proposed system. Section 3 explains the experimental setup along with the alignment and calibration mechanisms. Section 4 presents results obtained by the setup. The final section presents conclusion followed by the relevant references.

II. WORKING PRINCIPLE

The proposed system is based on two well established facts: (1) the fact that as an object moves away from a camera, it appears smaller in the image captured by the camera and (2) the fact that light (laser) travels in a straight line. The fact one alone cannot be used for estimating objects distances using image processing as sizes of scene objects are not known in priori. As can be seen from figure 1(a), objects of different sizes located at different distances appear of the same size. In figure1(a), the object AB and object CD are of different heights (sizes) and are placed at different depths, but the images of both the objects are same in size, as shown by EF. Hence, the image size of an object alone cannot be used to estimate depths. However, it is possible to estimate the distance of an object if the size of the object is known. To simulate an object of known size in a scene, a laser ray parallel to the camera axis is projected on the scene object. Since the camera axis and the laser ray are parallel to each other, the distance between the center of the image and the dot created by the

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A Comparative Study of Multilayer Perceptron, Radial Basis Function Networks and logistic Regression for Healthcare Data Classification

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Abstract- *The Healthcare databases are becoming more important nowadays. Many Healthcare institutions are maintaining the large volume of healthcare databases to provide the best clinical services and insurance claims. The profits of Healthcare insurance companies are totally depending on the care of their customers. It is predicted by the healthcare department of United States of America that the early detection of any disease and its cause is very important strategy to save the big amount of insurance claim. Therefore Healthcare data classification approach has become the dominant process to save the big amount of budget allocation for the government sector. There are many types of classification approaches used for classification and prediction. In this research paper mainly multilayered Perceptron, Radial basis function networks and Logistic Regression are used to classify the Healthcare databases and on the basis of classification trends the decision are taken. All these approaches of data classification are covered. in this paper.*

Index Terms— Healthcare databases, clinical services, data classification, classification and prediction, multilayered Perceptron, Radial basis function networks, Logistic Regression.

I. INTRODUCTION

Data Mining has become one of the prominent approaches of knowledge discovery in databases. There are many types of data mining techniques and algorithms are available for data classification and prediction. Finding the hidden patterns with help of data mining techniques are used in many fields. These techniques are playing the major role in banking data classification. Healthcare data classification, Fraud detection, spam detection and many other fields. To build the efficient data classification model is a very typical task. In this process many approaches of data cleaning, transformations are used. The healthcare databases are more complex and sophisticated machine learning approaches are used for better classification and prediction. The selection of a particular data classification approach is not an easy process. The selection is mainly based on the nature of the data. There are basically two machine learning approaches are used. Supervising learning and unsupervised learning. Multilayer Perceptron, Radial basis function networks and logistic Regression are the best supervise machine learning techniques. With help of these methods large volume of databases can be classified. Data are collected, cleaned and transformed in a suitable format for the classification. Multilayer Perceptron (MLP) network models are the popular network architectures used in most of the research applications in medicine, engineering, mathematical modelling. In MLP, the weighted sum of the inputs and bias term are passed to activation level through a transfer function to produce the output, and the units are arranged in a layered feed-forward topology called Feed Forward Neural Network (FFNN) [1].

The idea of Radial Basis Function (RBF) Networks derives from the theory of function approximation. In general, a function approximation problem asks us to select a function among a well-defined class that closely matches ("approximates") a target function in a task-specific way [16]. Radial basis function networks (RBF, [1]–[4]) are used for classification. Here, these neural networks are trained to estimate posterior probabilities of class membership by means of mixtures of Gaussian basis functions and hyperplanes. From a structural viewpoint, RBF networks are closely related to direct kernel methods [5] and support vector machines (SVM) with Gaussian kernel functions [1], [6]. Logistic regression is the appropriate regression analysis to conduct when the dependent variable is dichotomous (binary). Like all regression analyses, the logistic regression is a predictive analysis. Logistic regression is used to describe data and to explain the relationship between one dependent binary variable and one or more metric (interval or ratio scale) independent variables. Standard linear regression requires the dependent variable to be of metric (interval or ratio) scale. Logistic regression assumes that the dependent variable is a stochastic event. That is that for instance if we analyze a pesticides kill rate the outcome event is either killed or alive.

Since even the most resistant bug can only be either of these two states. logistic regression thinks in likelihoods of the bug getting killed. If the likelihood of killing the bug is > 0.5 it is assumed dead. if it is < 0.5 it is assumed alive[7].

II. LITERATURE SURVEY

A good deal of effort has been made in the recent past by researchers in their attempt to develop the computational intelligence models with an acceptable level of classification accuracy. It is fount through literature review that Radial

IMAGE CLASSIFICATION WITH DEEP LEARNING BASED ON DIFFERENT CONVOLUTIONAL LAYERS USING TENSORFLOW

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ABSTRACT

Deep learning is the subfield of machine learning which uses neural networks that inspired by the structure and functioning of the human brain. Deep learning is a new approach for data analysis and prediction; it has become very popular recently. Deep learning has achieved much higher success than machine learning in many applications, one of the reason for this is, that machine learning not able to process large amount of data effectively as well as it also not able to extract the features from the data automatically. Deep learning is being recognized as an essential tool for artificial intelligence research, with various applications in several areas such as speech recognition, object recognition and image classification. In particular, Deep Learning is preferred in the classification of images, because it can provide efficient results. In this paper, a deep learning convolutional neural network based on Tensor Flow and Keras is deployed for 2D Image Classification, using animal dataset. In this study, we used Tensor flow, one of the most popular Python programming language libraries for deep learning to classify Images and sigmoid classifier and Rectified Linear Unit (ReLu) function for deep learning convolutional neural network. At last, the each image features are trained with convolutional neural network for image classification. The proposed approach is compared for one and two convolutional layers on CPU system and finally we conclude that image classification with two convolutional layers gives better validation accuracy.

KEYWORDS –

Deep Learning; Tensorflow; Keras; Conolutional Neural Network; ReLu; Sigmoid Classifier; Image Classification

1.INTRODUCTION

Deep learning is a new approach for data analysis and prediction; it has become very popular recently. Deep learning is being recognized as an essential tool for artificial intelligence research, with various applications in several areas such as speech recognition, object recognition and image classification [3]. For Classification problems, more accurate values can be obtained using Deep Learning instead of Machine Learning.

Deep Learning can be classified into four types: Deep Neural Network (DNN), Convolution Neural Network (CNN), Recurrent Neural Network (RNN) and Q-learning. These Deep Learning types are rapidly evolving, with several software packages including Theano, CuDNN, Caffee, and Keras [3].

By using a Convolutional neural network in deep learning, a model can be created to enable powerful and often correct assumptions by changing various parameters such as activation function and number of convolutional layers. There are several libraries used in deep learning studies [2].

TensorFlow is one of the libraries used for image classification in deep learning. TensorFlow is an open-source software library developed by the Google in 2015 for numerical commutation. TensorFlow can deploy RNN, DNN and CNN not only to multi core CPUs, but also to GPUs. It also supports the AdaGrad, Dropout, and ReLu functions, which are very

Comparative Study of MapReduce Frameworks in Big Data Analytics

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Abstract: Big Data is large and rapidly growing volume of information that is mostly untapped by existing analytical applications and data warehousing systems. One such example of this data is social networking information from web sites such as Facebook and Twitter. Most organizations now understand that if they capture all the data that streams into their businesses, they can apply analytics and get significant value from it. Big data analytics helps organizations harness their data and use it to identify new opportunities. That, in turn, leads to smarter business moves, more efficient operations, higher profits and happier customers. The volume of data with the speed it is generated makes it difficult for the current computing infrastructure to handle big data. To overcome this drawback, big data processing can be performed through one of the programming paradigm known as MapReduce. Typical, implementation of the MapReduce paradigm requires networked attached storage and parallel processing. Apache Hadoop is an open source platform which is used for storage and parallel processing of huge amounts of data and has been adopted by a number of organizations. The drawbacks and limitations in Hadoop led to the development of the next generation Hadoop called Apache YARN, in which the resource management component is separated from the programming paradigm and a number of programming paradigms beyond Map-Reduce frameworks are supported like Spark, Tez, Hoya, REEF etc. The most important features included were the HDFS High Availability, YARN and HDFS federation, besides some performance tuning. At the same time, Facebook which used Apache Hadoop for its storage and processing began to see issues as Apache Hadoop could not handle its scalability and processing needs. To address these issues Facebook modified the architecture of Hadoop to create a new framework called Corona. This paper compares three parallel programming frameworks - Hadoop, YARN and Corona based on various parameters such as Architecture, HDFS Federation, MapReduce Availability and HDFS Availability.

Keywords: Hadoop, MapReduce, HDFS, YARN, Corona

I. INTRODUCTION

Hadoop provides a distributed file system and a framework for the analysis and transformation of very large data sets using the Map-Reduce paradigm. An important characteristic of Hadoop is the partitioning of data and computation across many (thousands) of hosts, and executing application computations in parallel close to their data. A Hadoop cluster scales computation capacity, storage capacity and IO bandwidth by simply adding commodity servers. Hadoop clusters at Yahoo! span 25 000 servers, and store 25 petabytes of application data, with the largest cluster being 3500 servers. One hundred other organizations worldwide report using Hadoop [1]. Apache Hadoop has two core components, the Hadoop Distributed File System (HDFS) [5] for storage which is open source versions of Google File System (GFS) [2] and the MapReduce [4] Engine for computation which is open source version of Google's MapReduce.

A Hadoop Map-Reduce cluster employs a master-slave architecture where one master node (known as JobTracker) manages a number of worker nodes (known as the TaskTrackers). Hadoop launches a Map-Reduce job by first splitting (logically) the input dataset into multiple data splits. Each map task is then scheduled to one TaskTracker node where the data split resides. A Task Scheduler is responsible for scheduling the execution of the tasks as far as possible in a data-local manner. In a typical Map-Reduce job, input files are read from the Hadoop Distributed File System (HDFS).

Facebook initially employed the MapReduce implementation from Apache Hadoop. Over half a petabyte of new data arrived in the warehouse of Facebook every 24 hours, and adhoc queries, data pipelines, and custom MapReduce jobs processed this raw data around the clock to generate more meaningful features and aggregations. Facebook cluster had 100 PB of data and to process that it crunched more than 60,000 Hive queries a day. The data warehouse of Facebook grown by 2500x in the past four years, and was expected to continue growing with Facebook's

Efficiency Enhancing Resource Scheduling Strategies in Cloud Computing

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Abstract:

The clouds have changed the patterns of traditional way of using the software and infrastructures. In cloud computing job scheduling is used to schedule certain jobs to particular resources at particular time. In this paper, some scheduling strategies are discussed which schedule computing resources in a way that providers achieve high resource utilization, low power consumption and users meet their applications performance requirements with minimum expenditure.

Keywords — **Scheduler, Virtual Machine, Round Robin.**

I. INTRODUCTION

The enterprises can rapidly complete some business and reduce a lot of cost by using clouds. The cloud computing system is divided into consumers, service providers and resource providers, which is currently the major way to layer the cloud computing. The service providers want to minimize the cost of using the resources offered by the resource providers, and to reduce the response time for consumers. An application operated in the cloud consisting of one or more services which is sent to the service provider stating two main constraints, time and cost [1, 2]. Service/job scheduling is one of the most important methods to achieve these. The actual processing time is longer than the original estimated time because of delays occurring on the provider's side. As the cloud computing are primarily operated by the principle of paying by time, so the service provider want to reduce the delay and improve the quality of their service [3]. The ultimate goal of scheduling in cloud computing is to have efficient resource utilization.

II. SCHEDULING PROCESS IN CLOUD COMPUTING

The process dealing with normal service requests from consumers is as follow:

a) The cloud service provider receives the service request of user's [4]
b) Execution of the receiving.
c) The process of service/job scheduling.
d) The process of resource allocation.

Service/job scheduling work is carried out in the step(c). The service providers have a huge number of users; they have to deal with massive data [5], which are more difficult to schedule. The requests from users must be scheduled efficiently, so scheduler needs to calculate a proper sequence to response those requests.

A. Main Components in Service/Job Scheduling

The main components performing Service/job scheduling are shown in Fig. 1, which is composed of classifier, scheduler, and summary component.
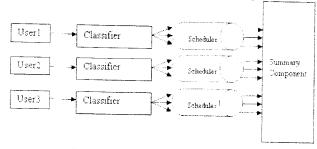

Fig. 1 Component in Service/Job Scheduling

a) Classifier. This component receives all requests from consumers, analyzes them and

Design and Calibration of an Experimental Setup for 3-D Reconstruction of A Scene from Stereo Images

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Abstract—The ultimate goal of a stereo vision system is to reconstruct 3D geometrical models of scenes. Once a 3D model is available, it can be used in many real life applications such as autonomous navigation of robots, metrology, artificial eyes, etc. This paper reports a design of an experimental stereo vision setup for generating 3D geometrical models of scenes from stereo pair images. It further reports the results of stereo camera calibration, intrinsic and extrinsic parameters, of the stereo system along with the calibration procedure. These parameters are used to rectify captured stereo pair images for generating the disparity map. The paper further describes the basic steps of 3D reconstruction from a pair of stereo image. Finally, the paper presents a reconstructed scene from the stereo image captured by the stereo system.

Keywords— *Stereo vision, 3D reconstruction, camera calibration,disparity map.*

I. INTRODUCTION

The stereo vision is based on optics of a set of two pin-hole cameras where three-dimensional real world scene is projected as two-dimensional images and a set of intelligent algorithms to interpret these images. In this, two images of a scene are simultaneously captured by our two eyes. These images are further processed by our brain to recreate the three-dimensional model for visualization, depth perception and many other applications. It has been theoretically established that a set of two projections of a scene captured by two cameras from two slightly different viewpoints are enough to reconstruct three-dimensional model of the scene. Physics of binocular vision system is simple and very powerful. As per pinhole camera image formation concept, it is found that the projection of a scene point in one image captured by one eye is slightly displaced in the image captured by the other eye. The displacement between the locations of a point in the two images is commonly referred as disparity and it is inversely proportional to distance between scene point and eyes. This is the fundamental mechanism used by the stereo vision system to reconstruct the scene and depth perception. The perception of depth which is so intuitive in humans and other animals is eluding researchers in computer vision from past few decades to develop visual perception capabilities in machine.

The ability of a machine to reconstruct a 3D scene from 2D images is extremely useful for many applications in science and industry. One such application is robotics/machine vision where proper distance estimation is important for obstacle avoidance. Other applications include automatic navigation of mobile robots in an environment where human intervention is dangerous or is unreachable and automatic driving and navigation of road vehicles. The stereo vision is also useful for accurate human face recognition system, reconstructing 3D environment for path planning, retrieving a 3D object, creation of 3D maps and many other applications in engineering and medicine where human vision like capability is required.

Currently, active sensing technologies such as SONAR (Sound Navigation and Ranging), LIDAR (Light Detection and ranging), structured light etc. are used for automatic navigation and other vision applications. These methods are based on emitting energy into the environment and analyzing the reflected pattern. Unfortunately, such techniques are invasive and have limited range, and thus have a restricted application domain [1]. Further, they require special purpose hardware (laser projector) that is bulky, expensive and power consuming. Besides, these methods are sensitive to the reflection properties of the elements in the scene. Passive sensing approaches, such as multi view stereo vision are robust and very cheap alternatives because only cameras (two in case of binocular stereo) and a computer are required and no energy emission is involved. However, this technology is in its infancy and requires extensive research to make it a commercially and technically viable alternative to above mentioned methods. Specific issues of concern are computational efficiency and improper reconstruction near object boundaries and textureless areas [2].

In this paper, the design of an experimental stereo camera setup for acquiring stereo pair images is presented. It further reports the results of stereo camera calibration in the form of intrinsic and extrinsic parameters of the stereo system along with the calibration procedure. These parameters are used to rectify the captured stereo pair images for generating the disparity map. The paper also describes the basic steps of 3D reconstruction from stereo images. Finally, the paper presents a reconstructed scene from stereo images captured by the stereo system using the disparity map generated by the algorithms developed by the authors in their earlier work [3-4].

II. RELATED WORK

The major challenge to obtain 3D reconstruction of a scene is to generate an accurate disparity map in real time.

Development of an Intelligent Database System to Automate the Recognition of Machining Features from a Solid Model Using Graph Theory

Rachna Verma and A. K. Verma

Abstract—Automatic recognition of machining features is essential for the integration of CAD and CAM. Graph-based recognition is the most researched feature recognition method as the B-Rep CAD modelers' database uses graph to store the model data. A graph-based feature recognition system uses attributed graphs to store CAD models as well as machining feature templates. The graph isomorphism is used to extract features in the model graph and template graphs. There are two main research issues in this system- (1) Efficiently recognize the features as the graph isomorphism is computationally very expensive and (2) incrementally expanding the feature template database to include new features, without any structural change in the recognizer. In this paper, the application of feature vectors (a heuristic developed by the authors that converts a feature graph into a unique vector of integers, irrespective of the node-labeling scheme used by B-Rep modelers), to automatically expand the recognizer's feature template database, is presented. It facilitates automatic inclusion of new features in a feature database, without requiring any additional programming effort from the user or any changes in the structure of the recognizer. The proposed system has been implemented in Visual C++ and ACIS solid modeling toolkit. Further, the proposed system is intelligent as it has the capabilities to learn from the examples to incrementally build the feature database.

Index Terms—Machining feature, feature recognition, graph matching, solid model.

I. INTRODUCTION

An intelligent database is a full-text database that employs some artificial intelligence to return the most relevant information possible requested by the user depending on the context. This is in contrast to a traditional database, which is searchable only by keywords and verbatim phrases with some relational operators. In this paper, definition of intelligent database is extended to include geometrical data along with the textual data. Further a system is presented that interact with this raw geometrical database to extract useful machining features for automated manufacturing of the various parts. The manufacturing process and operation selection is highly dependent of the shape of the part to be produced. Since there are infinite possibilities of shapes it is not possible to create a predefined library of it, hence shapes are stored in the solid model database in terms of low level geometrical entities such as vertex, edges and faces in the form of a graph or in some other suitable structure. Hence there is a requirement of a system that can extract patterns in this low level database that can be used to automate the manufacturing of the given shape. There are a number of techniques used for this purpose but graph-based recognition is the most researched feature recognition method due to sound mathematical background of graph theory and a graph's structural similarity with B-Rep CAD modelers' database. A graph-based feature recognition system represents geometry and topology information of a part using a graph structure. The graph carries all the useful information of part features as certain attributes assigned to its arcs and/or nodes. This explains the inherent advantage of B-Rep-based solid models over others in graph-based feature recognition. Pre-defined manufacturing features, known as manufacturing primitives are also represented by similar graphs. Graph isomorphism is then used to extract features.

A feature recognition system uses a pre-defined database of feature templates. Thus, a simple mechanism is needed to define new features and expand the template database to include user-defined features without any structural change in the recognizer. This led to development of various methods to represent features. Pratt [1] proposed a non-manifold feature representation scheme using B-Rep for volumetric features. He introduced the concept of implicit and explicit feature representations. In explicit representation, a full geometric shape is defined, while in implicit representation, minimal information is used to define the feature but other details have to be computed when needed. Shah and Rogers [2] and Wang and Ozsoy [3] used hybrid CSG and B-Rep schemes for feature representation. None of these schemes, however, is suitable for feature recognition as the B-Rep or CSG representations of a shape are not unique.

The ASU feature test bed [4], a system developed by Laakko and Mantyla [5], and STEP [International Standard for Exchange of Product data] all use feature definition languages to define new features [6].

In this paper a heuristic has been reported that converts a feature graph into a vector of integers, called feature vector [7], [8]. A feature vector uniquely represents a feature graph, irrespective of the node-labelling scheme used by B-Rep modelers. It can be generated automatically from the modeler database. Its usage is intended to reduce the graph matching time complexity to a polynomial of order three. It also facilitates automatic inclusion of new features in a feature

Security Keys: Modern Security Feature of Web

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ABSTRACT
Security providing devices that are used to protect against multiple threats like man-in-the-middle attack and phishing are known as "security keys". With the help of security keys, user can register himself with any kind of online services that works with this protocol. If we install these security keys in some devices, deployment, implementation and use becomes very easy. We can also see the security keys in some browsers like chrome, Mozilla, even in some online services as well. These keys provide more satisfaction to user with the help of higher security level. This work is all about security keys which are second-factor devices that are used to improve the state of the art for authentication purpose for real consumers in terms of privacy, security, and usability.

Keywords
Authentication, client, keys, signature, registration

1 INTRODUCTION
There are many research papers which have been proposed to work on some other security feature rather than passwords. But till no such efforts is successful. Even most of the service providers works on password-based authentication with one other feature i.e. OTP (One Time Password). One Time Passwords also not provide complete security in some of the common attacks. In this way deployment of OTPs is limited in case of reliability and security perspective. Each and every client who is working on the internet wants security of information but sometimes he or she do not know that someone else may be a intruder is collecting the information. Information is an asset that must be protected [11]. At the same time, other authentication and security factors related to response and challenge based protocols also suffer from some deployment problems. On the other hand smart cards and NID (National ID) cards require some pre-installation before use. Protocol is proven to be secure under CDH assumption in both the random oracle model and the ideal cipher model [8].Over forty years of research have demonstrated that passwords are plagued by security problems [2] and openly hated by users [3]

The security is achieved in the formal security model of Bellare et al. [9].This work is related to one other security factor provided by "Security Keys". These Security keys help the user in better way than OTPs in terms of usability, authentication, privacy etc. Here we will see how security keys increase the security level and how they provide satisfaction to user.

2 RELATED WORKS
Now we will have an overview of related work. Some schemes can do better than passwords on security as expected, given that inventors of alternatives to passwords tend to come from the security community. The concept of using combining functions to determine the combined effect of vulnerabilities in a network[12].Network security involves the authorization of access to data in a network, which is controlled by the network administrator [10]. Some schemes do better and some worse on usability—suggesting that the community needs to work harder there.[1] Before that let's see some basic knowledge that will help us to understand the work done.

One Time Passcodes: Even though One Time Passwords provides higher security than simple passwords, still we suffer from some problems. First, OTPs are vulnerable to some cyber-attack like man-in-the-middle attack and phishing. Second, OTPs require the availability of phones and internet as they are send via messages or emails. OTPs offer a sub-optimal user expertise as they typically need the user to manually copy codes from one device to a different. Security Keys are unit immune to phishing and man-in-the-middle by design; our preliminary study conjointly shows that they supply a far better user expertise.

Smartphone: Many of the efforts were taken to take the leverage of user's mobile phone to provide more security, whether it is in industry or academics. At the time of promising, they face lots of challenges: Like, on a general purpose, protection of application logic from malware is very difficult. Even though, sometimes user's phone gets unreachable or data connection problem is there or battery related issue

may be there. There is no requirement of batteries in security keys.

Smart Cards: Security Keys work into the what you have class of authentication schemes and have a detailed relationship to smart cards. Whereas Security Keys are often enforced on prime or top of a smart card platform like JavaCard, Security Keys defines a specific protocol for which smart cards area unit only one attainable implementation platform.

TLS: TLS is a Transport Layer Security (TLS) protocol which is used to provide security, data integrity and privacy between two communicating parties. Now a Days TLS is the only security protocol which is widely deployed today. On the other hand TLS is used for Web browsers and some other kind of applications which requires data to be securely transmitted over a network like VPN Connections, Voice over IP, File Transfer and instant messaging. TLS basically consists of two types of protocols:

* TLS Record Protocol and

* TLS Handshake Protocol

Protocol is proven secure Password-Based Group Key Exchange in a Constant Number of Rounds against dictionary attacks under the DDH assumption, in the ideal-cipher and random oracle models [4]. Proposed the use of probability scores for each vulnerability to represent the likelihood that one attacker or the percentage of attackers that will exploit the vulnerability [13].Record protocol is used to provide secure connection and Handshake Protocol permits the client to authenticate server and vice versa.

Performance Analysis of AODV and AOMDV Routing Protocols Using ZigBee for Precision Agriculture

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Abstract - The need for intelligent farming especially in developing countries like India has grown to a greater extent. Moreover, the research in the area of ZigBee based wireless sensor network in precision agriculture, such as monitoring of environmental conditions like soil moisture content, monitoring growth of the crop, and automated irrigation facility has taken a new dimension. Manual collection of data for desired factors can be sporadic, time-consuming, noncontinuous and may produce variations from incorrect measurement taking. Wireless distinct sensor nodes can reduce time and effort required for monitoring the environment along with the guarantying accuracy of data. The logging of data allows for reduction of data being lost or misplaced. The present study compares AODV and AOMDV routing protocols in mesh and star topology on basis of five parameters including Average Energy, Average Throughput, Average End-To-End Delay, Average Jitter and Packet Delivery Ratio. Furthermore, the study compares the two given routing protocols at different distances of 10 meters and 20 meters and at various numbers of nodes including 11, 21 and 31. The NS-2 simulator has been used for experimental setup in the study which provides an environment for the networks, topology and the nodes. The study aims at analyzing the derived results from the experimental setup and thereby suggesting the most suitable topology and routing protocol for developing an effective and efficient model in ZigBee for the real-time implementation in precision agriculture.

Keywords- Precision Agriculture; Wireless Senor Network; ZigBee; Routing Protocols; AODV; AOMDV; Star Topology; Mesh Topology

I INTRODUCTION

The current scenario of agriculture has drastically changed over the recent years. Today. agriculture routinely employs sophisticated technologies such as temperature and moisture sensors. robots. aerial images. smart power systems. Global Positioning System (GPS) technology and farm management software. These advanced devices, precision agriculture, and robotic systems help save time and money of the farmer and allow businesses to be more profitable. efficient and more environmentally friendly.
Precision agriculture (PA) is a farming management concept based on observing. measuring and responding to inter and intra-field variability in crops. The goal of precision agriculture research is to define a Decision Support System (DSS) for whole farm management with

the goal of optimizing returns on inputs while preserving resources [1] [2]. Precision farming involves the application of technologies and principles to manage spatial and temporal variability that is associated with various aspects of agricultural production for improving the environmental qualities and crop performance. The logic behind the precision farming is that production inputs (fertilizer. seeds. chemicals. etc.) should be implied as and where needed.

II WIRELESS SENSOR NETWORK IN PRECISION AGRICULTURE

The major technology that drives precision agriculture is Wireless Sensor Network. The sensor network can guide the farmers' attention towards the crop zones in need of nutrients. water. etc. The derived information can result in an increase in farming efficiency provided that he farmer receives it in time and has the capacity to act on the same. Several kinds of sensors can be consolidated into the sensor node. thus. the conditions of the soil and crops. including illumination. temperature. pests. humidity. crop disease. etc. can be monitored both - remotely and in real-time. WSN nodes are categorized into three types of network topologies. One is the star topology. wherein each node connects directly to a gateway. Another is cluster tree network wherein each node connects to a node higher in the tree and then to the gateway. and data is routed from the lowest node on the tree to the gateway. Finally. to offer increased reliability. mesh networks feature nodes that can connect to multiple nodes in the system and pass data through the most reliable path available. This mesh link is often referred to as a router [3].

III STATEMENT OF THE RESEARCH PROBLEM

At present. automatic systems have few manual operations. insufficient flexibility. and inaccuracy. Therefore. agricultural field requires automatic control system in order to provide adequate irrigation to a specific area and detecting other plant needs right on time without having to go in the field to check each plant individually. This study aims at proposing a based on the wireless sensor network for the control of various parameters of the irrigation system. In addition to the proposed system. the study uses ZigBee technology for the long distance communication

Analyzing Big Data Using Updatable Classifiers

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Abstract---There is exponential growth in amount of data that is generated in various sectors like genetics, telecommunication, banking sectors etc. This enormous data has lot patterns and information stored in it. There is need to extract this intel from the data. Machine learning is used in identifying these patterns and the relation between inputs and outputs. Traditional algorithms like decision tree, neural network, random forest and others were used in machine learning models. But these models become inefficient with large number of instances and when input data varies with time like in stock markets, spams or biological viruses. In this paper, techniques to analyse big data using updatable classifiers in WEKA will be discussed. With the development in algorithms that automate adversarial sample generation like deep neural networks. There is an urgent need to fight these perturbations that are introduced to yield adversary selected misclassifications. The adversaries adapt to the data miner's reactions, and data mining algorithms constructed based on a training dataset degrades quickly. These kind chunks in classifiers help spammers and hackers to exploit our privacy. To help in these environments there is need for classifiers that can update themselves with evolving inputs.

Keywords—Updatable Classifiers, WEKA, Big Data, Adversarial Learning, Cyber Security, Spam Filters, Machine Learning.

I. INTRODUCTION

The industrial revolution was a major turning point in the history of humanity. It enabled businesses to be more productive, create more jobs, and raise the overall standard of living. Today, we are on the precipice of another revolution. With machine learning done right, organizations can develop insights instantly and dramatically grow their business.

Machine learning enables cognitive systems to learn, reason and engage with us in a natural and personalized way. Think Netflix movie recommendations, Internet ads based on browsing habits, or even stock trades — these are all ways machine learning is helping us navigate our world in powerful new ways. Learning here is not by remembering and following step by step instructions but recognizing complex patterns and makes intelligent decisions based on data. The difficulty lies in the fact that the set of all possible decisions given all possible inputs is too complex to describe. To tackle this problem the field of Machine Learning develops algorithms that discover knowledge from specific data and experience, based on sound statistical and computational principles

With the exponential growth in the amount of data that is being generated there was a great opportunity to exploit that by finding patterns and relations between the data. Traditionally algorithms like decision trees, random forest, neural networks etc. were used and they are very efficient in what their results are but they have their limitations.

Problem with these algorithms were that they needed the whole data in the memory while training their models. Another limitation with these logarithms that they were prone to adversarial samples that are crafted to force a target model to

3.2 IB1/IBk

This algorithm does not built the model, it generates prediction

Classify them in a class different from their legitimate class which lead to many security issues like the failing of spam filters, image recognizers etc.

In this paper, we discuss how to apply concept of machine learning on Big data using updatable classifiers and using similar kind of algorithms in to deal with adversarial opponents. We will be using WEKA to analyze the working of updatable classifiers. Updatable classifiers do not need whole training data in memory while building the model they update the model tuple by tuple. They have the edge when dealing with inputs which change with time like spam mails, as models can then be updated seeing how it is performing on new inputs.

2. OPEN SOURCE DATA MINING TOOL: WEKA

Waikato Environment for Knowledge Analysis (Weka) is a popular suite of machine learning software written in Java, developed at the University of Waikato [9]. Weka is a work bench that contains a collection of visualization tools and algorithms for data analysis and predictive modeling, together with graphical user interfaces for easy access to these functions. Weka supports several standard data mining tasks, more specifically, data preprocessing, clustering, classification, regression, visualization, and feature selection. Weka's main user interface is the Explorer, but essentially the same functionality can be accessed through the component-based Knowledge Flow interface and from the command line. There is also the Experimenter, which allows the systematic comparison of the predictive performance of Weka's machine learning algorithms on a collection of datasets. In this paper we will be using explorer and the data generator of the WEKA tool [10].

3. UPDATABLE CLASSIFIERS

3.1 Naive Bayes Updatable

It is an incremental form of Bayesian networks, as it assumes that each feature is not dependent on the remaining features. The naive Bayes algorithm usually used for a batch learning, because when algorithm handles each training sample separately, it could not perform its operations well, described in. As per the characteristics of the incremental learning algorithm, the naive Bayes algorithm can be trained by using one pass only as per the steps below[3]:

1. Initialize count and total=0
   - Go through all the training samples, one sample at a time.
   - Each training sample, t (x, y) will have its label associated with it.
   - Increment the value of count, as it goes through the particular training sample.

2. The probability is calculated by dividing individual count by the set of training data samples of the similar class attribute.
3. Compute the previous probabilities as the portion of entirely training samples which are in classy.

Classification can be made. Its probabilistic model can directly handle situations where some data are missing.

Analysis of Consumer Behavior on SCM Related Factors Using Data Mining: A Case Study of the Indian E-Commerce Industry

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Abstract: The electronic commerce (e-commerce) supply chain management (SCM) or ECSCM is a new and rapidly developing area of study in India and abroad. At the same time there are several challenges faced by e-commerce. These challenges lead to customers refraining from its use due to poor experiences while shopping online. According to industry experts, these issues are mostly pertaining to inefficient SCM. To confirm it, three hypotheses are proposed on discussions with the industry experts. First hypothesis states negative correlation of problems faced with overall customer satisfaction. Second states negative correlation of problems faced with the factors re-establishing trust. Third hypothesis states positive correlation of factor re-establishing trust with the overall satisfaction. A survey has been launched fetching replies from 401 Indian e-commerce consumers. The responses are processed by a statistical tool named Smart PLS 3.0 and the proposed hypothesis are checked by creating a suitable model. The results confirmed the three proposed hypothesis. The survey provides a clear understanding of demands, problems faced and solutions proposed by consumers themselves. The knowledge generated through this work could prove to be a win-win situation for both consumers and e-commerce companies. The consumers could be benefited by enhanced shopping experience according to their preferences. The e-commerce companies will be benefitted with better consumer loyalty which ultimately leads to increased profits.

Keywords: E-commerce, supply chain management, data mining, consumer behavior.

I. INTRODUCTION

Today all businesses are making their mark on internet to reach maximum number of customers, expanding business and generating larger revenues. But, with growth comes several challenges and issues. These obstacles if not handled properly, make the respective company loose customer loyalty and hence business. But, if these obstacles are well addressed, not only the business prospects and customer loyalty are maintained but it further attracts a larger number of new customers as well. These obstacles could be easily known by taking feedback from the customers. Considering the Indian e-commerce industry in this case, and after analyzing various research papers, the attention is focused on the supply chain management (SCM) related issues pertaining in this industry. Electronic commerce supply chain management (ECSCM) is a new and rapidly developing area of study in India and abroad given the exponential growth of e-commerce in every sector of the market. In conventional and e-business, its effective implementation could build trust for consumers or ineffective implementation could break that trust. Every company takes appropriate measures to curb out the elements of distrust.

Direct implementation inculcates various costs and risks involved for its success or failure, there the best options seems taking customer reviews for a lot and extrapolating the results. For this, a survey has to be launched asking questions to the customers which depict their view points. The obtained data cannot be processed through manual methods as it is large data, therefore data mining techniques are used for processing, translating, analysis and drawing useful inferences out of it.

A. Research objectives

The main objective of this study is to validate the conformance / non-conformance of the hypothesis which are stated as follows:-

1) *Hypothesis 1:* The problems faced by e-commerce customers tend to create a sense of distrust i.e. negatively affects overall satisfaction.

2) *Hypothesis 2:* The problems faced by e-commerce customers tend to decrease trust in factors that re-establish trust i.e. problems faced are negatively co-related to factors that re-establish trust.

3D Trajectory Reconstruction of a Moving Object from a Stereo Video using Particle Filter

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Abstract: Moving object detection and tracking in videos is an actively researched area for the last two decades due to its practical applications in many areas, such as trajectory analysis of moving objects, making game playing robots, human computer interaction. etc. This paper presents an experimental study to reconstruct the 3D trajectory of a coloured moving object by combing particle filter and stereo vision. Although, the initial results obtained are encouraging, but the generated trajectory has waviness. Further research is required to reduce the waviness and generate more accurate trajectory.

Keywords: Object detection, object tracking, particle filter, 3D trajectory, Kalman filter, optical flow

I. INTRODUCTION

Detecting and tracking objects in videos and reconstructing their 3D trajectories are an active research area of computer vision. These technologies have many potential applications, such as analysis of sport videos to detect faulty motions of a sportsman, trace the trajectory of a ball, etc[1], understanding human postures to improve human machine interactions, prediction trajectories of moving objects to detect and avoid collisions, catching moving objects by robots, surveillance, etc. The reconstruction of the 3D trajectory of a moving object is impossible from a monocular video alone without making prior assumptions about the motion of the object [2]. Biological and artificial systems use binocular stereoscopy to calculate the 3D co-ordinates of a scene point by utilizing the disparity in the projections of the scene point in the two views captured by a pair of two cameras positioned side by side at a distance. However, the calculation of disparities of all the points of a scene is a time consuming process and no real time solution is yet available for commonly available hardware. To efficiently reconstruct the 3D trajectory of a moving object, the combination of the stereo vision concept and moving object detection techniques, such as optical flow, background subtraction, particle filter, Kalman filter, etc, can be combined. The combination reduces the correspondence matching to only objects of interest, making the process more efficient. In this paper, the particle filter object tracking concept is combined with the stereoscopy concept to efficiently calculate the 3D trajectory of a moving object from a stereo video. The remaining part of the paper is organized as follows: section 2 reviews the related work. It introduces the basic concepts of stereoscopy and gives an overview of the particle filter object tracking concept. Section 3 describes the proposed system. Section 4 presents some experimental results and finally, section 5 concludes the paper.

II. RELATED WORK

Vision based object tracking has been actively researched for the past three decades. However, most of the research is limited to monocular videos, which alone is insufficient to create the 3D trajectories of the tracked objects in a scene without relying on assumptions about the scene that are too strong for any practical application [3]. To overcome the inherent limitations of monocular vision to recreate 3D trajectory, many researchers proposed to use stereoscopy. Harville [4] and Zhao et al [5] proposed to use dense stereo and static background model to recreate 3D trajectories of moving objects. Since they use dense stereo vision, the process is computationally inefficient to generate the trajectory in real time and their assumption of static background model also limits the domain of the object tracking.

Mittal and Davis [6] proposed to use region based stereo vision to track moving object. The method is more efficient than the methods proposed by Harville [4] and Zhao et al [5], but they also used the static background model. Hence, the method has the similar limitations.

Tsutsui et al [7] uses stereovision and optical flow to recreate the 3D trajectory of a moving person. The optical flow method is very sensitive to illumination change and require static background model. Zhongwei et al [8] used stereoscopy in combination with camshaft algorithm to reconstruct the 3D Trajectory. They used dynamic programming for the correspondence matching and disparity calculation.

Park at el. [2] used the multiple perspective projections of a scene to reconstruct 3D trajectory of moving objects. They used co-ordinate independent basis vectors derived from the stationary areas of the scene, which reduces the computational complexity of the trajectory reconstruction.

The method proposed in this paper is an extension of the method presented by Heath and Guibas [4] which uses sparse stereo vision and particle filter to reconstruct the 3D trajectory. In contrast to multiple stereo cameras used by

A Review of Object Detection and Tracking Methods

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Abstract: *Moving object tracking in videos is an actively researched area for the last two decades due to its practical applications in many areas, such as event analysis, human computer interaction, crowd analysis, etc. Extensive research reported some success applications in highly constrained domains, but there are still many challenges that need to be resolved, such as abrupt object motion, changes in appearance of the object, non-rigid objects, occlusion, illumination, etc. This paper presents a comprehensive review of various object tracking approaches reported in literature and proposes a new categorization to group various tracking approaches to streamline future researches. It also discusses, in detail, methods used in each category for tracking single and multiple objects. Finally, the paper concludes by setting directions for further research.*

Keywords: *Object detection, object tracking, particle filter, Kalman filter, background subtraction, optical flow*

I. INTRODUCTION

Now a days, many researchers are actively involved in the development of computer vision systems that try to simulate the basic abilities of biological systems, such as the abilities to understand scenes, detect objects(static or moving), understand surrounding, recognize events, analyze crowd, count people, detect people and vehicles detection, etc. Object detection refers to finding an object of some interest in a scene, for example detecting people, vehicles, etc. in a scene. Object tracking refers to estimate the trajectory of a moving object in a scene, for example, tracking the trajectory of a moving car to find lane violation. For tracking objects, videos are generated either from static cameras, such as surveillance cameras, or moving cameras, such as cameras mounted on a mobile robot. In a static camera, the background is always static and objects move, while in a moving camera, objects move in a dynamic background.

In order to design a robust visual tracker, there are some fundamental problems, such as abrupt object motion, changes in appearance of the object, occlusion, illumination, non-rigid objects and real time processing requirements, which need to be resolved. The appearance of the object often varies during tracking, for example appearance changes due to articulation, rotation or geometrical transformations of the object. Therefore, to achieve the robustness in tracking, adaptability to appearance changes is necessary.

II. OBJECT TRACKING FRAMEWORK

A typical object tracking framework, as shown in Figure 1, generally consists of three modules: Object Detection, Object Modeling and Object Tracking. They interact with each other during a tracking process. These are discussed in detail in the following sections.

III. OBJECT DETECTION

Object detection, a pre-requisite for initializing a tracking process, refers to locate the object of interest in every frame of a video sequence. There are generally two approaches of object detection strategies commonly used to initialize a tracking process: (1) manually locating the object in the first frame and let the system detects features, such as corners, to track the object in the next frame and (2) automatic detection of the object using predefined features, such as color. There are many techniques to detect moving objects: Background subtraction, Kalman filter, particle filter.

Background Subtraction [1-3] is widely used in video sequences having static background. The method segments the image into foreground and background. The foreground contains moving objects such as moving people, cars while the background contains static objects, like road, building, trees, stationary cars, etc.

In this technique, a reference background image is first captured when the objects of interest are not present in the scene. The moving object is detected by subtracting the current image frame from the reference background image. The resulting difference image has values below a predefined threshold in the background area of the current image except the area occupied by the object. The pixels where the difference is above the threshold are classified as foreground. As, in practice, the background of any scene gradually changes with time, the reference background image should be updated from time to time to avoid false detection of objects.

Temporal differencing [4] is a method most suitable for scenarios where the camera is moving. It detects objects by taking differences of consecutive frames (two or three), pixel by pixel. In a moving camera situation, the motion of the camera and the motion of the object are mixed up. Therefore, some researchers [2] proposed to estimated and adjust camera motion first and then apply the background subtraction method. The temporal differencing method fails to detect

Comparative Performance Evaluation of Various Color-Based Object Tracking Methods

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Abstract —*Extensive research in object detection and tracking has produced many techniques for detecting and tracking objects in videos. The most widely researched techniques include color-intensity based, particle filter based and optical flow based trackers. Each technique has its own merits and limitations. This paper presents a comparative performance evaluation of these leading object detection and tracking techniques. After a brief overview of various techniques, viz. particle filter, color-intensity based and color optical flow trackers, that directly or indirectly uses color for the purpose of object detection and tracking, their performance on a test video is reported in this paper.*

Keywords — *Object detection, object tracking, optical flow, particle filter, color-based tracking*

I. INTRODUCTION

Object detection and tracking is one of the active research areas of computer vision. It has many practical applications, such as analysis of sport videos to detect faulty motions of a sportsman, tracing the trajectory of an object of interest, human computer interaction, target localization, event analysis, etc. Object detection refers to finding the object of interest in a scene while object tracking refers to locating the object of interest in successive video frames for generating the trajectory, for example tracking the trajectory of a moving car to find lane violation.

Object tracking is a challenging problem in a natural scene due to abrupt changes in object motion directions, changes in appearance of the object in different frames, object occlusion, illumination changes, non-rigid transformation of objects, noises in images, and computational complexity to meet real time processing requirements. A robust object tracker should be able to track single or multiple objects moving in a dynamic background. Typically, an object tracker consists of three modules [1]: Object Detection, Object Modeling and Object Tracking. During the last two decades, various object tracking methods have been emerged focusing on designing a robust tracker. A categorization of various tracking approaches is presented in [1].

This paper investigates comparative performance of some of the leading object tracking methods, viz. color-based method, optical flow method and Particle filter method, to track a red color object. These three methods are briefly discussed in the following sections for tracking primary color objects; their comparative evaluation in terms of performance is also presented. The results are reported for a test video captured by the author in common household lighting conditions.

The remaining part of the paper is organized as follows: Section 2 describes the basic work flow of a typical color-based object detection and tracking system. Section 3 presents a brief description of color-intensity based object detection and tracking system developed by the author. Section 4 presents a color-based optical flow method, which is modified by the author to handle a dynamic background. Section 5 discusses the standard color-based particle filter method, which is commonly used by the researchers. In section 6, the results of the methods developed/modified by the author are evaluated and compared with the results obtained by the standard particle filter. Finally, conclusions are drawn and the direction for the future research is proposed.

II. COLOR-BASED OBJECT DETECTION AND TACKING METHODS

Color is one of the most important features of an object that is used extensively in literature to detect and track objects. The basic work flow in typical color-based object detection and tracking system is given in figure 1. Recent advances using color as a feature often use color histograms to model the object. Besides having low computational cost, color histogram distribution is robust against non-rigidity, scale and rotation transformation of objects.

Detecting and Tracking a Moving Object in a Dynamic Background using Color-Based Optical Flow

Rachna Verma

Abstract— In this paper, a hybrid object detection and tracking system is proposed that combines object color and optical flow method to enable the optical flow method capable to track objects in a dynamic background. The proposed method uses the formula developed by the author to convert RGB images into corresponding intensity images that highlights the selected color in images and suppresses other colors. Thus, the object of interest is automatically detected without use of computationally expensive matching methods. This makes the overall process efficient. However, the proposed method is limited to only objects of primary color shades.

Index Terms—Object tracking, Object detection, Optical flow.

I. INTRODUCTION

Detecting and tracking moving objects in videos and reconstructing trajectories are an active research area of computer vision [1]. Many techniques, such as optical flow, background subtraction, particle filter, Kalman filter, have been developed for moving object detection and tracking in videos. Most of the researches in this area assume situations in which backgrounds are assumed to be fixed. However, most of the real-life situations have changing background. The ability to track a moving object in a changing background is a difficult problem. Detecting and tracking objects in a dynamic environment has many practical applications, such as video surveillance, human computer interaction, robot navigation in a dynamic environment, etc.

Optical flow is very effective in tracking objects in a stationary background, but its performance degrades to an unacceptable level in a dynamic background. It cannot tolerate even a slight change in lighting conditions. On the other hand, color-based techniques have some tolerance to changing background situations, but its performance degrades if backgrounds contain colors similar to the colors of moving objects.

In this paper, a new method is proposed that can detect and track a moving object in a changing background. The method combines color feature with optical flow. This combination makes optical flow adaptable to changing background situations. Traditionally, optical flow uses intensity image to detect the motion of a moving object in two consecutive

video frames. However, intensity images generated by the popular RGB to intensity conversion scheme have no discriminating power to highlight a particular color. Therefore, in this paper, the new intensity calculation formula developed by the author [2] for converting an RGB image into an intensity image has been used, which facilitates detection of primary color objects more accurately and efficiently.

The remaining part of the paper is organized as follows: section 2 reviews the related work. It introduces, briefly, the optical flow object tracking concept and the new intensity conversion scheme. Section 3 describes the proposed system. Section 4 presents some experimental results and finally, section 5 concludes the paper and sets directions for the future research.

II. RELATED WORK

Vision based object tracking has been actively researched for the past three decades. Many techniques, such as optical flow, background subtraction, particle filter, Kalman filter, have been developed for moving object detection and tracking in videos. Each technique has some strength that makes it suitable in a particular situation. Readers can find overview of various methods and their merits and demerits in [3]. The optical flow method is one of the most researched methods for object detection and tacking as it is found to resemble to the animal and human visual systems.

The moving objects in a scene form dynamic patterns, known as the optic flow field, on the retinas of our eyes. These patterns contain a wealth of information about the world around, which help us to extract many useful information, such as the directions of moving objects, the distances to objects from us and their relative positions in the observed scene, etc. However, it is unclear how the visual system accomplishes this task [4]. Motivated from natural visual systems, researchers in computer vision have developed various methods to detect and track moving objects using the concept of optical flow. In the context to computer vision, optical flow is a velocity field associated with the change of the location of a group of pixels, assumed to be the object of interest, with certain brightness, under the assumption of brightness consistency, in two consecutive image frames of a video [5]. In other words, optical flow is the apparent motion of brightness patterns in two consecutive video frames. The assumption of brightness consistency, which is rarely observed in real life situations, is the major limitation of the optical flow method. Due to this assumption,

Query Performance Analysis on Hadoop over Cloud Architecture

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Abstract: Big data Analysis is widely used now and a huge amount of data is being generated every second. This needs an efficient cloud infrastructure environment to process huge amount of data by using the Hadoop cloud environment; we can process this huge data in seconds. In this paper the Big Data processing tool as Hadoop is used to perform query execution in terms of processing time by using Hive. Datasets of two different sizes and varying number of nodes in a cluster are used to measure the performance. It is observed that query performance increases when processing some large datasets on increasing number of nodes.

***Index Terms* - Big Data; Hadoop; Hive; Performance Analysis; Data Processing; Query Execution Time;**

I. INTRODUCTION

The quick growth and development of technology and inventions in the area of computer science and technology requires the efficient use of data generated by these technologies. A large number of organizations utilize the services of data warehouse for the analysis of their data. These organizations use data analytics to make the decision for their growth. Thus, to make the accurate decisions we need to process data accurately. But the data sizes nowadays are growing and are available in peta bytes and that amount of data cannot be handled by using centralized server architecture.

With the introduction of the internet it improved the business growth at small scale. The big internet tycoons like Facebook, Google etc. are managing their data using Big Data technologies. Facebook is generating about 2-3 Terabytes (TB) of data per day [1]. The large amount of data and use of distributed computing creates a new set of challenges to manage and perform computational operations on data using data mining, machine learning and other data analytics approaches. A huge amount of time and cost is required for managing and utilizing the large amount of data. So efficiency is the key factor in data analytics.

The technologies related to data storage and analytics are growing rapidly which increases the trend of data analytics with more accurate and efficient way and the data processing cost has also been decreased in an organization. For the data processing a large amount of resources like computing power and data transfer capability has also been increased which made the traditional technologies and tools outdated. The new tools and technologies are being explored. Big Data [4] and Big Data analytics provides a good solution for processing the huge amount of data. Hadoop an open source software platform became a widely used solution to process and store Big Data in the data oriented enterprise/industries.

In this paper, the cloud environment such as Microsoft Azure HD Insight has been used to process data. HDFS and Hive [7], tools of Hadoop [5] has been used to store and process the datasets. In this research work we used datasets of size 2GB and 6GB to perform the data analysis. In the initial step all the required installation is done and then datasets are stored on azures storage engine. After that all the datasets are loaded in the Hive tables. Finally, a series of six different types of queries are executed on Hive. The execution is carried on the different sets of node of Hadoop cluster and results are analyzed.

II. BACKGROUND STUDY

A. Big Data and Analytics

The huge growth in data during the last decade in the world has introduced a new term Big Data in the technology field. The data which have been out of the limit of traditional system is often referred to as Big Data. To get some useful insights there is a need to process and analyze the huge amount of data has introduced a new form of data analytics called Big Data Analytics.

Big Data analytics uncovers the hidden patterns and other useful insights by analyzing the large amount of data. To gain insights in many businesses applications, increase the revenue and profit of many data analytics organization and to get competitive advantage over their rivals, organizations are using Big Data Analytics.

The characteristics of Big Data are mainly divided into four Vs i.e. Volume, Velocity, Varity and Variability. Volume means the size of the data. Velocity refers to the pace at which data is generated; Varity and Variability refers to   the complexity and structure of data and different ways of interpreting it.

Query Execution Performance Analysis of Hive and Pig in Cloud Architecture

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Abstract—Cloud platforms require a skilled computing infrastructure. At this level, a large amount of data is generated in fractions of a second, so traditional computing techniques are not enough. Big data provides answers to such huge calculations and supports measurement storage based on application requirements. Big data is the next generation storage infrastructure. This paper examines the big data environments and compares data retrieval techniques. For comparative research, Pig and Hive techniques are chosen. These technologies provide effective data processing capabilities. Hadoop storage is designed for comparative research and then configures pig and hive with the help of the MapReduce framework. In addition, in order to evaluate the efficiency of query execution in terms of processing time, a list of similar questions is prepared and used for processing each query. Both technologies are used for the resulting queries. The hive queries have been found to be processed inless time as compared to Pig in library dataset.

I. INTRODUCTION

In order to rapidly develop technologies and inventions in the fields of computer science and technology, it is necessary to effectively use the data generated by these technologies. Many organizations use data warehousing services to analyze their data. These organizations use data analytics to make decisions for their development. In this way, we need to process the data accurately to make accurate decisions. But now the amount of data is increasing and is available in PETA bytes, and the centralized server architecture cannot be used to control the amount of data.

With the introduction of the Internet, it has improved small-scale business development. Large Internet giants like Facebook, Google, etc. are using big data to manage their data. Facebook generates 2-3 terabytes of data per day [1]. The large amount of data and usage of distributed computing presents a new set of challenges for managing and performing computational operations such as mining, machine learning, and artificial Intelligence. Managing and using large amounts of data requires a lot of time and cost so, efficiency is critical in data analysis.

The technology is rapidly increasing, which increases the demand of the users and increases the cost of data processing in an organization. A large number of resources (such as computing power and data transmission capabilities) in data processing have also increased,

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Devanagri character recognition model using deep convolution neural network

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Abstract

In recent times, there has been a significant increase in the use of deep learning in the field of computer vision and image analysis. Deep learning is a subfield of machine learning which uses artificial neural networks that is inspired by the structure and function of the human brain. Identifying hand written text by machines has been achieved remarkable success with the use of artificial neural networks. In Optical Character Recognition for hand written text, the majority of work has been done for the popular languages such as English, Arabic or Chinese languages. There is very limited work in the literature for the handwritten character recognition for Devanagri characters. In this paper, we focus on recognition of Devanagri characters using deep convolution neural networks. Devanagri lipi is responsible for twelve languages used in India. In this paper, we optimize the network by selecting best hyperparameters for the network. Experimental results show the effectiveness of the proposed approach on the benchmark dataset.

Keywords: Deep Learning, Convolution Neural Network, Optical Character Recognition, Activation Functions, Devanagri Characters

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OBJECT DETECTION AND CLASSIFICATION THROUGH DEEP LEARNING APPROACHES

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ABSTRACT-In this paper, we implemented the image classification and object detection. This paper presents a deep learning approach for traffic light detection in adapting a single shot detection(SSD) approach and image classification of two categories of bicycle by retraining inceptionv3 model both using an open source tool called TensorFlow Object Detection API. We reviewed the current literature on convolutional object detection and tested the implementability of one of the methods and discovered that convolutional object detection is still evolving as a technology despite that convolutional object detection has outranked other object detection methods. To implement object detection and image classification there is free availability of datasets and pre-trained networks it is possible to create a functional implementation of a deep neural network without access to specialist hardware.

KEYWORDS-Object detection, Deep learning, Convolutional neural network, TensorFlow Object Detection API, SSD model, InceptionV3, InceptionV2.

I. INTRODUCTION

Classification of objects into their specific categories is often been vital tasks of machine learning. In recent years, deep learning has been utilized in image classification, object detection. To increase the performance of image classification deep learning uses a neural network with more than one hidden layer. For image classification and object detection one of the most frequently used deep learning neural network with more number of hidden layers is the convolutional neural network (CNN). CNN information gets directly from the image, so it eliminates manual feature extraction.There is a common problem in classifying image with deep learning, is lower performance because of over-fitting. To increase performance, and to prevent over-fitting we use large datasets. CNN have fewer connections and hyper parameter that make CNN model easy to train and perform slightly worse than other models [5].

Robotized driving on roadways is an effectively looked into issue which has prompted the rise of numerous driver help frameworks. Urban territories give another arrangement of difficulties which require more advanced calculations in different zones running from observation over conduct intending to impact shirking frameworks. One essential piece of recognition is the identification and classification of traffic lights. Traffic lights exhibit a testing issue because of their little size and high vagueness with different items introduce in the urban condition, for example, lights, beautifications, and reflections [7], [14].

Recent enhancements in object detection area unit driven by the success of convolutional neural networks (CNN). They're able to learn rich features outperforming hand stitched options. So far, research in traffic light detection mainly focused on hand-crafted features, admire color, shape or brightness of the traffic light bulb. In this research work we present a deep learning approach for traffic light detection in adapting a single shot detection (SSD) approach. SSD performs object proposals creation and classification using a single CNN. The initial SSD struggles in sleuthing terribly tiny objects, which is essential for traffic light detection. By our variations it's potential to find objects a lot of smaller than 10 pixels while not increasing the input image size. As a result, we have a tendency to reach high accuracy [13].

In this paper, we performed two separate experiments, for the first experiment we are classifying images of bikes, we are taking two different categories of bike images for e.g. mountain bikes and road bikes and for the second experiment traffic light detection in an image and its classification. We have used TensorFlow object detection API to train and evaluate convolutional neural network, one of the most popular Python programming language libraries for deep learning.The flow diagram of Proposed Methodology is shown in Figure 1 and 2.
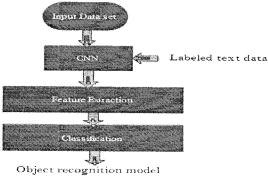

Figure 1:Training dataset

KNN Classification for the Face Spoof Detection

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Abstract- The face spoof technique was proposed to identify and detect the spoofed and non-spoofed images. The DWT technique is used to analyze the textual features present within the test images. There is a possibility that some exceptional disturbances are available like geometric disturbances and the artificial texture disturbances. The face spoof detection techniques are based on two steps, the first step is of feature extraction and second is of classification. The Eigen based technique is applied for the feature extraction and SVM classifier is applied for the classification. To improve accuracy of the face spoof detection SVM classifier will be replaced with the KNN classifier. The Comparisons are made to analyze the performance of the proposed algorithm and the existing algorithm in terms of accuracy and time of execution.

Keywords- Feature Extraction, SVM, KNN

I. INTRODUCTION

The process of producing input images in a particular place is called imaging. It contains a metric and topological edge which is used for image analysis and crack edge for creating structure between the pixels. Analysis shows that the intensity is varied from small neighborhood of pixel boundary. The pixel boundary is another significant topic used in image processing. The image is visible to computer through sinkhole. The processing is completely based on knowledge and execution [1]. It consists of human cognition abilities in order to make decisions according to the information provided. The image quality is used to assess the percentage of degradation. Image processing is defined as the process use to perform some operation on the images, which generate an enhanced version of the images or extract some features from it. It signal processing in which image act as the input and characteristic or features act as the output of that image. The image similarities are significant as they are used to assist retrieval from image database. The original images are often degraded by errors called noises [2]. This happens at the time of image capture, transmission of images contents. The perception of human color adds another subjective layer on the top highlighting the physical properties of electromagnetic radiations. The object will be transferred between client and the server. It is responsible for graph storage analysis from resource images. Every node of graph works as the processing unit of the application. Face recognition is also one of the very widely used security purpose used technique. As the numbers of crimes are increasing day by day, so to maintain the proper check on the people such type of methods are employed on

various fields like banks, hospitals, industries and so on. There is huge success in this area, by applying them on several applications like human-computer interaction (HCI), biometric analysis, content-based coding of images and videos, and surveillance [3]. Face recognition is proved to be very difficult to imitate artificially, although there are certain similarities in some faces most probably due their age, gender, color. The biggest problem this method is facing is image quality, expressions, background and other climatic conditions. Face detection as the name suggests, it suggests where the face is located in an image. As it seems to be very easy task but in reality it is very difficult to detect images. We have to consider all the possible constraints like single face or multiple faces, image rotation, pose etc. this give rise to some false detection of an image, or it sometimes does not contain any image [4]. There are various types of techniques available for face detection. When someone tries to interferes in the face biometric system by presenting a false face towards the camera. It attacks on face recognition systems which involve all the artificial faces of authorized users to cleverly go inside the biometric security systems. These attacks are very easy to carry by just having printed photographs or digitalized images being displayed on the screen. If we want to differentiate between the real face features from fake faces, the face liveness technique is used. It aims at detection of physiological signs of life. Biometric technologies are used to measure and analyze human body characteristics [5]. It can be categorized into two parts, physical characteristics in which fingerprints, faces or iris patterns are used and then activity characteristics which includes voice signatures or strolling patterns. It is the most prominent challenge being varied in biometric systems. The variations involve chances of fraud which is most commonly known as spoofing attack. The stolen data will effectively ruin and mimicked by the adversary to have a unauthorized access to the systems. This technique is based on facial statistics in the light weighing physiological properties detection. Moreover, the false faces are of two types i.e. positive and the negative one. The positive faces are real faces and having restricted variation and negative includes spoof faces on images, dummy and so on. Spoofing attack is type of attack in which the attacker submits the fake identity and evidence to the biometric system in order to get access to the network. It is very easy for the attacker to generate attack in the face recognition system because the images and videos are easily available on the social networking sites [6]. The attacker can store images from the

A Literature Survey on Automatic License Plate Recognition System (ALPR)

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Abstract- Automatic license plate recognition system is the optical character recognition which aims at extracting the number of license plate from a vehicle. In this paper we have discussed various existing ALPR systems, the basic algorithm used, the variations in the existing algorithm to improve the overall system. There are also a plenty of applications where this system could be used, among these criminal surveillance is one of the most wanted application. This system mostly concentrates on localization of license plates and then go on to extract the characters by using morphological operations such as dilation, eroding the image, dilating, filtering etc. All these morphological operations leads to the efficiency of overall system. ANPR is used by police forces around the world for law enforcement purposes, including to check if a vehicle is registered or licensed.

Index Terms- Automatic license plate recognition, ALPR, Vehicle, optical character recognition, localization, surveillance system.

I. INTRODUCTION

Automatic number plate recognition systems (ANPR) is based on the localization of license plate and recognition of characters by extraction. This whole problem is generally sub-divided into 5 parts:(1) image acquisition i.e. capturing the image of the license plate (2) pre-processing the image i.e. normalization ,adjusting the brightness , skewness and contrast of the image (3) localizing th license plate(4) character segmentation i.e. locating and identifying the individual symbol images on the plate,(5) optical character recognition. There may be further refinements over these (like matching the vehicle license number with a particular database to track suspected vehicles etc.) but the basic structure remains the same. Provide a means to overcome the drawbacks and deficiency of successful surveillance of the cctv cameras. The ANPR system is well developed in certain countries such as USA and Dubai, and existed from a longtime, but only in the late 90s it became an important application because of the large increase in the number of vehicles. The information extracted from the license plates is mainly used for traffic monitoring, access control, parking, motor way road tolling, and border control, making car logs for parking systems, journey time measurement for toll booth etc. by the law enforcement agencies. A guiding parameter in this regard is country-specific traffic norms and standards. This helps to fine tune the system i.e. number of characters in the license plate, text luminance level (relative index i.e. dark text on light back ground or light text on dark

background) etc. So the problem can then be narrowed down for application in a particular country. For example, in India the norm is printing the license plate numbers in black color on a white background for private vehicles and cn a yellow background for commercial vehicles. The general format for the license plate is two letters(for state code) followed by district code, then a four digit code specific to a particular vehicle.

II. STEPS OF ALPR

The number plate background should not match the color of the vehicle It is a pattern with very high variations of contrast. If the number plate is very similar to background it's difficult to identify the location. Brightness and contrast is changes as light fall changes to it. The morphological operations are used to extract the contrast feature within the plate. The work is divided into several parts. The basic four stage algorithm for ALPR system is:

Image acquisition
License plate localization
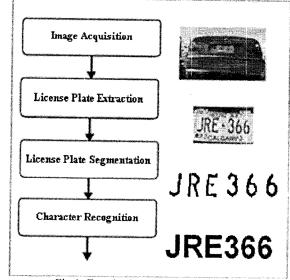Character Segmentation
Character recognition

Fig.1: Four basic Algorithmic Stages.

First step among the 4 basic algorithms is to acquire all the raw images of the number plate, then the images are converted into grayscale or binarization is done. After grayscale conversion De-noising of image is done. After reduction of

A Hybrid Feature Extraction Approach for Finding Local Discriminative Coordinates for Face Recognition

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Abstract. Several techniques have been proposed for face recognition that use global and local approaches for finding most eligible features for classification. Generally, methods based on localized feature selection techniques are found to be more robust towards illumination, pose and expression variations. In this paper, author has proposed an architecture that uses wavelet decomposition and informational entropy for finding localized discriminative coordinates in the image space for face recognition. The identified coordinates are supplied to a Gabor filters based face recognition model for classification. The proposed system uses single image per subject for training database and is able to achieve a recognition rate of 92.5% with ORL face database.

Keywords: Discriminative coordinates · Face recognition · Gabor filters
Informational entropy

1 Introduction

Among the widely used biometric identity systems, physiological methods (i.e. fingerprint, face, DNA etc.) are usually more stable because of their non-mutable properties (except in the case of severe injuries or medical interference). Face recognition is one of the few biometric methods that possess the merits of both high accuracy and low intrusiveness. For this reason, since the early 70's [1], face recognition has drawn the attention of researchers in fields from security, psychology, image processing and computer vision [2, 3].

Face Recognition, generally, refers to the process of identification of individuals from a database of digital raster images. A face recognition system can be, generally, divided into three parts: (1) Face Detection, (2) Feature Extraction and (3) Classification [4]. The detection step is to determine - whether any human faces appear in a given image, and where these faces are located at. The output of face detection is supposed to be patches containing each face in the input image -effectively processed to justify the scales and orientations of respective faces. These face patches are then processed in feature extraction step to obtain a low-dimensional unique representation of each face. The output is usually a fixed dimension vector or a set of fiducial points (i.e. their respective locations in face image) corresponding to each face image. At last, the

COMPARATIVE ANALYSIS OF NON CO OPERATIVE AND CO OPERATIVE ROUTING PROTOCOLS IN UNDERWATER COMMUNICATION NETWORKS

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Abstract: Underwater communication networks (UWCNs) include sensors and autonomous underwater vehicles (AUVs) that interact to perform specific applications such as underwater monitoring. Some of the applications like Mission critical applications require reliability and network efficiency in Underwater Communication Networks, so for coordination and data forwarding between sensor nodes cooperative communication routing protocols are developed that enhances network efficiency. Cooperation is added to the existing non-cooperative routing protocol at network layer that perform better in terms of reliability and throughput. This paper focuses on evaluation of non co operative routing protocols DBR (Depth Based Routing Protocol), EEDBR (Energy Efficient Depth Based Routing Protocol) and cooperative routing protocols Co DBR, Co EEDBR in terms of packet delivery ratio, end to end delay, throughput and energy consumption. NS2 simulator judge the performance of these protocols. Simulation results show that Cooperative Routing Protocols outperforms than Non Cooperative Routing Protocols.

Keywords: DBR, EEDBR, Co DBR, Co EEDBR

1. INTRODUCTION

Underwater communication has become an important data transmission technology that is widely used in various ocean applications such as oil/gas spill monitoring, off-shore oil industry, pollution monitoring in environmental, disaster prevention, submarine detection and surveying sea floor for detection of objects and search for new resources. Underwater communication networks consist of a variable number of sensors equipped with transducer, buoys, surface sink, stations [3] and autonomous underwater vehicles (AUVs) that interact each other for a particular application over given area. Acoustic signal is best suited for underwater communication [1,4].

Routing in underwater sensor networks (UWCNs) is very challenging because of unique characteristics of UWCNs and also UWCNs have very dynamic topology as sensors move with water currents. A number of routing protocols have been proposed to deal with the challenging problem in UWCNs. Localization process which requires full dimensional location of sensor nodes is used in most of the routing protocol. That is yet major challenging issue to be solved in UWCNs. Recently, many geographical routing protocols have been proposed for UWCNs, which can be classified into two sections, localization-based and localization-free routing protocols [2].In this paper localization free routing protocols DBR, EEDBR, Co DBR and Co EEDBR based on co operation are considered for further analysis. DBR [8] is a non-cooperative receiver based routing protocol in which the routing is depends only on depth of the sensor node. Drawbacks of DBR is improved in the EEDBR, where depth from sink as well as residual energy of sensor nodes is used to select the candidate forwarder to achieve load balancing. Co DBR overcomes the problems associated with DBR and EEDBR by using cooperative diversity [14]. Co DBR transmits the

packet to the destination thru two relay nodes [13] .The relay nodes selects on the basis of minimum depth and they cooperatively deliver the data to the sink. The packet delivery ratio will be increases because in case of any link failure at least one link is capable of delivering the data successfully to the destination. Co DBR consumes three times more transmission energy than DBR because it uses source node and two relay nodes to transmit data, so to achieve reliability energy will be compromised also every time it consider the lower depth nodes. To handle problems associated with all these three protocols, a new cooperative routing protocol Co EEDBR [9] is introduced. Co EEDBR route the data through the UW network nodes with reduced path-loss [15] over the channel [14]. Advantages of single-hop and multi-hop are taken into account as well. Relaying techniques used are AF and FR.

2. ROUTING PROTOCOLS IN UWCN

Recently, many geographical routing protocols have been proposed for UWCNs, which can be classified into two sections, localization-based and localization-free routing protocols. In this paper the localization free routing protocols are considered for further analysis.

2.1 DBR (Depth Based Routing) Protocol

DBR is a non-cooperative receiver based routing protocol in which source node broadcasts its data to all its neighbors [5]. DBR transmits data packets greedily towards the water surface where data sinks are situated and the transmission is based on the depth information of each sensor. In DBR After receiving a packet node holds the packet for certain amount of time called holding time and then transmits the packet if the depth of the node is smaller than the depth of previous sender that is embedded in the packet. Otherwise, it discards the packet [5,10,11]. Holding time depends on the

Review of Different Deep Learning Approaches for Image Classification

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Abstract : As a major breakthrough in artificial intelligence, deep learning has achieved very impressive success in solving grand challenges in many fields including speech recognition, natural language processing, computer vision, image and video processing, and multimedia. Deep Learning is the subpart of machine learning; it uses neural networks which stimulate by the human brain's structure and working. It is a new approach for data analysis and prediction and has become very popular recently. Deep Learning has achieved much higher success than machine learning in many applications, one of the reasons for that is, machine learning not able to process large amount of data effectively but also not able to extract the features from the data automatically. Since Deep Learning has been the core topic in machine learning and convolutional neural network have become state of the art methods for image classification over the last couple of years. Convolutional neural network has won numerous competitions in recent years. It has outstanding results in image recognition. In this paper, different deep learning approaches will be reviewed which have been used in the field of image classification and localization.

IndexTerms - Artificial Intelligence, machine learning, deep learning, image classification, neural network, convolutional neural network, artificial neural network

I. INTRODUCTION

Recent advances in deep learning made possible tasks such as image and speech recognition. Deep learning is a subset of machine learning algorithms that is very good at recognizing patterns, but generally requires a large amount of data. Deep learning is excellent in the recognition of objects in images, since it is implemented using 3 or more layers of artificial neural networks where each layer is responsible for extracting one or more characteristics of the image.
Neural network: a computational model that works in a similar way to neurons in the human brain. Each neuron takes an input, performs some operations and then passes the output to the next neuron. Representation of neural network (src). we will teach the computer to recognize the images and classify them into one of these categories:

To do this, we must first teach the computer how a cat, a dog, a bird, etc. looks before we can recognize a new object. The more cats see the computer, the better it will be to recognize cats again. This is called supervised learning. We can carry out this task by labeling the images, the computer will begin to recognize the patterns present in the images of cats that are absent from others and will begin to develop their own cognition. We are going to use Python and TensorFlow to write the program. TensorFlow is an open source deep learning framework created by Google that gives developers granular control over each neuron (known as a "node" in TensorFlow) so that it can adjust weights and achieve optimal performance. TensorFlow has many integrated libraries (some of which we will use for image classification) and has an incredible community, so you can find open source implementations for virtually any deep learning topic.

II. MACHINE LEARNING

Machine Learning Algorithm is a step by step process to get information from the given set of data, without relying on a fix program. This information is useful to predict output for a given input.
Machine Learning Algorithms find patterns inside the set of data, i.e. given to it. These Patterns are useful to make better decisions and predictions. Today ML algorithms are useful in many areas to make better decisions like, in medical diagnosis, stock trading, and energy load forecasting, etc. These algorithms are used by media sites to recommend movies and songs to users and also use by retailers to recommend products to customers, based on their purchasing behavior [1].

A. Machine Learning Algorithms

Mainly two types of Machine Learning Algorithms are defined based on their learning capability. Which are shown below in Fig 1.
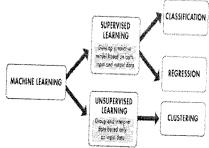

Fig 1: Machine Learning Architecture

Deep Learning Approach for the Classification of Small and Large Size Image Datasets

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Abstract

Deep learning is a new approach for data analysis and prediction; it has become very popular recently. Deep learning technologies are becoming the major approaches for natural signal and information processing, like image classification, speech recognition. Convolutional Neural Networks have become very popular for image classification in deep learning; CNN's perform better than human subjects on many of the image classification datasets. In this paper, deep learning convolutional neural network is deployed based on keras and tensorflow libraries using python for image classification. Here, two different CIFAR image datasets are used to compare the accuracy of CNN based on size of image dataset which is small and large size dataset (32*32, 64*64). This dataset contains images of different categories for image classification. Two different structures of Convolutional neural network are deployed on CPU system, with different Convolutional Neural Network parameters and obtained the accuracies.

Keywords: *CNN, Deep Learning, CIFAR, Image Classification*

1. Introduction

Deep learning for image classification has become an essential use of the machine learning method. To increase performance, the application of neural networks to learning tasks that contain more than one hidden layer. Deep learning is part of a wider family of machine learning methods based on representations of learning data, unlike hard code machine algorithms.

Learning can be supervised, partially supervised or unsupervised. Deep learning architectures, such as deep neural networks, deep belief networks and recurrent neural networks, have been applied to fields such as computer vision, speech recognition, natural language processing, audio recognition, the classification of images, the filtering of social networks, the automatic translation and the bioinformatics, in which they produced results comparable and in some cases superior to human experts.[1]

Popular datasets used for image classification like MNIST, ImageNet, PASCAL, and CIFAR10/100, all classify the images by the type of a prominent object or feature in the image. In this research work, Here I present image classification through CIFAR-10 dataset using Convolutional Neural Network and find the accuracies of small dataset (32*32) and Large dataset (64*64).

2. Convolutional Neural Network

CNN is a type of deep learning model for processing data that has a grid pattern, such as images, which is inspired by the organization of animal visual cortex [2] and designed to automatically and adaptively learn spatial hierarchies of features, from low- to high-level patterns. CNN is a mathematical construct that is typically composed of three types of layers (or building blocks): convolution, pooling, and fully connected layers. The first

Sentiment Analysis of Twitter Datasets using Support Vector Machine and Naïve Bayes Classifiers

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ABSTRACT

Social networking sites are the great source of communication for internet users nowadays. Millions of people conveniently express their views and opinions on a wide array of topics using micro-blogging websites. Natural language processing is the discipline that studies how to make the machines read and interpret the language that the people use, the natural language. But in the machines world, the words not exist and they are represented by sequences of numbers that the machine represents with a character when displaying them on screen. Growing use of social media websites and cloud computing technology advances have bumped up a huge amount of online data available so the information is convoluted with varying interests, opinions and emotions. This data consisted primarily Textual and numerical forms that can be categorized as Structured, semi-structured or non-structured.

Sentiment analysis which is also known as opinion mining is basically done to computationally identify and extract subjective information from source materials and to categorize this information to know the user's behavior towards a particular agenda. This categorization is basically done broadly into Positive, Neutral, or Negative. In this paper, the extraction of sentiment from a famous micro-blogging website, Twitter where the user posts their views and opinion will be discussed. The twitter datasets has been collected using twitter APIs. For actual implementation, python with NLTK and python-twitter APIs has been used.

Keywords – Machine Learning, Sentiment Analysis, Support Vector Machine, Naïve Bayes, Python

I. INTRODUCTION

Sentiment Analysis, which is also referred as opinion mining, is the computational study of people's opinions, attitudes and emotions towards an entity (e.g. individuals, events or topics). People express and share their view and opinion using social media application such as Twitter, Facebook, WhatsApp and Instagram etc. Two fundamental approaches are there in sentiment analysis i.e. Supervised learning and unsupervised learning Approaches. Sentiment classification of twitter data is done using supervised machine learning approaches like Naïve-Bayes, SVM, and Maximum-Entropy etc.

Today internet has become the major part of our life. Most of the people use online blogging sites or social networking sites to express their opinions on certain things. They also use these sites to know what other

A preliminary note on big data and machine learning technologies

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Abstract

Big data is high-volume, high-velocity and variable information assets which demand cost-effective, innovative forms of processing for enhanced insight and decision making. An essential quality of the Big Data is the large volume which is heterogeneous and of different dimensions. Data mining and machine learning systems are utilized to separate the important and concealed examples from the huge volume of data. Many machine learning strategies are coordinated with big data analytics tools

Keywords: Machine learning, Big data, Data mining.

Introduction

In recent times there has been an exponential production of data from various sources of the web, smart phones or smart sensors, which has lead to generation of big data. The term big data can be referred to as enormous, fast, arising, various classes and with parts of undesirable noises that are hard to store, process, analyze, translate, expend and settle for better decision in the field of medicinal services, funds, and business or industries. Gigantic data have originated from people through the usage of PC, advanced mobile phones, gadgets which are utilized to share message and recordings with companions in internet based life such as Facebook, Instagram, Whatsapp, etc, for sharing short clips, share their perspectives and purchase where data gathering has developed enormously and is already past the capacity of commonly utilized software tools to capture, manage, and process inside a "tolerable elapsed time" (Wu *et al.*, 2014) (Blazquez and Domenech, 2018)

Indeed, the activity of people and their exercises are recorded by smart sensors which are set in part of urban communities and in diverse public places. The most fundamental challenge for Big Data applications is to investigate the enormous volumes of data and focus on helpful data or information for future activities. In many cases, the learning/extraction procedure must be productive and near continuous on the grounds that putting away all watched data(Wu *et al.*, 2014).

Big Data begins with huge volume of heterogeneous, self-ruling sources with distributed and decentralized control, and tries to investigate complex and advancing connections among data which is known as HACE Hypothesis. These attributes make

3D Trajectory Reconstruction Using
Color-Based Optical Flow and Stereo Vision

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Abstract. Automatic trajectory estimation of a moving object in a video is one of the most active research areas of computer vision, which finds many practical applications, such as development of sport playing robots, predicting trajectory for avoiding obstacle collision, automatic navigation of driverless vehicles, monitoring target hitting, etc. However, most of the work reported in literature only considers monocular videos. Due to the availability of low price stereo cameras, many applications take their advantages by incorporating depth information. In this paper, the 3D trajectory of a primary color (red or green or blue) object is estimated using color based optical flow and stereo vision. The purpose of using stereo vision is to gain depth information for generating 3D trajectory. The system has been tested on many stereo videos and experimental results are quite accurate. Besides, the low computation time required for finding depth of the tracked path makes it suitable for real time applications.

Keywords: Object detection · Object tracking · Optical flow · 3D trajectory · Stereo vision

1 Introduction

Trajectory estimation has received a considerable attention by researchers due to many practical applications, such as predicting trajectory for avoiding obstacle collision, location estimation of a robot, tracing the trajectory of a moving vehicle for lane violation, etc. Trajectory generation is a two-step process: (1) detect the object in the initial frame of a video and (2) then locate the object in the subsequent frames.

It is established that the 3D trajectories of moving objects in a scene is impossible from monocular videos without prior assumptions about the scene, which restricts its practical utilities [1]. However, it is possible to generate 3D trajectories by combining stereo vision with any object tracking technique. In stereo vision, two views of the same scene are captured by a pair of cameras and the disparities of scene points in the captured images are used to calculate depths of scene points, using the principle of triangulation. The calculated depths are utilized to construct the 3D trajectories of the objects of interest.

Building Machine Learning Based Diseases Diagnosis System Considering Various Features of Datasets

Shrwan Ram and Shloak Gupta

Abstract Millions of people worldwide suffer from late diagnosis of diseases. Machine learning algorithms can significantly help in solving healthcare systems that can assist physicians in early diagnosis of diseases. Algorithms in Machine Learning provide the ways to classify data efficiently, at great speed and with high accuracy. Many types of machine learning algorithms are widely adopted and implemented for the early detection of various diseases; these algorithms are like Decision Tree, Naïve Bayes, Support Vector Machine, and Logistic Regression. The results show that there is no particular algorithm available which provides best accuracy in all kind of the healthcare data classification. Most appropriate method can be chosen only after analyzing the nature of the datasets. All the available machine learning techniques are used based on their performances in terms of accuracy and comprehensibility. The datasets considered in this paper are on breast cancer, dermatology, chronic kidney disorder, and biomechanical analysis of orthopedic patients. Data sets from UCI machine learning repository were taken to show applications of Machine Learning on wide variety of Life Sciences data. The four algorithms are implemented with considering various parameters of classification.

Keywords Machine learning · Diseases diagnosis · Supervised learning

1 Introduction

The Machine Learning is all about developing mathematical, computational, and statistical methodologies for finding patterns in and extracting insight from data. Data, in turn, are the concrete manifestations of structures and processes that shape the world. Machine Learning research aims to unlock technologies that can solve

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An Efficient Clustering Algorithm to Simultaneously Detect Multiple Planes in a Point Cloud

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Abstract— Plane detection in a point cloud is one of the primary step for various applications, such as computer vision, ground plane detection for autonomous navigation, obstacle detection, indoor scene reconstruction, etc. In this paper, a new algorithm for simultaneous detection of multiple planes in a point cloud is proposed. The proposed method is a two-step process. In the first step, the surface normals are automatically clustered into probable plane orientations (angular clusters) within a user specified angle threshold, without a priori knowledge of number of planes. In the second step, the angular clusters are further clustered into separate planes, within a user specified distance threshold, based on the normal distances of the points in an angular cluster. In contrast to popular random sampling based methods, the proposed method uses deterministic approach to simultaneously detect all possible planes and has comparable results with the existing methods and is two times faster. The proposed method is implemented using Open3d point cloud library and evaluated on datasets having variety of indoor scenes.

Keywords— *RGB-D, Plane Detection, Point Cloud, Open3d, Clustering, Surface Normal*

I. INTRODUCTION

. Point cloud is a type of 3D model of a scene consisting of a large number of individual points with their x, y, z values in a coordinate system along with other attributes, such as color, normal. A point cloud model is primarily obtained from sensors, such as Lidar, RGBD camera, Laser scanner, stereo vision system, etc. With the availability of low cost depth cameras (Microsoft Kinnect, Intel RealSence, etc.), uses of point clouds in various applications, such as autonomous mobile robot navigation, obstacle detection, vision based assistance system for blinds and visually impaired persons, etc. have attracted researchers' attention. In these applications, detection of planar surfaces in the given point cloud is the key step. Further, most of the man-made environment and objects primarily consist of planar regions. Plane detection refers to identifying a set of planes that best fits to the given point cloud data. Many methods have been reported in literature for detecting planer regions, such as methods based on: Hough transform [1-2], RANSAC [3] and region growing [4-5]. However, due to presence of noise in the point cloud, accurate and efficient solution is yet to be found.

In this paper, a new method for multiple plane detection simultaneously in a point cloud is proposed. In contrast to hypothesize and verify approach of RANSAC based methods, the proposed method uses a deterministic framework based on systematic auto clustering of surface normals and normal distances of points from origin to efficiently detect all planar

surfaces simultaneously and is suitable for parallelization. To identify planar surfaces, the proposed method is a two-step process. In the first step, points with similar normals (within the specified threshold) are automatically grouped together. A group of normals (angular cluster) represents collection of possible probable parallel planes. In the second step, points within each angular cluster are segregated from each other based on the normal distances of points from the origin to segregate various planes. The proposed method is similar to the method proposed in Holz et al. [6]. However, the proposed method differs from Holz et al. [6] as it uses auto clustering of point normals instead of random selection of seed points and region growing strategy.

The remaining part of the paper is organized as follows: Section 2 briefly presents review of the similar and related work. Section 3 describes the proposed method. Implementation and experimental results are reported in section 4. Finally, section 5 concludes the paper.

II. RELATED WORK

With the availability of low cost and fast 3D depth cameras and scanners, 3D point cloud processing to detect the structure of the captured scene is a very active research area in computer and robotic vision. Most of the downline applications, such as detection of ground plane, obstacle detection for autonomous navigation, indoor scene reconstruction etc., require detection of planar surfaces in a point cloud. For plane detection, several approaches have been proposed, such as region growing approaches, RANSAC based approaches, Hough transformed method and surface normal based methods, etc. Region growing based methods first select few seed points and then adds neighboring points, according to some criterion, until no more points can be added. Holz and Behnke [7] segments the range images into planar regions by region growing using local mesh neighbourhood. They used the region growth method for tagging different objects in a scene. The region growing methods are sensitive to the selection of the initial region seeds. Huang et al. [8] improved the choice of the initial seed position by using information of object edges. Instead of randomly selected seed points, Jin et al. [4] proposed an iterative growing process of a plane from a patch based seed selection approach. The method alleviated over growing and under growing problems.
RANSAC based methods tries to fit a plane to a set of inliers that best describes a plane. The RANSAC based methods randomly pick three points and create a plane model and then tries to fit other points to that plane. Out of many such

Classification of Healthcare Datasets through Supervised Machine Learning Algorithms

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Abstract The work centered on methodologies based on machine learning to develop applications that are capable of recognizing and disseminating health information. In this paper, a different type of supervised machine learning approach is used for the classification. Analyzing the machine learning algorithms and finding out the most appropriate algorithms for healthcare data. In this study, designed a classification system using a Decision tree, Naïve Bayes Support Vector Machine, and KNN for medical data classification with various numbers of attributes and instances. Its include two type classification namely present or absence data distribution from the Cleveland heart disease data set. The experiment outcomes positively demonstrate that the decision tree classifier is effective in undertaking healthcare data classification tasks.

Keywords– Classification, Machine learning, decision tree, naïve Bayes, support vector machine algorithms, heart disease dataset.

I. INTRODUCTION

Machine Learning is the ability of machines to adopt human behavior, in which a machine composed of different algorithms using these algorithms chooses its own choice and provides the user with the outcome or output. Machine learning is the skill of learning machines, where a machine is designed with certain algorithms from which it can make its own choices and give the user the answer. Machine Learning Algorithms are a step-by-step method for extracting information from the data set without relying on a patch programmer. Such data is useful in predicting the output of a given input. Inside the data collection, i.e. given to it.

Supervised learning algorithms aim to model relationships and dependencies between the output of the goals and the input features so that the output values for new data can be predicted based on certain relationships that have been learned from previous data sets. Healthcare data classification is a challenging task in the field of medical research. Both for a patient and the doctor, the medical record is very useful. The medical record would usually assist the doctor in classifying the illnesses, diagnosing, and treating the patient properly. In recent days, the volume of Healthcare data is huge. Therefore, the seriousness of manual diseases is difficult to identify and understand. This paper describes the classification of heart diseases through supervised machine learning.

1. **Healthcare dataset:** Cleveland's heart disease data set is a multivariate data set. It includes 76 attributes and 303 instances that range from Categorical, Integer, and True. However, the studies suggested involving the use of a subset of 13. The prediction area applies to the patient's existence of heart disease. The prediction field concentrated on simply attempting to distinguish the presence of diseased (value 2) data from non-diseased (value 1).

2. **Decision tree:** train classification decision tree to predict responses to data. Follow the decision of the root tree (beginning) node up to a leaf node to predict the answer. The leaf node contains the response. The value of one predictor (variable) is verified at each stage of a prediction. This tree predicts identifiers based on two predictors, x1 and x2. To predict, start at the top node. Check the values of the predictors in each decision to determine which branch to obey. When a leaf node is reached by the branches, the data is labeled as either form 0 or 1.

3. **Naive Bayes:** Bayes 'theorem (often called Bayes' law after Thomas Bayes), in probability theory, compares the conditional and marginal probabilities of two random events. Often used for calculating subsequent probabilities given observations. A naive classifier of Bayes is a concept that deals with a simple probabilistic classification based on applying the theorem of Bayes. Simply put, A Naïve Bayes classifier assumes that the presence (or absence) of a certain attribute of a class is irrelevant to the presence (or absence) of any other feature.

4. **Support Vector Machine:** Support Vector Machine: By finding the best hyper-plane that separates all data points of one class from those of another class, an SVM classifies information. The support vector machine algorithm performs classification by finding the hyper-plane or classifier which maximizes the margin between two classes. Two groups are divided by Hyper-plane. Classification can be seen as a task of separating classes in the space of features.

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A Review on IoT: Protocols, Architecture, Technologies, Application and Research Challenges

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Abstract - The Internet of Things (IoT) is a paradigm that is speedily gaining ground in the scenario of modern wireless telecommunications. Using IoT, billions of things get connected and communicate using different protocols and technologies. The expanse of IoT is ever increasing. From home consumers to the industrial one, IoT is becoming part of our everyday life. Individuals, companies and governments are trying to seek real-world IoT solutions which can be economically and technologically viable. In this paper, we have focused on technologies, protocols, applications and future challenges related to IoT. Initially, IoT looks twin to M2M, but in the years to come, it would facilitate real-world objects to communicate, connect and interact with one another in the same way humans do via the web today. Through the paper, we have tried to encapsulate the information regarding the best appropriate protocols, architecture, technologies and usage problems to assist scholars and developers in understanding the various nuances of the Internet of things.

Keywords: Internet of Things, RFID, Wireless Sensor Networks, Object, Security, Identification

I. INTRODUCTION

Within the two decades of its inception. the Internet of Things has impacted almost every field. and today only the sky is the limit for the opportunities it offers. Before delving into the architecture. technologies and usage problems. let's discuss what do we mean by IoT? Internet is an open resource on which anybody can manipulate data. Data is mostly operated on the Internet by human beings who are systematically slow. inefficient handler of data [6]. Systems could become more efficient and scalable if we connect sensors to real-world objects. and these real-world objects can then connect and inetract with one another in like manner as humans do via the web today. However. then how IoT is different from sensor network" or how is it different from Big Data which handles enormous volumes of data efficiently or how IoT differs from M2M (Machine to Machine) or D2D (device to device) communication? Even Cyber-Physical System which appears the same as IoT as they also interact with the real-world objects through sensors [5]. It is difficult to have an all-encompassing definition of the Internet of things but to define: we can say

IoT (Internet of Things) incorporates everything which is connected to the Internet from small sensors to devices to wearable [7]. These connected devices collect data, analyse it and create action. IoT performs of all the actions which other technologies like a sensor network. Big data, M2M or D2D communication do in isolation. Inventors of the traditional Internet would have never imagined that this "networks of networks" will one day make billions of devices to connect and interact with each other like real-world entities. With the burgeoning of IoT. certain aspects have become more relevant than they were with the traditional Internet [6].

Devices Heterogeneity: Today. IoT is useful in essentially every field which employs different devices. These devices use different operating systems. protocols and architecture and have different communication and computational abilities. Thus. it is essential to develop protocols and architecture for IoT. which can make these heterogeneous devices work in collaboration.

Scalability: Unlike the one size fits approach. scalability is the ability of the system to handle data as it grows. With billions of devices to use IoT scalability concerns are there at every stage from naming and addressing to service provisioning and supervision [14].

Energy-optimized solutions: wireless technologies consume more energy than the wired technologies. As per CISCO. there would be 50 billion IoT devices by the end of this decade: thus. energy optimization is a critical aspect of IoT development.

Localization and tracing abilities: Localizations pertains to an object's position. and Tracking is its position over a while. As devices connected through IoT can connect and communicate with one another other. it facilitates localization and Tracking.

Set in security and privacy-preserving devices: Due to the tight entanglement with the physical domain. IoT technology should be protected and privacy-preserving by choice. This suggests that security should be taken as a key system-level property. and be taken under consideration within the proposal of designs and techniques for IoT solutions [23].

Chapter 20
Security Threats for Time Synchronization Protocols in the Internet of Things

Suresh Kumar Jha, Niranjan Panigrahi and Anil Gupta

Abstract The Internet of Things (IoT) is an emerging field of application includes several technologies such as the Internet, Wireless Sensor Networks (WSN), Radio Frequency Identification (RFID), and communication technology which build a system that connects real and digital worlds. For the consistent working of the IoT ecosystem, the backbone WSN needs time synchronization. In the IoT ecosystem, the sensors are generally located in an unattended environment where may be a high chance of the existence of malicious nodes. In such a scenario, the time synchronization protocols will behave incorrectly which in turn will hamper the normal working of other dependent protocols. This chapter contributes a thorough insight into the possible threats to time synchronization in backbone WSN of IoT, existing security measures with qualitative and quantitative analysis, and their scope and limitations. This will further help the research community to develop light-weight and efficient secured time synchronization protocols for IoT.

Keywords IoT · WSN · Time synchronization · Security threats

20.1 Introduction

In a short time ago, the Internet of Things (IoT) emerged as a new era of application in almost all fields of society and engineering problems. In all applications of IoT, sensors are deployed to form a network to observe the physical or natural condition

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Glioma Tumor Detection Through Faster Region-Based Convolutional Neural Networks Using Transfer Learning.

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Abstract: - Glioma Tumor is generally found in the brain and spinal cord. This tumor begins in glial cells that cover the nerve cells and control the function of that. The Glioma tumor is classified based on glial cells involved in the Glioma tumor formation. The tumor affects the normal activity of the patients such as loss of memory, difficulties in speech, confuse the identification of objects, and also causes difficulties to maintain the balance of the body. The early detection of Glioma tumor helps healthcare practitioners to suggest a suitable treatment for the disease. The detection of a Glioma tumor is a challenging task. Many types of approaches had been proposed by the researchers and academicians for accurately detecting the Glioma tumor. Accurately detecting the brain tumor is still a big challenge. Because of recent advances in image processing and computer vision, healthcare professionals are using sophisticated disease diagnostic tools for disorders/disease prediction. The Neurosurgeons and Neuro-Physicians use the magnetic resonance imaging technique to identify multiple brain tumors. The approaches to computer vision play a significant role in the automated identification of different Brain tumors. This research paper explores the Convolutional neural network-based Faster R-CNN approach for the Glioma tumor detection using four pre-trained deep networks such as Alexnet, Resnet18, Resnet50, and Googlenet. The proposed approach of object detection as compared to other R-CNN approaches is more efficient and accurate having higher precision. The proposed model detects the Glioma tumor with 99.9% accuracy. The pre-trained networks used to train the tumor detection model are Alexnet, Resnet18, and Resnet50, and Googlenet. As compare to Alexnet, resnet18, and Googlenet deep networks, the Resnet50 Pre-trained network performed well with higher accuracy of detection.

Keywords: Glioma Tumor, Magnetic Resonance Imaging, Computer vision, Convolutional Neural networks, Pre-trained networks, Deep learning.

Performance Evaluation of Word Representation Techniques using Deep Learning Methods

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Abstract—Word vectors are the real-valued numbers which allow machine learning algorithms to extract the semantic information concern with the words when trained on natural language corpora. The paper explores word representation techniques with evaluation criteria to measure the quality of representation through deep learning models like BERT. The performance of these words vectors can be evaluated using certain measures. Broadly, the two classes of evaluation are intrinsic and extrinsic evaluation. Intrinsic evaluators directly extract syntactic or semantic relationships between the words independent of any language processing task. These evaluators focus on subtasks while extrinsic evaluators consider complete natural language processing task as a measure of performance like chunking, sentiment analysis etc. The experiments have been performed using BOW model, Word2Vec and BERT language model. In this research work word-similarity task is considered for intrinsic evaluation and part-of-speech (POS) tagging task is used as a measure for extrinsic evaluation. The experiments have been performed using python, sklearn machine learning toolkit and keras deep learning framework. BERT language model is used which has recently emerged as the prominent tool for natural language processing. The result obtained from the experiment in this research for word embedding representation techniques are efficient and better compared to other existing traditional models. However, considering large datasets this can be enhanced for better accuracy

Keywords— Word Vector, Word Embedding, Distributed Representation, Intrinsic Evaluators, Extrinsic Evaluators, BOW, Word2Vec, BERT, Pre-trained Embedding.

I. INTRODUCTION

The role of natural language processing is to extract information from unstructured text. A natural language processing system allows computers to understand the natural language and perform specific tasks like classification, part-of-speech tagging or sentiment analysis etc. The most significant task is to represent the meaning of words in a computer. The systems should be able to extract the similarity and difference between the words. Generally, the taxonomy like WordNet is used to express the hypernyms and synonyms sets. But this leads to a problem of missing words i.e. the words which are not defined in the corpus cannot be expressed. Word vectors are the real number vectors that encode the notion of similarity and difference between the words. These are the learned representation of the input. For example if there are k-million words in a language, then there exists some k-dimensional space to encode the semantics of the language. Each dimension encodes specific meaning which is transferred during communication. The numbers in the word vector represent the word's distributed weight across dimensions. The numerical weight of the word represents the closeness of the concept [10]. The vector embeds both semantic and syntactic information of the word obtained from the corpus.

The semantic dimension indicate tense (past/present/future tense), number (singular/plural number), gender (masculine/feminine gender) etc. As shown in figure 1, each column represents the dimension which captures defined meaning or some specific concept. The four dimensions are animal, domestic, pet and fluffy respectively. The each weight of the word within the column (dimension) represents its closeness with the concept.

Figure 1: word vector representation with specific dimensions [10].

The dimensions of the vector contain the meaning of the word. Using these continuous vectors space machines can extract similarities between the different words [10]. The words with similar word vectors means they are similar in some context. Word-embedding is a significant tool of natural language processing to learn quality representation for various tasks like semantic analysis, information retrieval, question-answering systems and machine translation etc [1]. The most significant point in the study of distributional semantics is to evaluate the quality of word representation models [15]. There are no clear criteria about the evaluation of these models. Ip engineers evaluate the performance of these models by experimenting on specific tasks like pos tagging, classification etc while computational linguistics perform experimentation using methods of cognitive science.

The paper presents the significance of word representation in natural language processing with various word representation approaches. It explains the comparative analysis of conventional and current word representational techniques for intrinsic and extrinsic evaluation. The paper is organized as follows: The section 1 cover the basic introduction and section 2 shows the related work done in the domain. Section 3 describes various approaches to word representation. The section 4 exposes the two classes of evaluation i.e. Intrinsic and extrinsic evaluation of word representations. The section 5 covers the experimental setup and results regarding performance evaluation of the word representation models. The next section concludes the work with specific points to be considered for further work.

ORIGINAL RESEARCH

SN

Security Threat Analysis and Countermeasures on Consensus-Based Time Synchronization Algorithms for Wireless Sensor Network

Suresh Kumar Jha[1] · Anil Gupta[1] · Niranjan Panigrahi[2]

Abstract

Time synchronization is an indispensable and fundamental requirement for all types of wireless sensor networks (WSNs) protocols and applications. The consistency and correctness of other protocols like localization, routing, etc., are highly dependent on time synchronization. However, due to the hostile deployment of wireless sensor networks, they are prone to cyber-physical attacks that create different threats to time synchronization protocols as well. Recently, consensus-based time synchronization (CTS) algorithms are gaining popularity due to their distributed nature and robustness toward different types of threats such as denial-of-service and node destruction. But, the inherent properties of the consensus-based approach of making in-network averaging make these algorithms vulnerable to message manipulation attacks. In this paper, an in-depth simulation-based analysis is conducted using pymote, a python-based discrete event simulator for WSN, on state-of-the-art CTS algorithms in the presence of message manipulation attacks. A novel and generic algorithm, Message Manipulation Attack Resilient CTS (MMAR-CTS) is proposed embedding which the state-of-the-art algorithms are extensively evaluated based on standard performance metrics, e.g., convergence speed, global synchronization error, and local synchronization error in the presence of the attack, and sufficient observations are derived to show the behavior of these algorithms. The comparison of protocols is validated with simulation results. Simulation results show that MMAR-CTS embedded SATS algorithm is 75% more efficient as compared to other candidate algorithms, measured in terms of convergence speed (number of iterations) and nearly 40% improvement in global and local synchronization error.

Keywords Wireless sensor network · Consensus time synchronization · Message manipulation attack

Introduction

From the last decade, wireless sensor networks (WSNs) have been receiving more attention due to their increasing demand in many applications such as healthcare

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monitoring, area monitoring, industrial domain, and threat detection. WSNs consist of a huge number of low-cost, battery-operated, and small motes. Time synchronization is a critical requirement among these motes due to its distributed nature and unavailability of a centralized clock. It is required between motes for different applications, such as multi-agent networks, data fusion, moving objects trajectory estimations, and different monitoring systems. It is also a prerequisite for the correctness and consistency functionality of other protocols [1]. Broadly, there are two types of approaches for time synchronization algorithm in WSN, centralized and distributed approach. The centralized algorithms are multi-hop, organized the network in a rooted tree structure, and synchronization is achieved with reference to the root's time. This type of approach has many shortcomings such as root node failure problems and hierarchy or cluster-creation overhead. The recent approach of time synchronization in WSNs is based on distributed consensus theory and based on this, many

Performance Evaluation of Merging Techniques for Handling Small Size Files in HDFS

Vijay Shankar Sharma and N. C. Barwar

Abstract When dealing with the storage of large files, HDFS is one of the good choices as a distributed storage. Processing a large number of small files results in the performance bottleneck of HDFS. A massive number of small files will produce excessive metadata that leads to inefficient utilization of the Name Node memory, and frequent function calls will consume all over more time to process; therefore, it can be concluded that HDFS degrades when handling with small files. A detailed performance evaluation is being conducted to understand the impact of increasing small files in Hadoop for processing. This paper mainly evaluates sequential files, CombineFileInputFormat, HAR and Hadoop streaming techniques to deal with small file problem in HDFS. Empirical evaluation conducted in this paper shows that HAR and CombineFileInputFormat perform better and have consistent and stable results when increasing number of files for processing.

Keywords Hadoop · MapReduce · HAR · Hadoop streaming · Sequential file · CombineFileInputFormat · Small files · HDFS

1 Introduction

The function of Hadoop is identified by its two major core components, i.e., Hadoop Distributed File System (HDFS) and MapReduce. The HDFS stores huge data into the computing nodes. This huge data cannot be stored directly to the computing nodes; HDFS divides the large file into 128 MB data chunks, and these data chunks

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IMAGE CLASSIFICATION WITH DEEP LEARNING BASED ON DIFFERENT CONVOLUTIONAL LAYERS USING TENSORFLOW

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ABSTRACT

Deen learning is the subfield of machine learning which uses neural networks that insnired by the structure and functioning of the human brain. Deen learning is a new antroach for data analysis and nrediction; it has become very nonular recently. Deen learning has achieved much higher success than machine learning in many annlications, one of the reason for this is, that machine learning not able to nrocess large amount of data effectively as well as it also not able to extract the features from the data automatically. Deen learning is being recognized as an essential tool for artificial intelligence research, with various annlications in several areas such as sneech recognition, object recognition and image classification. In narticular, Deen Learning is nreferred in the classification of images, because it can nrovide efficient results. In this naner, a deen learning convolutional neural network based on Tensor Flow and Keras is denloyed for 2D Image Classification, using animal dataset. In this study, we used Tensor flow, one of the most nonular Python nrogramming language libraries for deen learning to classify Images and sigmoid classifier and Rectified Linear Unit (ReLu) function for deen learning convolutional neural network. At last, the each image features are trained with convolutional neural network for image classification. The nronosed antroach is comnared for one and two convolutional layers on CPU system and finally we conclude that image classification with two convolutional layers gives better validation accuracy.

KEYWORDS –
Deen Learning; Tensorflow; Keras; Conolutional Neural Network; ReLu; Sigmoid Classifier; Image Classification

1.INTRODUCTION

Deen learning is a new antroach for data analysis and nrediction; it has become very nonular recently. Deen learning is being recognized as an essential tool for artificial intelligence research, with various annlications in several areas such as sneech recognition, object recognition and image classification [3]. For Classification nroblems, more accurate values can be obtained using Deen Learning instead of Machine Learning.

Deen Learning can be classified into four tynes: Deen Neural Network (DNN), Convolution Neural Network (CNN), Recurrent Neural Network (RNN) and Q-learning. These Deen Learning tynes are ranidly evolving, with several software nackages including Theano, CuDNN, Caffee, and Keras [3].

By using a Convolutional neural network in deen learning, a model can be created to enable nowerful and often correct assumntions by changing various narameters such as activation function and number of convolutional layers. There are several libraries used in deen learning studies [2].

TensorFlow is one of the libraries used for image classification in deen learning. TensorFlow is an onen-source software library develoned by the Google in 2015 for numerical comnutation. TensorFlow can denloy RNN, DNN and CNN not only to multi core CPUs, but also to GPUs. It also sunnorts the AdaGrad, Dronout, and ReLu functions, which are very

Chapter 6
A Theoretical Approach to Reinforcement Learning Algorithm and Nash Equilibrium to Maximize the Score in Imperfect Information Game

Ruchi Vyas and Alok Singh Gahlot

Abstract Computers have just overshadowed the degree of human play in imperfect information games like Scrabble, yet there remains an opportunity to get better. Specifically, there is a lot to be acquired about the rival's tiles and moves. Reinforcement learning is one of the parts of Machine Learning. It is tied in with making an appropriate move to increase reward in a specific circumstance. The Nash Equilibrium is a hypothesis in game theory that communicates that a player can achieve the ideal outcome by not wandering from their initial strategy. Reinforcement learning algorithm and game theory would be best technique for training the agent. It will learn from as much as it plays, such that our agent can play and win the game with different persons with their different playing strategy they use for Scrabble game. To do this, our agents need to find out about other players' strategies and win every time they play against the human.

Keywords Reinforcement learning · Nash equilibrium · Decision-making · Machine learning

1 Introduction

Scrabble is an imperfect information game, that is, the current player is unknown of the rack of other player, making it elusive out of the rival's best course of action until the finish of the game. Additionally, there is innate arbitrariness present in Scrabble as arbitrary letters are being chosen from the pack to the current player's rack at each round [1]. Our main motive is to provide training to the agent every time it plays against the human and gets itself skilled and ready for the next game.

In supervised learning, an agent is trained to play by gaining knowledge from the data sets provided by the trainer but in reinforcement learning an agent gets rewards whenever it wins so the main objective of the agent is to maximize its rewards and according to our implementation, the agent will be learning how to win the game

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Performance Evaluation of Word Representation Techniques using Deep Learning Methods

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Abstract—Word vectors are the real-valued numbers which allow machine learning algorithms to extract the semantic information concern with the words when trained on natural language corpora. The paper explores word representation techniques with evaluation criteria to measure the quality of representation through deep learning models like BERT. The performance of these words vectors can be evaluated using certain measures. Broadly, the two classes of evaluation are intrinsic and extrinsic evaluation. Intrinsic evaluators directly extract syntactic or semantic relationships between the words independent of any language processing task. These evaluators focus on subtasks while extrinsic evaluators consider complete natural language processing task as a measure of performance like chunking, sentiment analysis etc. The experiments have been performed using BOW model, Word2Vec and BERT language model. In this research work word-similarity task is considered for intrinsic evaluation and part-of-speech (POS) tagging task is used as a measure for extrinsic evaluation. The experiments have been performed using python, sklearn machine learning toolkit and keras deep learning framework. BERT language model is used which has recently emerged as the prominent tool for natural language processing. The result obtained from the experiment in this research for word embedding representation techniques are efficient and better compared to other existing traditional models. However, considering large datasets this can be enhanced for better accuracy

Keywords— *Word Vector, Word Embedding, Distributed Representation, Intrinsic Evaluators, Extrinsic Evaluators, BOW , Word2Vec, BERT , Pre-trained Embedding.*

I. INTRODUCTION

The role of natural language processing is to extract information from unstructured text. A natural language processing system allows computers to understand the natural language and perform specific tasks like classification, part-of-speech tagging or sentiment analysis etc. The most significant task is to represent the meaning of words in a computer. The systems should be able to extract the similarity and difference between the words. Generally, the taxonomy like WordNet is used to express the hypernyms and synonyms sets. But this leads to a problem of missing words i.e. the words which are not defined in the corpus cannot be expressed. Word vectors are the real number vectors that encode the notion of similarity and difference between the words. These are the learned representation of the input. For example if there are k-million words in a language, then there exists some k-dimensional space to encode the semantics of the language. Each dimension encodes specific meaning which is transferred during communication. The numbers in the word vector represent the word's distributed weight across dimensions. The numerical weight of the word represents the closeness of the concept [10]. The vector embeds both semantic and syntactic information of the word obtained from the corpus.

The semantic dimension indicate tense (past/present/future tense), number (singular/plural number), gender (masculine/feminine gender) etc. As shown in figure 1, each column represents the dimension which captures defined meaning or some specific concept. The four dimensions are animal, domestic, pet and fluffy respectively. The each weight of the word within the column (dimension) represents its closeness with the concept.

Figure 1: word vector representation with specific dimensions [10].

The dimensions of the vector contain the meaning of the word. Using these continuous vectors space machines can extract similarities between the different words [10]. The words with similar word vectors means they are similar in some context. Word-embedding is a significant tool of natural language processing to learn quality representation for various tasks like semantic analysis, information retrieval, question- answering systems and machine translation etc [1]. The most significant point in the study of distributional semantics is to evaluate the quality of word representation models [15]. There are no clear criteria about the evaluation of these models. Ip engineers evaluate the performance of these models by experimenting on specific tasks like pos tagging, classification etc while computational linguistics perform experimentation using methods of cognitive science.

The paper presents the significance of word representation in natural language processing with various word representation approaches. It explains the comparative analysis of conventional and current word representational techniques for intrinsic and extrinsic evaluation. The paper is organized as follows: The section 1 cover the basic introduction and section 2 shows the related work done in the domain. Section 3 describes various approaches to word representation. The section 4 exposes the two classes of evaluation i.e. Intrinsic and extrinsic evaluation of word representations. The section 5 covers the experimental setup and results regarding performance evaluation of the word representation models. The next section concludes the work with specific points to be considered for further work.

An Efficient Approach to Enhance the Scalability of the HDFS: Extended Hadoop Archive (EHAR)

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Abstract:- The Hadoop framework is most popular among data analytics applications. The file system of the Hadoop (HDFS) provides the layered storage facility for the frequent and infrequent data. In HDFS data can be archived using the HAR (Hadoop Archive) technique, but HAR archive are immutable means once the archive created it cannot be modified. One has to rewrite the whole archive if want to append the some new file to the existing archive. This paper introduces extended Hadoop archive (EHAR) that will resolve the scalability issue of the HDFS and also provide the mechanism to append the new files to the existing Hadoop archive. The experimental result shows that the execution time of the proposed approach is 53% to 39% lesser than the native HAR for the different fixed size files and 52% to 38% lesser than the native HAR for the different variable size files.

Keywords— HDFS, Index Files, HAR, Scalability, B-Tree, NameNode, EHAR, Computation Layer, Archive Layer.

I. INTRODUCTION

In the 21st century the data becomes very important asset for each and every organization and individual. The rate of data production by various direct and indirect platforms is also very fast. The analytics and analysis of this fast growing unstructured data is becoming the popular application domain for the researchers and scientists. There are number of technological issues to handle such fast growing unstructured data i.e. scalability, fault tolerance, etc. Hadoop Distributed File System (HDFS) is the most popular file system to efficiently analyze the large amount of data. HDFS is capable to store and process fast growing unstructured data along with features of data availability and scalability. The fast growing unstructured data is processed on the different storage layers, these layers are defined on the basis of the use of data. The data that is used frequently is stored at the computation layer of storage and the data that is used less frequently is stored at the archive layer. This classification of data will benefit in number of different ways i.e. data stored at the archive layer will require relatively less computation power in comparison to the computation layer and requires high and stable storage capacity, whereas computation layer does not need log term storage facility, it requires high computation capability. The data that needs to be executing faster and frequently are processed at the computation layer and the data for archival purpose and processed less frequently

are stored at the archive layer. The benefit of storing the data in different layers is that both layers can grow independently hence provides the scalability and reliability at a great extent.

The HDFS provides the storage layer separation for the frequent and un-frequent data, thus it is suitable for the archival storage. HDFS will be able to store fast growing unstructured data efficiently with the features of the scalability and data availability and data analytics frameworks can directly access the data stored in the archive, there is no need of the data ingestion. HDFS works on the principle of the master-slave architecture, the central node (NameNode) in the HDFS will works as the master node and responsible for the meta-data management. The central level meta-data management at the master node will limit the scalability of the HDFS, because as the number of files increases it will also increase the NameNode memory requirement, thus while dealing with the million number small files the performance of the HDFS degrades. Each file, directory and block in the NameNode is represented as the object and that will occupy approximately 150 bytes of the memory in the NameNode, therefore it comes to the million number of small files. NameNode memory get overloaded and performance of the HDFS degrades, number or researches provide several solutions to overcome from the small file problem of the HDFS. Some researchers suggest increasing the NameNode memory by allowing multiple NameNode (Federated Name Nodes) to store the meta-data; each NameNode is responsible to save the subset of the meta-data. Some researchers proposed that merging the small files can solve the small file problem; the major solutions based on the merging of the small files are sequence file, combinefileinputformat and map file. HDFS also provide a solution to deal with the small file problem that is HAR (Hadoop Archive). In HAR small files are merged and then stored to the HDFS. The process of archiving file using the HAR will be done in two steps; the first step is to merge the small files by writing binary data of the small files to the part files, the second step is updation of the index files, in this step both _index and _masterindex file are updated. With help of theses index files one can access the small file from the archive without any data connector, the small files in the archive are treated as the normal files in the HDFS. The problem with HAR archive is that once the archive

A Novel Technique for Handling Small File Problem of HDFS: Hash Based Archive File (HBAF)

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Abstract. Now a day's, Data is exponentially increasing with the advancement in the data science. Each and every digital footprint is generating enormous amount of data, which is further used for processing various tasks to generate important information for different end user applications. To handle such enormous amount of data, there are number of technologies available, Hadoop/HDFS is one of the big data handling technology. HDFS can easily handle the large files but when there is the case to deal with massive number of small files, the performance of the HDFS degrades. In this paper we have proposed a novel technique Hash Based Archive File (HBAF) that can solve the small file problem of the HDFS. The proposed technique is capable to read the final index files partly, that will reduce the memory load on the Name Node and offer the file appending capability after creation of the archiv.

Keywords. HDFS, Small File Problem, Meta Data Management, Hash Function, HAR, Map File, SSHF, HT-MMPHF, Merging Technique.

1. Introduction

Hadoop is open-source technology to handle the vast amount of unstructured and big data, which offers the wide range functionality in comparison to the traditional relational data bases. The file system of Hadoop is known as the Hadoop Distributed File System (HDFS) that is based on the master slave architecture. In this architecture there is a Name Node that acts as a master with processing capabilities and stores the meta-data information of the files stored in the file system. There are number of Data Node's that act as the slave means these Data Node's are only used to store the data, no processing is required at the Data Node's. Once a file is stored on the HDFS it is divided in the 128 MB size blocks and then these blocks are stored on the HDFS. The size of the HDFS block is variable means client can configure the size of the HDFS block as per the requirement, by default it is 128 MB. To ensure the availability of the data, HDFS replicate the data blocks on the Data Node's and it will be decided by the replication factor that is by default 3, means each data block is written on the three Data Node's, in case if any one of the Data_Node's gets down then data block can be

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Vijay Shankar Sharma and N. C. Barwar

Abstract When dealing with the storage of large files, HDFS is one of the good choices as a distributed storage. Processing a large number of small files results in the performance bottleneck of HDFS. A massive number of small files will produce excessive metadata that leads to inefficient utilization of the Name Node memory, and frequent function calls will consume all over more time to process; therefore, it can be concluded that HDFS degrades when handling with small files. A detailed performance evaluation is being conducted to understand the impact of increasing small files in Hadoop for processing. This paper mainly evaluates sequential files, CombineFileInputFormat, HAR and Hadoop streaming techniques to deal with small file problem in HDFS. Empirical evaluation conducted in this paper shows that HAR and CombineFileInputFormat perform better and have consistent and stable results when increasing number of files for processing.

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PATCH BASED STEREO MATCHING USING CONVOLUTIONAL NEURAL NETWORK

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Abstract

The paper presents a new Convolutional Neural Network (CNN) architecture, called stacked stereo CNN, for computing disparity map from stereo images. In stacked stereo CNN, left and right image patches are stacked back-to-back and fed to a single tower CNN. This is in contrast to Siamese network where two towers are used, one for the left patch and other for the right patch. The proposed network is trained on a large set of similar and dissimilar image patches, which are generated from stereo images and their ground truth images from Middlebury stereo datasets. The network returns a dissimilarity score for a pair of image patch which is used to compute the cost volume. The cost volume is further refined using post processing steps before generating the final disparity map. The proposed network is evaluated on Middlebury datasets and achieves comparable results to the state-of-art algorithms.

Keywords:
Stereo Vision, Patch Matching, Disparity Map, CNN

1. INTRODUCTION

Stereo vision is a widely used technique to estimate depth of various scene points from two images of the scene obtained from two slightly different viewpoints. The basic principle of stereo vision is that the depth of a scene point is inversely proportional to its disparity in the left and right images. However, efficient and accurate implementation of this simple principle, specifically calculation of disparity, is eluding researchers for the last three decades due to the presence of occlusion, repetitive patterns, reflections, textureless areas. Thus, the stereo vision is still a very active research area of computer vision. It has many applications, such as 3D scene reconstruction, autonomous driving, obstacle avoidance and robotics.

Over three decades of research in stereo vision, many methods have been reported in literature. These methods can be grouped into two categories: traditional approaches and machine learning based approaches. Traditional disparity estimation methods start by first computing dissimilarity cost at each disparity level for each pixel and generates a cost volume followed by cost volume filtering for smoothing and noise removal and finally, disparity selection by selecting index of the lowest cost. Commonly, some measures of a small window around the pixel of interest in one view, called the reference image, is used to locate the most similar window in the other view called the target image. The commonly used handcrafted similarity measures are: absolute difference or squared difference of pixel intensities, normalized cross-correlation. However, due to occlusion, repetitive patterns, reflections, textureless areas, a large number of wrong matches are generated by direct matching.

To improve the accuracy of the disparity map by traditional methods, a typical pipeline of stereo disparity computation, using other clues from the stereo pair images and neighbourhood continuity, consists of the following steps: (1) matching cost computation, (2) cost aggregation, (3) optimization, and (4) disparity refinement [1]. For more details about these steps, refer [1]. The major drawback of traditional methods is inability of handcrafted similarity measures to generate accurate initial disparity map leading to inaccurate final disparity map, even after applying all the steps of the stereo pipeline.

In machine learning based approaches, neural networks are used in one or more steps of the traditional stereo pipeline. Due to the availability of advanced GPU hardware and deep learning libraries, researchers in stereo vision have reported many deep learning based approaches to calculate disparity maps. These methods outperform traditional methods in terms of accuracy and sometimes speed. Based on how convolutional neural networks (CNN) is used in stereo pipeline, deep learning stereo matching methods are classified into patch based [2][3] or end-to-end [4] [5].

In patch based methods, stereo matching problem can be modelled as a binary or multi class classification problem or a regression problem where a network is trained to categorise similar and dissimilar patches or to generate a similarity/dissimilarity score for the input patches. In a rectified stereo image pair, given a patch from the left (reference) image, the task of the network is to locate the best matching patch in the right (target) image. In patch based methods, the hand crafted feature to generate matching score is replaced by a trained network. Similar to traditional methods, to further refine the disparity map, extensive post processing steps are used. On the other hand, in end-to-end deep learning methods, hourglass shaped deep convolutional neural networks are used to generate the final disparity map in one go and no further post processing steps are used. Currently, the end-to-end networks are capable to handle domain specific problems. Researchers are unable to train a generic stereo matching network due to non-availability of suitable labelled datasets. Further, the end-to-end methods are very expensive in terms of memory requirements.

In this paper, a new CNN architecture, called stacked stereo CNN (SS-CNN), for the patch based stereo matching is proposed. In contrast to commonly used two tower Siamese network [2] [3] for the patch based stereo matching, the proposed network is a single tower CNN where the two input patches are stacked together along the colour plane axis before feeding to the network. The network directly generates the dissimilarity score for the input patches which can be used as dissimilarity cost in downline processing steps. The dataset to train the proposed network is generated automatically from publically available stereo images datasets with ground truth from Middlebury [6]. The raw disparity map obtained from the proposed network is further refined using semi global matching and left-right (LR) consistency check. Further, a new method is proposed to fill inconsistent disparities generated after LR check. Typically, inconsistent disparities are

Article

Kinetic study and modeling of homogeneous thermocatalytic decomposition of methane over Ni-Cu-Zn/Al2O3 catalyst for production of hydrogen and bamboo-shaped carbon nanotubes

Sushil Kumar Saraswat, Bipul Sinha, Kamal K. Pant, and Ram B. Gupta

Just Accepted

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Hierarchical nitrogen-doped porous carbon derived from lecithin for high-performance supercapacitors

Muslum Demir, [ORCID]* Sushil Kumar Saraswat and Ram B. Gupta*

The development of renewable carbon sources for sustainable energy storage applications is of significance importance. Herein, we report the synthesis of three-dimensional N-doped carbons derived from lecithin *via* a simple route. Hierarchical porous carbons with high surface area (up to 1803 m^2 g^{-1}) and nitrogen-doping level (up to 9.2 wt%) were successfully prepared by hydrothermal carbonization and a subsequent thermal annealing. The electrochemical performance of the carbon electrodes was examined with both two and three-electrode cell configurations in 1 M KOH and 1 M H$_2$SO$_4$ electrolytes. The as-prepared NC-800 electrode features a large specific capacitance (285 F g^{-1} at 0.5 A g^{-1}), high-rate capacitive behavior, and long-term cycling stability (8% loss after 20 000 cycles). Furthermore, NC-800 exhibits an energy density of 24.7 W h kg^{-1} at a power density of 500 W kg^{-1} in 1 M H$_2$SO$_4$. The excellent electrochemical performance of N-doped carbons is attributed to the unique hierarchical porous frameworks along with pseudocapacitive effect. This work opens up a new approach for preparation of hierarchical N-doped porous carbon materials with tailored properties for supercapacitor applications.

1. Introduction

Electrochemical supercapacitors (ESs), also known as electro-double layer capacitors have received much attention due to their high power density, fast charge–discharge rate, and long cyclability.[1-3] ESs have been extensively implemented in a variety of applications such as electronic devices, hybrid electric vehicles, memory backup, *etc.*[4] ESs can be classified into two types based on their charge storage mechanism: (a) electric double layer capacitor (EDLC) in which energy is stored by adsorption of ions on the electrode surface and (b) pseudo-capacitor (also known as faradaic supercapacitor) in which charge is stored through redox reactions on the electrode material.[5]

The electrode material plays a key role in determining the capacitance of a supercapacitor. To date, porous activated carbons (PACs),[5,6] metal oxides,[7] conductive polymers,[8] graphene[9] and carbon nanotubes[10] have been utilized as potential electrode materials in energy storage technologies.[11,12] Among these, abundant PACs present high surface area, excellent stability, and moderate cost. However, pristine (or bare) PACs suffer from low electron/ion conductivity, lacking of pseudocapacitance contribution but also their mediocre electrochemical performance lead to a poor energy/power density. In order to

overcome these issues, pristine PACs have been modified by introducing heteroatoms (such as N, S, P) into their framework to further enhance the electrochemical activity, surface wettability, and electron/electrolyte conductivity through the pseudocapacitive contribution.[13-15] The induced electrochemical activity may arise from shifting of the conjugation electrons between heteroatom (lone-pair) and carbon framework, which causes facilitation of electron transfer.[16] Moreover, the high surface area of PACs is mostly due to their overwhelmingly microporous structure (*i.e.*, micropore distributions ranging from 0.5 to 1.1 nm). These narrow pores do not allow adequate transport of ions which greatly hinder practical applications of PACs as high energy/power density supercapacitors.[17-19] Therefore, it is essential to develop hierarchical porous architectures with abundant micropores (to accumulate charge effectively), interconnected mesopores (to reduce the ion diffusion distance) and appropriate macropores (to serve as the ion-buffering reservoirs for storing electrolyte ions).[20-22] In the last decade, many template-based methods such as using silica oxides or metallic compound have been reported for synthesizing of hierarchical porous carbons.[23,24] However, these methods could not be commercialized due to the consumption of high-cost templates and multistep synthesis process. Thus, it is vital to develop a simple and inexpensive method for fabricating of hierarchical porous carbon. In this work, we utilized a straightforward chemical activation (with KOH) approach which yields a 3D hierarchical porous structures. The successful formation of hierarchical porous carbon using KOH activation
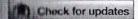
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Hierarchical nitrogen-doped porous carbon derived from lecithin for high-performance supercapacitors

Muslum Demir, [image] * Sushil Kumar Saraswat and Ram B. Gupta*

The development of renewable carbon sources for sustainable energy storage applications is of significance importance. Herein, we report the synthesis of three-dimensional N-doped carbons derived from lecithin via a simple route. Hierarchical porous carbons with high surface area (up to 1803 m^2 g^{-1}) and nitrogen-doping level (up to 9.2 wt%) were successfully prepared by hydrothermal carbonization and a subsequent thermal annealing. The electrochemical performance of the carbon electrodes was examined with both two and three-electrode cell configurations in 1 M KOH and 1 M H$_2$SO$_4$ electrolytes. The as-prepared NC-800 electrode features a large specific capacitance (285 F g^{-1} at 0.5 A g^{-1}), high-rate capacitive behavior, and long-term cycling stability (8% loss after 20 000 cycles). Furthermore, NC-800 exhibits an energy density of 24.7 W h kg^{-1} at a power density of 500 W kg^{-1} in 1 M H$_2$SO$_4$. The excellent electrochemical performance of N-doped carbons is attributed to the unique hierarchical porous frameworks along with pseudocapacitive effect. This work opens up a new approach for preparation of hierarchical N-doped porous carbon materials with tailored properties for supercapacitor applications.

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Electrochemical supercapacitors (ESs), also known as electro-double layer capacitors have received much attention due to their high power density, fast charge–discharge rate, and long cyclability.[1-3] ESs have been extensively implemented in a variety of applications such as electronic devices, hybrid electric vehicles, memory backup, etc.[4] ESs can be classified into two types based on their charge storage mechanism: (a) electric double layer capacitor (EDLC) in which energy is stored by adsorption of ions on the electrode surface and (b) pseudo-capacitor (also known as faradaic supercapacitor) in which charge is stored through redox reactions on the electrode material.[5]

The electrode material plays a key role in determining the capacitance of a supercapacitor. To date, porous activated carbons (PACs),[5,6] metal oxides,[7] conductive polymers,[8] graphene[9] and carbon nanotubes[10] have been utilized as potential electrode materials in energy storage technologies.[11,12] Among these, abundant PACs present high surface area, excellent stability, and moderate cost. However, pristine (or bare) PACs suffer from low electron/ion conductivity, lacking of pseudoca-pacitance contribution but also their mediocre electrochemical performance lead to a poor energy/power density. In order to

overcome these issues, pristine PACs have been modified by introducing heteroatoms (such as N, S, P) into their framework to further enhance the electrochemical activity, surface wetta-bility, and electron/electrolyte conductivity through the pseu-docapacitive contribution.[13-15] The induced electrochemical activity may arise from shifting of the conjugation electrons between heteroatom (lone-pair) and carbon framework, which causes facilitation of electron transfer.[16] Moreover, the high surface area of PACs is mostly due to their overwhelmingly microporous structure (i.e., micropore distributions ranging from 0.5 to 1.1 nm). These narrow pores do not allow adequate transport of ions which greatly hinder practical applications of PACs as high energy/power density supercapacitors.[17-19] There-fore, it is essential to develop hierarchical porous architectures with abundant micropores (to accumulate charge effectively), interconnected mesopores (to reduce the ion diffusion distance) and appropriate macropores (to serve as the ion-buffering reservoirs for storing electrolyte ions).[20-22] In the last decade, many template-based methods such as using silica oxides or metallic compound have been reported for synthe-sizing of hierarchical porous carbons.[23,24] However, these methods could not be commercialized due to the consumption of high-cost templates and multistep synthesis process. Thus, it is vital to develop a simple and inexpensive method for fabri-cating of hierarchical porous carbon. In this work, we utilized a straightforward chemical activation (with KOH) approach which yields a 3D hierarchical porous structures. The successful formation of hierarchical porous carbon using KOH activation

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Recent advancements in semiconductor materials for photoelectrochemical water splitting for hydrogen production using visible light

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ABSTRACT

Water splitting technology directly stores solar energy into the chemical bonds of diatomic hydrogen to be used as a clean fuel without producing any unwanted side reactions, byproducts or environmentally polluting compounds. Semiconductor materials are needed for a photoelectrochemical (PEC) device to catalytically convert photons from sunlight into chemical energy. Materials implemented in a device for sustainable hydrogen production are required to be inexpensive, highly photo-active, chemically stable, environmentally sustainable, and have a high solar-to-hydrogen conversion efficiency. Although many semiconductor composites and nanostructures have been examined, thus far, no material satisfies all criteria of an implementable photocatalyst and many materials do not show necessary energy conversion efficiency. Materials that depicted a high efficiency often rely on the ultraviolet portion of the solar spectrum, which does not contain enough energy for the industrial utilization of PEC water splitting technologies. Focusing on the use of the visible spectrum is promising for hydrogen production. Herein, recent advancements in the activity of visible light semiconductors are presented, including both platinum and non-platinum group materials. This review touches on the latest developments in various synthesis schemes capable of achieving suitable water splitting compositions and architectures while highlighting the challenges being faced when designing visible light-active water splitting photocatalysts. Interesting advancements in the use of nanostructures for designing the next generation of catalysts will be discussed. Also, for the proper comparison of catalytic efficiencies, it is important to establish terminology that can compare data across a magnitude of experimental conditions. A notable challenge associated with the catalysis is its stability or photocorrosion, which lacks established protocols. Promising future directions for designing next generation materials are discussed.

1. Introduction

The energy crisis in the mid-1970s triggered a worldwide research enthusiasm for the expansion of renewable energy resources to replace conventional fossil fuels. Recently, increasing CO_2 levels and atmospheric pollution have led to the development of several clean energy resources, including solar, wind, geothermal, tidal, etc. With an increase in the population and industrialization, the global energy demand increases with each passing day, further leading to the depletion of fossil fuels. Simultaneously, the concentration of greenhouse gases in the atmosphere is increasing daily resulting from the burning of fossil fuels to meet ever-growing energy demands. Greenhouse-gas emissions from the energy sector represent roughly two-thirds of all anthropogenic greenhouse-gas emissions, which have steadily risen over the past century. Solar energy via sunlight is one of the most promising alternative energy resources that can replace fossil fuels and fulfill the

rising global energy demand. For example, the total energy consumption of the world projected for the entire year of 2020 is approximated to be 663.6 exajoules, equivalent to all of the energy from sunlight striking the Earth for just 90 min (given that the average energy rate of sunlight striking the surface of the Earth is ca. 1,200,000 TW) [1]. However, unlike the reasonably reliable petroleum fuel supply chain, sunlight intensity is intermittent and dependent upon the geographic location, weather forecast, and time of day [2].

Hydrogen production from sunlight and water is being considered as a promising solution to supply sustainable energy; it is environmentally clean and can act as a suitable buffer between energy supply and demand. Based on the solar harvesting technology utilized, solar hydrogen production methods can be generally categorized (Fig. 1) as: (a) *solar photocatalytic water splitting*: utilizes photo-active electrodes, particles, or photovoltaic cells made of semiconductors or semiconductor composites to split water with and without an external
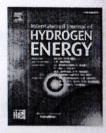
Nitrogen and oxygen dual-doped porous carbons prepared from pea protein as electrode materials for high performance supercapacitors

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ABSTRACT

Porous carbons as electrode materials are highly desired for use in energy storage/conversion devices. Herein, the development of a series of highly porous nitrogen and oxygen co-doped carbons by using pea protein (PP) as a cost-effective, sustainable and nitrogen-rich precursor is reported. Pea protein derived carbons (PPDCs) have been prepared by applying a straightforward two-step synthetic route including pyrolysis and KOH-chemical activation. Potassium hydroxide has been employed to generate porosity and introduce oxygen functionalities into the framework of carbon. The heteroatoms doping content and porosity parameters have been tuned by varying the synthesis temperature and activator to precursor ratio. The carbon obtained with optimal synthetic parameters (T = 800 °C and KOH/Precursor = 4) featured the highest surface area, the maximal pore volume and N-/O doping level of 3500 m^2 g^{-1}, 1.76 cm^3 g^{-1}, and 2.5-/17.9 at%, respectively. PPDC-4-800 as supercapacitor presented a very high specific capacitance (413 F g^{-1} at 1.0 A g^{-1} in 1 M KOH), remarkable cycling stability (92% retention after 20000 cycles) and outstanding rate capability (210 F g^{-1} at 30 A g^{-1}). The cooperative effects of the well-developed porous architecture and surface modification of PPDCs resulted in enhanced electrochemical performances, suggesting their potential application for energy storage devices.

Introduction

Due to the fast-growing consumption of energy in our industrial society, development of inexpensive and efficient energy storage devices emerges as an absolute necessity [1]. In this regard, batteries and capacitors have gained much attention as two major storages technologies. The electrochemical reaction as the primary storage mechanism in the batteries may hinder their performance. On the contrary, the charge separation mechanism in the supercapacitors (also known as ultracapacitors) does not limit their storage properties. Thus,

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RESEARCH ARTICLE

Lignin-derived heteroatom-doped porous carbons for supercapacitor and CO$_2$ capture applications

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Summary

The present study reports the economic and sustainable syntheses of functional porous carbons for supercapacitor and CO$_2$ capture applications. Lignin, a byproduct of pulp and paper industry, was successfully converted into a series of heteroatom-doped porous carbons (LHPCs) through a hydrothermal carbonization followed by a chemical activating treatment. The prepared carbons include in the range of 2.5 to 5.6 wt% nitrogen and 54 wt% oxygen in its structure. All the prepared carbons exhibit micro- and mesoporous structures with a high surface area in the range of 1788 to 2957 m^2 g^{-1}. As-prepared LHPCs as an active electrode material and CO$_2$ adsorbents were investigated for supercapacitor and CO$_2$ capture applications. Lignin-derived heteroatom-doped porous carbon 850 shows an outstanding gravimetric specific capacitance of 372 F g^{-1} and excellent cyclic stability over 30,000 cycles in 1 M KOH. Lignin-derived heteroatom-doped porous carbon 700 displays a remarkable CO$_2$ capture capacity of up to 4.8 mmol g^{-1} (1 bar and 298 K). This study illustrates the effective transformation of a sustainable waste product into a highly functional carbon material for energy storage and CO$_2$ separation applications.

KEYWORDS

biomass, chemical activation, CO$_2$ separation, heteroatom-doped carbon, hydrothermal carbonization, lignin, supercapacitor

1 | INTRODUCTION

Supercapacitors, also named as electrochemical capacitors, are high-performance energy storage devices. During the last decades, supercapacitors have become very prominent devices because of their excellent cyclability, a high power density, and an excellent charge/ discharge rates.[1] Supercapacitors have been classified as two types based on the charge storage mechanism: first, electric double layer capacitors (EDLCs) and second, pseudo-capacitors (PCs). Electric double layer capacitors store the charge electrostatically within the active material/ electrolyte interface. In contrast to EDLCs, PCs store the charge via reversible redox reaction and fast process.[2-5] To date, carbon-derived electrode materials have been widely used for EDLCs owing to their low cost, excellent

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Adsorptive removal of heavy metals from industrial effluents using cow dung as the biosorbent: Kinetic and isotherm modeling

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Abstract

This article investigated an eco-friendly technique for the removal of heavy metals using biosorbent derived from cow dung. Heavy metals bearing wastewater were collected from a common effluent treatment plant located at Sangariya, Jodhpur (Rajasthan, India) to evaluate the removal efficiency of synthesized cow dung–activated carbon. The prepared activated carbon materials have a high surface area in the range of 948–1072 m^2/g and also have significant quantities of micropore and mesopore volumes. Furthermore, pore diameters were in the range of 2.24–2.33 nm. Surface morphology was improved after being treated with NaOH. The adsorbent material was found to be an efficient medium for the removal of Cr(VI) and Cd(II). The results revealed that more than 95.6% of Cr(VI) and 66.88% of Cd(II) were achieved at the optimized condition of pH12.0, initial concentration of heavy metals 10 mg/L, 300 min of contact time, and the dose of 0.2 g/L, whereas only 16.3% removal efficiency was observed for Ni(II). Equilibrium data have been analyzed by Langmuir, Freundlich, Temkin, and Redlich and Peterson (R–P) isotherm models with the help of nonlinear regression analysis. Experimental data were best fitted for Freundlich and R–P isotherms.

KEYWORDS
adsorption, biosorbent, cow dung–activated carbon (CDAC), heavy metal

1 | INTRODUCTION

Pure water, vital for a healthy environment, is a resource that is adversely affected both quantitatively and qualitatively by man-made activities. Rapid industrialization and urbanization have brought a real water crisis. Industries continue to be a major cause of water pollution due to diverse kinds of waste, especially toxic heavy metal ions released in water bodies, without adequate treatment (Nguyen et al., 2013). Water quality changes significantly with the presence of toxic heavy metals (Ni, Cd, Zn, Hg, Cr, Pb, Cu, and As) when the level exceeds prescribed limits. Thus, it becomes potentially harmful to all kinds of life on this planet. Heavy metals in water streams originate from the effluent of smelters, mines, and various industries such as batteries, tanneries,

electroplating, steel, refining ores, paint manufacture, pesticides, fertilizers, pigment manufacture, printing, and photographic sectors (Babalola, 2018). The nature and composition of industrial effluents depend mainly on raw materials, process, and treatment methods.

The ingestion of heavy metals via the food chain, in concentrations above the permissible limit, has a detrimental effect on human physiology and other biological systems. Due to their hazardous tendency of accumulation and toxicity, they pose a severe threat to the function of different organs in the human body and aquatic animals (Fu, & Wang, 2011; Rangabhashiyam, Jayabalan, Rajkumar, & Balasubramanian, 2019). Various agencies, viz., the U.S. Environmental Protection Agency (EPA), the Bureau of Indian Standards (BIS), and the Indian Council of Medical Research (ICMR), set regulatory limits for

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Catalytic Cracking of Waste Polypropylene in a Nitrogen Fluidized Bed Reactor

Anil Vyas (articles.aspx?searchcode=Anil++Vyas&searchfield=authors&page=1)[1], Suresh Kumar Singh (articles.aspx?searchcode=Suresh+Kumar++Singh&searchfield=authors&page=1)[2], Komal Sharma (articles.aspx?searchcode=Komal++Sharma&searchfield=authors&page=1)[3], Sukhwant Singh (articles.aspx?searchcode=Sukhwant++Singh&searchfield=authors&page=1)[2]

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Abstract

Polypropylene (PP) is rated first as volume leader in the plastic sector. Its non-biodegradable property poses serious environmental problem in case of disposal. The catalytic cracking of PP was performed with various catalysts i.e. ZSM-5, Zeolite, RB and SPS. The cracking was observed under different feed to catalyst ratio i.e. 1:1 to 5:1. The fluidized bed reactor was fabricated with arrangement to measure the temperature ranging from 100· C to 800· C. The effective of feed to catalyst ratio was found 3:1 at a temperature range of 420· C - 510· C and catalyst ZSM-5 gives maximum liquid conversion of waste PP. Conversion of PP to liquid fuel will not only resolve the problem of disposal of waste polypropylene plastic but also give a value aided product.

Keywords

Waste PP (articles.aspx?searchcode=Waste+PP&searchfield=~~About SCIRP (https://www.scirp.org/AboutUs/Index.aspx) (articles.aspx?searchcode=+Pyrolysis&searchfield=keyword&page=1&skid=0), Catalytic Cracking (articles.aspx?searchcode=+Catalytic+Cracking&searchfield=keyword&page=1&skid=0), ZSM-5~~

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(articles.aspx?searchcode=+ZSM-5&searchfield=keyword&page=1&skid=0), Zeolite (articles.aspx?searchcode=+Zeolite&searchfield=keyword&page=1&skid=0), Liquid Fuel (articles.aspx?searchcode=+Liquid+Fuel&searchfield=keyword&page=1&skid=0)

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ect of Reduction in Peak Expiratory Flow Rate on Blood Pressure of Sand one Mine Workers

na Ram Panwar (articles.aspx?searchcode=Banna+Ram++Panwar&searchfield=authors&page=1)[1], Anil Vyas
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tract

Expiratory Flow Rate (PEFR) measures the airflow through the bronchi and thus the degree of obstruction in the airways.
sure to high concentration of respirable suspended particulate matter (RSPM) decreases the PEFR and the decrease
nds upon the exposure concentration of particles and exposure duration. The decrease in PEFR is found to be responsible
crease in blood pressure (BP). Relationship between increase in BP and reduction in PEFR is not exactly linear but it can
nsidered as liner. It is noticed that if PEFR is reduced to about 50% to 60% in that case sudden increase in BP is
ded and behaviour of BP rise has complex pattern. It is also an established fact that if PEFR is reduced more than 50 %,
treated as severe respiratory problem. There are many factors (i.e. smoking habits, medical treatment, physiology,
which may govern the increase of BP in this condition. Estimated relationship is found as: ISBP = 0.213 + 0.263 IPE F,
= 0.102 + 0.176 IPEF.

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r, B. , Vyas, A. and Singh, S. (2016) Effect of Reduction in Peak Expiratory Flow Rate on Blood Pressure of Sand Stone
Workers. Journal of Geoscience and Environment Protection, 4, 14-19. doi: 10.4236/gep.2016.44003 (http://dx.doi.o_org

COMPARATIVE STUDY OF MEMBRANE CAPACITIVE DEIONIZATION TECHNOLOGY AND REVERSE OSMOSIS FOR TOTAL DISSOLVED SOLIDS FROM WATER

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Abstract—Growing human population, severe neglect and over-exploitation of water resources has made water, a scarce commodity. The whole world is concerned for the availability of clean and potable water. Most of the available water is saline and is not potable. Water supplies are running out of the actual water needs of the society. We are now in need of finding cost competitive newer technologies for reclaiming this valuable life-sustaining liquid. Membrane capacitive deionization is one of those prominent technologies which assure to be more efficient with higher water recovery and less power consumption. This comparative study was done to evaluate the salt removal efficiency of Membrane Capacitive Deionization over reverse osmosis. The pilot plant (CapDI) manufactured by Voltea (Netherland) was provided by InNow India Pvt. Ltd for carrying out this study. It was found that Capacitive deionization technique is very efficient in removal of low salinity feed water sources. Energy consumption is quite low approximately only 20 to 30% of energy utilized by reverse osmosis. And flow recovery rate of CapDI plant is also high than reverse osmosis plant.

Index Terms—Electric Conductivity, Membrane Capacitive Deionization, Trace Metals

I. INTRODUCTION

The desalination of seawater and brackish groundwater to provide fresh drinking water is an established and thriving industry. Desalinisation refers to any of several processes that removes amount of salt and any other minerals present in the saline water. Salt water is desalinated in order to produce fresh water that is suitable for human consumption or irrigation. The most commonly used technologies at present for the desalination process are Thermal Distillation and Reverse Osmosis (RO) filtration.

Rajasthan is the largest state of India, it shares only 1/10 of the average share of water than rest of the country [1]. Water supplies in most of the Indian cities including cities of Rajasthan are not matching the actual water need of the society. Groundwater is the major source of drinking water in some part of the Rajasthan. Presence of higher amount of salts in underground water sources in the western Rajasthan is enhancing the less availability of potable water to the population. This study was done to evaluate removal of salts from membrane capacitive deionization.

By definition, Membrane Capacitive Deionization is a combination of conventional Capacitive Deionization with ion-exchange membranes (IEMs) placed in front of the electrodes. Ion exchange membranes can be positioned in front of one or both electrodes. Ion exchange membranes have a high internal charge due to covalently bound groups such as sulfonate or quaternary amines, which allows easy access for one type of ion (the counter ion) and block access for the ion of equal charge sign (the co-ion). Addition of Ion-exchange membranes significantly improves desalination performance of the Capacitive Deionization process, in terms of salt adsorption, charge efficiency and energy consumption. The membranes can be included as stand-alone films of thicknesses between 50 and 200 μm, or can be coated directly on the electrode with a typical coating thickness of 20 μm[2].

MCDI Working

Desalination by MCDI is done by applying constant current with varying voltage , so method is known as constant current(CC).
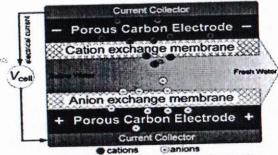
Figure 1 membrane capacitive deionization.

In CC-operation the effluent salt concentration level remains at a fairly constant value, namely at a constant low value during adsorption and at a constant high value during desorption. Another advantage of CC operation is that one can precisely tune the effluent salt concentration level by adjusting the electrical current, or water flow rate, as control parameters. CC operation works only in MCDI and not in CDI. Inste

Assessment of Fluoride Contamination on Groundwater Along Jojari River Due to Discharge of Steel Industries Wastewater

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Abstract- *Environmental pollution is placing an ever-increasing load on the various resources of our environment, including soil. Soils polluted with various pollutants can be found near industrial areas, metropolises, along major transportation routes, underground soil, and areas treated with waste-water sludge, but soils can also be polluted geologically. Soils are able to accumulate these ions for many years without the obvious signs of their acute toxic effect. However, the filtering/purifying capacity of soils is finite and, above a certain level, soils are no longer able to absorb these elements and become sources of pollution themselves. Toxic elements are released into water, absorbed by cultivated crops and plants; they are assimilated into vegetative and generative organs, and enter the food-chain where they cause long-term harm. Presence of low or high concentration of certain ions is a major issue as they make the groundwater unsuitable for various purposes. Fluoride is one such ion that causes health problems in people living in more than 25 nations around the world. Waste water from steel industries of Jodhpur is discharged into the Jojari river. Fluoride ions from this wastewater leach into the groundwater and contribute high fluoride concentration in the nearby underground water. Samples of underground water were collected along the Jojririver. Concentration of fluoride in some of the samples was found above the permissible limits. Health impacts like dental fluorosis and skeletal fluorosis are found in many villages of Jodhpur district. Treatment of wastewater, generated in industries is urgent necessary to bring the concentrations under prescribed limits before discharging it into the river Jojri.*

Keywords- Pollution , Fluoride ,TDS, Steel Industry , Ground water

I. INTRODUCTION

Jodhpur is situated in the western part of the Rajasthan. It is the second largest city of Rajasthan after Jaipur. City is well known for its textile and steel industries. .

Industries in Jodhpur are mainly located in Industrial Areas developed by RIICO and city is situated on the bank of river Jojari. This river is no more perennial in nature. Fresh water flows into it only in rainy season and in remaining seasons, water in the river contains treated or untreated domestic waste water and treated or untreated industrial waste water.Due to the critical condition of this river it was chosen as the study area. Samples of sludge and ground water were collected from various locations and at various depths. Locations of the sampling point were decided randomly to represent an overall view of the river length.

As wastes from Steel industries is discharged into the river Jojari pollutants are continuously depositing on the river bed. The waste contains large amount of fluoride in the form of HF, it can be harmful to human and crops if the water from tube-wells is used for drinking and irrigation purpose. In the present study, deposited sludge samples from the river bed and water samples from nearby tube well were taken along the river to find out the leaching effect of fluoride from the polluted river water to underground water.

II. OBSERVATIONS & ANALYSIS

Water samples were collected at various depths from investigated sites. 12 samples of underground water and 16 samples of sludge were taken. Before the samples were taken, the water was pumped out for 5-10 minutes until fresh water comes out from deep in the well. New polyethylene sample bottles were taken for sample collection. Two litres of water samples were collected. Grab samples were collected from the tube well and well near Jojari River at all the sampling locations. The sample bottles were soaked in 10% HNO_3 for 24hr and rinsed several times with double distilled water (DW) prior to use. Water samples were collected as per the sampling protocol and tested as per standard method. Water samples were tested for pH, total dissolved solids (TDS) and fluoride.

Effect of Textile Industry Sludge on River Bed on Under Ground Water near Jojari River

Effect of Textile Industry Sludge on River Bed on Under Ground Water near Jojari River

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Abstract- *Jodhpur is one of the most industrialized city of Rajasthan and mainly known for textile industry. This city is situated along the river Jojari in which fresh water flows only in monsoon season and rest of the years only treated and untreated domestic and industrial waste water flows.Effluents from these industries contain lots of heavy metals and salts present in dissolved forms and they are deposited on river bed since many years. And during a course of time, these contaminants infiltrate through the bed to meet with the ground water table. In this study various parameter in water samples sample from various tube-wells located on the bank of the river i.e., pH ,Total Dissolved Solids (TDS), concentration of Na^+ , Ca^{2+} , Mg^{2+} , K^+ , P^+ and concentrations of heavy metals like Ni, Pb, Zn, Cr, Cd etc. was determined using Inductive coupled plasma- Optical emission Spectrometer (ICP-OES). Sludge samples from the bed of river Jojari from various places were collected and Ni, Pb, Zn, Cr, Cd were measured. Results indicate that leaching of deposited metals are taking place and is polluting upper level of ground water. Presently leaching effect is not found in deep underground water, it may be because of presence of impermeable layer of soil at certain depth. But if this continues to be same in nearby future then, it may contaminate deep layer of ground water table as well.*

treated and untreated waste from different textile industries flows. This industrial waste water contains various types of heavy metals and these metals are deposited in the river bed. Heavy metals are important environmental pollutants, particularly in areas with high anthropogenic sources [2]. These pollutants are extremely persistent in the environment, nonbiodegradable nonthermodegradable, therefore could readily accumulate to toxic levels [1,3].Heavy metals contribute to environmental pollution because of their unique properties; heavy metals do not leach from the topsoil and have the potential to accumulate in the different organs (such as the kidneys, bones and liver) leading to unwanted side effects [4,5]. Each heavy metal shows specific signs of its toxicity. Some effects of heavy metals could be toxic (acute, chronic or sub-chronic), neurotoxic, or even carcinogenic, mutagenic or teratogenic [5]. Heavy metals can accumulate in the soil at toxic levels due to long-term application of wastewater. Metals can be transferred from soil to the other ecosystem components, such as underground water or crops, and can affect human health through the water supply and food [1,6]. Soils, as filters of toxic chemicals, may adsorb and retain heavy metals from wastewater. The amount of heavy metals mobilized in the soil is a function of pH, clay content, organic matter content, cation exchange capacity, and other

AIR QUALITY INDEX DETERMINATION OF COMMERCIAL AREAS OF JODHPUR CITY: A CASE STUDY

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Abstract: This paper presents a case study of Jodhpur City in which an attempt has been made to prepare an inventory of pollutants (PM_{10}, $PM_{2.5}$, SO_2, NO_x, CO) at regional level to know the current cumulative air pollution load in the study area and thereafter computing Air Quality Index by computing sub index for every pollutant. Monitoring stations were set up at seven different locations and samples have been analysed and subsequently air quality index has been computed. The results reveal that gaseous pollutants such as SO_2, NO_2 & CO are within the permissible limits. $PM_{2.5}$ levels exceed the prescribed National Ambient Air Quality standards (NAAQS) and PM_{10} levels also exceeded the prescribed NAAQS during all the monitoring location thus particulate matter is the predominant cause of air pollution in the study area. The AQIs were calculated using IND-AQI procedure. It has been observed that the calculated AQIs value for SO_2 falls under 'good' category. The calculated AQIs values for NO_2 & CO fall under 'good' and 'satisfactory' categories. The calculated AQIs values of PM_{10} fall under 'moderate' and 'poor' categories. The calculated AQIs values of $PM_{2.5}$ fall under 'moderate', 'poor' and also in 'very poor' categories. The overall AQI was found to fall under the category 'Poor' owing to $PM_{2.5}$. Thus it is observed that $PM_{2.5}$ is responsible pollutant at these seven locations in Jodhpur.

Keywords: Air quality index, ambient air quality, Jodhpur city, Residential area, PM_{10}, $PM_{2.5}$, SO_2, NO_2, CO.

I. INTRODUCTION

Today pollution in urban areas especially in commercial areas has become an important issue to all the government. Because of increasing commercial activities, industrial activities and transportation load   air quality is continuously deteriorating. The acute health effect of suspended particulate matter (SPM), even at short term low levels exposure; include increased daily mortality and hospital admission rates for exacerbation of respiratory disease. Long term exposure to PM2.5 increases the risk of the non accidental mortality. Living close to busy traffic appears to be associated with elevated risk. The available human clinical results do not establish a mechanistic pathway leading to adverse health impacts for short term NO_2 exposure at present day ambient environment. In all the analytical studies total mortality was directly associated with long term exposure to particulate matter .Each day our lungs are directly exposed to more than 7000 liters of air, which contain varying amount of inorganic, organic particles and various types of gases. Air Quality Index is a medium to communicate the quality of ambient air to common people so it is easy to understand. It transforms the complex data of various air pollutants into a single number which is called index value along with nomenclature and colour.Jodhpur is the second largest city of Rajasthan and is a well-known tourist place. Varieties of pollutants are emitted in ambient air of Jodhpur city but particulate matters primarily dominate. Jodhpur is Rajasthan's most polluted city as per May 2016 report of World Health Organisation. Therefore an attempt was made to present overall air quality in residential areas of Jodhpur city in terms of Air Quality Index & AQI has been calculated as per the guidelines of Central Pollution Control Board of India.

II. MATERIAL AND METHOD

Seven sampling stations were selected for monitoring of air quality in the commercial areas of Jodhpur City for the analysis of air pollution and determination of Air Quality Index i.e. Paota Circle, Jaljog Circle, BasniCircle, Akhaliya Circle, NaiSarak, Ratanada Circle and Near Pungalpada. Five ambient air pollutants (i.e.PM_{10}, $PM_{2.5}$, SO_2, NO_2 and CO) were determined using Respirable Dust Sampler, Fine Particulate Sampler, gaseous sampling attachment (EPA modified-West and Gaeke method for $SO_2$and Modified Jacobs Hochheiser method for NO_2) and CO meter respectively. Readings were taken during the months of March to May as per the norms established by Central Pollution Control Board. Particulate matters measured by Cyclonic Flow Technique and Gravimetric method using GF/A filter papers on 8 hourly basis for 24 hours. Size of filter paper for PM_{10} was 20.3 cm $\times$ 25.4 cm with a flow rate of 1000 L/min and 47 mm at the rate of 16.7 L/min for $PM_{2.5}$. Gaseous pollutants which were SO_2 and NO_2 were measured using gaseous sampling attachment attached with Rapid Dust Sampler. Carbon Mono-oxide was measured using CO meter at the desired locations instantly.

2.1 Sub-Index calculation

Air Quality index (AQI) is so deigned that any three of the parameters from PM_{10}, $PM_{2.5}$, SO_2, NO_2, CO, O_3, Pb, &NH_3, are sufficient to calculate the AQI. Sub-indices of eachselected pollutants were calculated and then highest value from among all the values of sub index was considered as AQI for that area.

The sub-index (I_p) for a given pollutant concentration (C_p) was calculated as,

$$I_P = \left[\left\{ \frac{I_{HI} - I_{LO}}{B_{HI} - B_{LO}} \right\} \times (C_P - B_{LO}) \right] + I_{LO}$$

Where,

Determination of Air Quality Index Around a Thermal Power Plant-A Case Study of RWPL at Bhadresh, Barmer

Nitish Rai   Surender Vishnoi   Nitish Rai   K. Singh   anil vyas

Determination of Air Quality Index Around a Thermal Power Plant-A Case Study of RWPL at Bhadresh, Barmer

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Abstract: This paper presents a case study on determination of Air Quality Index for a Thermal Power Plant known as Raj West Power Limited (RWPL), situated at Bhadresh in Barmer district of Rajasthan state. Air pollutant concentration were measured in the prevalent windward direction, leeward direction, and in the crosswind directions at both left and right to the prevalent windward direction around the plant. Method for calculation and experimentation was based on the basis of guidelines given by Central Pollution Control Board of India. Five criteria pollutants i.e., PM_{10}, $PM_{2.5}$, SO_2, NO_2 and CO were chosen for AQI determination at the given locations. Pollutants concentrations were found different in different directions. Maximum AQI was observed in the windward direction and minimum in leeward direction.

Key words: Air Quality Index, PM_{10}, $PM_{2.5}$, SO_2, NO_2 and CO, Thermal Power Plant, Air pollution.

I. INTRODUCTION

Raj West Power Limited (RWPL) is a part of JSW Group and the project consist of 8x135 MW Thermal Power Plant at village Bhadresh in Barmer District of Rajasthan state. Geographically the Plant is located at 26° 02' 34.7" N Latitude & 71° 15' 24.76" E Longitude having an elevation of ~184 meter above MSL, which is suitable for installation of 8x135MW considering the availability of all the basic requirement. The plant is operational under environmental clearance (EC) granted by Ministry of Environment and Forests and consent to operate (CTO) granted by Rajasthan state pollution control board[9]. Purpose of this study is to measure the Air Quality Index in surrounding area of Thermal Power Plant as many villages are situated in its nearby areas. Thermal power plants are well known for its pollutant emissions like oxides of sulfur, nitrogen and carbon along with particulate matters[7]. Sulphur dioxide pollution, which takes a major toll on public health, including by contributing to the formation of small acidic particulates that can penetrate into human lungs and be absorbed by the bloodstream. SO_2 also

Case Study

AIR QUALITY INDEX DETERMINATION OF RESIDENTIAL AREAS OF JODHPUR CITY: A CASE STUDY

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ARTICLE INFO

ABSTRACT

This paper presents a case study of Jodhpur City in which residential areas have been analysed for their ambient air quality analysis. Whole experimental and calculative procedure was based on the guidelines of Central Pollution Control Board of India. 24 hourly average concentrations of five criteria pollutants i.e., PM_{10}, $PM_{2.5}$, SO_2, NO_2 and CO were selected for the study for the year 2016 at five different locations of residential areas in Jodhpur city. Observations were taken twice in a week for three months. Results revealed that SO_2 and NO_2 concentrations were within prescribed limit of standard norms. CO concentration was also within permissible limit except few areas. Only particulate matters were crossing the standard limit and specially PM_{10}. Overall AQI was falling under the category of Good to moderatecategory. Thus, it can be concluded from the study that major pollutionin the residential areas of Jodhpur was due to particulate matters.

INTRODUCTION

Today pollution in urban areas especially in residential areas as become an important issue to all the government. Because of increasing commercialactivities, industrial activities and transportation load   air quality is continuously deteriorating. The acute health effect of suspended particulate matter (SPM), even at short term low levels exposure; include increased daily mortality and hospital admission rates for exacerbation of respiratory disease[6]. Long term exposure to PM2.5 increases the risk of the non accidental mortality. Living close to busy traffic appears to be associated with elevated risk[1]. The available human clinical results do not establish a mechanistic pathway leading to adverse health impacts for short term NO_2 exposure at present day ambient environment[2]. In all the analytical studies total mortality was directly associated with long term exposure to particulate matter[5]. Each day our lungs are directly exposed to more than 7000 liters of air, which contain varying amount of inorganic, organic particles and various types of gases[3]. Air Quality Index is a medium to communicate the quality of ambient air to common people so it is easy to understand. It transforms the complex data of various air pollutants into a single number which is called index value along with nomenclature and colour.Jodhpur is the second largest city of Rajasthan and is a well-known tourist

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place. There are more than 3 lakh registered vehicles in Jodhpur city and also this city has desert like climatic and soil structure which in overall contribute more to air pollution Varieties of pollutants are emitted in ambient air of Jodhpur city but particulate matters primarily dominate. Jodhpur i Rajasthan's most polluted city as per May 2016 report of World Health Organisation[7]. Therefore an attempt was mad to present overall air quality in residential areas of Jodhpur cit in terms of Air Quality Index & AQI has been calculated a per the guidelines of Central Pollution Control Board of India

MATERIAL AND METHOD

Monitoring has been carried out at five different locations residential areas of Jodhpur city i.e., Chaupasani Housir Board Sector-10, Shastri Nagar, Sector-G, Saraswati Naga Golf Course and Nehru Park. Five ambient air pollutar (i.e.PM_{10}, $PM_{2.5}$, SO_2, NO_2 and CO) were determined usir Respirable Dust Sampler, Fine Particulate Sampler, gaseo sampling attachment (EPA modified-West and Gaeke meth for $SO_2$and Modified Jacobs Hochheiser method for NO_2) a CO meter respectively. Readings were taken for twice in week during the months of March to May as per the nor established by Central Pollution Control Board. Particul matters measured by Cyclonic Flow Technique a Gravimetric method using GF/A filter papers on 8 hourly ba for 24 hours. Size of filter paper for PM_{10} was 20.3 cm × 2

Research Paper   Open Access

Assessment Of Fluoride Removal By Membrane Capacitive Deionization

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ABSTRACT: *Water is the symbol of existence of life. In the modern industrial era, we have used water so careJlessly. To complicate matters, increasing groundwater extraction around the globe results in progressive salt water ingress in wells and aquifers. Potable water as well as water for agriculture and industry has become critical. Rajasthan is the largest state, which covers 10% of the country area but receives only 1/100 of the total rains. It shares only 1/10 of the average share of water than rest of the country. The geographical and geological setup leads to deterioration of water quality. Therefore, state faces acute water crisis making Groundwater a centralized source of drinking water for millions of rural and urban families in Rajasthan. Unfortunately, Groundwater is deeper and contains high minerals and concentrated chemicals, making the water unfit to drink. Water quality standards are not meeting the prescribed Indian standards. Underground water of twenty three districts of Rajasthan contain high fluoride, which causes adverse health effects i.e. Dental fluorosis, skeletal fluorosis, nonskeletal manifestation etc. Many reverse osmosis plants have been installed in Rajasthan for removal of fluoride from ground watJer. But, due to high power consumption, scaling and fouling of membranes, reduced water recovery and poor maintenance, most of the RO plants are not working properly. Thus, alternative technology is required with low power consumption and maintenance cost for the treatment of underground water. The study was carried out to evaluate efficiency of membrane capacitive deionization for removal of fluoride from underground water with elevated electric conductivity in the western Rajasthan. Accordingly, certain areas of Jodhpur and Jaisalmer districts were selected as the study area. The pilot plant (CapDI) manufactured by Voltea (Netherland) was provided by InNow India Pvt. Ltd for carrying out this study. It is found that MCDI technology is very effective in fluoride removal if total dissolved solids concentration is less than 5000 mg/lt and percentage reduction of fluoride by MCDI technology is almost same as of by reverse osmosis technology. It was found that MCDI technology requires less power &gives more water recovery with low maintenance cost. Therefore it can be said MCDI technology is better than reverse osmosis technology.*
Keywords: *Fluoride, Membrane capacitive deionization (MCDI), Water Recovery, Reverse osmosis*

I. INTRODUCTION

Inadequate rainfall and Inattentive use of Water has resulted in critical water scarcity. Rajasthan is the largest state, which covers 10% of the country area but receives only 1/100 of the total rains. It shares only 1/10 of the average share of water than rest of the country [1]. Groundwater is the principal source of drinking water in rural and urban Rajasthan. Due to careless use, continuous groundwater extraction, reduced rainfall and geographical setup, groundwater contains much elevated amount of salts making water unfit for not only drinking but also for other purposes. As far as Fluoride is concerned, Ground water fluoride contents in high levels are present in all 33 districts and have become a serious health related issue in 23 districts of Rajasthan [2]. Higher concentration of fluoride in water causes adverse health effects i.e. Dental fluorosis, skeletal fluorosis, nonskeletal manifestation etc. Many reverse osmosis (RO) plants have been installed in Rajasthan for removal of fluoride from ground water. But, due to high power consumption, scaling and fouling of membranes, reduced water recovery and low maintenance, most of the RO Plants are not working properly. Thus, alternative technology is required with low power consumption and maintenance cost for the treatment of underground water. Membrane capacitive deionization is the emerging technology which provides higher percentage of salt removal with lower power consumption. The energy efficiency of Membrane Capacitive Deionization M(CDI)

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Interference Study of Pollutants Released from Various Industrial Areas in a Region: A Case Study

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Abstract Jodhpur is well known city of Rajasthan state in India and is a tourist place. Jodhpur is surrounded by industrial areas and defence installations. Air pollution is now becoming a challenge to the administration of a city because of its adverse effects on human beings. In this study four monitoring stations were selected to find pollution level in the ambient air. Air Quality Index was calculated by considering five pollutant parameters i.e. SO_2, NO_2, PM_{10}, $PM_{2.5}$, CO at all monitoring stations. Minimum, average and maximum air quality index were calculated at each industrial area monitoring stations. It was observed that PM_{10} and $PM_{2.5}$ are responsible air pollutants which governs the air quality index. In this study duration weather was clear and wind direction was either from North direction or from North-East direction. SCREEN3 Air Dispersion Model was used to find the pollutant concentration with increasing distances from area sources. Modelled AQI was also calculated before and after overlapping zone using SCREEN3 Air Dispersion Model. It was observed that air pollution from one industrial area is interfering the AQI of other industrial area.

Keywords: Air pollution, Industrial area, PM_{10}, $PM_{2.5}$, AQI, Air dispersion model

Cite This Article: Narendra Katara, Mayank vyas, Anil Vyas, and Suresh Kumar Singh, "Interference Study of Pollutants Released from Various Industrial Areas in a Region: A Case Study." *American Journal of Environmental Protection*, vol. 5, no. 3 (2017): 82-88. doi: 10.12691/env-5-3-3.

1. Introduction

Jodhpur is well known city of Rajasthan state in India and is a tourist place. Jodhpur is surrounded by industrial areas and defence installations. Jodhpur city has major four industrial areas. Basni industrial area has mainly textile / timber / Guar gum industrial units. Boranada industrial area has mainly Metal and Wooden Handicrafts industrial units, Mandore industrial area has oil mills/Guar gum/ textile / Stone Processing industrial units. Kankani industrial area has mainly handicraft / plastic industrial units. Air pollution is now becoming a challenge to the administration of a city because of its adverse effects on human beings. The acute health effect of suspended particulate matter (SPM), even at short term low levels exposure; include increased daily mortality and hospital admission rates for exacerbation of

respiratory disease [1]. Long term exposure to PM2.5 increases the risk of the non accidental mortality. Living close to busy traffic appears to be associated with elevated risk [2]. The available human clinical results do not establish a mechanistic pathway leading to adverse health impacts for short term NO2 exposure at present day ambient environment [3]. In all the analytical studies total mortality was directly associated with long term exposure to particulate matter [4]. Therefore it is now essential to have knowledge about the AQI in various reasons because of industrial areas and effects of one industrial area on other. The AQI was divided in six categories considering five pollutants (PM_{10}, $PM_{2.5}$, NO_2, SO_2, and CO) as per the norms given by Central Pollution Control Board (CPCB) of India. Air quality index values are typically grouped into various ranges [5] and is given in Figure 1 and breakpoint concentration for various pollutants are given in Table 1 [6].
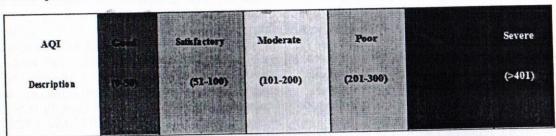
AQI	Good	Satisfactory	Moderate	Poor	Severe
Description	(0-50)	(51-100)	(101-200)	(201-300)	(>401)

Figure 1. Overall AQI Systems [5]

RESEARCH ARTICLE   **OPEN ACCESS**

Street Level Modeling of Pollutants for Residential Areas

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ABSTRACT:
An effort has been done here to model the pollutants concentration using a software i.e., COPERT STREET LEVEL. This software is a Microsoft windows based software and calculates emission on street basis. Working of this model is limited to calculation of pollutants up to street level only. Area under consideration is taken from streets of Jodhpur city which are basically residential areas. Six residential areas have been considered. Pollutants are modelled considering Indian environmental conditions and compared with the actual possible data of streets. Overall analysis shows the slight variations in pollutant concentration from actual conditions. It may be due to dust storms and heating effects which are highly prevalent due to geographical conditions of Jodhpur. Pollution estimations are represented in their standard units which are further converted into Air Quality Index. This Air Quality Index is calculated from the year 2016 to 2025 in alternate year. Pollutants which are calculated using this model are carbon monoxide, oxides of nitrogen and particulate matters. This model doesn't differentiate between PM_{10} and $PM_{2.5}$. Model results shows that pollutant concentrations are increasing if number of vehicles keeps on increasing and other street characteristics remains unchanged. Most dominating pollutant was observed to be carbon monoxide.
Key words: modeling of pollutants, COPERT STREET LEVEL, air quality index, residential area pollutant estimation, carbon monoxide, oxides of nitrogen, particulate matters.

I. INTRODUCTION

Jodhpur, popularly known as Blue City of Rajasthan is the second largest city of state. Climate of Jodhpur is generally very hot due to its nearby desert areas. Temperature variations may occur from 45^0C in summer to 0^0C in winter. Hence it faces extreme weather conditions. This geographical condition changes the environmental nature of this city. As it is fastest upcoming state of Rajasthan, it is now witnessing the large number of human population and also enormous increase in vehicular numbers. It has led to increase in vehicular pollution to a very large extent. As per the latest WHO report, Jodhpur is the most polluted city of Rajasthan and grabbed 30th position in global ranking. It is followed by Jaipur at 33rd, Kota at 58th and Udaipur at 59th position. Such a high level of pollution is not only limited to industrial or commercial areas but also it can be found in residential areas also. Air pollution modeling is a method of determining the concentration of different air pollutants at different locations and different time period mathematically either manually or with the help of some software based on certain mathematical formulae. To calculate the level of pollution in the streets of such areas, COPERT STREET LEVEL model has been used. It is a standalone MS Windows software designed to calculate emissions on a street basis. It is structured in such a way as to work alongside traffic analysis tools. It is assumed during uses of this model that environmental conditions of India have been taken nearest to matching country. But do not correspond to exact environmental conditions of Jodhpur city as this city comprises lots of dust storms and heat waves. All these values were calculated at all monitoring stations of Jodhpur.

II. MATERIAL AND METHODOLOGY

This model uses the all characteristics of streets i.e., street length, time, number and type of vehicles, average speed of vehicles, emission and geographical characteristics and passenger car equivalents etc. pollutants estimated for measurement of quality of ambient air are carbon monoxide, oxides of nitrogen and particulate matters. These pollutants can help to predict future Air Quality Index of monitored streets. These values are inserted in an excel sheet first as shown in fig. 3.1and then uploaded in this software. After uploading, an input is given for passenger car unit (PCU). PCU's of different vehicles are given in table 3.1. As this model is country specific hence, in this case, country chosen was Turkey among the entire possible available list of COPERT STREET LEVEL as India

DETERMINATION OF AIR QUALITY INDEX OVER TSDF-A CASE STUDY OF UDAIPUR

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Abstract—Udaipur is well known tourist place in India and is known as "Lake City". A hazardous waste disposal site was constructed in Udaipur for disposal of hazardous waste generated by the various industrial and commercial activities in the state of Rajasthan. The purpose of this paper is to discuss the analysis of the ambient air quality over TSDF site of Udaipur city in terms of air quality index (AQI). The 24-hourly average concentrations of five major criteria pollutants, viz. Particulate matter PM_{10}, $PM_{2.5}$, Sulphur Dioxide (SO_2), Nitrogen Dioxide (NO_2) and Ammonia(NH_3) at three different locations in TSDF site were measured as per guidelines of CPCB of India. Selected stations were near store Room, security Room roof top and secured landfill. The AQIs were calculated using IND-AQI procedure. Concentration of PM_{10} and PM_{205} was found above the prescribed limit whereas concentration of SO_2, NO_2 and NH_3 was found below the prescribed limits laid down by CPCB of India at all considered sampling points. From the analysis of AQI it is concluded that PM_{10} is governing factor for determination of AQI at all the sampling station. According to AQI over TSDF, this site falls in the category of moderate type. Therefore now it is time to reduce the PM_{10} and$PM_{2.5}$ concentration at site by plantation and or by other means so that air quality is maintained in the nearby area of TSDF.

Index Terms— Air quality index (AQI), PM_{10}, $PM_{2.5}$, CPCB, TSDF

I. INTRODUCTION

Computation of the AQI requires an air pollutant concentration over a specified averaging period, obtained from an air monitor or model. Taken together, concentration and time represent the dose of the air pollutant. Health effects corresponding to a given dose are established by epidemiological research1.Air pollutants vary in potency, and the function used to convert from air pollutant concentration to AQI varies by pollutant. Air quality index values are typically grouped into ranges. Each range is assigned a descriptor, a color code, and a standardized public health advisory. The AQI can increase due to an increase of air emissions (for example, during rush hour traffic or when there is an upwind forest fire) or from a lack of dilution of air pollutants. Stagnant air, often caused by an anticyclone, temperature inversion, or low wind speeds lets air pollution remain in a local area, leading to high concentrations of pollutants, chemical reactions between air contaminants and hazy conditions. On a day when the AQI is predicted to be elevated due to fine particle pollution, an agency or public health organization might advise sensitive groups, such as the elderly, children, and those with respiratory or cardiovascular problems to avoid outdoor exertion. Declare an "action day" to encourage voluntary measures to reduce air emissions, such as using public transportation [2]. Recommend the use masks to keep fine particles from entering the lungs [4]. During a period of very poor air quality, such as an air pollution episode, when the AQI indicates that acute exposure may cause significant harm to the public health, agencies may invoke emergency plans that allow them to order major emitters (such as coal burning industries) to curtail emissions until the hazardous conditions abate [5]. Most air contaminants do not have an associated AQI [6]. Many countries monitor ground-level ozone, particulates, sulfur dioxide, carbon monoxide and nitrogen dioxide, and calculate air quality indices for these pollutants [7]. The definition of the AQI in a particular nation reflects the discourse surrounding the development of national air quality standards in that nation [8]. Website allowing government agencies anywhere in the world to submit their real-time air monitoring data for display using a common definition of the air quality index has recently become available [9].

Central Pollution Control Board (CPCB) of India has formulated guidelines to calculate AQI and can be calculated as discussed below:

An air quality index is defined as an overall scheme that transforms the weighed values of individual air pollution related parameters (pollutant concentrations) into a single number or set of numbers. The result is a set of rules (i.e. set of equations) that translate parameter values into a more simple form by means of numerical manipulation .If actual concentrations are reported in µg/m^3 or ppm (parts per million) along with standards, then it cannot be considered as an index. At the very last step, an index in any system is to group specific concentration ranges into air quality descriptor categories. Primarily two steps are involved in formulating an AQI:

(i) Formation of sub-indices (for each pollutant) and
(ii) Aggregation of sub-indices to get an overall AQI.

Formation of sub-indices $(I_1, I_2 ... I_n)$ for n pollutant variables $(X_1, X_2,...X_n)$ is carried out using sub index functions that are based on air quality standards and health effects, Mathematically;

$$I_i = f(X_i), \qquad i = 1, 2,.... n \qquad [1]$$

Each sub-index represents a relationship between pollutant concentrations and health effects.

Aggregation of sub-indices, I_i is carried out with some mathematical function (described below) to obtain the overall index (I), referred to as AQI.

$$I = F(I_1, I_2,...., I_n) \qquad [2]$$

The aggregation function usually is a summation or multiplication operation or simply a maximum operator.

Sub-indices (Step 1)-Sub-index function represents the relationship between pollutant concentration Xi and corresponding sub-index Ii. It is an attempt to reflect environmental consequences as the concentration of specific pollutant changes. It may take a variety of forms such as linear, non-linear and segmented linear [10]

Typically, the I-X relationship is represented as follows:

$$I = \alpha X + \beta \qquad [3]$$

REVIEW ON EFFECTS OF SOME HEAVY METALS ON PLANTS AND HUMAN HEALTH

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Abstract—Wastes are the major source of soil pollution, originating from mining, chemical, metal processing industries and other allied industries. These wastes include many chemicals like heavy metals, phenolic, organic, non-metals etc. Heavy metals are the intrinsic components of the environment, with essential and non-essential both types. Heavy metal accumulation in soil is major concern in agricultural production due to its adverse effect on food safety, marketability and crop growth and also due to phyto-toxic effects and environment health of soil organism .The toxic effect of heavy metals, even though they do not have any biological role, remain present in some or the other form harmful for human body and its person functioning . Metal toxicity depends upon the absorbed dos(a:he route of exposure and duration of exposure, acute or chronic .This can lead to various disorder and can also result in excessive damage due to oxidative stress induced by free radical formation. This review paper details about some heavy metals and their toxicity mechanism along with their health effect. Heavy metals exhibit toxic effects towards soil by affecting key microbial process and decrease the number and activity of soil micro-organism. Even low concentration of heavy metal in plants and subsequent accumulation along the food chain is potential threat to human health

Index Terms—Heavy metals, Effects on Human health, Toxicity, Effects on plants

I. INTRODUCTION

Metallic elements are intrinsic components of the environments. Heavy metals or toxic metals when present in excess of required concentration or is unwanted which were found naturally on the earth , and become concentrated as a result of human caused activities , enter in plants , animal and human tissues via inhalation, diet and manual handling can bind to, and interfere with the functioning of vital cellular components1. Heavy metals are significant environment pollutants and their toxicity is a problem of increasing significance for ecological, evolutionary, nutritional and environmental reason .They are group of metals and metalloids with atomic density greater than $4g\backslash cm^3$ or those which are 5 times or more, greater than water, including copper, manganese, lead, cadmium, nickel, cobalt, iron, zinc, chromium, silver. Uptake of heavy metals by plants and subsequent accumulation along the food chain is a potential threat to human health. Adverse health effects of heavy metals have been known for a long time. Exposure to heavy metals continues and is even increasing in some areas. For example mercury is still used in gold mining in many part of Latin America. Arsenic is still common in wood preservatives, and tetraethyl lead remain a common additive to petrol, although this use has decreased dramatically in the developed countries. This paper briefly describes the nature and properties of heavy metal and its effect on the plants and human health.

II. SOURCE AND EMISSION

Toxic metals, to a large extent, are dispersed in the environment through industrial effluents, organic wastes, refuse burning and transport and power generation. They can be carried to places many miles away from the sources by wind, depending upon weather. They are found in gaseous form or as particulates.

Table 1 List of Metals

Metals	Manufacturing Industry
Arsenic	Paints and Textile
cadmium-	Electronics and pigments
chromium	Metal plating
copper	Plating
lead	Plating
zinc	Galvanizing, plating iron

III. EFFECTS ON PLANTS

The heavy metals available for plant uptake are those present as soluble components in the soil solution or those soluble by root exudates 8. Plants require certain heavy metals for their growth and upkeep, but excessive amounts of these metals can become toxic to plants. The ability of plants to accumulate essential metals equally enables them to acquire other non-essential metals 9. They adversely affect the plant both directly and indirectly. Some of the direct toxic effects caused by high metal concentration include inhibition of cytoplasmic enzymes and damage to cell structure due to oxidative stress10. Indirect toxic effect includes replacement of essential nutrients at cation exchange sites of plants11. The negative influence of heavy metals on the growth and activities of soil microorganisms also indirectly affect the growth of plants. Reduction in the number of beneficial soil microorganisms due to high metal concentration may lead to decrease in organic matter

EFFECTIVENESS STUDY OF MEMBRANE CAPACITIVE DEIONIZATION TECHNOLOGY IN TRACE METAL REMOVAL FROM WATER

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Abstract:
Increasing environment protection awareness made the availability of clean water, technological, social and economical challenge of the 21st century. Water, is a scarce amenity not only in India but in the whole world. Most of the available water is saline and is not potable. Water supplies are not matching the actual water needs of the society. We have been squandering and polluting water resources since ages and are now in need of finding cost competitive newer technologies for reclaiming this valuable life-sustaining liquid. Membrane capacitive deionization is one of those prominent technologies which assure to be more efficient with higher water recovery and less power consumption.
In this study concentration of trace metals viz. Barium, Arsenic, Lead, Chromium, Cadmium, Nickel and Boron in ground water samples from western Rajasthan were determined using Inductive coupled plasma- Optical emission Spectrometer (ICP-OES). These metals have toxic effects on the human health; most of them are carcinogenic and can cause fatal effects if consumed in fewer amounts continuously for long duration. This study has also been done to assess the removal of trace metals by membrane capacitive deionization process. Electrical conductivity of water was assessed to compare the results with trace metals. Certain areas of Jodhpur and Jaisalmer districts of Rajasthan state in India were selected as the study area. The pilot plant (CapDI) manufactured by Voltea (Netherland) was provided by InNow India Pvt. Ltd for carrying out this study. The maximum EC was reduced by 98 %, whereas the trace metals Barium, Cadmium, Chromium and Boron were removed by 57%, 70%, 50%, and 74% respectively. Thus it can be interpreted from the study that Membrane Capacitive Deionization Technology can remove the Heavy and Toxic metals up to a certain limit effectively with low power consumption.

Keywords: Chromium, Electric conductivity, Lead, Membrane capacitive deionization, Trace Metals, Water Recovery.

I.   INTRODUCTION

Potable Water is a scarce source. . Rajasthan is the largest state of India, Rajasthan shares only 1/10 of the average share of water than rest of the country [1]. Water supplies in most of the Indian cities including cities of Rajasthan are not matching the actual water need of the society. Groundwater is the major source of drinking water in some part of the Rajasthan. Presence of higher amount of salts and trace metals in underground water sources in the western Rajasthan is enhancing the less availability of potable water to the population. Trace metals removal from water in field is difficult. These are carcinogenic and can cause fatal effects if consumed in less amount for long duration. This study was done to evaluate removal of trace metals from membrane capacitive deionization.

By definition, Membrane Capacitive Deionization is a combination of conventional Capacitive Deionization with ion-exchange membranes (IEMs) placed in front of the electrodes. Ion exchange membranes can be positioned in front of one or both electrodes. Ion-exchange membranes have a high internal charge due to covalently bound groups such as sulfonate or quaternary amines, which allows easy access for one type of ion (the counter ion) and block access for the ion of equal charge sign (the co-ion). Addition of Ion-exchange membranes significantly improves desalination performance of the Capacitive Deionization process, in terms of salt adsorption, charge efficiency and energy consumption. The membranes can be included as stand-alone films of thicknesses between 50 and 200 μm, or can be coated directly on the electrode with a typical coating thickness of 20 μm[2].

Air Quality Index Assessment of Industrial Areas of Jodhpur City

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Abstract: *Jodhpur district is centrally situated in Western region of Rajasthan state. In this study four monitoring stations were established to find pollution level in the ambient air of various industrial areas situated around the city. Four industrial areas where samplings were done are Basni industrial area, Boranada industrial area, kankani industrial area and Mandore industrial area. Air Quality Index has been calculated by considering five pollutant parameters i.e. SO_2, NO_2, PM_{10}, $PM_{2.5}$ and CO. Minimum, average and maximum air quality index were calculated for every industrial area. It was found after analysis that air quality index of Basni and Mandore industrial falls under Poor category, while other industrial area falls in Moderate category. In the analysis, it was also observed that PM_{10} and $PM_{2.5}$ were responsible air pollutants for maximum sub-index as well as air quality index. Hence it is the time to plan activities in industrial areas to control air pollution emissions otherwise in future problem may aggravate and create a serious condition.*
Keywords: *Air pollution, AQI, industrial area, PM_{10}, $PM_{2.5}$.*

I.   Introduction

The 'Surya Nagari' Jodhpur is the second largest city of Rajasthan and the gateway of famous 'Thar Desert'. Air pollution of a city mainly depends upon the pollution from industrial areas, pollution from transportation; fuel burning and house hold activities. Pollution due to industrial areas around city significantly affects air quality of city if city lies on the downwind direction.

Air pollution is physical or chemical changes brought about by natural processes or human activities that result in air quality degradation[1]. Air is invariably impure and is always contaminated with gases like CO, NO_2, SO_2, and others (which are poisonous in nature) and finely divided solid and liquid particles and smog. Air becomes polluted due to the presence of the above contaminants. The presence of these contaminants in the air is called air pollution and the materials which pollute the air are called air pollutants[2]. As the population increased, people began to congregate and establish cities. The release of large amounts of smoke and other forms of waste into the air caused an unhealthy condition because the pollutants were released faster than they could be absorbed and dispersed by the atmosphere[3]. "More than 2 million premature deaths each year can be attributed to the effects of urban outdoor air pollution and indoor air pollution .More than half of this disease burden is borne by the populations of developing countries. Heart attacks, respiratory diseases, and lung cancer are all significantly higher in people who breathe dirty air compared to matching groups in cleaner environments[1]. The acute health effect of suspended particulate matter (SPM), even at short term low levels exposure; include increased daily mortality and hospital admission rates for exacerbation of respiratory disease[4]. Living close to busy traffic appears to be associated with elevated risk[5]. The available human clinical results do not establish a mechanistic pathway leading to adverse health impacts for short term NO_2 exposure at present day ambient environment[6].Each day our lungs are directly exposed to more than 7000 liters of air, which contain varying amount of inorganic, organic particles and various types of gases[7]. Hence it is now time to assess the air quality of the area in terms of pollutant concentration.   Basni industrial area has mainly textile / timber / Guar gum industrial units. Boranada industrial area has mainly Metal and Wooden Handicrafts industrial units, Mandore industrial area has handicrafts/ oil mills/ Guar gum/ textile / Stone Processing industrial units. Kankani industrial area has mainly handicraft / plastic industrial units[8].

II.   Methodology, Observations, Calculations and Analysis

Monitoring was carried out in all the four industrial areas as per central pollution control board (CPCB) of India guidelines. Five pollutants (SO_2, NO_2, PM_{10}, $PM_{2.5}$ and CO) were measured to calculate AQI of a particular area. AQI has been developed and used effectively in many industrialized countries to represent

EFFECT OF AIR POLLUTION ON VEGETATION: A REVIEW

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ABSTRACT: An environment plays a vital role for the sustainability of life on our planet. Environmental comprises some very basic parameters on which earth's life is very much dependent i.e. air, water and soil etc. Every parameter has got its own importance but air and water are two such thing without which human life can never be imagined .Further, water can be made usable by providing some degree of treatment but if air gets polluted to alarming level then ,it will not be so easy to adverse this effect. Air pollution receives one of the prime concern in India, primarily due to rapid economic growth, industrialization and urbanization with associatedincrease in energy demands. lacks of implementation of environmental regulations are contributing to the bad air quality of most of the Indian cities. Air pollutants produced in any air shed are not completely confined, but at time trespassing all the geographical boundaries, hence do not remain only a problem of urban centres, but spread and affect remote rural areas supporting large productive agricultural land. Air pollutants pose risks on yield of crops depending on the emission pattern, atmospheric transport, leaf uptake and have a deleterious effect on a variety of biochemical and physiological processes and on structural organization within the cells.

Air pollutants have been shown to reduce the growth and yield before any visible symptoms appeared. It is now commonly believed that injury initially takes place at the biochemical level (interference with photosynthesis, respiration, lipid and protein biosynthesis, etc.), subsequently progressing to the ultrastructural level (disorganization of cellular membranes), and then to the cellular level (cell-wall, mesophyll, and nuclear breakdown). Finally, visible symptoms develop (chlorosis and necrosis of foliar tissues). An adverse effect caused by air pollutants depends not only upon its concentration, but also on the duration and combination of air pollutants. Biochemical injury results when the concentration of the pollutant exceeds the capacity of the tissues to detoxify it through their normal metabolism. The subtle and varied nature of the biochemical and physiological effects produced by air pollutants suggest that reduction in plant growth and yield.

Keywords: Air pollution, injury,SO_2, NO_2, CO,plant physiology.

INTRODUCTION

Air pollution is a major problem today not only in india but in the whole world. Air pollution adversaly affecting the various constituent of the environment. The main air pollutants are represented by gases forms, particles in suspension, different ionizing radiation.The gases forms are: oxidized and reduced forms of carbon (CO_2, CO, CH_4), of nitrogen (NO_2, NO, N_2O_4, NH_3, NH_4^+), SO_2, O_3, C_6H_6 vapours, Hg, volatile phenols, Cl_2, etc.The particulate forms are: PM10 and PM2.5 particulate matter, heavy metals with toxic effect (Pb, Ni, Cd, As), PAHs(polycyclic aromatic hydrocarbons) etc.

Air pollution was earlier considered as a local problem around large point sources. But due to use of tall stacks and long range transport of pollutants, it has become a regional problem. The transboundary nature of pollutants was clearly evident when areas remote from sources of air pollution also showed higher concentrations of air pollutants. Uncontrolled use of fossil fuels in industries and transport sectors has led to the increase in concentrations of gaseous pollutants such as SO_2, NOx, etc.

Effects of different kinds of pollution can be determined by the nature of pollutants, their concentration and the period of exposure. Under exposure to high concentration, plants suffer acute injury with externally visible symptoms, such as chlorosis, discolouration, necrosis and death of entire plant. Besides morphological changes, chemical, biochemical, physiological and fine structural changes also occur in plants. Air pollution decreases the yield of all crops by affecting their photosynthetic activity and growth. Pollution damage can also be recognized by the accumulation of toxic material in the plant, changes in pH followed by solubilization of toxic salts of metals like aluminum, reduced increased activity of certain enzymes, increase in compounds with SH groups and phenols, lowered ascorbic acid level in the leaves, depression of photosynthesis, stimulation of respiration, low dry matter production, changes in permeability, disturbances in water balance and reduced fertility under prolonged exposure. Plants show reduced productivity and yield and quality is lowered and ultimately they die. The symptoms of pollution affected plants are varied and unspecific. A particular pollutant affects different plants in very different ways and particular symptom can be produced by a variety of substances. The development and severity of the injury depends not only on the concentration of the particular pollutant, but also on a number of other factors. These include the length of exposure to the pollutant, the influence of external factors (pollutants) on plants depends upon the species, stage of development and the organ and tissue involved as well the environmental factors conducive to a build-up of the pollutant and to the preconditioning of the plant, which make it either susceptible resistant to injury. Morphological alteration of a plant and floristic composition of a plant community are commonly used to indicate

NASA/ADS

Inter-state Mobility of Pesticide Leachate in Underground Water

Show affiliations

Singh, S. ; Singh, S. K. ; Chaubey, J. ; Arora, H. ; Bhandari, K. ; Vyas, A.

Pesticide usage has become an integral part of modern agriculture; excessive and injudicious usage of which generally leads to groundwater pollution. Assessment of pesticide impact on groundwater, employing certain tools and available dataset, is a foremost step towards the preparation of regulatory policies that governs the application of pesticides to agricultural fields. In this study, the impact of pesticide usage is assessed for an agricultural area lying in North-western India employing a model named Pesticide Impact Rating Index (PIRI). Four pesticides wiz. Atrazine, Chlorophyrifos, Phorate and Monocrotophos, were selected and a relationship is established between their usage and their impact on the quality of groundwater (by employing PIRI) for the study area consisting of seven farms lying in Nakodar tehsil of Punjab state in India. Groundwater sampling was conducted for these locations and samples were analyzed for observed values of pesticide residues. Furthermore, these observed values were compared with the PIRI model estimates and results showed that though the observed values were higher corresponding to the estimated values, but the ratio seemed to be fluctuating within consistent range. Therefore, the evaluation of PIRI model for the study area resulted in promising results subject to the introduction of multiplicative correction factors for the model estimates so as to predict realistic pesticide residues in the area corresponding to local conditions and considered time frame of analysis. The study is further extended to observe the occurrence of the pesticides in the downstream side of the study area. The same pesticides have been detected in underground water available in desert of Jaisalmer district of Rajasthan which is about 700 km away from the area where these pesticides are used. It indicates inter-state pollution and contamination of underground water, the remediation of which is of utmost importance for the study area and is recommended for a sustainable future.

Feedback/Corrections? (/feedback/correctabstract?bibcode=2019AGUFM.H41J1829S)

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Foaming and Cleaning Performance Comparison of Liquid Detergent Formulations using Mixtures of Anionic and Nonionic Surfactants

Modern detergents are typically appreciated for their cleaning performance rather than foaming characteristics. The aim of the current study was to compare the foaming and cleaning abilities of liquid detergents, built from a combination of surfactants, to be applied for household laundry purpose. A total of eighteen different liquid detergent formulations containing mixtures of important anionic, nonionic surfactants, and other additives were prepared. The first set of nine new detergent formulations (S1) was prepared using the surfactants sodium lauryl sulfate (SLS), Tween-20 and Tween-80. Another set of nine new detergent formulations (S2) was prepared using surfactants SLS, Triton X-100 and alkyl polyglucoside (APG). The impact of water quality (RO, hypersaline or hard water) on the foam properties of the detergent formulation sets (S1 and S2) was systematically examined. The second set of detergent formulations (S2) showed a better performance in terms of foamability and foam stability, regardless of the water quality. Also, the surface tension of the detergent formulation set S2 was found to be lower and it showed a higher detergency for both cotton and woolen fabrics. The detergency of the formulation no S2.9 (in set S2) was the maximum amongst all the detergent formulations. The surface morphology of the cotton and woolen fabrics, washed with liquid detergent formulation no S2.9, displayed the removal of oily soil and grease from the surface of the fabrics, without affecting the quality of the fabrics.

Key words: Detergent formulation, non-ionic surfactants, application of surfactants, anionic surfactants

Vergleich der Schaum- und Reinigungsleistung von flüssigen Waschmittelformulierungen unter Verwendung von Mischungen aus anionischen und nichtionischen Tensiden. Moderne Waschmittel werden typischerweise eher für ihre Reinigungsleistung als für ihre Schaumbildungseigenschaften geschätzt. Das Ziel der vorliegenden Studie war es, die Schaum- und Reinigungsleistung von Flüssigwaschmitteln zu vergleichen, die aus einer Kombination von Tensiden bestehen und für die Haushaltswäsche verwendet werden. Insgesamt wurden achtzehn verschiedene flüssige Waschmittelformulierungen hergestellt, die Mischungen von wichtigen anionischen, nichtionischen Tensiden und anderen Additiven enthielten. Der erste Satz von neun neuen Waschmittelformulierungen (S1) enthielt die Tenside Natriumlaurylsulfat (SLS), Tween-20 und Tween-80. Ein weiterer Satz von neun neuen Waschmittelformulierungen (S2) wurde unter Verwendung der Tenside SLS, Triton X-100 und Alkylpolyglucosid (APG) hergestellt. Die Auswirkung der Wasserqualität (RO, stark salzhaltiges oder hartes Wasser) auf die Schaumeigenschaften der Waschmittelformulierungssets S1 und S2 wurde systematisch untersucht. Das zweite Waschmittelformulierungset S2 zeigte unabhängig von der Wasserqualität eine bessere Leistung hinsichtlich der Schaumentstehung und Schaumstabilität. Auch wurde gefunden, dass die Oberflächenspannung des Waschmittelformulierungssets S2 niedriger war und eine höhere Waschleistung sowohl für Baumwolle als auch für Wollgewebe hatte. Die Formulierung Nr. S2.9 (in Satz S2) hatte die höchste Waschleistung unter allen Waschmittelformulierungen. Die Oberflächenmorphologie der mit der flüssigen Waschmittelformulierung Nr. S2.9 gewaschen Baumwoll- und Wollgewebe zeigte, dass öliger Schmutz und Fett von der Gewebeoberfläche entfernt werden konnten, ohne die Qualität der Gewebe zu beeinflussen.

Stichwörter: Waschmittelformulierung, nichtionische Tenside, Tensideinsatz, anionische Tenside

1 Introduction

A detergent product is a composition of various chemicals namely surfactants, filler, builders and solubilizers. Surfactants, being the primary component, resemble the major influencing factor in formulating an effective detergent product [1]. The detergency is the measure of surface cleaning by any detergent formulation [2]. The surfactant is a major component affecting the detergency of any laundry product. Since detergency is the prime factor in measuring the cleaning efficiency, the choice of selecting a surfactant in preparing a detergent formulation is important [3]. The selection of additives is also a prime factor in the formulation of a well-balanced detergent. The major additives used in the detergent formulation include builders, solubilizers, and polymers. Each of these components contributes to the improvement of detergent performance [4]. For instance, the presence of a water soluble polymer in the detergent formulation helps in preventing the redeposition of oily soil on the fabric after being removed by the detergent action [5, 6]. Builders used in the detergent mixture to eliminate the water hardness thereby increasing the performance of the detergent [7]. Enzymes have been incorporated in modern detergents so as to remove any organic compound such as fat, oil secretions, and protein which are insoluble in water [8]. The use of environmental friendly surfactants and other additives prepared from biodegradable products have been pursued producing detergent formulations in the last decade. Detergents prepared with a mixture of surfactants have a greater impact in the removal of soil from fabrics. Nonionic surfactants such as alkyl polyglucoside show a sy-

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Identification of psychological factors associated with car ownership decisions of young adults: Case study of Jodhpur city, India

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A B S T R A C T

In the context of a developing country, not many studies have attempted to examine the attitudinal factors that influence the car ownership decisions of young adults. The present study aims to identify the pertinent psychological factors and their effects, along with demographic variables, upon car ownership decisions. The study used 813 individuals' responses to employ a principal component analysis and subsequent binary logit model to determine the future car ownership decisions. The major findings show that the individuals who are status seekers, image-conscious, passionate for cars, obsessed with cars, and influenced by peers/external factors are more likely to buy a car in the near future. However, those who are conscious about paying high taxes, environmental sustainability and traffic problems are less likely to buy a car in the near future. The results of this study can help transport planners and policymakers to develop and implement transport policies that could potentially discourage the use and ownership of cars in order to develop sustainable mobility patterns in the future.

1. Introduction

1.1. Background and need of the study

Cars are the most important matter of concern for transportation planners because their growth and use in cities cause serious environmental and urban problems like congestion, air pollution, accidents, etc. (Newman and Kenworthy 1999; Gärling and Schuitema 2007; Tao et al., 2019) and leads towards unsustainable development. Car ownership and their uses are increasing in developing countries (like India) due to rising income levels (Belgiawan et al., 2014). As the income increases, those who already have a car, tend to buy a second or a third. As per report of Niti Aayog, in 2018, India had 22 cars per 1000 population and by 2025 the number of cars is likely to be 35 cars per 1000 population (Ghate and Sundar 2014) and it is expected to increase about 175 cars per 1000 population by 2040 (IEA 2015). It is to be noted that, these numbers are the ratio of expected total cars to the expected total population of India. In 2017, the developed countries like New Zealand, USA, Australia, Canada, Japan, etc. have car-ownership levels above 450 cars per 1000 persons. As per MoRTH report (MoRTH 2012), developed cities of India like Delhi have 157 cars, Chennai 127 cars, Pune 92 cars, Bangalore 85 cars, Hyderabad 72 cars per 1000 population. These cities of India may also follow the same

trend (as of developed countries) if corrective steps are not taken today to reduce the growth of car ownership and their uses.

The growth in car ownership and uses are influenced by various factors like socio-demographic variables like income, age, gender, etc. (Bergstad et al., 2011; Dargay and Hanly 2007; Delbosc and Currie 2014; Verma et al. 2016, 2017), quality attributes of public transport (Beirão and Sarsfield 2007; Cullinane 2002; Ibrahim 2005; Redman et al., 2013), cost of buying and running cars, journey requirements (work or non-work) (Banister and Button 1993) and psychological factors like status, comfort, independence, intension, aspiration, happiness, pro-sustainability, etc. (Belgiawan et al. 2011, 2014, 2016; Ghate and Sundar 2014; Setiawan et al., 2015; Steg et al., 2001; Steg 2005; Verma et al. 2016, 2017; WU et al., 1999; Zhu et al., 2012). As most of the studies pointed out, that psychological factors are affecting car ownership and their uses majorly but these studies are mostly done in developed countries. A comprehensive study related to psychological behavior, regarding car ownership decisions, for developing countries has been found to be very limited in the existing literature. This study tries to identify the psychological factors and their effects, along with demographic variables on car ownership decisions of young Indian adults, in near future. This study mainly focusses on young adults because they will be the future decision-makers of their family. The results of the study will help transport planners and policymakers to develop

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sustainable transportation policies to reduce the ownership and usage of cars.

The next section of the paper deals with the literature review of research work done previously on car-ownership decisions followed by sections on the study area, research methodology, demographic characteristics of the respondents, model structure and results, estimation of coefficient of binary logit model and validation of binary logit model. The last section includes key findings and policy recommendations from the study.

1.2. Previous research on factors associated with car ownership decisions

One of the recent studies on car ownership decisions was done by Verma et al. (2016) in Bangalore city, India. They analyzed that the factors responsible for increase in car ownership in India are low-interest rates on the car loan. People who come from car-owning household and qualified at or above post-graduation level are feeling safe and comfortable in cars as compared to other modes of transport, while the availability of good public transport came out to be a major factor in deterring car use but the overall scores on the service quality dimensions show that the user expectations is not met by urban bus transport service. Cullinane (2002) suggested that if the quality of public transport service is good and cheap, it can suppress the demand for the car. Car usage is not only popular because of its instrumental factors such as its speed, convenience and flexibility but other factors also seem to play an important role, such as arousal, feelings of sensation, power and superiority (Belgiawan et al. 2011, 2016; Steg 2005). Easy finance schemes or low-interest rates on car loans have played an significant role in growing car ownership among youngsters in India. Also the use of a car is more for personal use rather than official use, especially for social and recreational trips (Verma et al., 2016). According to Ghate and Sundar (2014) owning a car is not always about essential requirement but many times, it is for aspiration and status symbol also.

Two different scenarios can be seen in developed countries like Germany, France, Great Britain, etc. and developing countries like China, Malaysia, and India. Young people are becoming increasingly less likely to obtain a car driving license in Australia, North America, and most of the Europe. Delbosc and Currie (2014) investigated the demographic and structural justification for these trends. They documented that in both the regional and metropolitan groups, cars were described with reference to providing freedom and control over their time and activities. Cars are referred to as an achievement, a symbol of maturity, adulthood, and expression for freedom. The ownership of car did not appear to infer the status of symbol and luxury, but owning an expensive car gives higher social status than an inexpensive or old car. Belgiawan et al. (2014) analyze undergraduate student's (age cohort until 30) motivation regarding car ownership in developing countries like China, Indonesia, Lebanon and developed countries like Japan, Taiwan, Netherlands, and the USA. They found that in developed countries, students have less desire to buy a car in the near future, in comparison to developing countries. Expectations of others seem to be an important factor affecting buying intentions whereas symbol, affection of cars and income are less correlated with Intentions. Zhu et al. (2012) identifies that Chinese college students have a strong, planned intention for car ownership. Like Hong Kong students, they also perceived that cars provide comfort, save time, help to travel to more desired places, and as a success symbol. Belgiawan et al. (2011); Belgiawan et al. (2016) analyze the physiological factors for car ownership decisions in Bandung, Indonesia using binary logistic regression analysis and they found that convenience, social orderliness, and arrogant prestige are significant determinants for future car-ownership decisions. Pojani et al. (2018) analyzed the mobility intentions of young university students in Tirana, Albania using Structural equation Modelling. They found that individuals who do not like cars and

driving, want to buy cars and drive in the future. This Pro-car attitude indicates that cars will remain a strong status symbol. Steg (2005) examined various motives of car use in Netherlands and results revealed affective and symbolic factors positively affecting the utility of driving. The existence of three groups was suggested by Sigurdardottir et al. (2014) while narratively analyzing the intention behind the car and driving license ownership among Danish young adults groups. The first group have car-oriented social networks, perceive cars with high symbolic, affective, instrumental, and relational values and visualize a car-oriented lifestyle in the future; the second group associated with high relational and instrumental values of cars, perceive the cost of running and maintenance as a strong barrier and visualize a car-oriented lifestyle in the future; the third group, have a low interest in cars and visualize a cycling-oriented future. Steg et al. (2001) tried to identify the relative importance of symbolic and affective factors to the instrumental and reasoned motives for car use and they found that instrumental, reasoned, symbolic and affective factors of the cars are significantly contributing towards ever increasing use of car. At the earlier stage of motorization, household vehicle ownership was influenced by economic, sociological, and psychological factors (WU et al., 1999). People were of the opinion that expensive vehicles give more symbolic meaning and the effect of the economic factor in the symbolic utility of a vehicle tends to diminish. Setiawan et al. (2015) explored university student car commuting behavior in Surabaya, Indonesia. The result revealed that the actual behavior of using cars is influenced by their habit and intention to use car for traveling in campus. Young people's travel behavior and intentions are influenced by identity, social recognition, self-image and desire to drive a car (Line et al., 2010). Although they are aware of climate changes but their understanding of the link between transport and climate change is weak. There is always a scope to reduce the intention to drive cars by motivating towards environment sustainable modes before they develop driving habits. Awareness program concentrating on the consequence of cars and ascription of responsibility, had a positive impact on the personal norm and intension to reduce car-transport (Liu et al., 2017). A significant influence of the parents on the attitude of the children toward the cars was observed by Nishihara et al. (2017) in a study performed on young adults across Japan. Young adults are more aware of the environmental and urban problems and the fact that the car is not environmental friendly. However, majority of them say that it is very difficult to take away cars because of their usefulness.

To summarize it all, there is growing study on young people's travel mode choices and many studies explaining their travel behavior. The trend of driving license and car ownership is reduced in the developed countries but enthusiasm can be seen in developing countries. Table 1 shows the summary of key factors behind this fascination to car ownership, which are independence, status symbol, comfort, and freedom. Few studies have also addressed the environmental attitudes of young people, but the concern for the environment does not affect much until youth is made aware of the repercussions of excessive use of vehicle on environment. It is noticeable that most of the existing studies are concentrated on developed countries only. Very few researches had their focus on developing countries. For fast-growing countries like India, it is necessary to have knowledge about the travel trends among youth population for transport planning and future development.

2. Study area and methodology

2.1. Study area

The study is conducted in Jodhpur city of India. Jodhpur is the second-largest city of Rajasthan and it is one of the famous tourist destinations of India. It is also known as the "Sun City" because of its sunny and bright weather. Jodhpur metropolitan region has a population of

Table 1
Summary of literature review of psychological factors associated with car ownership decisions.

Authors	Study Area	Sample Size	Psychological factors considered in the study
WU et al. (1999)	Xi'an City, China	2703	Symbolic utility, Use-value Attitude, Sign-value Attitude and Ostentation desire
Steg et al. (2001)	Groningen and Rotterdam, Netherlands	185	Instrumental-reasoned and symbolic-affective functions
Cullinane (2002)	Hong Kong	389	Image and symbol
Steg (2005)	Rotterdam, Netherlands	113	Independence, instrumental, symbolic and affective
Zhu et al. (2012)	Shanghai and Zhenjiang, China	963	Symbol of success, In control of life, Future necessity and Symbol of modern life
Belgiawan et al. (2014)	China, Indonesia, Japan, Lebanon, Netherlands, Taiwan, and USA	China (167), Indonesia (200), Japan (142), Lebanon (271), Netherlands (84), Taiwan (139), and USA (226) Total = 1229	Symbolic affective, independent, negative aspects, social orderliness, safety and reliability, and convenience
Delbosc and Currie (2014)	Regional Victoria and Metropolitan Melbourne, Australia	100	Social status and environmental attitude
Sigurdardottir et al. (2014)	Denmark	–	Symbolic, affective, instrumental, and relational values
Belgiawan et al. (2011); Belgiawan et al. (2016)	Bandung, Indonesia	500	Symbolic/Affective, arrogant prestige, Convenience, comfort, and social orderliness.
Liu et al. (2017)	China	600	Ascription, Intention
Nishihara et al. (2017)	Japan	300	Usefulness, Image, Environmental/Safety
Verma et al. (2016)	Bangalore, India	646	Pro-sustainability, status-seeker, tax-conscious, happiness-oriented, comfort-oriented and city conscious
Verma et al. (2017)	Bangalore, India	750	Enjoyment and image, happiness, like driving vehicles, city conscious, congestion influence, comfort oriented, opportunity/ image conscious, tax and environment conscious, societal image seeker, pro-sustainability, peer/external influences and status.

nearly 1.138 million as per the census population data (Census, 2018). It is one of the fastest-growing cities of India with an average annual growth of 3% which is slightly more than the country urban growth. In addition to the local population of Jodhpur city, an average of 4000 tourists visit the city every day (Jodhpur Development Authority 2010). According to the Government of India, people aged between 15 and 29 years are considered as a youth (Central Statistics Office Ministry of Statistics and Programme Implementation 2017). As per this report, the youth population of India is nearly 19.10% of the total population. The growth of the population has not been matched by investment in transportation infrastructure, especially in public transportation. As a result, the proportion of people traveling by private mode of transport has been increasing due to which overcrowding and congestion on limited infrastructures such as on roads and parking facilities increased. The public transport buses in the city are inadequate and often overcrowded and because of this, private mode share has increased. According to Regional Transport Authority (RTO) in the period from 2003 to 2011 the registration of new motorcycles have grown at an annual average growth of about 18% while cars have grown at about 14% which indicates greater private vehicle population in future (Asian Development Bank 2012). As of now, the bus (minibus and semi low-floor bus) is the only main public transport of the city. There are two types of buses, minibus, and semi low-floor bus. Mini Buses are operated by a majorly private operator under contract to Jodhpur City Transport Services Ltd (JCTS) which was set up as a joint venture of Jodhpur Municipal Corporation and the Urban Improvement Trust, Jodhpur and semi-low floor buses are operated by Jodhpur Municipal Corporation itself. The bus system, both government or privately operated is inadequate in terms of comfort and frequency and most of the time they are operated in crush capacity (Jodhpur Development Authority 2010). These factors contributes in psychological

perception and affects car ownership decisions. Motorized three-wheelers (Auto-rickshaw) and taxi are the most common Intermediate public transport modes. Nearly 45% of peak hour trips are non-motorized trips out of which 38% are walk trips. There is significant usage of cycle rickshaws and bicycles in the city especially near the city center area and rest 55% of motorized peak hour trips are made by two-wheelers (46%), car (19%), auto-rickshaw (25%), taxi (1%), and public transport (8%) respectively (Jodhpur Development Authority 2010).

2.2. Study methodology

The overall framework of study methodology adopted for this study is shown in Fig. 1. A set of questionnaire was prepared to analyze the perception of young adults related to car-ownership decisions. As mentioned earlier, this study mainly concentrates on young adult's (which is the future) travel behavior because they are going to become decision-makers in the near future and it is very important to analyze their psychological perception related to car-ownership decisions to develop future policies related to transportation. The questionnaire recorded socio-demographic information (like age, gender, income, education qualification, occupation, number of two-wheelers and four-wheelers owned by the family, number of members in the family, possession of a driving license), frequency of using public transport and perception related questions on Likert scale (strongly agree = 5; agree = 4; neutral = 3; disagree = 2 and strongly disagree = 1) about future car ownership, growth of cars in India, car-related individual image, peer-influence, social status, and transport policy.

A manual pen and paper method of data collection was adopted for the present study. The questionnaire is only meant for young adults (age
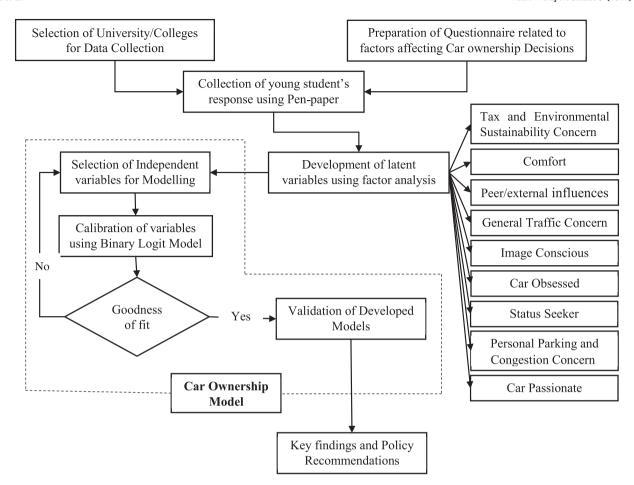
Fig. 1. Framework of study methodology.

group 15–29 years), therefore, to make the data collection process convenient, responses were collected from the randomly selected colleges and universities of Jodhpur. Permissions were obtained from various administration authorities to conduct the survey inside colleges and universities. For some college/university which did not permit to conduct a survey inside their campus, the survey was conducted outside their jurisdiction area. One drawback of this adopted survey methodology is that since the dataset consists of students from colleges and universities only, a generalization to the larger younger-adult population is limited.

A total of 1130 data samples were collected from November to December 2019, out of which 956 data samples are considered valid after removing incomplete or erroneous observations. The socio-demographic information of the respondent is shown in Table 2. This study developed the nine latent variables (shown in Table 3) using principal component analysis (PCA) in SPSS software for the development of a binary logit model. 85% of the randomly selected data samples i.e. 813 samples is used for the model calibration and remaining 143 samples are used for the validation of calibrated model. The binary logit is calibrated considering socio-demographic and psychological factors and validated in N-Logit software. The developed model is then verified in terms of the logical signs and the significance level of each variable (checked using p-values). For the overall goodness-of-fit of the models, parameters like McFadden's rho-squared value and prediction success rate (validation) of the models are taken into consideration. Once the developed model is validated, the key findings are observed from the results and that will help in policy recommendations for future transport planning.

2.3. Demographic characteristics of the respondents

This section broadly summarizes the demographic characteristics of the collected data samples. The collected data shows that a higher percentage of males (71.34%) participated in the questionnaire survey than females (28.66%), reflecting the gender ratios (in general more male candidates than females) in colleges. The average age of the participants is 21.06, also everyone has at least 4–5 members in the family.

Most of the respondents are under-graduate and from the engineering background, may be because of large samples from engineering students only. Only 40% of the participants have household car ownership. Almost 40% of participants have possession of their own driving license and only 30% of the respondents live with their family. About 45% of the participants never travel through public transport.

2.4. Estimation of psychological factors

The various psychological variables considered for the model estimation are given in Table 3. Since the questions on the survey form are the attitudinal type and their responses are based on the Likert scales. The factor analysis approach is used to reduce the number of explanatory variables. A total of 813 data samples are selected for final analysis after data cleaning and the value of Cronbach's alpha reliability coefficient for Likert scale is 0.89, which is satisfying the minimum acceptance limit of 0.7 (Churchill 1979).

The sample adequacy measures such as Kaiser-Meyer-Olkin value (0.864) and Bartlett's test of sphericity (approximate chi-square is

Table 2
Respondent demographics.

Characteristics	Number	Share
Categorical Variables		
Gender		
Male	682	71.34%
Female	274	28.66%
Degree		
Under-Graduation	828	86.61%
Post-Graduation	128	13.39%
Course Pursuing		
Engineering	832	87.03%
Others (Medical, science, management, etc.)	124	12.97%
Household Car Ownership		
Yes	398	41.63%
No	558	58.37%
Possession of own driving license		
Yes	376	39.33%
No	580	60.67%
Living with family		
Yes	290	30.33%
No	666	69.67%
Uses of Public Transport		
At least once in a week	168	17.57%
At least once in a month	116	12.13%
Very Occasionally	248	25.94%
Never	424	44.35%
Quantitative Variables		
Age of the Respondent		
15–18 years	78	8.16%
19–21 years	554	57.95%
22–25 years	286	29.92%
26–29 years	38	3.97%
Average	21.07 (2.05)[a]	–
Numbers of members in the family		
≤2	10	1.05%
3	74	7.74%
4	392	41.0%
5	254	26.57%
6+	226	23.64%
Average	4.96 (1.68)[a]	–

[a] Value in parentheses shows the standard deviation.

15,457.333, a degree of freedom is 820, and significance is 0.000) indicates that collected data is fit for factor analysis. Principal component analysis (PCA) along with the varimax rotation method with Kaiser Normalization is used for extracting factors, and total 9 factors are retained on the basis of eigenvalues and variance explained by the variables. Eigenvalue shows the total variance explained by each factor. Generally, all the factors with eigenvalues of more than 1 should be extracted. Thus, total 9 factors are extracted which explained 61.48 percent of the total variance. A factor loading of '0.3' has been set as the benchmark for identifying each factor. The name of the factors, variable labels, and factor loadings are summarized in Table 3.

The factors are named on the basis of factor loadings which describe the correlation between the underlying factors and the statements. Factor scores are then derived from the extracted factors for evaluating the relative significance of perceptions and attitude in the car ownership behavior of young adults. The factor scores for each of the observations are deduced from the factor loadings and the Likert-type Scale responses for each observation in the sample. These factor scores are used for the analysis of car ownership decisions of young adults in the near future.

3. Model structure and results

The aim of this study is to analyze the car-ownership propensity of young Indian students. A Binary Logit Model (BNL) was used to calibrate the parameters of the utility equations associated with each individual i

and alternative j. In the binary case, only two alternatives are available to each decision-maker. Therefore the decision to buy a car in the near future is considered as a dependent variable (binary variable, 1 = if going to buy a car in near future or 0 = not buying a car) and demographic, psychological factors considered as an independent variable for model development. The probability function of the Binary logit model is derived as the following:

Utility equation for individual i and alternative j (here j = buying a car, not buying a car in the near future) is:

$$U_{ij} = \beta'_J x_{ij} + \varepsilon_{ij} \tag{1}$$

The vector x_{ij} includes socio-economic, socio-demographic characteristics and attitudinal perception factors regarding car-ownership decisions. The coefficient of utilities, which is calibrated from observed data is represented by β'_J. The random term represents the latent (i.e. unobserved) variables that drive the choice process of an individual. It was assumed that ε_{ij} is not correlated with x_{ij} (i.e. x_{ij} is exogenous in the random utility function) and normally distributed.

$$U_{i1} = \beta'_1 x_{i1} + \varepsilon_{i1} \tag{2}$$

$$U_{i0} = \beta'_0 x_{i0} + \varepsilon_{i0} \tag{3}$$

Where, U_{i1} represents the utility of buying the car in the near future and U_{i0} represents the utility of not buying a car in the near future. We assume that the utility of the second alternative (not buying a car) is zero.

$$U_{i0} = 0 \tag{4}$$

The probability of choosing alternative 1 (buying a car in the near future) is:

$$Prob(U_{i1} > 0) = Prob(\beta'_1 x_{i1} + \varepsilon_{i1}) > 0 \tag{5}$$

$$Prob(U_{i1} > 0) = \frac{exp(\beta'_1 x_{i1} + \varepsilon_{i1})}{exp(\beta'_1 x_{i1} + \varepsilon_{i1}) + exp(\beta'_0 x_{i0} + \varepsilon_{i0})} > 0 \tag{6}$$

Table 4 presents the results of the binary logit model after trying different combinations of demographic and psychological variables. To examine the presence of multi-collinearity before model calibration, Pearson's correlation coefficients are reported in Appendix A. Since, multi-collinearity is indicated when the correlation coefficient of independent variables is 0.90 and higher (Pallant 2010). None of the socio-demographic and psychological variables in this sample show collinearity problem. NLOGIT 5 econometric software is used for the calibration of the model. The dependent variable is the decision to buy a car in the near future (Yes > 0; No ≤ 0). The results of the developed model show that respondents whose education qualification is higher than the post-graduation level are more likely to buy a car with 99% confidence level than the respondent who is qualified below this level. It may be because these people are going to get a high paid job and have the confidence to afford a car in the near future. The individuals whose educational background is related to engineering are more likely to buy a car compared to medical, science, management students etc. at 99% of confidence level. It may be because of data samples having a large percentage of engineering students' responses. Further studies are required to understand the impact of educational background on car-ownership decisions. As expected, Individuals having a four-wheeler driving license and car in their household have a positive effect on car-buying decisions than those who do not have a car in their household with 95% of confidence level. This implies that an individual wants to buy his/her own vehicle instead of depending upon the common household vehicle. It is interesting to observe that the number of members in the family have a positive impact on car buying decisions with 95%

Table 3

Factor loadings from principal component analysis with varimax rotation with kaiser normalization (N = 813).

Factor Name	Statements	Factor Loading
Factor 1: Tax and Environmental Sustainability Concern	I will not use a car if parking charges are high	0.843
Eigen Value: 4.122	I will not use a car if fuel taxes are high	0.806
% of Variance: 10.05	I will not buy a car if car ownership and additional taxes are high	0.760
Reliability: 0.868	I will sacrifice traveling by car for sustainable environment and better future	0.673
	Does advertisement related to Impact of car usage on the environment, will reduce the car ownership	0.647
	I will not use a car if bicycle infrastructure is appropriate	0.590
	I will not use a car if public transport is appropriate	0.561
	I will not use a car if I get a Job near my house (within 1 km)	0.476
Factor 2: Comfort	I enjoy traveling by or driving a car	0.791
Eigen Value: 4.045	Car is the best mode for leisure activity travel	0.773
% of Variance: 9.867	Car is the safest mode of transportation	0.711
Reliability: 0.839	Traveling by car is less stressful	0.701
	Car is more comfortable than public transportation	0.688
	I would be happier if I had a car	0.431
Factor 3: Peer/external influences	I should own a car when my relative have it	0.848
Eigen Value: 3.854	I should own a car when my friend have it	0.844
% of Variance: 9.401	I should take a car when my family purchase for me (If I'm not able to afford it in the future)	0.655
Reliability: 0.831	If car loans are easily available then I will buy a car next day or within a month	0.626
	I will buy things because of their attractive advertisement (In the future when you have enough money do you buy a car based upon an attractive advertisement)	0.618
	Car will improve my career opportunities	0.541
	Car will improve my social image	0.360
Factor 4: General Traffic Concern	Major traffic problems like congestion can be reduced by discoursing the use of cars.	0.785
Eigen Value: 3.078	Major cause of environmental air pollution can be attributed to car fumes	0.752
% of Variance: 7.507	Cars are more involved in fatal accident	0.734
Reliability: 0.816	Traffic by cars is increasing so fast that the existing roads network not able to manage increased traffic by the year 2025	0.685
Factor 5: Image Conscious	People will not give me importance, if I use Public Transport for daily travel	0.766
Eigen Value: 2.959	People will give me more importance, if I have a car	0.742
% of Variance: 7.217	People without car suffers more, because modern life favors car	0.729
Reliability: 0.766	Coming a college by a car is considered as a cool person	0.635
	In India, owning car is essential after Job	0.383
Factor 6: Car Obsessed	In future, I don't want to see myself to commute my daily travel by walking or cycling	0.736
Eigen Value: 2.179	In future, I don't want to see myself riding on a public transport bus or an auto-rickshaw to commute my daily travel	0.674
% of Variance: 5.314		
Reliability: 0.647	Car will improve more my personal life with respect to Public Transport	0.531
	Coming to a college by a bicycle or walk is unfashionable	0.373
Factor 7: Status seeker	I will buy a car because it is a symbol of status	0.658
Eigen Value: 1.788	Car is a success symbol for me	0.658
% of Variance: 4.360		
Reliability: 0.795		
Factor 8: Personal Parking and Congestion Concern	I want to buy a car, but driving on the road is too difficult because of heavy traffic	0.839
Eigen Value: 1.734	I want to buy a car, but parking is very difficult	0.838
% of Variance: 4.230		
Reliability: 0.748		
Factor 9: Car Passionate	Buying a new car is a dream for me	0.487
Eigen Value: 1.449	I will buy a car as soon as I am able to afford it	0.451
% of Variance: 3.534	Growth of cars in country is a sign of developing nation and it should be encouraged	0.361
Reliability: 0.160		

Total Variance explained: 61.48%.

Method of Extraction: Principal Component Analysis.

Method of Rotation: Varimax with Kaiser Normalization (Rotation converged in 9 iterations).

Note: Loadings less than 0.30 are omitted.

confidence level, which is logically obvious, i.e. if the number of people in the family increases, then the demand for vehicles will be increased for daily travel. Those who are staying with family are less likely to buy a car in the near future at 90% confidence level. Expectedly, an individual's propensity of using public transport have a negative coefficient with 95% confidence level. Those who are using public transport at least once in a week are less likely to buy a car in comparison to those who are using it once in a month, occasionally and never. This suggests that, if the use and serviceability of public transport will improve, that could make a significant impact on the car buying behavior of young adults.

Various psychological variables are also found significant in the above utility equation of buying a car in the near future. Those who have a "Tax and Environmental Sustainability concern" are less likely to buy a car in the near future with 90% of confidence level (Verma et al. 2016, 2017) and those individuals whose decisions are influenced by peer/-external factors (like advertisements or inspired by relatives) are more likely to buy a car with 99% of confidence level. As per the model, individuals concerned with general traffic-related issues like accidents, pollution, congestion, and parking etc. are less likely to buy a car at 99% of confidence level. Those who are image-conscious and passionate about

Table 4
Results of binary logit model for car ownership decisions in the near future.

Variable	Coefficient	t-value
Constant	−0.82223**	−2.09
Education Qualification (If qualification ≥ P.G. level = 1, otherwise 0)	0.67483***	2.92
Course Pursuing (If course related to Engineering = 1, otherwise 0)	0.70173***	3.00
Household car ownership (yes = 1, otherwise 0)	0.38287**	2.33
Possession of Car Driving License (yes = 1, otherwise 0)	1.65785**	2.08
Number of members in the family	0.09073**	1.96
Living with family (yes = 1, otherwise 0)	-0.28,512*	1.71
Uses of public transport (If, use at least once in a week = 1, at least once in a month = 2, very occasionally = 3, never = 4)	−0.15182**	−2.16
Factor 1: Tax and Environmental sustainability concern	−0.13053*	−1.68
Factor 3: Peer/external influences	0.27368***	3.85
Factor 4: General traffic concern	−0.25293***	−3.26
Factor 5: Image conscious	0.15698**	2.21
Factor 6: Car obsessed	0.21453***	2.90
Factor 7: Status seeker	0.21877***	3.07
Factor 8: Personal parking and congestion concern	−0.21587***	−2.83
Factor 9: Car passionate	0.14078**	2.07
Goodness-of-fit measures:		
Log-likelihood function: LL(β)	−418.084	
Log-likelihood at constant only: LL(0)	−559.684	
McFadden's Rho-squared (ρ2)	0.253	

Note: ***, **, * = => Significance at 1%, 5%, and 10% level.
Likert Scale: (strongly agree = 5; agree = 4; neutral = 3; disagree = 2 and strongly disagree = 1).

cars are more likely to buy a car in the near future with 95% of confidence level. Another interesting finding is that those who are status seekers (Ghate and Sundar 2014; Pojani 2018) and obsessed with the car are likely to buy a car in the near future with 99% of confidence level.

Effect of the gender (1 if male, 0 if female), age of respondent (absolute value between 15 and 29) and comfort (as a psychological variable) was also examined on the decision to buy a car in the near future of young adults; however, these variables were found to be insignificant in the developed model. The binary logit model is developed using 15 variables and the value of log-likelihood at function is −418.084 and the value of log-likelihood at a constant is −559.684. The goodness-of-fit for the calibrated model is analyzed by finding out the McFadden's Rho-squared (ρ2) value given by equation (7),

$$Rho-squared = 1 - \frac{Log\ likelihood\ at\ function}{Log\ likelihood\ at\ constant} \qquad (7)$$

$= 1 - \frac{(-418.084)}{(-559.684)} = 0.253$ The rho-square value (0.253) of developed model is lies between 0.2 and 0.4. It shows that the developed model is good fit (Hensher et al., 2016).

3.1. Validation of the binary logit model

The prediction success table is the cross-classification between observed and predicted choices of decision makers. As mentioned earlier, 143 randomly selected data sample were used for the validation of calibrated model. The prediction success table of the developed binary logit model for validation is shown in Table 5. The overall prediction success rate is found to be more than 81%, which shows that the developed model is reasonably good.

4. Key findings and policy recommendations

This study aims to identify the psychological/attitudinal factors along with demographic variables and their effects on car ownership decisions of young adults (future decision maker of their family). The questionnaire comprising of demographic characteristics, frequency of using public transport and attitudinal behavior-related questions on future car ownership decisions is conducted in the Jodhpur city of India and responses from 813 individuals (age group 15–29 years) are used in this study. The study employed a principal component analysis, and a subsequent binary logit model to determine the young Indian adults' perception towards car ownership decisions in the near future. This study gives many insights about car-ownership decisions. The major findings of the study are:

1. Gender of the respondent had no significant role in car ownership decisions.
2. Individuals whose educational qualification is higher than the post-graduation level and have educational background related to engineering are more likely to buy a car in the near future.
3. Individuals having a four-wheeler driving license and the car in their household have a higher tendency to buy a car than those who do not have a car in their household.

Table 5
Prediction success table.

Observed Choices of Individual	Predicted Choices of Individual		Row Totals	Observed Share (%)
	Buying a car	Not buying a car		
Buying a car	57	11	68	47.55
Not buying a car	16	59	75	52.45
Column Totals	73	70	143	100
Predicted Share (%)	51.05	48.95	100	
% Correctly Predicted	78.08	84.29	**81.12**	

4. Frequency of using public transport, have a considerable impact on attitudinal behavior regarding car-ownership decisions.
5. Those who are conscious about environmental sustainability, paying high taxes, and general traffic problems (like congestion, parking, accidents, etc.) are less likely to buy a car in the near future.
6. Individuals whose decisions are influenced by peer/external factors (like advertisements or inspired by relatives) have a higher tendency to buy a car.
7. Respondents who are passionate about cars, obsessed with cars, image-conscious and status seekers are more likely to buy a car in the near future.

From a broad viewpoint, this study recommends some policies to reduce the growth of new cars in developing countries like India:

1. The awareness programs/campaigns concentrating on the effect of cars on environmental sustainability and imposing high taxes on the purchase of new cars and fuels may decline the growth of new cars in developing countries.
2. Implementing road pricing in the form of per kilometer charge will be a much effective incentive in congested areas. It will force people to get out from their cars. Then provide education and information about other forms of sustainable transport (Kroesen 2020).
3. The external factors like advertisements related to consequence of cars in daily life, environments, etc. can alter or affect the growth of cars.
4. The quality of public transportation (comfort, fare, speed, safety, frequency, and reliability, etc.) influences use and car-owning behavior (He and Thøgersen, 2017). Hence, by improving the quality of public transport (as per user expectations) would increase the attractiveness of public transport with respect to car driving.
5. Like other developing countries (ex. China), Indian government should develop and implement transport policies that could potentially discourage use and owning a car without necessity purpose (like for status/image purpose) in order to ensure better sustainable mobility patterns in the future (Gärling and Loukopoulos 2008).
6. Policies that make the acquisition and driving a car more expensive on roads (by increasing toll taxes and fuel prices) would help to decline the growth of cars.

This study is highly relevant for transport planners, policy and decision-makers. The results of this study could be improved by considering larger sample sizes of young adults' across India (as this study only concentrates on the college/university young adults) and by incorporating various variables like age, gender, working employee, job seeker, perception about electric cars, frequency and use of other modes of transportation in the model.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgements

Appendix A. Pearson's correlations among demographic and psychological (n = 813)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. PG	1																	
2. Engg	-0.126	1																
3. Gender	0.007	0.195	1															
4. Age	0.509	-0.040	0.055	1														
5. LWF	0.011	-0.168	-0.154	0.012	1													
6. NMF	-0.032	-0.051	-0.022	-0.101	-0.064	1												
7. NOCF	0.009	-0.078	-0.180	-0.012	0.128	0.040	1											
8. DL	0.117	-0.023	0.146	0.239	0.150	-0.094	0.311	1										
9. UPT	0.046	0.179	0.025	0.016	-0.182	0.001	-0.020	0.044	1									
10. FAC1	-0.128	-0.019	0.046	-0.019	0.035	-0.031	-0.033	-0.117	-0.113	1								
11. FAC2	0.008	0.013	-0.031	0.008	0.012	-0.011	-0.010	-0.106	-0.125	0.285	1							
12. FAC3	0.062	0.031	-0.094	0.030	0.023	-0.109	0.090	0.076	0.028	0.013	0.249	1						
13. FAC4	-0.078	-0.040	0.008	-0.090	0.014	-0.061	-0.012	-0.117	-0.083	0.418	0.287	-0.045	1					
14. FAC5	-0.008	0.037	-0.122	-0.002	0.107	-0.097	0.112	0.063	-0.034	0.094	0.365	0.437	0.205	1				
15. FAC6	0.108	0.028	0.008	0.122	0.041	-0.009	0.043	-0.010	-0.087	0.056	0.532	0.392	0.000	0.356	1			
16. FAC7	0.081	0.060	-0.028	0.090	-0.011	-0.055	0.035	0.058	-0.024	0.076	0.418	0.495	0.068	0.462	0.471	1		
17. FAC8	-0.093	0.047	0.014	-0.082	-0.073	0.016	0.004	-0.029	-0.039	0.248	0.072	0.105	0.229	0.104	-0.039	0.053	1	
18. FAC9	0.147	0.037	0.054	0.061	-0.006	-0.070	-0.066	-0.033	-0.035	-0.150	0.223	0.128	-0.012	0.159	0.265	0.215	-0.148	1

Note: PG = Education Qualification (If qualification ≥ P.G. level = 1, otherwise 0); Engg = Course Pursuing (If course related to Engineering = 1, otherwise 0); Gender = 1 for male & 0 for female; Age = Age of the respondent; LWF = Living with family (yes = 1, otherwise 0); NMF = Number of members in the family; NOCF = Household car ownership (yes = 1, otherwise 0); DL = Possession of Car Driving License (yes = 1, otherwise 0); UPT = Uses of public transport (If, use at least once in a week = 1, at least once in a month = 2, very occasionally = 3, never = 4); FAC1 = Tax and Environmental Sustainability Concern; FAC2 = Comfort; FAC3 = Peer / external influences; FAC4 = General Traffic Concern; FAC5 = Image Conscious; FAC6 = Car Obsessed; FAC7 = Status seeker; FAC8 = Personal Parking and Congestion Concern; FAC9 = Car Passionate.

References

Asian Development Bank, 2012. India: Strengthening Urban Transport Subsector under ADB-Supported Urban Development Projects — Jodhpur BRT Pre-feasibility Study. Ministry of Urban Development, p. 226.

Banister, D., Button, K., 1993. Transport, the Environment and Sustainable Development. 1st Ed. Routledge.

Beirão, G., Sarsfield Cabral, J., 2007. Understanding attitudes towards public transport and private car: a qualitative study. Transport Pol. 14 (6), 478–489.

Belgiawan, Prawira, Schmöcker, Jan-Dirk, Fujii, Satoshi, 2011. Psychological determinants for car ownership decisions, 2011. In: The 16th International Conference of Hong Kong Society for Transportation Studies (HKSTS).

Belgiawan, P., Schmöcker, J., Abou-Zeid, M., Walker, J., Lee, T., Ettema, D., Fujii, S., 2014. Car ownership motivations among undergraduate students in China, Indonesia, Japan, Lebanon, Netherlands, Taiwan, and USA. Transportation 41 (6), 1227–1244.

Belgiawan, Prawira, Schmöcker, Jan-Dirk, Fujii, Satoshi, 2016. Understanding car ownership motivations among Indonesian students. International Journal of Sustainable Transportation 10, 295–307. https://doi.org/10.1080/15568318.2014.921846.

Bergstad, C., Gamble, A., Hagman, O., Polk, M., Gärling, T., Olsson, L., 2011. Affective–symbolic and instrumental–independence psychological motives mediating effects of socio-demographic variables on daily car use. J. Transport Geogr. 19 (1), 33–38.

Central Statistics Office Ministry of Statistics and Programme Implementation, 2017. YOUTH IN INDIA. Government of India, New Delhi, p. 86.

Churchill, G.A., 1979. A paradigm of developing better measures of marketing constructs. J. Market. Res. 2 (16), 64–73.

Cullinane, S., 2002. The relationship between car ownership and public transport provision: a case study of Hong Kong. Transport Pol. 9 (1), 29–39.

Dargay, J., Hanly, M., 2007. Volatility of car ownership, commuting mode and time in the UK. Transport. Res. 41, 934–948.

Delbosc, A., Currie, G., 2014. Using discussion forums to explore attitudes toward cars and licensing among young Australians. Transport Pol. 31, 27–34.

Gärling, T., Loukopoulos, P., 2008. Economic and psychological determinants of car ownership and use. In: Lewis, A. (Ed.), The Cambridge Handbook of Psychology and Economic Behaviour (Cambridge Handbooks in Psychology. Cambridge University Press, Cambridge, pp. 383–405. https://doi.org/10.1017/CBO9780511490118.016.

Gärling, T., Schuitema, G., 2007. Travel demand management targeting reduced private car use: effectiveness, public acceptability and political feasibility. J. Soc. Issues 63 (1), 139–153.

Ghate, A., Sundar, S., 2014. proliferation of cars in Indian cities: let us not ape the west. POLICY BRIEF. [online] New Delhi: the energy and resources institute. Available at:. Accessed. https://www.teriin.org/sites/default/files/2017-12/cars.pdf. (Accessed 10 April 2020).

He, S., Thøgersen, J., 2017. The impact of attitudes and perceptions on travel mode choice and car ownership in a Chinese megacity: the case of Guangzhou. Res. Transport. Econ. 62, 57–67.

Hensher, D., Rose, J., Greene, W., 2016. Applied Choice Analysis. Cambridge University Press, Cambridge.

MoRTH, Ministry of Road Transport and Highways, 2012. Road Transport Year Book: Motor Transport Statistics of India, MoRTH, India. MoRTH, 2012. "Road Transport Year Book (2009–10 and 2010–11).

Ibrahim, M., 2005. Attitudes to transport modes for shopping purposes in Singapore. Transport Rev. 25 (2), 221–243.

Iea, 2015. Energy and Climate Change: World Energy Outlook Special Report. International Energy Agency, New Delhi.

Jodhpur Development Authority, 2010. Comprehensive Mobility Plan for Jodhpur. Wilbur Smith Associates, p. 194.

Kroesen, M., 2020. A revolution in modelling travel behaviour. [online] TU delft. Available at:. Accessed. https://www.tudelft.nl/en/stories/articles/a-revolution-in-modelling-travel-behaviour/. (Accessed 10 April 2020).

Line, T., Chatterjee, K., Lyons, G., 2010. The travel behaviour intentions of young people in the context of climate change. J. Transport Geogr. 18 (2), 238–246.

Liu, Y., Sheng, H., Mundorf, N., Redding, C., Ye, Y., 2017. Integrating norm activation model and theory of planned behavior to understand sustainable transport behavior: evidence from China. Int. J. Environ. Res. Publ. Health 14 (12), 1593.

Newman, P., Kenworthy, J., 1999. Sustainability and Cities. Island Press, Washington.

Nishihara, N., Belgiawan, P.F., Zürich, I.V.T., Kim, J., Schmöcker, J.D., Axhausen, K.W., 2017. Identifying the relationship between parents' and child's car attitudes: for long-term management of car ownership. In: 17th Swiss Transport Research Conference (STRC 2017), Monte Verita, Ascona. https://doi.org/10.3929/ethz-b-000130803.

Pallant, J., 2010. SPSS Survival Manual: a Step by Step Guide to Data Analysis Using SPSS. Open University Press/McGraw-Hill, Maidenhead.

Pojani, E., Van Acker, V., Pojani, D., 2018. Cars as a status symbol: youth attitudes toward sustainable transport in a post-socialist city. Transport. Res. F Traffic Psychol. Behav. 58, 210–227.

Redman, L., Friman, M., Gärling, T., Hartig, T., 2013. Quality attributes of public transport that attract car users: a research review. Transport Pol. 25, 119–127.

Setiawan, R., Santosa, W., Sjafruddin, A., 2015. Effect of habit and car access on student behavior using cars for traveling to campus. Procedia Engineering 125, 571–578.

Sigurdardottir, S.B., Kaplan, S., Møller, M., 2014. The motivation underlying adolescents' intended time-frame for driving licensure and car ownership: a socio-ecological approach. Transport Pol. 36, 19–25.

Steg, L., 2005. Car use: lust and must. Instrumental, symbolic and affective motives for car use. Transport. Res. Pol. Pract. 39 (2–3), 147–162.

Steg, L., Vlek, C., Slotegraaf, G., 2001. Cognitive-reasoned and affective-emotional motives for using a motor car. Transportation Research-F: Psychology and Behaviour 4 (3), 1–19.

Tao, S., He, S., Thøgersen, J., 2019. The role of car ownership in attitudes towards public transport: a comparative study of Guangzhou and Brisbane. Transport. Res. F Traffic Psychol. Behav. 60, 685–699.

Verma, M., Manoj, M., Verma, A., 2016. Analysis of the influences of attitudinal factors on car ownership decisions among urban young adults in a developing country like India. Transport. Res. F Traffic Psychol. Behav. 42, 90–103.

Verma, M., Manoj, M., Verma, A., 2017. Analysis of aspiration for owning a car among youths in a city of a developing country, India. Transportation in Developing Economies 3 (1).

Wu, G., Yamamoto, T., Kitamura, R., 1999. A vehicle ownership preference model that incorporates the causal structure underlying attitudes towards vehicle ownership by non-owners. INFRASTRUCTURE PLANNING REVIEW 16, 553–560.

Zhu, C., Zhu, Y., Lu, R., He, R., Xia, Z., 2012. Perceptions and aspirations for car ownership among Chinese students attending two universities in the Yangtze Delta, China. J. Transport Geogr. 24, 315–323.

Protection of Distribution Feeder Using Stockwell Transform Supported Voltage Features

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Abstract— This paper presents a research work focussed on the identification of faults on the distribution feeder supported by Stockwell transform based summing of absolute values and median features using the voltage signals. A fault index is proposed which is obtained by the multiplication of H-index (obtained summation of absolute values S-matrix evaluated by ST supported decomposition of voltage) and VS-index (obtained median of absolute values S-matrix evaluated by ST supported decomposition of voltage). Classification of faults is achieved using decision rules. Investigated faults include phase to ground, fault between two phases, two phases to ground fault and fault involving all three phases and ground. Performance of algorithm is tested on high fault impedance and fault incidence angle. Proposed study is performed using MATLAB software in Simulink environment.

Keywords— Distribution Feeder Fault, Hilbert transform, protection, Stockwell Transform, voltage.

I. INTRODUCTION

Feeders used to transform power from grid substations (GSS) to the consumer ends are normally known as power distribution lines. These are exposed to different various natures of failures which are commonly not expected due to involvement of the random causes. These failures adversely affect the availability as well as reliability of the network. Accurate detection and identification of type of fault on these distribution feeders help to restore the power supply timely and also avoid the severe damage to the power system equipments [1]. Many schemes have been reported in last decades for the recognition of faults to design protection scheme for the radial distribution feeders. Signal processing methods have played a significant role for the identification of the faults. Signal analysis approaches like Wavelet transform (WT), Fourier transform (FT), Short time Fourier transform (STFT), fast Fourier transform (FFT), Stockwell transform (ST), Gabor transform (GT) etc. are reported for identification of faults [2]. Mahela et al. [3], introduced an approach using Stockwell transform for identification of faults on the transmission line in the presence of Thyristor switched capacitor (TSC). An intelligent scheme for identification of HIF on distribution network based on a combination of probabilistic neural network (PNN) and adaptive extended Kalman filter (AEKF) is found in [8]. AEKF is implemented for estimation of separate components of harmonic in HIF as well as no-fault (NF) associated with the current signals in the presence of non-linear loads. These harmonic components have been used utilized for training and testing of PNN which helps for classification of HIF from NF accurately. In [9], authors introduced an approach for location of fault in network of power system based on the processing of voltage signals. Voltage signals are converted into absolute values of phasor of complex valued which indicate travelling waves associated with the faults. This has been processed further for localization of faults using Hilbert–Huang transform (HHT). Results are validated on in mixed feeder for all types of faults including HIF of arcing. In [10], authors presented modelling of HIF on distribution feeder. Proposed model uses resistance of non-linear nature which represents high impedance path in the faulty event. Performance analysis of various parameters which are electric in nature and pertains to the fault of high impedance has been evaluated. In [11], a methodology for detection of HIF in distribution feeder of power network using Mathematical Morphology (MM) is proposed. Current signals are utilized for detection of HIF faults. MM is implemented for extraction of the features (in time domain) and a classification of HIF faults has been achieved using the rule supported algorithm. Data has been collected on network of power distribution utility. Low impedance faults (LIF) and switching transients have been simulated in MATLAB. It is established that proposed method is effective in detection and differentiation of HIF from switching transients. This is achieved is time lesser compared to that utilized by different approaches maintaining high security as well as dependability. Performance of introduced algorithm is independent on location of fault, time of fault inception, and fault type. Following is the main contribution of the paper:-

- An algorithm supported by Stockwell transform using voltage signals for identification of faults on the distribution feeder is proposed.
- Classification of faults is achieved using decision rules.
- Performance of algorithm is tested on high fault impedance and fault incidence angle.

II. PROPOSED DISTRIBUTION TEST SYSTEM

Proposed study related to fault identification and classification associated with distribution feeder is performed with the help of IEEE-13 bus distribution network. IEEE-13

Information Processing in Extended Hodgkin-Huxley Neuron Model

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Abstract— Models of a variety of neurons share the same form as the Hodgkin-Huxley (HH) neuron and evidence suggests that single-compartment models can capture the key properties of in vivo and in vitro neurons. In this paper we are going to discuss about how the conductance of the excitatory and inhibitory synapse vary when the pre synaptic action potential arrived at the synapse and how this synaptic conductance affects the information transfer in the single neuron. In our model the injected current is replaced with the synaptic current in the HH model. In order to validate the impact of excitatory and inhibitory synapse in the generation of action potential, the extended HH model is examined with various synaptic inputs.

Index Terms— HH Model, Mean Firing Rate, Entropy, Synaptic Conductance, Spike Train.

I. INTRODUCTION

Many models of brain function have been built; they differ in their objectives, requirements and limitations. Based on the questions what, how and why that a model can answer, the models can be classified as conceptual/phenomenological/black box type, mechanistic type/realistic or interpretive type models respectively. Hodgkin & Huxley model is a biological model which is accurately designed to describe and predict the behaviour of the neuron .Izhikevich[6] in his paper reviewed neuro-computational features of various spiking models and ranked the models based upon the neuro-computational behaviour, their implementation efficiency, etc. HH model is the only biological model which finds its way to achieve the complete fit of data which Izhievich have discussed.

II. HODGKIN & HUXLEY MODEL

Intracellular recordings of the neuron state that the action potential is characterized as the sudden increase in the membrane potential (depolarization) followed by a slow sharp decrease towards the resting potential. This may be followed by a fall below the resting potential due to the fall in membrane potential below the resting potential called after hyperpolarisation phase. Hodgkin and Huxley (partly in collaboration with Katz) were the first to describe the active mechanisms quantitatively [5].The final paper of Hodgkin and Huxley [5] shows the complete expression for the three ionic currents. The description of how the membrane potential changes in time is explained in the equation

$$C_m \frac{dV}{dt} = -\bar{g}_{Na} m^3 h(V - E_{Na}) - \bar{g}_K n^4 (V - E_K) - \bar{g}_L(V - E_L) + I_{inj} \qquad (1)$$

The HH model is stimulated by the external injected current. Similar to real neuron this model generates repetitive firing and the greater the input current, the faster the firing rate. However the real single neuron firing traces show high variability, for instance, the coefficient of variation in the spike interval (ISI) of neuron firing in response to the stimulus for a period of several seconds is approximately equal to 1 as expected from the Poisson process[4].Furthermore, the neuron receives inputs from several other neurons. The current generated by these neurons may be from the excitatory or from inhibitory, which are approximately balanced to each other [10].To study this behaviour, the original HH model described in the equation 1.1 is extended by adding additional synaptic currents. Simulations based upon applying Poisson distributed excitatory and inhibitory inputs demonstrate that the neuronal firing output shows considerable variability in the ISI. Depolarizing with balanced synaptic current reduces the membrane time constant and also affects the information processing in several aspects[1-2],[7-9].

In this paper the extended HH model is modelled with the network consisting of 1000 excitatory and 200 inhibitory synapses. The excitatory and inhibitory synapses are activated by the spike train generated by a Poisson process of various rates f_{ex}, f_{in} respectively [3].The behaviour of the membrane potential is approximated using the conductance-based relationship is now given below by (2).

$$C_m \frac{dV}{dt} = -\bar{g}_{Na} m^3 h(V - E_{Na}) - \bar{g}_K n^4 (V - E_K) - \bar{g}_L(V - E_L) + I_{syn} \qquad (2)$$

where, I_{syn} is the synaptic current and the synaptic current is given by (3).

$$I_{syn} = -\bar{g}_{exe}(V - E_{Na}) - \bar{g}_{in}(V - E_K) \qquad (3)$$

The time course of synaptic input can de described by a simple decaying exponential function. The synaptic conductance [4], [11] is calculated as given below in (4).

Convolutional Neural Networks with Transfer Learning for Recognition of COVID-19: A Comparative Study of Different Approaches

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Abstract: To judge the ability of convolutional neural networks (CNNs) to effectively and efficiently transfer image representations learned on the ImageNet dataset to the task of recognizing COVID-19 in this work, we propose and analyze four approaches. For this purpose, we use VGG16, ResNetV2, InceptionResNetV2, DenseNet121, and MobileNetV2 CNN models pre-trained on ImageNet dataset to extract features from X-ray images of COVID and Non-COVID patients. Simulations study performed by us reveal that these pre-trained models have a different level of ability to transfer image representation. We find that in the approaches that we have proposed, if we use either ResNetV2 or DenseNet121 to extract features, then the performance of these approaches to detect COVID-19 is better. One of the important findings of our study is that the use of principal component analysis for feature selection improves efficiency. The approach using the fusion of features outperforms all the other approaches, and with this approach, we could achieve an accuracy of 0.94 for a three-class classification problem. This work will not only be useful for COVID-19 detection but also for any domain with small datasets.

Keywords: convolutional neural networks; transfer learning; K-means clustering; principal component analysis

1. Introduction

COVID-19, a global pandemic, is still spreading in many parts of the world since its identification in late December 2019. In these nine to ten months, this disease has become one of the most significant public health emergencies requiring remedial measures and early diagnosis. In many countries till recently, reverse transcription-polymerase chain reaction (RT-PCR) tests are the most popular diagnostic method for detecting COVID-19. Although popular, this method suffers from limitations in its long wait time and low sensitivity. Therefore, for the early diagnosis of COVID-19, many have started using molecular tests to determine the coronavirus. For example, many existing machines like Genmark's ePlex Respiratory Pathogen instrument or Abbott's ID, etc., have a COVID-19 feature for testing, which takes much less time [1,2]. The other advantage is that the sensitivity of these molecular tests is around 90% better than the RT-PCR method having a sensitivity of about 70%. However, both the RT-PCR method or molecular testing approach need expensive equipment and trained professionals. Further, the availability of these methods is limited in remote areas and low and middle-income

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Convolutional Neural Networks with Transfer Learning for Recognition of COVID-19: A Comparative Study of Different Approaches

by

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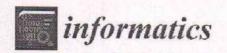
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Voltage-Based Hybrid Algorithm Using Parameter Variations and Stockwell Transform for Islanding Detection in Utility Grids

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Abstract: This paper has introduced an algorithm for the identification of islanding events in the remotely located distribution grid with renewable energy (RE) sources using the voltage signals. Voltage signal is processed using Stockwell transform (ST) to compute the median-based islanding recognition factor (MIRF). The rate of change in the root mean square (RMS) voltage is computed by differentiating the RMS voltage with respect to time to compute the voltage rate of change in islanding recognition factor (VRCIRF). The proposed voltage-based islanding recognition factor (IRFV) is computed by multiplying the MIRF and VRCIRF element to element. The islanding event is discriminated from the faulty and operational events using the simple decision rules using the peak magnitude of IRFV by comparing peak magnitude of IRFV with pre-set threshold values. The proposed islanding detection method (IDM) effectively identified the islanding events in the presence of solar energy, wind energy and simultaneous presence of both wind and solar energy at a fast rate in a time period of less than 0.05 cycles compared to the voltage change rate (ROCOV) and frequency change rate (ROCOF) IDM that detects the islanding event in a time period of 0.25 to 0.5 cycles. This IDM provides a minimum non-detection zone (NDZ). This IDM efficiently discriminated the islanding events from the faulty and switching events. The proposed study is performed on an IEEE-13 bus test system interfaced with renewable energy (RE) generators in a MATLAB/Simulink environment. The performance of the proposed IDM is better compared to methods based on the use of ROCOV, ROCOF and discrete wavelet transform (DWT).

Keywords: distribution grid; islanding event; renewable energy; Stockwell transform

1. Introduction

Renewable energy (RE) provides clean energy to the consumers and reduces transmission losses when integrated to the grid in large quantum near-load centers. The structure of the conventional power network has been modified, and the power network is smarter and more efficient. In addition, problems arise because of grid convergence that urgently needs to be solved. Unintentional islanding is an important problem that can lead to poor quality of power (PQ), frequency instability and a risk to the personal safety of the consumer. Hence, it becomes essential for detecting this scenario accurately and reliably to isolate islanded network immediately [1]. According to the IEEE Std. 1547, the islanding event should be identified within 2 s after it has an incident on the network. The methods of islanding detection (IDMs) are graded into passive IDM, active IDM and hybrid IDM [2]. For identification of the islanding, passive IDMs use under/over voltage, under/over frequency,

Article

A Fusion-Based Hybrid-Feature Approach for Recognition of Unconstrained Offline Handwritten Hindi Characters

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Abstract: Hindi is the official language of India and used by a large population for several public services like postal, bank, judiciary, and public surveys. Efficient management of these services needs language-based automation. The proposed model addresses the problem of handwritten Hindi character recognition using a machine learning approach. The pre-trained DCNN models namely; InceptionV3-Net, VGG19-Net, and ResNet50 were used for the extraction of salient features from the characters' images. A novel approach of fusion is adopted in the proposed work; the DCNN-based features are fused with the handcrafted features received from Bi-orthogonal discrete wavelet transform. The feature size was reduced by the Principal Component Analysis method. The hybrid features were examined with popular classifiers namely; Multi-Layer Perceptron (MLP) and Support Vector Machine (SVM). The recognition cost was reduced by 84.37%. The model achieved significant scores of precision, recall, and F1-measure—98.78%, 98.67%, and 98.69%—with overall recognition accuracy of 98.73%.

Keywords: Bi-orthogonal; DCNN; DWT; Hindi characters; hybrid-features; fusion; MLP; PCA; SVM; transfer learning

1. Introduction

The increasing demand for the automation of language-based systems is high due to the associated vast application field. It includes digitalization and preservation of the manuscripts of historic significance, computerized editing of handwritten documents, automatic processing of cheques in the bank, recognition of postal address written on mails, parcels, etc. and their address-wise sorting through computer vision, translation of road safety-instructions written in the local language on roadside boards, computerized recognition of medical-aids as mentioned in handwritten prescription, and many more related applications. The machine-based recognition of handwritten scripts is much more difficult than that of printed ones due to inherent unconditional variation in shape, size, skewness, and degree of connectedness between various characters. Countries like India, China, Saudi Arabia, and the United Arab Emirates are developing automation systems in country-specific languages to serve its advantage to the mass of the people as large populations of these countries have not adopted English as their first language.

Many advancements have been reported for English language-based automation systems due to their global acceptance. Extra attention is needed for systems based on languages like Hindi (Devnagari), Chinese, Urdu, Farsi, etc., as they are in a developing

Article

Design and Performance Analysis of Hybrid Battery and Ultracapacitor Energy Storage System for Electrical Vehicle Active Power Management

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Abstract: The electrical energy storage system faces numerous obstacles as green energy usage rises. The demand for electric vehicles (EVs) is growing in tandem with the technological advance of EV range on a single charge. To tackle the low-range EV problem, an effective electrical energy storage device is necessary. Traditionally, electric vehicles have been powered by a single source of power, which is insufficient to handle the EV's dynamic demand. As a result, a unique storage medium is necessary to meet the EV load characteristics of high-energy density and high-power density. This EV storage system is made up of two complementing sources: chemical batteries and ultracapacitors/supercapacitors. The benefits of using ultracapacitors in a hybrid energy storage system (HESS) to meet the low-power electric car dynamic load are explored in this study. In this paper, a HESS technique for regulating the active power of low-powered EV simulations was tested in a MATLAB/Simulink environment with various dynamic loading situations. The feature of this design, as noted from the simulation results, is that it efficiently regulates the DC link voltage of an EV with a hybrid source while putting minimal load stress on the battery, resulting in longer battery life, lower costs, and increased vehicle range.

Keywords: electric vehicles; battery; ultracapacitors; energy storage system

1. Introduction

Electric cars (EVs) are becoming more popular as a result of environmental concerns and rising gasoline prices. When compared to gasoline-based internal combustion engine (ICE) vehicles, EVs have superior fuel economy and adhere to modern world pollution requirements. Standard EVs are available on the market as a power source. It is worth noting that EVs are subjected to a variety of time-varying power needs, such as abrupt acceleration and deceleration (regeneration period). This acceleration and regeneration period is analogous to pulse load changes, and the battery must absorb a huge transient charging current at this time, negatively impacting the battery's performance. A supplementary energy storage technology (ultracapacitor) is occasionally used to mitigate this negative effect on the battery [1].

By incorporating diverse topologies of ultracapacitor connection, the influence of the battery's performance on abrupt charging and draining can be mitigated. An ultracapacitor

Estimation of Faults in Grid Connected Solar Photovoltaic Farm Using Voltage Based Median and Summing Values Features of Stockwell Transform Based Algorithm

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Abstract—Research work under taken in this paper is concentrated to design an algorithm using Stockwell Transform for estimation of faults in grid integrated solar PV farm. An algorithm based on Features such as median and summing absolute values of Stockwell Transform using the voltage signal has been presented in this manuscript. Proposed algorithm can be utilized in protection schemes of the transmission and distribution feeders in the grid integrated solar PV farms. Algorithm has been tested for the estimation of the faults such as phase to ground, phase to phase, two phases to ground and three phases to ground fault on the AC side of the grid. Algorithm is also tested for estimation of faults on the DC bus of the solar PV farms. Study is carried out using MATLAB software.

Keywords—AC grid; DC bus; fault; Solar PV farm; Stockwell Transform.

I. INTRODUCTION

Power utility network is complex in nature which may be considered as spatial and temporal complexity. This network is also nonlinear and non-stationary in nature which includes many uncertainties at different levels of generation, transmission and distribution of electrical power. Transmission lines are constructed with long distances in different geographical regions having variable nature like deserts, plains and hills. These lines are used to transfer power in bulk quantity from generator station to centres of loads over long distances. Hence, possibility fault occurrence on the transmission lines is very in comparison to other components of the utility power network. Frequently observed faults on the transmission line may be included in the categories such as line to ground (LG) fault, double line (LL) fault, double line to ground (LLG) fault, three phase (LLL) fault, three-phase to ground (LLLG) fault and faults of nature inter circuits [1]. Long distance transmission lines are essential requirement of the electric power utility grid to transfer bulk power over long distances from generators to load centres. This includes multiple sending end generators and the multiple receiving load centres. In recent years the power system network

transmission system deployed the high voltage direct current (HVDC), ultra high voltage DC (UHVDC), multi-terminal DC (MTDC) and multi-terminal AC for transmission of bulk power from one point to the other [2]. Power transfer capability of the existing corridors of the transmission lines have been increased by the use of the compensations devices like series and shunt. In addition of power transfer capability of transmission lines, these compensations also help to increase the voltage profile and improve the transient stability of the system. However, presence of renewable power generation creates additional problems related to protection due to the uncertain in nature of RE sources. The issues observed due to deployment of compensation devices include [3] as detailed.

- Sudden change impedance of line at compensation point
- Inversion of current and voltage
- Frequency components other than the power frequency are introduced in voltage and current signals.

When the solar PV farms are integrated with network of distribution part of the power system, protective devices faces change in behaviour due to fact related to flexibility of changes in number of solar PV plant units. Further, these units are spread over the large area and power output of these units may change due to the variation in solar insolation and wind speed. The solar energy source production capacity is low in terms of volume. It has low operational cost compared to the large sized generators and power plants. Also integration of these units to distribution and transmission networks has been gaining interests due to the economic issues associated with the development of the power plants, reduced environmental pollution, increased power generation efficiency, improved quality of power supplied to customers, reduced losses in power network, improved voltage profile, and liberalized network capacity [4].

Time frequency methods play important role on the detection of transmission line faults to design the efficient

This article has been accepted for inclusion in a future issue of this journal. Content is final as presented, with the exception of pagination.

IEEE SYSTEMS JOURNAL

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Recognition of Islanding and Operational Events in Power System With Renewable Energy Penetration Using a Stockwell Transform-Based Method

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Abstract—Integration of RE sources to the utility grid offers technical and operational challenges causing problems of PQ, stability, identification of operational events, etc. This article presents an algorithm to identify events including islanding, grid integration, and outage of the solar PV and WG plants in grid using a ST. Islanding event may occur in the presence of any kind of plant. Processing of negative sequence component of voltage is performed by utilizing ST based multiresolution analysis at the test node and the output matrix is evaluated. The features (F1–F4), VI and STD indexes are obtained from this matrix. These features are utilized for identifying the events and transient phenomenon. The VI and STD indexes are used to recognize the type of RE source present during the islanding and outage events. Moreover, for recognizing the type of RE source at the time of synchronization event, an SI is proposed. This is computed by the ST depended processing of voltage signals. Performance of the algorithm is found satisfactory for all incidence angles and complete voltage cycle under the noisy conditions of 10 dB SNR. As compared to the time–frequency transform based coefficients of the voltage signal, the proposed technique is found to be superior in terms of small NDZ and low computation time and least affected by noise. Further, the developed technique is also efficient to detect various events stated above and the type of RE source. Study is performed using MATLAB/Simulink software and validated in real time using RTDS.

Index Terms—Grid synchronization event, islanding event, outage event, power system network, renewable energy (RE), Stockwell transform (S-transform), transient phenomenon.

Manuscript received June 5, 2020; revised August 3, 2020; accepted August 27, 2020. (*Corresponding author: Om Prakash Mahela.*)

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Digital Object Identifier 10.1109/JSYST.2020.3020919

NOMENCLATURE

AC	Alternating current.
ACSR	Aluminum conductor steel reinforced.
AI	Artificial intelligence.
ANFIS	Adaptive neuro-fuzzy inference system.
DC	Direct current.
CWT	Continuous wavelet transform.
DFIG	Double fed induction generator.
DG	Distributed generation.
FT	Fourier transform.
HID	Human interface device.
IDI	Islanding detection index.
IEEE	Institute of Electrical and Electronics Engineers.
IID	Island interconnection device.
MGP	Multigene genetic programming.
NDZ	Nondetection zone.
NSC	Negative sequence component.
PHEV	Plug-in hybrid electric vehicle.
PQ	Power quality.
PV	Photovoltaic.
RE	Renewable energy.
RTDS	Real-time digital simulator.
SAM	Sum absolute magnitude.
SAV	Sum absolute values.
SI	Synchronization index.
SNR	Signal to noise ratio.
SPS	System protection schemes.
STD	Standard deviation.
ST	Stockwell transform.
STA	Absolute values matrix of ST-matrix.
STFT	Short time Fourier transform.
SVM	Support vector machine.
VI	Variance index.
WG	Wind generator.
WT	Wavelet transform.
kW	Kilowatt.
kVAr	Kilovolt ampere reactive.
kV	Kilovolt.
MVA	Megavolt ampere.
MW	Megawatt.
Ω	Ohm.

Combined Stockwell and Hilbert Transforms Based Technique for the Detection of Islanding Events in Hybrid Power System

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Abstract—This paper presents a technique using hybrid features extracted from current signals using Stockwell and Hilbert Transforms for detecting the islanding events and operational events of renewable energy generators and loads. The study is performed on a hybrid power system test network incorporating wind and solar power generators. Results are computed using MATLAB/Simulink software for a variety of case studies. Through the applied technique islanding events are successfully identified and discriminated from operational events.

Keywords—Hybrid power system; wind energy; Hilbert Transform; solar energy; Stockwell Transform.

I. INTRODUCTION

Integration of the Renewable Energy (RE) to grid is being continuously increasing due to the requirement of pollution free energy all around the world [1, 2]. However, the use of renewable energy as green energy has imposed many challenges to the utilities in terms of power quality, power system protection; and reliability [3]. This has caused due to the uncertain nature of the renewable power generation. This has also caused unwanted tripping of the power system equipments and generators. Sometimes, this may also disconnect a section of energy network from the rest of the supply network, and this isolated part of the network would operate in an isolated mode and known as islanding operation of the power system operation. In this mode, the load demand is met by the local generators. Islanding takes place when a distributed generation (DG) and connected load are disconnected, and these DG sources supply power to the loads in isolated mode. Islanding poses many challenges for the power system network. The existing standards do not permit the DGs to operate in islanded mode. Hence, there is a need to detect the islanded operation of the power system network and discriminate the same from the other operational events. The operational events with renewable energy (RE) sources sceanrios like outage of RE plants, grid synchronization of RE plants and islanding of test grid also affects quality of the power. Techniques of signal processing have played important

roles in the detection of islanding events [4]. However, available techniques use only the single signal processing methods, where the efficiency is quite low [5-10]. The use of combined features of more than two methods may improve the efficiency of islanding detection. In [5], the authors proposed an algorithm for anti-islanding, which is passive in nature and can be used for the inverter, based distributed generation (DG) units as well as synchronous machine supported DG units. At the moment when mismatches between the active power and reactive power approach near to null value, most of the anti-islanding techniques, which are passive in nature, cannot be effective for the detection of the islanding phenomenon with good accuracy. In [6], an algorithm was introduced for the identification of islanding of wind turbine based power system network. Applications of trajectory based on state variables and wavelet transform (WT) have been tested in a micro-grid system. Relays are used for the estimation of variations in the energy state of coefficients of time-frequency transform of signals recorded in two-dimensional space [6]. Performance of relay has been improved with the help of selection of signals supported method and using the correlating islanding as well as non-islanding phenomena [6]. In [7], a method is proposed for the detection of islanding, which inserts sufficient and variable impedance on low voltage part of the grid. Identification of islanding will be affected by intelligent agents inserted in a central switch of the micro-grid. It is converted to a hybrid automatic transfer switch (HATS). HATS agent is effective in identification of operational mode of the micro-grid supported by measuring the local parameters and supervising the grid status. In [8], a detailed comprehensive review on Islanding detection methods is presented aiming to aid the design efforts of islanding identification methods and standards of anti-islanding. In [9], a detailed study is presented, which is related to islanding identification scheme that can be implemented in remote areas for the hybrid power plant based on the wind and solar PV systems. Method has also been implemented based on the solution reached using the classification supported by the currents. The proposed techniques are effective in monitoring

Effect of Irradiance on Performance for Poly-Crystalline Photo-voltaic Cell

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Abstract:

In this paper, simulation of 60 Cells Eldora Ultima Silver 1500 V Series by Vikram Solar Panel using Matlab Simulink approach is presented. The method is used to determine the PV & I-V characteristics of proposed module in various conditions especially in different levels of irradiation. In addition, all results from Matlab Simulink are verified with the data sheet of Eldora Ultima Silver 1500 V Series by Vikram Solar Panel.

Keywords — **Solar photovoltaic cell, mathematical model, modeling, PV module, standard test condition (STC), PV characteristic; simulink/matlab.**

I. INTRODUCTION

Studies of polycrystalline silicon are numerous especially through the technical development of characterization methods in order to raise the performance of solar cells made of this material document is a template. The polycrystalline PV cell (solar cell) converts the sunlight into the electrical energy by the photovoltaic effect. Energy from PV modules offers several advantages, such as, requirement of little maintenance and no environmental pollution. The polycrystalline PV module typically consists of a number of PV cells in series. The conventional technique to model a PV cell is to study the p-n junction physics. The polycrystalline PV cell has a non-linear voltage-current (*V-I*) characteristic which can be modelled using current sources, diode(s) and resistors. Single-diode and double-diode models are widely used to simulate PV characteristics. The single-diode model emulates the PV characteristics fairly and accurately. The manufacturer provides information about the electrical characteristics of PV by specifying certain points in its *V-I* characteristics which are called remarkable points.

In this paper, a simplified polycrystalline PV equivalent circuit with a diode (The single-diode model) equivalent as model is proposed. The main contribution of this work is the implementation of a generalized polycrystalline PV model with Matlab/simulation.

II. A MATHEMATICAL MODEL OF PHOTOVOLTAIC MODULE

A solar cell is basically a p-n junction fabricated in a thin wafer of semiconductor. The electromagnetic radiation of solar energy can be directly converted to electricity through photovoltaic effect. Being exposed to the sunlight, photons with energy greater than the band-gap energy of the semiconductor creates some electron-hole pairs proportional to the incident irradiation. The equivalent circuit of a Poly-Crystalline PV Cell is shown in figure 1.This model is known as a single diode model of solar cell. The current source I_{ph} represents the cell photo-current. R_{Sh} and R_S are the intrinsic shunt and series resistances of the cell respectively. Usually the value of R_{Sh} is very large and R_S is very small, hence shunt resistor may be neglected to simplify the analysis. The poly-crystalline PV panel can be modelled mathematically with the equations [(1) to (4)] given below:

Investigation of Complex Power Quality Disturbances using Discrete Wavelet Transform

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Abstract – *This research work aims to investigate power quality disturbances using discrete wavelet transform technique. MATLAB is used for generation of power quality disturbances using mathematical relations as per IEEE Standard-1159. The investigated power quality disturbances are single stage as well as complex power quality disturbances. These power quality signals are decomposed using discrete wavelet transform with db4 as mother wavelet up to level 4 of decomposition. The plots related to detail coefficients and approximation coefficients are analyzed for detection of PQ disturbances. Power quality disturbance present in the signals are detected and classified using the features of these plots.*

Key Words: **IEEE, Single Stage Power Quality disturbances, Complex power quality disturbance, discrete wavelet transform, power quality.**

1. INTRODUCTION

The considerable changes in a business environment have increased the use of sensitive electronic components, computers, programmable logic controllers, protection and relaying equipments, which have increased the power consumption [1]. The simultaneous occurrence of two or more than two of these disturbances is known as complex power quality disturbance. These disturbances causes the problems such as failure of equipments, short life time of the equipments, malfunction of equipments, instability of the system, reduced efficiency of equipments etc. [2]. Increasing consumer expectation with the requirement of green supply around the globe, where integration of renewable energy sources to the distribution grid is the focus area of smart grid, Electrical Power Systems are expected to deliver power supply continuously at high quality to the consumers. Economy of ant country suffers with huge losses when there are voltage or current abnormalities present in the power delivery. Any deviation / disturbance manifested in the voltage, current and frequency from the standard rating is treated as power quality (PQ) problem that results in failure or malfunctioning of electrical/electronic equipments [3]. Power quality disturbances and resulting problems are due to increasing use of the solid state switching devices, power electronically switched loads, non-linear loads, lighting controls, unbalanced power systems, industrial plant rectifiers and inverters as well as data processing

equipments [4]. Therefore, power quality needs to be monitored and improved. The advanced signal processing and Artificial Intelligence techniques are proposed for recognition of Power Quality Disturbances   [5]. The mathematical and signal processing techniques have been utilized for the detection and classification of single stage as well as complex PQ disturbances. An approach for the recognition of PQ disturbances in the power system using wavelet transform and radial basis function neural network (RBFNN) has been reported in [6]. Mahela et al. [7], presented a comprehensive review of various signal processing and artificial intelligent techniques utilized for the automatic recognition of PQ disturbances as well as effect of noise on the detection and classification of these events. Commonly used PQ detection techniques include Fourier transform, Kalman filter, wavelet transform, S-transform, Hilbert Huang transform, Gabor transforms etc. The artificial intelligent tools used for the classification of PQ disturbances are support vector machine, artificial neural network, expert systems, Fuzzy logic, k-nearest neighbor etc. [8]. One variant of Fourier Transform, the Short Time Fourier Transform (STFT) divides the signal into small segments, where these signal segments can be assumed to be stationary and utilized for detection of PQ disturbance [9].

2. SIGNALS GENERATION OF PQ DISTURBANCES

The single stage power quality disturbances are generated using the mathematical relations reported in [10]. The generated single stage power quality disturbances include pure sine wave, voltage sag, voltage swell, momentary interruption, oscillatory transient, impulsive transient and notch. The discrete wavelet transform based plots of pure sine wave are used as the reference curves for the detection of PQ disturbance present in the signal. Single stage Power Quality Disturbances has been investigated in [11] & [12]. The complex power quality disturbances are generated using the various combinations of the above mentioned single stage PQ disturbances. The generated complex power quality disturbances include (voltage sag + harmonics), (voltage swell + harmonics), (momentary interruption + harmonics), (oscillatory transient + voltage sag), (impulsive transient + voltage sag),   (oscillatory transient + voltage sag + harmonics), (impulsive transient + voltage sag + harmonics), and (Oscillatory Transient + Impulsive Transient + Voltage sag + Harmonics). The discrete wavelet transform based

Analysis of Modelling of Double Diode PV Panel and Effects of Various Parameters and Its Efficiency

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Abstract *–This paper presents P-V characteristics and efficiency of double diode model equivalent circuit for modeling of photovoltaic cell using MATLAB program. The main work of this simulation is to observe effect of variations in solar cell parameters on output power and efficiency. Since simulation with double diode model require extra equations but due to using efficient iterative method it reduced and less equation for faster calculation. This simulation is based on data provided by solar panel manufacturer.*

Key Words: **P-V Characteristics, Double Diode, Irradiation, Temperature, No. of Cells, Ideality Factor, Parasitic Resistance**

1. INTRODUCTION

Today most of the country use fossil fuel to run vehicles, airplanes, and to power houses and industries but this fossil fuel is limited on earth and will get empty in few decades. [1] To extend this time renewable source of energy is available sun is the great example of renewable source of energy for millions of year as long as the life of sun will give energy. [1][2] Solar gives solar energy in abundant amount of energy in the form of light and various energy, some are harmful like UV some are useful like irradiation and sunlight used by plants and irradiation to heat water, cooking and to generate electricity. [2][3]

Due to blackbody effect almost all material absorbs solar radiation for example a red plate absorbs all visible light 250nm to 2500nm wavelength except 700nm which is red colour's wavelength which is reflected. This absorbed energy heat up the surface, this same pheromone is done with irradiation whose wavelength starts from 700 to make electrical energy with solar cell which captures photons which convert to electrons in junction point and semiconductor will try to make balance between electrons and holes which produce potential across terminals. The energy is very dense in radiation as $1.75W/m^2/nm$ for 500nm wavelength however after $1.5W/m^2/nm$ it starts decreasing near to 0.1 for irradiation. Single layer solar cell is not efficient to collect this amount of densed energy, for higher efficiency multilayer solar panel is used. [4][5][6]

PV technology is getting popular among the world due to it generates energy from free source of energy sun and require less maintenance. Electrical power is generated by a plate of semiconductor its same as other diode with p-n

junction where electron-holes pair is generated by collision of sunlight (photons) with atom which release electrons and a hole is left behind this imbalance produces potential across terminals. A single solar cell produce 0.5 to 0.7 V and 0.1 to 0.3A current, which means it requires large array to produce required power this further require large area of land which is an drawback of using solar energy the solution is to increase efficiency of absorption of irradiation, this can be achieve by research in photovoltaic technology which is done by simulation of solar cell. [7]

Researchers use simulation software like matlab and spice for solar cell many pv model is available for an ideal pvcell ideal diode model is used with 3 parameter, single diode model with parasitic resistance with 5 parameters and double diode model with 7-8 parameters and three diode model with 9 parameters.[2][6][7]

In this paper double diode is chosen because this model gives higher accuracy for simulation of solar cell, to reduce simulation time 8 parameter is reduced to seven this result in reduction in no. of equations by the help of efficient iterative method and simulation is done on 7 selected parameter (irradiation, temperature, parasitic resistances, and no. of series and parallel cells and ideality factor) for wide observation on P-V characteristics and their effect on performance & efficiency.

2. Equivalent circuit with double diode model

For mathematical expression of solar cell an equivalent electrical circuit is required as shown in fig 1 which is a double diode model with an current source(Iph) which represent current generated by photons, an ideal diode (D1) in parallel to source whose ideality factor is 1, another diode (D2) in parallel with known ideality factor, series and parallel resistance which represent internal resistance of solar cell , Id1 and Id2 is diode leakage current and I is the output current get by removing all losses from Iph. By efficient iterative method ideality factor, series & parallel resistance and saturation current is obtained. [14] The simulation is based on real model data provided by manufacturer of adani eternal series (300wp) whose specifications are shown in Table 1.

Assessment of impact of relaxation in lockdown and forecast of preparation for combating COVID-19 pandemic in India using Group Method of Data Handling

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ARTICLE INFO

ABSTRACT

Ever since the outbreak of novel coronavirus in December 2019, lockdown has been identified as the only effective measure across the world to stop the community spread of this pandemic. India implemented a complete shutdown across the nation from March 25, 2020 as lockdown I and went on to extend it by giving timely partial relaxations in the form of lockdown II, III & IV. This paper statistically analyses the impact of relaxation during Lockdown III and IV on coronavirus disease (COVID) spread in India using the Group Method of Data Handling (GMDH) to forecast the number of active cases using time series analysis and hence the required medical infrastructure for the period of next six months. The Group Method of Data Handling is a novel self organized data mining technique with data driven adaptive learning capability which grasps the auto correlative relations between the samples and gives a high forecasting accuracy irrespective of the length and stochasticity of a time series. The GMDH model has been first validated and standardized by forecasting the number of active and confirmed cases during lockdown III-IV with an accuracy of 2.58% and 2.00% respectively. Thereafter, the number of active cases has been forecasted for the rest of 2020 to predict the impact of lockdown relaxation on spread of COVID-19 and indicate preparatory measures necessary to counter it.

1. Introduction

Human civilizations have been periodically challenged by the onset of infectious diseases. In the realm of infectious diseases, a pandemic is the worst case scenario. The latest one in the series of pandemics has been caused by the family of corona viruses. Corona viruses are pleomorphic, single stranded ribonucleic acid (RNA) viruses. The "novel" coronavirus is a new strain that has not been previously identified in humans. The name derives from the crown like appearance produced by the club shaped projections that stud the viral envelope. The 21st century saw its first pandemic in 2002 as Severe Acute Respiratory Syndrome or SARS followed by Middle East Respiratory Syndrome (MERS-CoV) and Severe Acute Respiratory Syndrome (SARS-CoV) [1]. Today the world is fighting another pandemic known as Coronavirus disease 2019 abbreviated as COVID-19. The initial cases of COVID-19 were reported on 8 December 2019 in Wuhan, Hubei province, China.

Cases were reported after exposure to the local Hunan South China seafood market that sells a variety of wild animals, suggesting that the zoonotic Coronavirus crossed the barrier from animal to human at this market [2]. The COVID-19 is said to be caused by 2019-nCoV (Novel Coronavirus 2019, 2020) termed by World Health Organization (WHO) or SARS-CoV-2(Severe Acute Respiratory Syndrome Coronavirus 2) as termed by the International Committee on Taxonomy of Viruses. COVID-19 virus is categorized by WHO as β-CoV of group 2B [3]. The genome of this virus is identified and it resembles the SARS-CoV (80% similarity) and MERS-CoV (50% similarity) [4,5]. As of 30/06/2020, the world has registered 1,01,85,374 confirmed cases and 5,03,862 deaths due to COVID-19. With nearly 25% of total cases in world, USA has been the most effected country followed by Brazil, Russia, and India. The first confirmed case of novel coronavirus in India was reported on 30 January 2020, in the state of Kerala. As of today, India has reported 5,66,840 confirmed cases and 16,893 deaths due to COVID-19 [6,7].

The spread of coronavirus is by sneezing, cough droplets and contact. This virus tends to enter the body through the mouth, nose, and eyes [8]. It is speculated that the virus may infect a person at a distance of about 6 ft (1.8 m) radius. The virus can sur-

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Automatic Generation Control for Three Area System Using Improved Bacteria Foraging Optimization Algorithm (IBFOA)

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Abstract— Simultaneous optimization of certain parameters like Ki, Ri and Bi has been done which grants not only the best dynamic response for the system but also permits us to use quiet larger values of Ri than put into practice. This will help the industries concerning power for simpler as well as cheaper realization of the governor. The performance of IBFOA is also investigated through the convergence characteristics which reveal that that the Bacteria Foraging Algorithm is relatively faster in optimization such that there is drop in the computational load and also minimum use of computer resource utilization.

Keywords—(IBFOA-Improved Bacteria Foraging Optimization Algorithm)

I. INTRODUCTION

Power systems are very large and complex electrical networks consisting of generation networks, transmission networks and distribution networks along with loads which are being disturbed throughout the network over a large geographical area. The rapid growth of industries has further lead to the increased complexity of the power system. The successful operation of interconnected power system requires the matching of total generation with total demand and associated system losses [1][2]. With time, the operating point of a power system changes, and hence, these systems may experience deviations in nominal system frequency and scheduled power exchanges to other areas, which may yield undesirable effects. In actual power system operations, the load is changing continuously and randomly. The ability of the generation side to track the changing load is limited due to physical/technical consideration, causing imbalance between the actual and scheduled generation quantities. This action leads to a frequency variation. The difference between the actual and the synchronous frequency causes mal operation of sophisticated equipment like power converters by producing harmonics [3].

In the power system, the system load keeps changing from time to time according to the needs of the consumers. Changes in real power affect mainly the system frequency, while reactive power is less sensitive to changes in frequency and is mainly dependant on changes in voltage magnitude. Thus active and reactive powers are controlled separately. The Load Frequency Control (LFC) loop controls the real power &

frequency and Automatic Voltage Regulator (AVR) loop regulates reactive power & voltage magnitude. Load frequency control has gained in importance with the growth of interconnected systems and has made the operation of interconnected systems possible [4].

Since, frequency is greatly depends on active power and voltage greatly depends on reactive power, so the control difficulty in the power system may be divided into two parts. One is related to the control of active power along with frequency and the other is related to the control of reactive power along with voltage regulation. The active power control and the frequency control are generally known as the Automatic Load Frequency Control (ALFC) [4]. The major objectives of AGC are

- To take care of the required MW power output of a generator matching with the changing load.
- To take care of the appropriate value of exchange of power linking control areas.
- To facilitate control of frequency for larger interconnections.

II. CHARACTERISTICS OF PROPERLY DEGINED POWER SYSTEM

A properly designed power system should respond to the changes in the load smoothly and it should maintain the balance between the powers generated and demanded. Further, the power system should have the following characteristics:

- It should supply power wherever demanded by the costumer.
- It should supply uninterrupted power to the consumer.
- The power system should be capable of meeting the changing load demands.
- The supplied power should be of good quality.
- The power system should supply power at economic rate.
- The necessary safety requirements should be satisfied.

The power delivered must satisfy certain minimal necessities with regard to the quality of supply. The quality of the power system is considered superior if the system frequency is kept around the specified value i. e. 50 Hz and the magnitude of the bus voltage is maintained within the prescribed limits around the normal value. Voltage and

Effect of Solar Radiation on the Thermal Performance of Power Transformer and its Life Estimation

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Abstract—With the continuous rise in the load demand at consumer end, the performance of the existing operating electrical machines gets affected. The increasing temperature of earth's surface due to solar radiation is another reason of the rise in the temperature of the electrical machines. Power transformers are one of the electrical machines whose performance is directly affected by its inner and outer temperature values as they are generally installed outdoors. The life of the power transformer reduces gradually with the time and sometimes the severe outdoors surface temperatures may lead to sudden explosions that also obstruct the operation of the other associated machines as well. Therefore, thermal modeling of outdoor power transformers should include the consideration of variation in environmental temperature. This is expected to create an opportunity for the research in this field. This includes developing computational thermal models simulation using appropriate software tools. These models can be employed to evaluate the actual operational age of power transformers by estimating equivalent life at the reference temperature on the basis of the time period of the estimated temperature cycle causing acceleration of aging. This paper presents a MATLAB/ Simulink based thermal model determining temperature in increasing the aging acceleration factor, which has been used for estimation of the loss of life of the transformer. Further, the effect of outdoors surface temperature due to the influence of solar radiation for increasing the loss of life of power transformer has also been studied and verified by using the thermal model. The proposed model has been validated using real time data gathered from the power transformer in operation at 220kV GSS, Jhalamand, Jodhpur.

Keywords—life of power transformers, solar radiation, thermal modeling, aging acceleration factor, loss of life.

I. INTRODUCTION

Power transformers are one of the main electrical machines in any electrical substation whose functioning directly governs the operational efficiency and the economic capability of the power system. The reliability of any electrical substation is directly affected by the performance of the constituent power transformers. Any kind of failure in the power transformer normally occurs due to the failure of inner insulation materials caused by high stress, under abnormal or critical operating conditions. The most challenging problem in every power transformers is heat dissipation. Greater the heat accumulated without being dissipated, lesser is the life of the power transformer. Although, the design concept of the power transformers include a robust cooling arrangement system, still the changing environmental conditions outside the power transformers always affect its thermal performance. The inner temperature of the power transformer is directly affected by its inside as well as outside conditions.

The inside conditions include the increase in the power losses of the windings and the core which rises the temperature of the power transformer drastically. This generally happen due to the increase in the load of the power transformers. The insulating oil circulating inside the power transformer absorbs heat from the interior of transformer windings and core through conduction. This heat must be transferred to the transformer oil by convection and further, from the oil to the cooling medium via a heat exchanger.

The outside surrounding conditions that impact on the heat dissipation process may include natural conditions as well as built in conditions. The natural conditions include the effect of solar radiation, wind, rain, dust, natural landscape and humidity. Likewise, the built in condition includes transformer external layout, sheds, buildings, abstractions and design of enclosures, etc. The IEEE loading guides and IEC standard documents of the oil- immersed power transformers provide no such information regarding the above surrounding effects and their impact on the thermal performance of power transformer. By doing the thorough study of the above mentioned environmental conditions, it was found that all those factors have different level of harshness which affects the safe and reliable operation of the power transformers.

This paper presents a technique for estimating the loss of life of power transformer with the help of computational thermal model and employing it to calculate the accelerated aging. Further, the proposed thermal model is modified by incorporating the effect of solar radiation on the surface of power transformer. The most important factor while determining the accelerated aging is the hot spot temperature (HST), which is a major reason for the loss of life of transformer. The HST of a transformer primarily depends on the ambient temperature, the rise in the top oil temperature (TOT) over the ambient temperature and the rise in the winding HST over the top oil temperature. HST values for different load conditions can be estimated with the help of these thermal models on the basis of the thermal characteristics of the power transformer and the cooling system.

The proposed thermal model has been used to predict the loss of life of a 160MVA power transformer in operation at 220kV GSS, Jhalamand, Jodhpur (Rajasthan, India). After Introduction section, the paper includes four more sections that present the state of art, proposed methodology, MATLAB/ Simulink model, results and discussion.

II. STATE OF ART

The research work in the field of thermal modeling of power transformers is having some commonly accepted procedures that primarily come under either IEEE or IEC guidelines. IEEE Guide for Loading Mineral Oil-Immersed Transformers [1] is applicable to oil- immersed distribution and power transformers, with different types of constructions, along with

3.4.5

Free vibration analysis of rotating laminated composite plate type blades with variable thickness

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ABSTRACT

The dynamic behaviour of rotating flexible bodies, such as turbine blades/exhaust fan blades are significantly different from those of stationary bodies as centrifugal force come into effect in addition to gravity. Such rotating blades may be modelled as cantilever beam plate / panel. A finite element formulation for vibration analysis of rotating laminated composite panels is employed in this article; based on the first order shear deformation theory, an accurate relationship between strains and displacements of pre-twisted panels are derived. The governing equations of motion are derived considering centrifugal force. Here studied the effect of rotation speed (ω), setting angle (α), twist angle (ψ), fibre orientation angle (θ) and variable thickness of panels on the vibration behaviour of cantilever composite panels. Also noticed the loci veering and loci crossing phenomena occurs between symmetric and skew-symmetric modes, respectively at different rotation speeds.

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Selection and peer-review under responsibility of the scientific committee of the International Conference on Advanced Materials Behavior and Characterization.

1. Introduction

Structural components, such as cantilever panels having variable thickness along span wise / chord wise / both span-chord wise, are used in several applications for example: balconies, bridges, multi-story buildings, radio towers, chimneys, air craft wings, marine hulls to design light weight and more efficient structures. The variable thickness of panels can also modify the resonant frequency. Hence, the vibration analysis of the plates with variable thickness is an important matter of concern for the researchers.

Many researchers analysed the free vibration behaviour of square and rectangular isotropic plates [1-6]; orthotropic and laminated composite plates [7-12] with linearly and parabolically variable thickness using analytical and numerical methods, considering the various combinations of boundary conditions (SSSS, CSCS, CSSS, SSSF, SCSC, SSCF, SSCC, SSFF, SSCS, CCCC, CCCS, CCCF, SSSC, CSSC, SCCS, CCSS, CCSC, SCCC, CSCC, FSCS, FSFS, FSSS, CSCF, CSSF, CCSF, SCSS, here S-simply supported, C-clamped, F-free along edge x-axis and y-axis).

[13,14] investigated the free transverse vibratory response of symmetric and un-symmetric trapezoidal plates of variable thickness using the variational principle of a minimum energy functional and the Ritz method with the *pb*-2 global shape functions, respectively. The vibration characteristic of cantilever plates with linearly variable thickness in one coordinate direction using finite element method based on the classical plate theory [15,16] and first order shear deformation theory [17] has been studied and validated with experimental results. Sakiyama and Huang [18] presented the natural frequencies and mode shapes for thin and moderately thick linearly tapered plates based on an approximate method using the Green function. Shufrin and Eisenberger [19] analysed the free vibrations of rectangular thick plates using both first-order shear deformation theory and higher order shear deformation theory, considering linear and parabolic thickness variations with various (SSSS, SSFF, CCCC, CFFF and CFCF) combinations of boundary conditions. Manna [20] carried out the free vibration analysis of isotropic rectangular plates with linearly varying thickness in one direction using the first order shear deformation theory considering a higher-order triangular element. The effects of variable thickness and curvature on the vibrations of blades were reported by Lee *et al.* [21] using shallow shell theory. Budak [22] studied the vibration behaviour of shallow cylindrical shells and rectangular plates of varying thickness using a spline-approximation method, and examined the effects of the curvature of the mid-surface on the natural frequencies. Chen and Li [23] used the Rayleigh-Ritz method to study the vibration behaviour of laminated pre-twisted rotating plates. Authors formulated the

Buckling analysis of folded structures

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A B S T R A C T

Stability characteristics of folded structures has been investigated here using finite element based commercial software ANSYS considering shell element. In this communication authors considered the flat panel, I-section, C-section, rectangular or square - section of structure and analysed the buckling behaviour of these under compression, shear and combination of both with various boundary conditions. The critical buckling load of open and close box structures with mode shapes under various loading conditions (pure compression, shear on two edges, shear on one edge, shear on four edges, pure shear on four edges) is presented here. It is noticed that, stability of various sections is increased with the increase in flange width; whereas critical buckling load of closed box is more than the open box under similar conditions due to the cover plate. Moreover, the post-buckling path of cantilever flat panel and the box structure are given to design the thin-walled structures. Present results will enhance understanding of engineers and researchers on the local buckling characteristics of the built-up members; and will be useful for designers those are working on the built-up sections.

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Selection and peer-review under responsibility of the scientific committee of the International Conference on Advanced Materials Behavior and Characterization.

1. Main text

Folded structures and box sections are commonly used in civil, mechanical, automobile, marine and aerospace structures. Hence, the buckling behavior of such thin walled structures, made of flat panels is one of the major concerns in several fields of engineering applications. A few analytical investigations [1-4] on the buckling load of rectangular thin-walled boxes are reported based on the hypothesis of assuming that "joints of assembled plates will offer restraints equivalent to simply supported boundary condition for individual plates". However, [5] studied the limitations of the above assumptions considering the cases of symmetric and unsymmetric buckling modes of individual plates of a rectangular hollow tube. The authors concluded that the critical buckling loads of tubes and simply supported plates are nearly equal only for limiting case of thin plate. Hence, a thorough analysis of assembled plate structure is essential for better understanding of the stability characteristics of such tubes.

Even though a significant amount of research has been devoted to investigate the global bending and buckling behaviors of long tubes using one-dimensional beam theory [6-11]. The buckling

analysis of composite thin walled beams, both open and close cross-sectioned with initial stresses was carried out by [6-7] and proposed a theoretical model considering the shear flexibility due to warping and bending and obtaining the equations by Hellinger-Reissner formulation of composite shells. They presented the analytical solutions for simply supported thin-walled beams using the proposed model for the free vibration and buckling analysis of considered structures. [8-9] studied the buckling behavior of thin walled laminated composites box-beams subject to axial loading. They developed a model based on classical lamination theory which was applicable for flexural, torsional and flexural–torsional buckling of thin-walled axially loaded composite box-beam. In order to predict critical loads and buckling modes in case of thin-walled composite bar they developed a displacement based one- dimensional FE model, deriving the governing equations from the principle of the stationary value of total potential energy. [10] developed a general theory based on the semi tangential moments and semi tangential rotations for coupled buckling analysis of thin-walled composite box beams subjected to eccentric constant axial force, end moments and linearly varying axial force. [11] carried out coupled flexural, torsional and buckling analyses of thin walled laminated composite box beams by developing a general analytical model considering structural couplings from material anisotropy and shear deformation effects. They used

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Performance of Different Implicit Time Integration Techniques for Nonlinear Structural Dynamic Analysis

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Abstract: **The efficiency of different implicit time integration techniques for the nonlinear transient dynamic analysis of isotropic and laminated composite plates and panels is examined here by employing a shear deformable finite element method based on first order shear deformation theory. The time integration techniques considered here are (a) Newmark's average acceleration scheme, (b) multi-step trapezoidal rule, (c) energy and momentum conserving two-step and (d) three-step time integration techniques. The numerical dissipation (period elongation and amplitude decay) of the above implicit time integration techniques is compared to the dynamic response (displacement, velocity, acceleration and total energy) of plates and spherical panels with initial perturbation and under sinusoidal step loading.**

Keywords: *Time integration techniques, nonlinear dynamic analysis, period elongation, plates and panels*
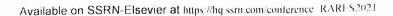
1. Introduction

The large amplitude vibration behavior of thin-walled structural components under different dynamic loads is an important problem to be investigated for their effective and safe design. Generally, the equations of motion for the nonlinear forced vibration of structures is discretized in space domain by the finite element method and the nonlinear differential equation is solved in time domain with the specified initial condition to obtain the transient dynamic response of the structure. The direct integration method has the ability to analyze realistic problems and get accurate predictions. For nonlinear transient dynamic analysis, the accuracy of the predictions significantly depends on the adopted time integration scheme.

Different time integration techniques are employed in the literature (Center difference, Houbolt, Wilson- θ method, HHT-α method, WBT-α method and Newmak-β method) for the solution of the nonlinear initial value problem. A general procedure for the solution of nonlinear problems in structural dynamics considering any type of loading is Newmark's time integration method proposed by Newmark [1959]. The Newmark method is the most commonly used methods for solving the nonlinear second order differential equations. Dahlequist [1963] proved that the constant average acceleration method is the most accurate unconditionally stable method. The main disadvantage of the method is that it does not possess numerical damping. Wilson *et al.* [1973] introduced Wilson-Δ method that is based on the basic assumption that the acceleration varies linearly during the time interval *t* to *t* + θΔ*t* where θ≤ 1. Hilber *et al.* [1977] proposed the HHT-α method that is unconditionally stable one-step method by introducing an additional parameter for controlling the damping properties of Newmark's algorithm. Further, Wood *et al.* [1980] introduced WBZ-Δ method by replacing α parameter of HHT-Δ method with Bossak-parameter.

RARES 2021

CFD Analysis in Solar Air Heater for Heat Transfer Enhancement: A Review

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Abstract

The solar strength performs a chief position in contributing closer to the overall boom in sustainable power. For utilising this strength solar Air heaters are used as they may be low value and more generally used collector machines and extensively utilized in lots of programs at low and slight temperatures. Many sun warmers were devised in beyond however the essential issue diagnosed in its miles the lack of thermal strength which did no longer get applied well, that is specially because of a lack of heat transfer the absorber plate's coefficient. With the help of CFD, (Computational Fluid Dynamics), the heat switch fee could be increased by means of incorporating synthetic roughness within the solar heater's absorber plate and their efficacy can be stepped forward through simulations. With growth in temperature of air intake and exhaust by way of addition of absorber plate in duct of air heater advanced temperature levels of sun heaters.

Keywords Solar energy;Solar air heaters;Computational Fluid dyanamics;Absorber plates;Artificial roughness

1. Introduction

The capacity of solar strength is considerable for numerous applications since the centuries, particularly northwest of Rajasthan location easily on hand and substantial. A solar air heater is a specific framework that manages the drying technique and protects the products from dust, rain or insect damage[1]. The consistency of drying products obtained by sun drying is better than that of solar drying [2].sun air heater is an equipment for growing air temperatures using solar powered warmth. it is a form of square conduit encapsulating an absorber, top platform, a returned panel, an enclosed wall below the rear panel, a pitcher cowl over the exposed solar-radiation surface, and a area among the bottom plate and air-pace absorber [3].it's miles indoors surface can be artificially roughened through adding irregularities [4.5]. They can be classified as lively or passive based totally on how sun absorbs and

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CFD Analysis on Solar Air Heater to Enhance the Heat Transfer - A Review

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Abstract

The solar air heaters are extensively brought in use for converting solar energy into thermal energy. There are various applications of these solar air heaters such as process heating, space heating and drying the agriculture products. For enhancing the capability of solar air heater in transferring the heat, powerful computers as well as mathematical model are used to perform "computational fluid dynamics (CFD) simulation". The simulation made from CFD is capable of predicting the transfer of momentum, heat and mass in several processes of fluid flow and heat transfer. This work constitutes of reviews of various researchers made in relation of enhancing the performances of the solar air heater. The presented literature reviews contains both numerical as well as experimental analysis conducted by bringing the Roughness geometries fitted on the flow side of absorber plate in use.

Key Points: CFD, Solar Air Heater, SAH.

I. Introduction

For various applications, solar energy is widely used as it is easy to access and present abundantly in various tropical countries like India. Solar energy is a sustainable form of energy. The weakness of direct drying is overcome by solar drying which helps in eliminating the contaminants such as animals, birds, insects etc. In comparison with the normal convection drying, solar drying is more beneficial as it requires more fluid and energy cost is also high [1]. In comparison with the open sun drying, solar drying is a better option. Some of the benefits of solar drying are it increases the drying temperature and on the other hand it decreases the relative humidity of the products. Solar drying is a very convenient method as it constitutes specialized structure which controls the drying process and also protects the products from damages such as insects, dust and rain. In comparison with the open sun drying, the products obtained from solar drying are of better quality [2], [3].

A. Principle of heat absorption

For heat conversion, the most fundamental process which is nowadays generally brought in use is greenhouse effect. It got its name because it was first brought in application in green house projects. It helps the plants grow better especially at those places where sunlight is not sufficiently available.

The large portion of the solar energy is received from the sunlight which is basically a "shortwave radiation". This radiation when comes in contact with any liquid or solid material, the heat is absorbed by the material and it transforms into heat energy. This increases the temperature of the material and it stores this heat energy. After that, it starts conducting this heat to its surroundings such as liquids, solids or air or conduct it to any material available in contact with it and have a comparatively lower temperature. This type of radiation is termed as "long wave radiation".

The absorption of the visible sunlight at $20^{\circ}C$, on the surface of the ground, will emit IR lights at approximately $10\mu m$ wavelength. However, sunlight of shorter wavelength is not absorbed by carbon dioxide.

ARTICLE

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Nonlinear Bending Analysis of Cylindrical Panel under Thermal Load

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Abstract

In this communication, the nonlinear bending behaviour of laminated cylindrical panels in the presence of thermal load has been studied using the finite element-based simulation package ANSYS. The efficacy of present numerical results is compared with published results. Thereafter, the effect of radius-to-span ratio (R/a) on the nonlinear static response of isotropic and laminated panels under thermal load is studied here. Moreover, the nonlinear bending deflection verses x-axis of cylindrical panels at different thermal loads is presented here that will serve as benchmark for future research.

1. Introduction

Curved panels are widely used in defence, automobile, aerospace, civil and other engineering applications. Thus, the strength and flexural stiffness of these thin-wall structures under the thermal environment is very important for engineers and researchers (Thang, Nguyen, and Lee). The generalized differential quadrature numerical method was employed for the nonlinear analysis with thermomechanical loads of moderately thick laminated cylindrical panels and considering the variation of thickness for conical panels (Naidu and Sinha). The linear bending behaviour of skew plates has been studied by employing a shear deformable triangular finite element (Yoosefian, Golmakani, and Sadeghian). They studied the effect of thickness ratio and lamination sequence for skew plates. The geometrically nonlinear bending behaviour of composite plates with analytical approach such as Navier type and Levy type techniques has been reviewed by (Madrigal, Navarro, and Chaves). The nonlinear dynamic responses of curved panels have been investigated by employing finite element method with first order shear deformation the-

ory considering Von-Karman's geometric nonlinearity. (Loja, Barbosa, and Soares). The buckling behaviour of isotropic plates under compression and shear has been studied by Qiao, P., & Huo, X. (Qiao and Huo) Analytically investigated the linear buckling of rectangular plates under shear and compression using Rayleigh-Ritz Method (Aghdam and Falahatgar), Kantorovich Method (Yuan and Jin Shufrin, Rabinovitch, and Eisenberger) and numerically by using Finite Strip Method (Smith and Sridharan de Vargas Lisbôa and Marczak). The linear bending results of isotropic plates employing energy method has been by Liew (Saadatpour and Azhari), and investigated the effect of boundary conditions. The static analysis of plates has been performed by using Galerkin Method (Karami, Shahpari, and Malekzadeh Yu and Shen Kumari). Static and Dynamic behaviour of flat panels has been examined by using finite element method with First-Order Shear Deformation Theory (Kumari and Saxena ZHAO, LIU, and LI). The nonlinear bending response of three-dimensional braided laminated cylindrical panels has been investigated using higher-order plate theory with Von-Karman's Geo-

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Analysis of Piston of Internal Combustion Engine under Thermo-mechanical Load

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Abstract

The main objective of this article is to study the thermal and structural performance of piston using finite element based commercial software ANSYS. Piston is modelled using SOLIDWORKS and analysis would be performed through ANSYS workbench. Optimization analysis has been performed considering three different materials such as Grey Cast iron, structural steel and aluminium alloy because these three material have good compression strength and their thermal conductivity and density will different for each one. For the same amount of pressure Aluminium alloy has shown maximum deformation and equivalent strain, where von misses stress value is minimum for it. Whereas, Structural steel and Grey cast iron shows deformation and strain values less than that of Aluminium alloy for same pressure load. Aluminium alloy has highest heat flux and lowest temperature on piston head under thermal load. Piston receives thermal energy generated via combustion and higher heat flux ensures quick cooling of component by quick drainage of thermal energy. Grey cast iron and Structural steel has half of the value of heat flux to that of Aluminium alloy. Therefore, Aluminium alloy is the preferable material for the design of automobile piston among the given three materials.

Keywords: Internal Combustion Engine, Piston, ANSYS, FEA, Load Analysis

1. Introduction

Single-slider crank mechanism is a four linkage simple slider mechanism that is used in internal combustion engines. An internal combustion engine consists of cylinder, piston, crankshaft, piston rings, inlet & exhaust valves, and connecting rod. The component of IC engine which is exposed to combustion is piston. The main aim of automobile manufacturers and researchers has been to modify engine's performance and maximize its power output for limited fuel consumption. Piston is the main component of whole engine assembly. Various researches and modifications have been done throughout the decades to reduce wear and tears, to resist high pressure, maintain temperature generated during combustion and to increase overall lifecycle of piston and its components. In the engine cylinder, during power stroke piston experiences extreme temperatures. Piston also undergoes cyclic gas pressure and inertial forces due to reciprocation. Under these thermal and mechanical stresses piston may fail. Since, this thermal and mechanical stress depends upon the properties of piston materials. So, the material preferred for the piston, cylinder, piston rings, and other related parts of an internal engine must have high thermal conductivity, high wear and tear strength. Due to the versatile nature, castability and mechanical properties of magnesium and aluminium alloys have several applications for example automotive and aerospace industries [1]

A review on the Social Media in Healthcare

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Abstract:

Now days social media is a main platformfor healthcare providers and consular to communicate with patients and resolve their health-related issues. Itis providing a platform to discuss health-related problemsusing computer-based technology, that facilitate to medical professionals for shar their ideas, thoughts, documents, audios, videos, photos, x-rays and massages. Electronic communication is a form,which is used to create online communications. Social media also providesa platform to share personal experience (patients-to-patients), asking questions and answers (professionals-to-patients), etc. Professionals and patients engage with each other through computer, tablet, smartphone via social media,web-based software / web applications. Healthcare professionals use social media to promote their services for the betterment of their patients,but the utilization of social media in the right direction is really a difficult task.Healthcare providers should give useful information consistently and respond to their queries to harvest healthcare benefits for their patients. The aim of this article is to provide an overview of the extant literature on the effects of social media: use for health-relatedissues of patients and their relationship with healthcare professionals. In this article, reviewed the bright and dark side of the social media in the healthcare field that will help in patient empowerment.

Keywords:bright side, healthcare management, online health communities, professional networking, Facebook, Twitter, YouTube, Web 2.0.

1. Introduction

Several social media tools and web applications are available for healthcare professionals, for example,social networking sites, blogs, microblogs, wikis, YouTube, Instagram, WhatsApp, google plus, LinkedIn, zoom, media sharing sites, virtual life,and virtual reality gaming environments[1]. The popularity of social media has increased drastically in medical, technical and engineering applications. These tools may be used to

Design of a Stephenson III six-bar path generating mechanism for index finger rehabilitation device using nature-inspired algorithms

Debaditya Chakraborty[1] · Ayush Rathi[1] · Ramanpreet Singh[1] · Vimal Kumar Pathak[1] · Kailash Chaudhary[2] · Himanshu Chaudhary[3]

Abstract
The paper presents a new mechanism for an index finger rehabilitation device. The mechanism was designed based on a pre-specified trajectory obtained by performing flexion/extension experimental trials with index finger. These experiments were performed 30 times and mean of the normalized trajectory was extracted. From this trajectory, six precision points were selected and based on the obtained trajectory, a path generating optimization problem was formulated to imitate the flexion/extension. Besides, rectification constraints were posed to avoid defects that typically encounter during synthesis. The formulated nonlinear optimization problem was solved using nature-inspired and metaphor-less algorithms. It is found that the summed error between the desired and generated trajectories was very less in case of nature-inspired algorithm in comparison with metaphor-less algorithm. Then, all rectification constraints were validated. It is found that obtained mechanism is completely defect-free and is able to imitate the desired flexion/extension trajectory. Therefore, design obtained using nature-inspired algorithm may prove to be beneficial for the patients with dysfunction index finger.

Keywords Mechanism synthesis · TLBO · BWP · Nature-inspired algorithm · Finger rehabilitation

1 Introduction

Injuries and various other kind of diseases such as stroke, motor disorders, and meningitis can cause loss or impairment of motor function in hands, which includes stroke, injury, cerebral palsy, multiple sclerosis, etc. These diseases leave the people impaired and devoid of a normal life. The neural impairment also causes difficulty in movements required in performing routine activities. Neurological disorders have become a major causes of death and disability worldwide, most number of cases of neurological disorders includes stroke (42·2%), migraine (16·3%), Alzheimer's and other dementias (10·4%), and meningitis (7·9%) [1]. Approximately, 150 billion dollars are spent in the USA every year on nerve injuries [2].

Moreover, it has been observed that function of arm is acutely impaired in a large number of patients affected with stroke [3–5]. The deficits are persistently prevalent in the distal upper phalanges of the finger. In fact, extension of finger is the function which is mostly impaired in a stoke patient [6]. Therefore, in the case of stroke patients, it is important to undergo rehabilitation postoperation to regain

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STUDY ON EFFECTIVENESS OF CLOUD COMPUTING IN IMPROVING THE PERFORMANCE OF MANUFACTURING INDUSTRIES

Pankaj Sankhla

Dr. Kailash Chaudhary

Abstract

For the past few years, Cloud Manufacturing (CM) as a new manufacturing paradigm has accomplishing a huge amount of attention worldwide. Currently, many articles and review papers on Cloud Manufacturing are being published to speed up the research and to identify future trends. It is an emerging customer centric and service-oriented model to solve existing problems in traditional manufacturing. The aim of CM is to deliver and share ubiquitous on demand manufacturing service to consumers over internet which will enhance overall efficiency, reduce product cost, and allow for optimal resources. This is an innovative and web-based new paradigm which uses core information technology such as Cloud Computing, IOT, virtualization, radio frequency identification and service-oriented technology to solve complex manufacturing problems. However, the industry adoption of CM is still limited. The objective of this paper is to present fundamental concept model, participants, and architecture of Cloud Manufacturing. The paper also focuses on status of CM, benefits of implementation its model in industry and the future developments trends in manufacturing sector.

Keywords: Sustainable manufacturing, cloud computing, cyber-physical system, cloud manufacturing

I. INTRODUCTION

Cloud computing plays a pivotal role in the development of the global and sustainable manufacturing systems. Using cloud computing, product manufacturers and consumers interact with each other which helps in highly efficient rapid product development in minimum cost. A design and manufacturing cloud consists of collection of interconnected physical and virtual service pools of resources. Manufacturing industry professional need to know the characteristics of cloud computing-based manufacturing technology and its advantages as against the traditional manufacturing methods. The Internet- and web-based service-oriented system for machine availability monitoring and process planning is critical for sustainable manufacturing. This study discusses cloud manufacturing related research and development activities being carried out all over the world. It also presents the major challenges of developing and utilizing cloud computing technologies for manufacturing systems and services.

Manufacturing industry has always been a pillar industry of developed economics. To enhance national wealth and power reach nations are creating a high-quality manufacturing sector. As there is an increase in competitive pressure, rapid technology development and globalization, modern manufacturing requires a flexible and dynamic management. The traditional business models cannot sustain successful innovation because the old conventional ways of organizing work and services do not meet the level of agility, creativity and connectivity that companies require so that they can remain competitive in today's environment [1]. Hence, there is a need of adequate manufacturing approach, which addresses the issues and fulfills the current market demands and requirements. This gives birth to the concept of *Cloud Manufacturing.*

Cloud Manufacturing (CMfg) is a new manufacturing business model which is service oriented to share manufacturing capabilities and resources on a cloud platform. It merges the current informatized manufacturing technology and new information technology which transforms manufacturing resources and capabilities into manufacturing services. It builds a manufacturing service pool. CMfg is a platform where consumers can request services including product design, manufacturing, testing, management, and all other stages of a product lifecycle. Using this method, we can use the most sustainable and robust manufacturing route which results in customer centric supply chains. Modern technologies such as Cloud Computing, Service oriented Internet of Things (IOT), Virtualization, Radio Frequency Identification, Semantic web, and advanced high-performance computing technologies play a key role in CMfg. Customers could access the resources as services and manufacture their products. In this manner, they could use the distributed heterogeneous manufacturing resources for simple and complex tasks in supply chains. CMfg provides high quality, reliable and secure, relatively cheap and on demand manufacturing services to the users.

National Institute of Standards and Technology (NIST) defined Cloud Computing as a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction [35]. This short description is intended to serve as a means for broad comparisons of cloud services and deployment strategies while providing a baseline for discussion on the overall best uses for CC technology. The main factor which is restricting many industries to adopt CC technology is the security of their data for which they are mainly dependent on cloud service providers. Nevertheless, the main factor in favor of CC technology is that professionals get familiar quickly with its use as they are using IT extensively nowadays. Researchers

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Computational and Experimental Methods to Investigate Fracture Behavior of Functionally Graded Material Structures—A Critical Review

- Manish Bhandari (1)
- Kamlesh Purohit (1)

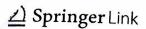1. MBM Engineering College, Jai Narain Vyas University, , Jodhpur, India

Abstract

Functionally gradient materials (FGM) are one of the most widely used advanced materials because of their adaptability to different situations by changing the material constituents. In recent decades, the crack problems of FGMs have attracted a significant amount of attention. This paper presents a comprehensive review of developments, applications, mathematical idealizations, computational and experimental methods, and solutions that are adopted for the analysis of FGMs. In spite of the variety of methods used to date of analysis of fracture behavior of FGMs, several common themes have emerged. Many of these works provide a fundamental understanding of the basic fracture behavior of the material. An attempt has been made to classify various numerical methods used for the crack and fatigue analyses of FGMs. Finally, some vital suggestions for future scope of research in the area of FGMs are presented. It is hoped that this review paper will serve the interests of all the academicians, researchers, and engineers involved in the analysis and design of FGMs.

Keywords

Fracture Crack Numerical FEM Experimental
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Analysis of Load Capacity of Functionally Graded Material Structures

International Conference on Advances in Materials Processing & Manufacturing Applications

iCADMA 2020: Advances in Materials Processing and Manufacturing Applications pp 197-206 | Cite as

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Conference paper
First Online: 23 June 2021

Abstract

Functionally graded materials are made up of predefined combination of ceramic and metals. The functionally graded materials (FGM) have been developed as high temperature-resistant and heat-resistant materials in space engineering and nuclear engineering. The FGM exhibits the resultant properties of ceramics and metal. The ceramics are involved for resistance in a high-temperature environment, while the metal contributes toward fracture toughness. The variation in strength and other properties may arise from geometry and other variable material properties like density. The studies related to energy-absorbing configurations in consideration with graded properties are of a great interest these days in research areas. These structural elements having graded properties have application in areas like vehicles, ships, safety devices and other load carrying members. The idea behind the functionally graded materials (FGM) is to have variable properties in a dimension following a particular law. The main objective of this paper is to understand the load capacity variations of such materials when graded in terms of different parameters such as diameter and thickness. In this research paper, a study is conducted on a FGM tapered frustum structure to identify the exact variation in the load capacities of such members when graded in terms of diameter, thickness, endurance strength, etc., in accordance with the empirical relations, the study on which has been previously conducted, to make it useful for designing of such members.

Keywords

Dimensional Tolerance Analysis of Mechanical Assemblies with Symmetric and Asymmetric Tolerances

Ravikant Mordia, A. K. Verma, and Deepak Verma

Abstract Geometric and dimensional tolerances are the key factors for the proper assembly of the parts, their manufacturability, and design functions. Hence, these need proper evaluation. This paper presents automatic tolerance analysis of the dimensional tolerances by using modified worst-case and root sum square (statistical) methods. This helps in reducing production and assembly time, error and human interaction, leading to lower manufacturing cost. In contrast to the original worst-case and root sum square methods which consider only symmetric tolerances without sensitivity, the modified methods can handle the asymmetric tolerances and also consider sensitivity. The influences of the lower and upper tolerance bounds of the manufactured dimensions on the assembly lower and upper bounds are shown in the form of percentage contributions on graphs in the modified models. In the modified models, linear and nonlinear problems are defined by using the Taylor series expansion which is implemented in the MATLAB. Finally, a perspective overview for future research of automatic tolerance analysis for the other problems is presented.

Keywords Dimensional tolerance analysis · Worst-case and statistical methods · Linear and nonlinear variables · Symmetric and asymmetric tolerances · Upper tolerance limit and lower tolerance limit · Percentage contribution

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Numerical investigation on melting and heat transfer characteristics of phase change material in a parallelogram enclosure

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ABSTRACT

In this paper, two-dimensional numerical simulations have been carried out in ANSYS Fluent to understand the melting and heat transfer characteristics of phase change material (PCM) kept inside parallelogram shaped enclosure. The results include evolution of solid liquid interface, melt fraction variation with time, averaged PCM temperature, averaged solid PCM temperature, averaged liquid PCM temperature, sensible heat absorbed, latent heat absorbed, total heat absorbed, variation of surface averaged Nusselt number, and time variation of maximum liquid velocity etc. The results are compared with the results of rectangular shaped enclosure. The results indicate that total time for complete melting of the PCM for parallelogram enclosure is considerably less as compared to that for rectangular enclosure. This can be attributed to enhanced strength of gravity assisted natural convection currents in liquid PCM as evident by increase in maximum velocity of liquid PCM in parallelogram enclosure. Higher value of Nusselt number for parallelogram enclosure depicts an enhanced heat transfer. The results so obtained will be useful in understanding the influence of geometry on passive manipulation of melting and heat transfer characteristics of PCM for thermal storage and thermal management applications.

Keywords: Phase change material, Melting, Parallelogram enclosure, Natural convection, Heat transfer enhancement.
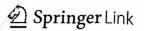
1. INTRODUCTION

Melting and heat transfer characteristics of phase change materials are useful in engineering applications such as thermal energy storage and temperature management systems. Phase change materials are currently being attempted in temperature regulation of building walls, temperature management of solar photovoltaic panels (PV), thermal management of batteries to avoid overheating, as thermal energy storage units, as heat sinks in electronic devices, and in heat exchangers etc. Due to its practical significance, melting of phase change materials has motivated researchers to investigate melting and heat transfer characteristics through experimental as well as computational approaches. The melting of PCM inside rectangular containers is well documented and forms basis of research inside other shaped containers. It is revealed from past studies that inclination of rectangular containers affects the melting behaviour of phase change materials. A parallelogram shaped container can be fabricated by providing inclination to the upper and lower sides of a rectangular shaped container. However, detailed study on melting and heat transfer behaviour on parallelogram shaped containers is not available in literature. A parallelogram shaped container can be regarded as a basic form because it can be altered into rectangular or trapezoid shaped containers by changing the inclination of top and bottom sides of the container. Therefore, melting behaviour can be passively manipulated significantly by changing the shape of the container for the same amount of PCM inside the container.

2. LITERATURE REVIEW AND OBJECTIVE

Previous investigations involving melting and heat transfer characteristics of phase change materials in rectangular enclosure include both experimental works and numerical simulations. In these studies phase change material was filled inside a rectangular enclosure and one wall of the enclosure was heated while other walls were insulated. Two boundary conditions of the heated wall i.e. constant heat flux [6] and constant wall temperature [1, 10] were studied. Results were presented in the form of time progression of solid-liquid interface, time variation of melt fraction, temperature distribution in PCM, energy absorbed by PCM and Nusselt number. Several researchers have studied the effect of inclination of enclosure on melting behavior of PCM. Various angles of inclination including horizontal and vertical orientation of container were studied. For inclined containers, heating was either provided from lower side wall [2, 4] or from upper side wall [5]. It is revealed that inclination of rectangular containers has significant effect on the natural convection in melted PCM which affects the melting behaviour of PCM. Low thermal conductivity of phase change materials affects the rates of heat transfer in the PCM and results in low melting and solidification rates. Therefore, use of high conductive metallic internal fins has been studied to improve melting rate of PCM. Results for both cases i.e. attaching fins on heated wall [3] or on back side wall [11] were studied. In literature a few studies involving melting characteristics of PCM in non-rectangular enclosures [7, 8] are also attempted. The review of literature reveals that melting behavior of PCM inside rectangular containers is mostly studied as function of inclination of container and fin attachement. However no detailed study on melting and heat

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Suppliers Selection Using Fuzzy AHP and Fuzzy TOPSIS Method—A Case Study of a Bearing Manufacturing Company

Communication and Intelligent Systems pp 275-288 | Cite as

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Abstract

Supplier selection is one of the most important activities of an industry. The goal of present paper is to exhibit key elements of supplier selection and ranking of potential suppliers. A bearing manufacturing company was considering two criteria of suppliers selection, i.e., quality rating and service rating. In the current paper, six criteria have been considered instead of two for improving the supplier's selection process which are product quality, product cost, location, delivery time, information system and service rating. First of all, the key factors involved in supplier selection have been identified, a survey has been conducted for data collection from purchase department in the company. Fuzzy AHP method and fuzzy TOPSIS method are used to calculate the criteria weights for the suppliers' selection and to determine the ranking of the suppliers. The contribution of this study is to give improved suppliers' selection process to the company.

Keywords

Fuzzy AHP Suppliers Selection

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Risk Management for e-Commerce Supply Chain Network Using Robust Optimization Approach: A Case Study

Recent Advances in Manufacturing, Automation, Design and Energy Technologies pp 35-46 | Cite as

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- Pradeep Kumar (2)
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Abstract

Supply chain (SC) encompasses all events involved in the transformation of goods from the raw material stage to the final stage, i.e., when the goods and services reach the end client. A supply chain comprises of flow of materials, information, funds, and services from suppliers, factories, distribution centers to the end clients. Decisions regarding facility locations, supply chain planning, and logistics should be made cautiously in order to establish robust supply chain. This work is an effort to provide the firms with the models so as to help the managers to take strategic level decisions under uncertainty. A close loop supply chain (CLSC) network design that consists of forward and reverse flow is carried out. The robust optimization (RO) based modeling with both direct shipping of the products and shipping through distribution center under demand uncertainty is proposed and analyzed. The results are presented for supply chain planning strategies for an e-supply chain of case company (furniture manufacturing firm). The objective function value for robust model increases for an increase in uncertainty level. This increase in the objective function value for robust model is because of meeting the customers demand in worst case. for the case company, it was observed that for uncertain parameters (demand = 0.8), opening of total 9 MF and 4 DC can accommodate the worst case of network design. The computational results indicate that robust model is better than the deterministic one for uncertain parameters.

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Layout improvement of railway workshop using systematic layout planning (SLP) – A case study

Shubham Khariwal, Pradeep Kumar, Manish Bhandari

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Abstract

Railways workshop is responsible for periodic overhauling of coaching stock and serves as a base for manufacturing, repairing and supply parts to Sheds/Depots. With increasing demand for rolling stock, workshop needs to increase its potential in maintenance and effectiveness to satisfy the demand of passengers. At the same time, the maintenance process needs to be equipped with the ability to have lower cost with higher effectiveness. Plant layout is one of the most effective ways to reduce the cost of maintenance for the improvement in productivity. It also increases good workflow in the production route. This Paper describes existing workshop layout, coach flow analysis that will include areas and distances among different shops. After studying the present layout, it has been found that there is scope of reduction in time delay in maintenance. Problems of movement of coaches in a long line, interrupted flow and useless area of the plant are existing. Considering these problems, Systematic layout planning (SLP) is the best method to improve workshop layout, which shows step-by-step improvement in layout and evaluation of layout. This method suggests a new workshop layout that improves the flow among the shops and helps to decrease movement in the workshop.

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Keywords

Plant layout; Cycle time; Haulage

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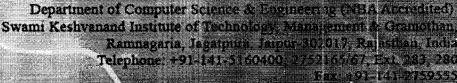
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AN EFFICIENT COLOR-BASED OBJECT DETECTION AND TRACKING IN VIDEOS

Rachna Verma[1]

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ABSTRACT:
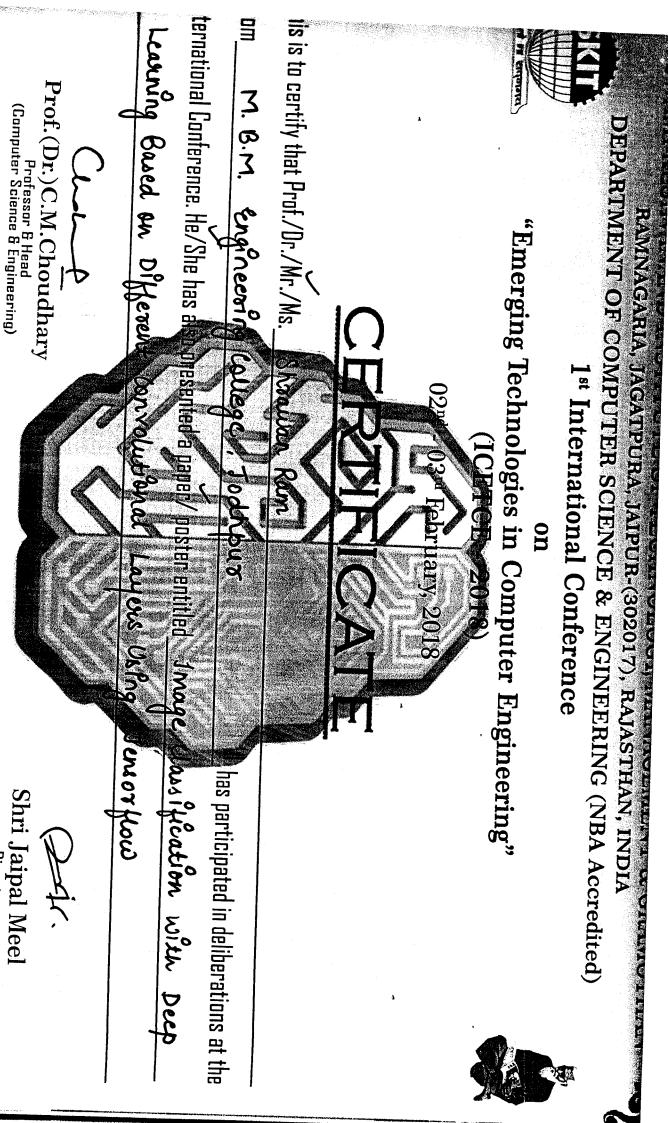
In this paper, a new efficient color based object detection and tracking of a moving object in a video is discussed, which is based on a new formula, proposed by the author, to convert an RGB image into an intensity image. The proposed formula has a great discriminating ability to highlight a shade of a particular primary color in an image and suppress all other colors. This discriminating ability is used to detect an object of any primary color shade very efficiently as it eliminates many additional processing steps, such as segmentation, histogram matching, etc, used in previously reported color based trackers. In future, the proposed concepts will be extended to track objects of any color.

[1] INTRODUCTION

Detecting and tracking moving objects in videos and reconstructing trajectories are an active research area of computer vision [1]. The ability to detect and track objects in videos helps a machine to simulate the basic abilities of biological systems, such as the abilities to understand scenes, detect objects (static or moving), understand surrounding, recognize events, analyze crowd, count people, detect people and vehicles detection, etc. Object detection refers to finding an object of some interest in a scene, for example detecting people, vehicles, etc. in a scene. Object tracking refers to estimate the trajectory of a moving object in a scene, for example, tracking the trajectory of a moving car to find lane violation. For object detection and tracking,

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Certificate of Participation

is hereby presented to

Sangita Kumari

For the active and invaluable participation during the conduct of
TEQIP-III Workshop on "Innovative Pedagogical Orientation of
Engineering Education" held on Feb 23-24, 2018

Prof. S.S.Mehta
Dean

Prof. S.K. Parihar
TEQIP-III Coordinator

Prof. Jayashri Vajpai
Head

Microsoft

Saksham

CERTIFICATE OF PARTICIPATION

This is to certify that

Mr. /Ms. _____ Bijayalaxmi Sahoo _____

of _____ M.B.M Engineering College, Jodhpur _____ College/University

has successfully completed **SAKSHAM – TEACHING WITH TECHNOLOGY TRAINING** from _____ 26th March _____ to _____ 27th March, 2018 _____

Director - Education Advocate

National Conference On

"New Advances in Theoretical Computer Science,
Algorithms, and Mathematical Modeling"

&

29th Annual Conference of Rajasthan Ganita Parishad

'ICSMM-18

27-28 April, 2018

This is to certify that Mr./Ms./Dr./Prof. _SIMRAN CHOWDHARY_ has attended/contributed

/presented research paper titled _IMPLEMENTATION OF QUANTUM — SECURE PUBLIC KEY_

CRYPTOSYSTEM BASED ON RING — LWE.

at the National Conference on "New Advances in Theoretical Computer Science, Algorithms, and Mathematical Modeling" &

29th Annual Conference of Rajasthan Ganita Parishad, held at Jodhpur Institute of Engineering & Technology, Jodhpur.

Er. Navneet Agarwal
Director General - JIG

Prof. (Dr.) K.R. Chowdhary
Campus Director - JIET

Prof. (Dr.) A.M. Khan
Convener

Mr. Ashutosh Vyas
Convener

National Conference On

"New Advances in Theoretical Computer Science,
Algorithms, and Mathematical Modeling"

&

29th Annual Conference of Rajasthan Ganita Parishad

ICSMM-18

27-28 April, 2018

This is to certify that Mr./Ms./Dr./Prof. _____ RACHNA VERMA _____ has attended/contributed

/presented research paper titled _____ 3D TRAJECTORY RECONSTRUCTION OF A MOVING

OBJECT BASED ON STEREO VISION.

at the National Conference on "New Advances in Theoretical Computer Science, Algorithms, and Mathematical Modeling" &

29th Annual Conference of Rajasthan Ganita Parishad, held at Jodhpur Institute of Engineering & Technology, Jodhpur.

Er. Navneet Agarwal
Director General - JGI

Prof. (Dr.) K.R. Chowdhary
Campus Director - JIET

Prof. (Dr.) A.M. Khan
Convener

Mr. Ashutosh Vyas
Convener

IITER

CERTIFICATE
OF PARTICIPATION

International Conference on Recent Innovations in Computer Science and Information Technology (ICRICSIT-18)

02nd September 2018, Jodhpur

This is to certify that .... **Shrwan Ram** ....
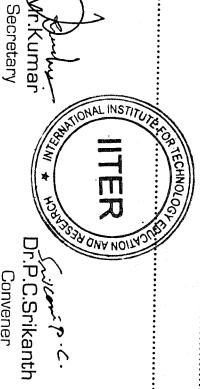
of .... MBM Engineering College, Jai Narian Vyas University, Jodhpur .... has done his/her excellence in presenting the research paper titled .. "Query Performance Analysis on Hadoop over Cloud Architecture " ....

On 02nd September 2018 at Jodhpur.

Mr. Kumar
Secretary

IITER

Dr. P.C. Srikanth
Convener

Certificate of Publication

Academic Science

This is to certify that

Shrvan Ram

MBM engineering college, Jodhpur, India

Published a paper in

JETIR, September 2018, Volume 5, Issue 9, www.jetir.org (ISSN-2349-5162)

Titled as

"Object detection and classification through deep learning approaches"

UGC Approved Journal

DIIF

Dr K. Agarwal
Editor, Academic Science

ICSTM-2018

DIIF

Academic Science

Reference No.: CHD863

Certificate of Presentation

2ND INTERNATIONAL CONFERENCE ON SCIENCE, TECHNOLOGY & MANAGEMENT

Venue : Indian Council of Social Science Research, North West Regional Center, Punjab University Campus, Chandigarh, India on 16th September 2018

This is to certify that

Shrwan Ram

MBM engineering college, Jodhpur, India

Presented a paper Titled as

"Object detection and classification through deep learning approaches"

in the conference organized by Conference Info in association with Academic Science at Indian Council of Social Science Research, North West Regional Center, Punjab University Campus, Chandigarh, India on 16th September 2018

Dr. K. Agarwal
Convener, ConferenceInfo

Conference Info

CENTER FOR
Global Management

CALIFORNIA STATE UNIVERSITY, SAN BERNARDINO

ELSEVIER
Tomorrow's Research Today

SSRN

SURESH
GYAN VIHAR
U N I V E R S I T Y
Accredited by NAAC with 'A' Grade

4th International Conference on

Cyber Security - (ICCS) 2018

October 26-27, 2018

This is to certify that

Dr/Mr/Ms _____ Simran Choudhary _____

from ___ MBM Engineering College, JNVU, ___ has successfully presented Paper, titled

Efficient Implementation & Analysis of Ring-LWE Quantum-Secure key Exchange Protocol

on 4th International conference on Cyber Security - (ICCS) 2018,

held on October 26 - 27, 2018 at Centre for Cloud Computing and Security,

Suresh Gyan Vihar University, Jaipur, India.

Director, CCIS, SGVU

Conference Info

ICRTESM-2018

Reference No.: OUCIP537B

3rd International Conference on Research Trends in Engineering, Applied Science and Management

Venue : Osmania University Centre for International Programmes, Osmania University Campus, Hyderabad, Telangana, India on 4th November 2018

Certificate of Presentation

This is to certify that

Shrwan Ram

Department of CSE, MBM Engineering College, Jai Narian Vyas University Jodhpur, India

Presented a paper Titled as

"Query Execution Performance Analysis of Hive and Pig in Cloud Architecture"

in the conference organized by Conference Info in association with Academic Science at Osmania University Centre for International Programmes, Osmania University Campus, Hyderabad, Telangana, India on 4th November 2018

Academic Science

DIIF

Dr. K. Agarwal
Convener, ConferenceInfo

Certificate of Publication

Academic Science

Department of CSE, MBM Engineering College, Jai Narian Vyas University Jodhpur, India

This is to certify that

Shrwan Ram

Published a paper in

IJMTE, Volume 8, Issue XI, November/2018   (ISSN NO : 2249-7455)

Titled as

"Query Execution Performance Analysis of Hive and Pig in Cloud Architecture"

DIIF

Dr K. Agarwal
Editor, Academic Science

SWAMI KESHVANAND INSTITUTE OF TECHNOLOGY MANAGEMENT & GRAMOTHAN, JAIPUR

International Conference

Emerging Technologies In Computer Engineering

"Microservices In Big Data Analytics"

on

ICETCE-2019

This is to certify that Prof./Dr./Mr./Ms. _Rachna Verma_

from _MBM Engineering College, Jodhpur_ has Participated/Presented

a paper entitled on _3D Trajectory Reconstruction Using Colour-based Optical Flow & Stereo_

Vision.

in the ICETCE'19 held at SKIT Jaipur during February 01-02, 2019.

Shri Jaipal Meel
Director (SKIT)

Prof.(Dr.) Anil Chaudhary
Conference Chair

Prof.(Dr.) C.M. Choudhary
Organizing Chair

Dr. Basant Agarwal
Program Chair

Technically Sponsored By
IBM

Sponsored By
Department Of Science & Technology

Springer Infosys | Campus Connect Developer Ecosystem Group

M.B.M. ENGINEERING COLLEGE, JODHPUR
INDIAN INSTITUTE OF TECHNOLOGY, BOMBAY

MOODLE TRAINING WORKSHOP FOR TEACHERS

TEQIP-III SPONSORED

CERTIFICATE OF PARTICIPATION

This is to certify that **Dr. Rachna Verma** *from M.B.M. Engineering College, Jodhpur*

has participated in 3-day "Moodle Training Workshop for Teachers" during 19-21 February, 2019

under the aegis of TEQIP-III, MBM Engineering College, Jodhpur and TEQIP-III KITE, IIT Bombay.

Mr. Abhisek Gour
Course Coordinator

Dr. Kailash Chaudhary
Course Coordinator

Prof. Sunil K. Parihar
Coordinator, TEQIP III, MBM

Prof. Vikram M. Gadre
Coordinator, KITE, IITB

Prof. Sachin C. Patwardhan
Co-Coordinator, KITE, IITB

M.B.M. ENGINEERING COLLEGE, JODHPUR

INDIAN INSTITUTE OF TECHNOLOGY, BOMBAY

MOODLE TRAINING WORKSHOP FOR TEACHERS

TEQIP-III SPONSORED

CERTIFICATE OF PARTICIPATION

This is to certify that **Mr. Rajendra Aaseri** from *M.B.M. Engineering College, Jodhpur*

has participated in 3-day *"Moodle Training Workshop for Teachers"* during 19-21 February, 2019

under the aegis of TEQIP-III, MBM Engineering College, Jodhpur and TEQIP-III KITE, IIT Bombay.

Mr. Abhisek Gour
Course Coordinator

Dr. Kailash Chaudhary
Course Coordinator

Prof. Sunil K. Parihar
Coordinator, TEQIP III, MBM

Prof. Vikram M. Gadre
Coordinator, KITE, IITB
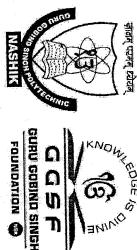
Prof. Sachin C. Patwardhan
Co-Coordinator, KITE, IITB

14th International Conference on Science, Technology & Management

www.conferenceworld.in

Conference World

Certificate

This certificate acknowledges and honours

Prof. / Dr. / Mr. / Ms. Shruan Ram

for participating & presenting his/her paper on

Sentiment Analysis of Twitter Datasets using Support Vector Machine and Naïve Bayes Classifiers

in

14th International Conference on Science, Technology & Management

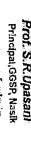Held on 2nd March 2019 at

Guru Gobind Singh Foundation's

Guru Gobind Singh Polytechnic, Nashik

Approved by AICTE New Delhi, DTE Mumbai, Govt. of Maharashtra & Affiliated to MSBTE Mumbai

(NBA Accredited Institute)

KNOWLEDGE IS DIVINE

GGSF
GURU GOBIND SINGH FOUNDATION

Prof. S.R.Upasani
Principal, GGSP, Nasik

Dr. A.K. Sharma
Editor Conference World

DEPARTMENT OF ELECTRICAL ENGINEERING
FACULTY OF ENGINEERING, M.B.M. ENGINEERING COLLEGE
JAI NARAIN VYAS UNIVERSITY
JODHPUR - 342001 (RAJASTHAN) INDIA

CERTIFICATE

This is to certify that **Dr. Alok Singh Gahlot**

of M.B.M. Engineering College , Jodhpur has attended the

TEQIP-III Seminar on

"Technical Aspects of Cyber Crime: Prevention & Detection"

held at

M.B.M. Engineering College Jodhpur, on 7th March, 2019.

Prof. Avdhesh Sharma	**Prof. A.R. Garg**	**Prof. Jayashri Vajpai**
Patron	Convener	Program Chair & Head
		Electrical Department

CERTIFICATE

This is to certify that **Dr. Simran Chaudhary**

of M.B.M. Engineering College, Jodhpur has attended the

TEQIP-III Seminar on

"Technical Aspects of Cyber Crime: Prevention & Detection"

held at

M.B.M. Engineering College Jodhpur, on 7th March, 2019.

Prof. Avdhesh Sharma
Patron

Prof. A.R. Garg
Convener

Prof. Jayashri Vajpai
Program Chair & Head
Electrical Department

CERTIFICATE

This is to certify that **Ms. Bijayalaxmi Sahoo**
of M.B.M. Engineering College, Jodhpur has attended the

TEQIP-III Seminar on

"Technical Aspects of Cyber Crime: Prevention & Detection"

held at

M.B.M. Engineering College Jodhpur, on 7th March, 2019.

'rof. Avdhesh Sharma
Patron

Prof. A.R. Garg
Convener

Prof. Jayashri Vajpai
Program Chair & Head
Electrical Department

09 – 10 March 2019

National Workshop on
Intelligent Multimodal Interfaces (NWIMI)

Organized by IIT Jodhpur

NWIMI
2019

Certificate of Participation

This is to certify that

Simran Choudhary

participated in the **National Workshop on Intelligent Multimodal Interfaces (NWIMI)** organized at Indian Institute of Technology Jodhpur during 09 – 10 March 2019.

General Chair

Organizing Chair

National Workshop on
Intelligent Multimodal Interfaces (NWIMI)

Organized by IIT Jodhpur

NWIMI
2019
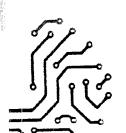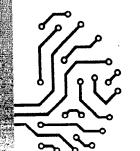
Certificate of Participation

This is to certify that

Rachna Verma

participated in the **National Workshop on Intelligent Multimodal Interfaces (NWIMI)** organized at Indian Institute of Technology Jodhpur during 09 – 10 March 2019.

General Chair

Organizing Chair

National Workshop on Intelligent Multimodal Interfaces (NWIMI)

Organized by IIT Jodhpur

|| नव ज्ञानस्य विज्ञानमोदके ||

NWIMI 2019

Certificate of Participation

This is to certify that

Anand Tanwar

participated in the **National Workshop on Intelligent Multimodal Interfaces (NWIMI)** organized at Indian Institute of Technology Jodhpur during 09 – 10 March 2019.

General Chair

Organizing Chair

09 – 10 March 2019

National Workshop on
Intelligent Multimodal Interfaces (NWIMI)

Organized by IIT Jodhpur

NWIMI
2019

Certificate of Participation

This is to certify that

Rajendra Aaseri

participated in the **National Workshop on Intelligent Multimodal Interfaces (NWIMI)** organized at Indian Institute of Technology Jodhpur during 09 – 10 March 2019.

General Chair

Organizing Chair

National Workshop on
Intelligent Multimodal Interfaces (NWIMI)

Organized by IIT Jodhpur

NWIMI 2019

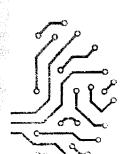# Certificate of Participation

This is to certify that

Bijayalaxmi Sahoo

participated in the **National Workshop on Intelligent Multimodal Interfaces (NWIMI)** organized at Indian Institute of Technology Jodhpur during 09 – 10 March 2019.

General Chair

Organizing Chair

09 – 10 March 2019

National Workshop on Intelligent Multimodal Interfaces (NWIM
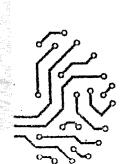
Organized by IIT Jodhpur

NWIMI
2019

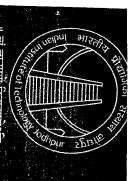## Certificate of Participation

This is to certify that

Abhisek Gour

participated in the **National Workshop on Intelligent Multimodal Interfaces (NWIMI)** organized at Indian Institute of Technology Jodhpur during 09 – 10 March 2019.

General Chair

Organizing Chair

09 – 10 March 2019

National Workshop on
Intelligent Multimodal Interfaces (NWIMI)

Organized by IIT Jodhpur

NWIMI
2019

Certificate of Participation
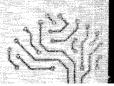
This is to certify that

Deepika Kamboj

participated in the **National Workshop on Intelligent Multimodal Interfaces (NWIMI)** organized at Indian Institute of Technology Jodhpur during 09 – 10 March 2019

General Chair

Organizing Chair

09 – 10 March 2019

National Workshop on Intelligent Multimodal Interfaces (NWIMI)

Organized by IIT Jodhpur

NWIMI 2019

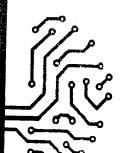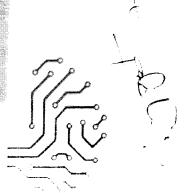## Certificate of Participation
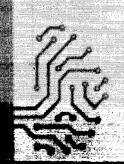
This is to certify that

Jagjeet Singh

participated in the **National Workshop on Intelligent Multimodal Interfaces (NWIMI)** organized at Indian Institute of Technology Jodhpur during 09 – 10 March 2019.

General Chair

Organizing Chair

11-12 March 2019

National Conference on AI Innovations and IP Trends (AIIIPR 2019)

Organized by IIT Jodhpur & Rajasthan Council of Science and Technology,
Department of Science and Technology, Government of Rajasthan

Certificate of Participation

This is to Certify that

Ms. Simran Chaudhary

participated in the *National Conference on AI Innovations and IP Trends (AIIIPR) 2019*
organized at Indian Institute of Technology Jodhpur during 11-12 March 2019.

Convenor

11-12 March 2019

National Conference on AI Innovations and IP Trends (AIIIPR 2019)

Organized by IIT Jodhpur & Rajasthan Council of Science and Technology,
Department of Science and Technology, Government of Rajasthan

Certificate of Participation

This is to Certify that

Dr ANIL GUPTA, MBM ENGINEERING COLLEGE

participated in the *National Conference on AI Innovations and IP Trends (AIIIPR) 2019*

organized at Indian Institute of Technology Jodhpur during 11-12 March 2019.

Convenor

PARIMAL AND PRAMOD CHAUDHARI CENTRE FOR LEARNING AND TEACHING

INDIAN INSTITUTE OF TECHNOLOGY BOMBAY

IIT Bombay   PPCCLT

This is to certify that

Anand Tanwar, MBMEC, Jodhpur

has participated in the MHRD – TEQIP – III KITE Activity

*Selected Twinning and Pedagogical Activities -'Make in India' Curricular
Initiatives, Placement Planning, GATE Sensitization, Transition Rate Improvement and Laboratory Visits*

under the 'Knowledge Incubation under TEQIP' ('KITE') Initiative of the MHRD, Govt. of India

Conducted in IIT Bombay

During the period 29 March 2019 - 02 April 2019

KITE Coordinator
Prof. Vikram M. Gadre

Head, PPCCLT
Prof. Sachin C. Patwardhan

Certificate of Participation

This is to certify that

Rajendra Anseri

has proactively participated in the Microsoft Workshop on transforming education through technology on April 3, 2019 at International Conference on Digital Pedagogies, April 2019, New Delhi.

Malay Dave

Conference Chair

Workshop Sponsored By

Microsoft

Virtual Labs

An AutoBlog Group of India Initiative

Virtual Labs Workshop

MBM ENGINEERING COLLEGE, JODHPUR

3-4 April 2019

CERTIFICATE

This is to certify that *Mr./Ms. RAJENDRA AASERI, COMPUTER SCIENCE AND ENGINEERING, M. B. M. ENGINEERING COLLEGE JODHPUR* attended the Workshop on Virtual Labs under the National Mission on Education through ICT, (MHRD Govt. of India) on 3-4 April 2019 jointly conducted by Virtual Labs, IIT Roorkee and MBM Engineering College, Jodhpur.

Dean
MBM Engineering College

Nodal Coordinator, Virtual Labs
MBM Engineering College

Team Virtual Lab
IIT Roorkee

Virtual

Virtual Labs Workshop
MBM ENGINEERING COLLEGE, JODHPUR
3-4 April 2019

CERTIFICATE

This is to certify that *Mr./Ms. SIMRAN CHOUDHARY, COMPUTER SCIENCE AND ENGINEERING, M. B. M. ENGINEERING COLLEGE JODHPUR* attended the Workshop on Virtual Labs under the National Mission on Education through ICT, (MHRD Govt. of India) on 3-4 April 2019 jointly conducted by Virtual Labs, IIT Roorkee and MBM Engineering College, Jodhpur.

Dean
MBM Engineering College

Nodal Coordinator, Virtual Labs
MBM Engineering College

Team Virtual Lab
IIT Roorkee

Virtual Labs Workshop

MBM ENGINEERING COLLEGE, JODHPUR

3-4 April 2019

CERTIFICATE

This is to certify that *Mr./Ms. RACHNA VERMA, CSE, M. B. M. ENGINEERING COLLEGE JODHPUR* attended the Workshop on Virtual Labs under the National Mission on Education through ICT, (MHRD Govt. of India) on 3-4 April 2019 jointly conducted by Virtual Labs, IIT Roorkee and MBM Engineering College, Jodhpur.

Dean
MBM Engineering College

Nodal Coordinator, Virtual Labs
MBM Engineering College

Team Virtual Lab
IIT Roorkee

Virtual

Virtual Labs

An MHRD Govt of India initiative

Virtual Labs Workshop

MBM ENGINEERING COLLEGE, JODHPUR

3-4 April 2019

CERTIFICATE

This is to certify that **Dr. NEMI CHAND BARWAR, COMPUTER SCIENCE & ENGINEERING, M. B. M. ENGINEERING COLLEGE JODHPUR** attended the Workshop on Virtual Labs under the National Mission on Education through ICT, (MHRD Govt. of India) on 3-4 April 2019 jointly conducted by Virtual Labs, IIT Roorkee and MBM Engineering College, Jodhpur.
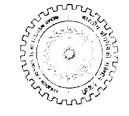
Dean
MBM Engineering College

Nodal Coordinator, Virtual Labs
MBM Engineering College

Team Virtual Lab
IIT Roorkee

Virtual Labs Workshop

MBM ENGINEERING COLLEGE, JODHPUR

3-4 April 2019

CERTIFICATE

This is to certify that *Mr./Ms. ABHISEK GOUR, CSE, M. B. M. ENGINEERING COLLEGE JODHPUR* attended the Workshop on Virtual Labs under the National Mission on Education through ICT, (MHRD Govt. of India) on 3-4 April 2019 jointly conducted by Virtual Labs, IIT Roorkee and MBM Engineering College, Jodhpur.

Dean
MBM Engineering College

Nodal Coordinator, Virtual Labs
MBM Engineering College

Team Virtual Lab
IIT Roorkee

ANDAMAN AND NICOBAR ADMINISTRATION

DR. B.R. AMBEDKAR INSTITUTE OF TECHNOLOGY

(NAAC ACCREDIATED)

ANDAMAN & NICOBAR ISLANDS

Sl. No. DBRAIT/CSE/BDML/2019/16

★ CERTIFICATE ★

Awarded to Dr. / Ms. / Mr. .... Deepika Kamboj .... from .... MBM JODHPUR ....

for having successfully completed One Week National Workshop on

"BIG DATA ANALYTICS & MACHINE LEARNING"

Jointly organized by Dept. of Computer Science and Engg, BRAIT and

NIT Trichy Under TEQIP-III Project, MHRD, Govt. of India

from 22.04.2019 to 27.04.2019

Place : Port Blair
Dated : 27.04.2019

Event Coordinator

HOD (CSE)
DBRAIT

Principal
DBRAIT

ANDAMAN AND NICOBAR ADMINISTRATION
DR. B.R. AMBEDKAR INSTITUTE OF TECHNOLOGY

(NAAC ACCREDIATED)

ANDAMAN & NICOBAR ISLANDS

Sl. No. DBRAIT/CSE/BDML/2019/15

★ CERTIFICATE ★

Awarded to Dr. / Ms. / Mr. ....Sangita Kumari.................. from ......MBM Jodhpur..........

for having successfully completed One Week National Workshop on

"BIG DATA ANALYTICS & MACHINE LEARNING"

Jointly organized by Dept. of Computer Science and Engg, BRAIT and

NIT Trichy Under TEQIP-III Project, MHRD, Govt. of India

from 22.04.2019 to 27.04.2019

Place : Port Blair
Dated : 27.04.2019

Event Coordinator

HOD (CSE)
DBRAIT

Principal
DBRAIT

ANDAMAN AND NICOBAR ADMINISTRATION
DR. B.R. AMBEDKAR INSTITUTE OF TECHNOLOGY
(NAAC ACCREDIATED)
ANDAMAN & NICOBAR ISLANDS

Sl. No. DBRAIT/CSE/BDML/2019/14

★ CERTIFICATE ★

Awarded to Dr. / Ms. / Mr. BIJAYALAXMI SAHOO from MBM JODHPUR

for having successfully completed One Week National Workshop on

"BIG DATA ANALYTICS & MACHINE LEARNING"

Jointly organized by Dept. of Computer Science and Engg, BRAIT and

NIT Trichy Under TEQIP-III Project, MHRD, Govt. of India
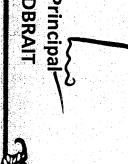
from 22.04.2019 to 27.04.2019

Place : Port Blair
Dated : 27.04.2019

Event Coordinator

HOD (CSE)
DBRAIT

Principal
DBRAIT

TEQIP-III

One Day Workshop on 3D Printing & Reverse Engineering

DEPARTMENT OF PRODUCTION AND INDUSTRIAL ENGINEERING

MBM ENGINEERING COLLEGE, JODHPUR

2nd MAY 2019

CERTIFICATE

This is to certify that *Mr. Rajendra Aaseri, Computer Science and Engineering, M. B. M. Engineering College Jodhpur* attended the Workshop on **3D Printing & Reverse Engineering,** held on 2nd May 2019, organised by the Department of Production and Industrial Engineering, MBM Engineering College, JNV University Jodhpur.

Prof. Manish Kumar
Head and Convener

Prof. Arvind Kumar Verma
Convener

Naveen Suniya
Coordinator

TEQIP-III

One Day Workshop on 3D Printing & Reverse Engineering

DEPARTMENT OF PRODUCTION AND INDUSTRIAL ENGINEERING

MBM ENGINEERING COLLEGE, JODHPUR

2nd MAY 2019

CERTIFICATE

This is to certify that *Mr. Anand Tanwar, Computer Science and Engineering, M. B. M. Engineering College Jodhpur* attended the Workshop on **3D Printing & Reverse Engineering,** held on 2nd May 2019, organised by the Department of Production and Industrial Engineering, MBM Engineering College, JNV University Jodhpur.

Prof.Manish Kumar
Head and Convener

Prof. Arvind Kumar Verma
Convener

Naveen Suniya
Coordinator

Indian
Institute of
Technology
Mandi

WADL 2019

Workshop on Applied Deep Learning

July 1-5, 2019

Certificate of Participation

This is to certified that _Rajendra Aaseri_ of
MBM Eng. College Jodhpur has participated in the "Workshop on Applied
Deep Learning", organized by MANAS LAB, School of Computing and
Electrical Engineering, IIT Mandi held from 1st to 5th July, 2019 at IIT Mandi.

Kamlesh Tiwari

Dr. Kamlesh Tiwari,
BITS- Pilani
(Convener, WADL 2019)

Dr. Aditya Nigam,
IIT Mandi
(Coordinator, WADL 2019).

WADL 2019

Workshop on Applied Deep Learning

July 1-5, 2019

Indian
Institute of
Technology
Mandi

Certificate of Participation

This is to certified that _Simran Choudhary_ of _JNV University_ has participated in the **"Workshop on Applied Deep Learning"** organized by MANAS LAB, School of Computing and Electrical Engineering, IIT Mandi held from 1st to 5th July, 2019 at IIT Mandi.

Kamlesh Tiwari

Dr. Kamlesh Tiwari,
BITS- Pilani
(Convener, WADL 2019)

Dr. Aditya Nigam,
IIT Mandi
(Coordinator, WADL 2019)

Indian
Institute of
Technology
Mandi

WADL 2019

Workshop on Applied Deep Learning

July 1-5, 2019

Certificate of Participation

This is to certified that INYU Jadhav has participated in the "Workshop on Applied Deep Learning" organized by MANAS LAB, School of Computing and Electrical Engineering, IIT Mandi held from 1st to 5th July, 2019 at IIT Mandi.

Abhisek Gour of

Kamlesh Tiwari

Dr. Kamlesh Tiwari,
BITS- Pilani
(Convener, WADL 2019)

Dr. Aditya Nigam,
IIT Mandi
(Coordinator, WADL 2019)

START UP CONCLAVE 2018
EDUCATE TO INNOVATE 1.0

27, 28, 29, July 2018

- Fostering startup and innovation culture within Engineering Campuses

PANELS I TALKS I WORKSHOPS I EXHIBITS / **Venue: ESCI Campus, Hyderabad**

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Engineering Staff College of India - An Autonomous Organ of The Institution of Engineers (India) appreciates the active participation by .... **Prof. Anand Tanwar** .... from .... **JNVU, Jodhpur Rajasthan** .... for 3 days Start up conclave 2018 (Educate to Innovate 1.0) at ESCI Campus, Hyderabad conducted on 27th, 28th, 29th July 2018

Dr. P. Sai Kishore
Head (FDP Cell), ESCI

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2ⁿᵈ INTERNATIONAL CONFERENCE ON COMMUNICATION & COMPUTATIONAL TECHNOLOGIES (ICCCT-2019)

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in 2ⁿᵈ International Conference on Communication & Computational Technologies (ICCCT 2019) held on

30ᵗʰ -31ˢᵗ August, 2019 at Rajasthan Institute of Engineering & Technology, Jaipur.

Chair/Coordinator
RIET, Jaipur

Chair/Coordinator
RTU, Kota

General Chair

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Seminar on Technical Teachers Training Policy, Its Implementation & AICTE Quality Initiatives

1st November 2019

Certificate

This is to certify that Mr./Ms./Dr. ...ANAND TANWAR... MBM JODHPUR... participated in Seminar on "Technical Teachers Training Policy, Its Implementation & AICTE Quality Initiatives on 1st November 2019 at MBM Engineering College, Jodhpur.

Col B Venkat
Director, AICTE, New Delhi

Prof. Rajat Bhagwal
Seminar Coordinator

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Seminar on Technical Teachers Training Policy,
Its Implementation & AICTE Quality Initiatives

1st November 2019

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Carl B Venkat
Director, AICTE, New Delhi

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Seminar Coordinator

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This is to Certify that *Ms. DEEPIKA KAMBOJ* of *M. B. M. Engineering College Jodhpur, Rajasthan* has participated in TEQIP workshop on "Faculty Training Program on Block chain Technology" organized at IIT Hyderabad between December 16th – 20th 2019.

Dr. Saday Peri
Workshop Coordinator
IIT Hyderabad

Dr. Subash Ranjan Dey
TEQIP Coordinator
IIT Hyderabad

TEQIP III

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CONFLUENCE-2020

THEME: CLOUD COMPUTING, DATA SCIENCE & ENGINEERING

CERTIFICATE OF PARTICIPATION

This is to certify that Dr./Mr./Ms. __Dupika Kamboj__

from __MBM Engineering College, Jodhpur__ has presented/published research paper on

__A Review on IoT: Protocols, Architecture, Technologies, Application and Research Challenges__ during the

10th International Conference Confluence-2020 on the theme 'Cloud Computing, Data Science and Engineering'

held on 29th - 31st January, 2020 at Amity University Uttar Pradesh, Noida.

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General Co Chair, Confluence 2020
Deputy HoD (CSE), ASET
Amity University Uttar Pradesh, Noida, India

Prof. (Dr.) Abhay Bansal
General Chair, Confluence 2020
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Place of Training: M.B.M. Engineering College, Jodhpur

Certificate No.: *444*

Gaurav Saluja

Gaurav Saluja
Director Grras Training Unit

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COMPUTER SCIENCE & ENGINEERING / INFORMATION TECHNOLOGY DEPARTMENT

INTERNATIONAL CONFERENCE
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EMERGING TECHNOLOGIES IN COMPUTER ENGINEERING

Machine Learning and Internet of Things

ICETCE-2020

This certificate is awarded to Prof./Dr./Mr./Ms. _Rachna Verma_

for Presenting/Publishing Paper on _An Efficient Clustering Algorithm to Simultaneously Detect Multiple Planes in a Point cloud_ in the 3rd International Conference

held at SKIT Jaipur, during February 7th-8th,2020.

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Patron, SKIT

Dr. Ramesh K. Pachar
Principal, SKIT

Prof.(Dr.) K. Subramania
IEEE Ambassador

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33rd National Convention of Computer Engineers
and National Conference
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This is to certify that Prof./Dr./Er./Mr./Ms. _Anil Gupta._

Faculty/ Research Scholar/Student from _Dept. of C.S.E., MBM. Engg. College, Jodhpur_

has presented/participated in the National Conference on **"Applied Computational Intelligence
and Informatics"** held at the Institute of Engineers (India), Rajasthan State Centre, Jaipur (Raj.)
on **15th and 16th February, 2020**. and paper entitled _Effect of Synaptic Depression in
Modulating the Response properties of Cortical Neurons._

Er. Sajjan Singh Yadav
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Dr. Hemant Kumar Garg
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Dr.M.Ramesh
Principal

ICAIML 2020

04th - 05th September 2020, Jaipur, Rajasthan, India

International Conference

on

Artificial Intelligence & Machine Learning

Certificate

This is to certify that

Shrwan Ram, Anil Gupta

has presented a paper titled

Classification of Pituitary Tumor and Multiple Sclerosis Brain Lesions through Convolutional Neural Networks

in the International Conference on Artificial Intelligence & Machine Learning held during 04/09/2020 to 05/09/2020 at Jaipur, Rajasthan, India on Virtual Platform.

We wish the authors all the very best for future endeavors.

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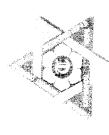
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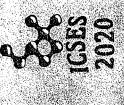
Pre-Trained Deep Networks for Faster region-based CNN model for Pituitary Tumor Detection.

in the *International Conference on Sustainable Expert Systems (ICSES 2020)* organised by Tribhuvan University, Nepal on 28-29 September, 2020.

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Pre-Trained Deep Networks for Faster region-based CNN model for Pituitary Tumor Detection.

in the *International Conference on Sustainable Expert Systems (ICSES 2020)* organised by Tribhuvan University, Nepal on 28–29 September, 2020.

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Classification of Pituitary Tumor and Multiple Sclerosis Brain Lesions through Convolutional Neural Networks

Shrwan Ram

Anil Gupta

Department of Computer Science and Engineering
MBM Engineering College,
Jai Narain Vyas University,
Jodhpur, Rajasthan, INDIA

Abstract: Automatic classification of Brain Tumor and brain Lesions has become a very important step in the field of medical image analytics. The machine learning/Deep learning approaches are playing a tremendous role in the field of medical imaging classification, due to the drastic changes in the field of computing power and image analytics techniques. The deep learning, which is the subfield of machine learning, is playing the major role in the automatic classification of Magnetic Resonance Images (MRIs) having various brain abnormalities. Convolutional Neural Networks are widely used for the classification and detection of various brain disorders. In this research paper, Convolutional Neural Networks are designed with considering various learning parameters for the classification of Multiple Sclerosis Brain Lesions and Pituitary Tumor. In the proposed research, T1-weighted Contrast-enhanced Magnetic Resonance images are preprocessed with various image-preprocessing approaches such as to resize the images, to convert the images into suitable image format so that the experimental work can be performed with deep learning in the Matlab environment. The Experiment is conducted with the dataset of Multiple Sclerosis and Pituitary Tumor each of having 718 and 930T1-weighted MRI images respectively. The experimental results we achieved 99.7% classification accuracy of pituitary Tumor, and 99.2% accuracy of Multiple Sclerosis brain Lesions. The average accuracy of both classifications is 99.55%. The precision of the classification of Pituitary Tumor is 99.7, recall value is 99.7 and the f1_score of the classification is 99.7%. Similarly, the Precision of the classification of Multiple Sclerosis Brain Lesions is 99.15%, the recall value is 99.15%, and the f1_score is 99.15%. The purposed approach of the Convolutional Neural Network architecture exhibited outstanding performance as compared to other research outcomes.

Keywords- Brain Tumor, Multiple Sclerosis Brain Lesions, machine learning, Deep learning, Convolutional Neural Networks, brain disorders.

S. Smys
Valentina Emilia Balas
Khaled A. Kamel
Pavel Lafata   *Editors*

Inventive Computation and Information Technologies

Proceedings of ICICIT 2020

Multiple Sclerosis Disorder Detection Through Faster Region-Based Convolutional Neural Networks

Shrawan Ram and Anil Gupta

Abstract Multiple sclerosis is a leading brain disorder that highly affects the normal functions of the human body. Due to this disorder, protective coverings of neuron cells are get damaged, which causes disrupting the information flow inside the brain and other body parts. The early detection of multiple sclerosis helps healthcare practitioners to suggest a suitable treatment for the disease. The detection of multiple sclerosis is a challenging task. Many types of approaches had been proposed by the researchers and academicians for accurately detecting the brain lesions. Precisely, detecting the brain lesions is still a big challenge. Due to the recent innovations in the field of image processing and computer vision, healthcare practitioners are using advanced disease diagnosis systems for the prediction of disorders/diseases. Magnetic resonance imaging approach is used for the detection of various brain lesions by the neurosurgeons and neurophysicians. The computer vision approaches are playing a major role in the automatic detection of various disorders. In this research paper, the faster region-based convolutional neural networks approach is proposed based on computer vision and deep learning, using transfer learning for the detection of multiple sclerosis as a brain disorder. The proposed approach is detecting the damaged area inside the brain with higher precision and accuracy. The proposed model detects the multiple sclerosis brain lesions with 99.9% accuracy. Three DAGNetworks are used for training; there are Alexnet, Resnet18, and Resnet50. As compare to Alexnet and Resnet18, deep networks, the Resnet50 Pre-trained network performed well with higher accuracy of detection.

Keywords Multiple sclerosis · Magnetic resonance imaging · Brain lesions · Computer vision · Convolutional neural networks · Deep learning

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Subarna Shakya
Valentina Emilia Balas
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Zubair Baig *Editors*

Proceedings of International Conference on Sustainable Expert Systems

ICSES 2020

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Pre-trained Deep Networks for Faster Region-Based CNN Model for Pituitary Tumor Detection

Shrwan Ram and Anil Gupta

Abstract Due to drastic changes in the field of technology and computing power for the last decade, it has become very easy to implement the convolutional neural networks for the classification and detection of objects from the large volume of images. Nowadays, the various deep networks with hundreds of layers are developed and implemented by the researchers for the classification of images and object detection inside the images. The Faster region-based convolutional neural network (R-CNN) is a widely used state-of-the-art approach that belongs to R-CNN techniques that were first time developed and used in 2015. Different R-CNN object detection approaches are developed and implemented by the researchers. Three approaches are developed and implemented on different platforms, and these approaches are R-CNN, fast R-CNN, and faster R-CNN. The efficiency and accuracy of the approaches are tested for various object detections inside the different images. Algorithms based on region proposals are used in R-CNN approaches to generate the bounding boxes or the actual location of the objects inside the images. The ground labels are generated through image labeling approaches. These ground truth labels are stored in a file. The features are extracted by pre-trained deep networks or the convolutional neural networks using the ground truth labeled images. The classification layer of the convolutional neural networks predicts the class of the object to which it belongs. The regression layer is used to create the relevant coordinates of the bounding boxes accurately. In this research paper, the faster R-CNN approach with retrained deep networks is used for the detection of pituitary tumor. The tumor detection performance of the detectors trained with three pre-trained deep networks is compared in the proposed approach of tumor detection. Three pre-trained deep networks such as Googlenet, Resnet18, and Resnet50 are used to train the tumor detector with ground truth labeled images.

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Preventing Unauthorized Access In Hadoop Distributed File System

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Dr. N.C.Barwar
Convener, COPIC-2015

Dr. Anil Gupta
Convener, COPIC-2015

Network Performance Analysis of Startup Buffering for Live Streaming in P2P VOD Systems for Mesh-Based Topology

Nemi Chand Barwar and Bhadada Rajesh

Abstract This paper explores mesh-based clustering for different start video streaming in P2P systems and estimates the performance of noncluster and clustered models. These models are based on mesh-based topology of P2P streaming consisting of peer join/leave. A new approach by way of "clustering" peers is proposed to tackle P2P VOD streaming. The proposed models were simulated and verified using OMNET++ V.4. A clustered model for video streaming is proposed and simulated to consider the performance of network under startup buffering for frame loss, startup delay, and end-to-end delay parameters. The results obtained from simulations are compared for both noncluster versus cluster models. The results show the impact of startup buffering on both models is also bounded due to time limits of release buffer and playing buffer under the proposed models, which causes reduction in wait time to view video improving the overall VOD system performance. The proposed model is also able to provide missing parts (of video) to late viewers, which gives the facilities of both live and stored streaming from user's point of view, therefore it serves to be functionally hybrid and is most useful.

Keywords Peer-to-peer (P2P) · Video streaming · Video on demand (VOD)

N.C. Barwar (✉)
Faculty of Engineering, Department of Computer Science & Engineering,
M.B.M Engineering College, J N V University, Jodhpur, India
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Bhadada Rajesh
Faculty of Engineering, Department of Electronics & Communication Engineering,
M.B.M Engineering College, J N V University, Jodhpur, India
e-mail: rajesh_bhadada@rediffmail.com

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RACHNA VERMA

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Department of Production and Industrial Engineering
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DR. RACHNA VERMA

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RESEARCH ISSUES IN OBJECT DISTANCE ESTIMATION USING A LASER POINTER AND A WEBCAM

in the National Conference on Advances in Computer Integrated Manufacturing (NCACIM-III), March 18-19, 2016.

Dr. Arvind Kumar Verma
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Dr. Manish Kumar
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SHRWAN RAM

attended /presented a paper on

A COMPARATIVE STUDY OF MULTILAYER PERCEPTRON, RADIAL BASIS FUNCTION NETWORKS AND LOGISTI REGRESSION FOR HEALTHCARE DATA CLASSIFICATION

in the National Conference on Advances in Computer Integrated Manufacturing (NCACIM-III), March 18-19, 2016.

Dr. Arvind Kumar Verma
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March 18-19, 2016

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J.N.V. University, Jodhpur – 342011

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attended /presented a paper on

PREDICTING CONSUMER BEHAVIOUR USING ARTIFICIAL NEURAL NETWORK

in the National Conference on Advances in Computer Integrated Manufacturing (NCACIM-III), March 18-19, 2016.

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Convener, NCACIM-III, 2016

Dr. Manish Kumar
Co-Convener, NCACIM-III, 2016

DR. RAJESH PUROHIT
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May 11, 2016

TO WHOM SO EVER IT MAY CONCERN

This is to certify that Dr. Alok Singh Gahlot, Assistant Professor has attended the following seminar/conferences as per record.

S.No.	Type	Title	Place	Dates	Duration
1	National Seminar	Emerging Trends in Soft Computing Based Artificial Intelligence (SCAI-04)	Dept. of CSE, MBM Engg. College, Jodhpur	27-29 Feb-2004	3 days
2	National Conference	Current Advances in Information Protection and Security, (CAIPS-05)	Dept. of CSE, MBM Engg. College, Jodhpur	26-28 Feb 2005	3 days
3	National Conference	Emerging Trends in Computer Simulations and Modelling for Complex System. (MRCS-07)	Dept. of CSE, MBM Engg. College, Jodhpur	23-24 Feb 2007	2 days
4	National Conference	New Advances in Programming Languages and Their Implementations, (APL-2013)	Dept. of CSE, MBM Engg. College, Jodhpur	15-16 Mar 2013	2 days

DR. RAJESH PUROHIT
HEAD
Dept. of Computer Science & Engg.
Faculty of Engg. J. N. V. University
JODHPUR

Science, Technology and Management

Certificate

This certificate acknowledges and honours

Dr N C Baruan

for presenting his/her paper on

Comparative Analysis of CBIR System using Entropy

in

5th International Conference on Science, Technology and Management

held on 30th July 2016 at
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for presenting his/her paper on

Comparative Analysis of Identification of Malicious Node in Vanet Using FFRDV and ERDV Routing Algorithm

in

6th International Conference on Recent Innovations in Science, Engineering and Management (ICRISEM-16)

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Organized by :- Department of Mechanical Engineering

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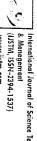
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28-29 MARCH, 2017

Certificate of Appreciation

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has attended/contributed/presented a research paper titled ...Analyzing Big Data

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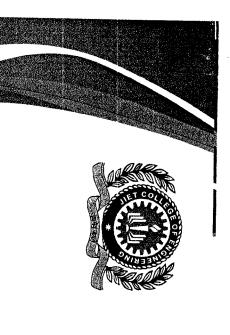
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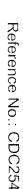
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Conference Info

3rd International Conference on Advancement in Engineering, Applied Science and Management (ICAEASM-2017)

Venue: Centre for Development of Advanced Computing, Juhu, Mumbai, Maharashtra (India) on 20th August 2017

Certificate of Presentation

This is to certify that

Dr. Anil Gupta

MBM Engineering College, Jodhpur, India

Presented a paper Titled as

" A study of Security issues towards Distributed System"

in the conference organized by Conference Info in association with Academic Science at Centre for Development of Advanced Computing, Juhu, Mumbai, Maharashtra (India) on 20th August 2017

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Dr. K. Agarwal
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A Review on Tools For Cyber Security

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ABSTRACT:- Cyber security is the group of advancements, procedures and practices intended to protect networks, computers, data and information from attack, damaged or unauthorized access. cyber security or information security are the strategies of ensuring computers, networks , data and information from unauthorized access or attacks that are gone for abuse. Principle zones canvassed in digital security are Application Security, Information Security, Disaster recuperation, Network Security.

KEYWORDS: - Cyber security, internet, wire shark, ngrep, ICT

INTRODUCTION:-In the present scenario increasing dependence on information and communication technologies (ICT), especially the Internet, for delivery of services and operations, the biggest challenges the world facing is that of cyber security. It is a complex issue which affecting many application domains and straddling many disciplines and fields. To Secure the critical infrastructures requires protecting not only the physical systems but, just as important, the cyber portions of the systems on which they rely. Given the kind of activities being carried out in the cyberspace, cyberspace merges seamlessly with the physical world. But so do cybercrimes. Backbone of cyber criminals the underground black market supported by exploit kits, packaged malware and hacks is expected to continue and evolve citing tried-and-true crime ware like Black Hole, ransomware, APTs which have been improved and refined in ways that shows the extent of professionalism and methodology for developing malwares. Cyber attackers can disrupt critical infrastructures such as financial and air traffic control systems, producing effects that are similar to terrorist attacks in the physical space. They can also carry out identity theft and financial fraud; steal corporate information such as intellectual property; conduct espionage to steal state and military secrets; and recruit criminals and others to carry out physical terrorist activities. What makes cyberspace even more attractive to criminals including non-state actors is that attribution in cyberspace is difficult, especially given that cyberspace is borderless and cuts across jurisdictions. It allows criminals to launch attacks remotely from anywhere in the world. With this growing threat landscape, cyber-readiness of the security systems has been constantly put to test.

CYBER SECURITY RESEARCH:-Cyber Security Research is one context where the solution to deal with cyber criminals is germinating. Investment of time and resources requires fostering strategies for research and developing transformative solution to meet critical cyber security challenges involving a certain technology (e.g. cloud computing), or a particular application domain (e.g. finance), or a combination of two. To begin with the focus of cyber security research is nowadays to deal with new emerging threats and detecting the threats before they effect or cause good amount of damages. With growing number of phishing, APTs and botnet attacks, there is lot to be worked in terms of technological advancements and detection technology to meet the cyber threats of the future.These are some useful tools used in cyber security.

WIRESHARK:- Wireshark is the world's foremost and widely-used network protocol analyzer. It lets you see what's happening on your network at a microscopic level, standard across many commercial and non-profit enterprises, government agencies, and educational institutions. It is a network analysis tool formerly known as Ethereal, captures packets in real time and display them in human-readable format. Wireshark

Academic Science

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Efficient Implementation and Analysis of Ring-LWE Quantum-Secure Key Exchange Protocol

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Abstract:

Today's cryptosystems based on classical hard mathematical problems in number theory like integer factorization, discrete logarithm over the finite fields and elliptic curve variants will become obsolete. The quantum algorithm proposed by Shor's for RSA and Proos and Zalka's for ECDLP claimed that these hard problems can be solved in polynomial time on quantum computer. While the symmetric key cryptography have minor threat as it make use of highly nonlinear s-boxes, p-boxes, cycles of confusion and diffusion. The only known threat to some symmetric cryptographic schemes like DES is Grover's algorithm that proposes a square root speed-up over classical brute force algorithms. NIST [14] points out that if the key sizes are sufficient, symmetric cryptographic schemes (specifically the Advanced Encryption Standard-AES) are resistant to quantum computers. The development of quantum computer is on full pace, hopefully it might be available in a decade. Thus, it is necessary to develop efficient quantum secure public key cryptosystems to provide safe key exchange in quantum era. In this paper we presented an efficient implementation of a Ring-Learning with errors public key cryptosystem whose security is based on intractability of hard problem on lattices. And comparative analysis of proposed cryptosystem with RSA, ECDH and LWE based key exchange protocols is presented.

Keywords—Lattices, Learning with errors, Ring-Learning with errors, Reconciliation mechanism

1. Introduction

Public-key encryption is an asymmetric cryptographic technique based on one–way function. It plays an exceptionally important role in secure key exchange, pseudorandom number generation, digital signature generation and authentication. The threat of quantum computers, which break most widely used public key cryptographic primitives like RSA, Diffie-Hellman (Diffie & Hellman, 1976) and Elliptic curve Diffie–Hellman key exchange, has raised interest in symmetrical structure lattice. Lattice is a set of points in n-dimensional space with a periodic structure. There are two fundamental computational problems in lattices (Goldreich, Goldwasser, & Halevi, 1997), the Shortest Vector Problem, i.e., finding a non-zero lattice vector with minimal Euclidean length and the Closest Vector Problem, i.e., given a non-zero lattice vector t, find a vector in lattice that is closest to t. All the lattice based cryptographic constructions are fundamentally based on these hard problems. This is further emphasized by an announcement of NIST, for starting standardization of post-quantum cryptography and by the statement of NSA's Information Assurance Directorate (IAD) to "initiate a transition to quantum resistant algorithms in the not too distant future" for Suite B cryptography. The usage of lattices in cryptography started in 1996, when Ajtai (Ajtai, 1996) revealed that there are certain problems in the area of lattices that have strong security guarantees from the worst-case hardness. Cryptography basically requires average-case intractability, i.e., problems for which random instances drawn from a specified probability distribution are hard to solve. This is qualitatively different from the worst-case notion of hardness usually considered in the theory of algorithms and NP-completeness, where a problem is considered hard if there merely exist some intractable instances. Thus, the problems that appear hard in the worst-case often turn out to be easier on the average. The Lattice-based cryptography has emerged as the most promising candidate that provides good performance in addition to resistance against both classical and quantum cryptanalysis. It has many compelling features, like security under worst-case hardness assumptions, efficiency and parallelism. It provides advanced cryptographic constructions like identity-based encryption, fully homomorphic encryption schemes [2] and multilinear maps.

Ideal lattices and cyclic lattices are widely used in recent lattice based cryptographic constructions (Alkim, Ducas, Pöppelmann & Schwabe, 2016). Learning with Errors (LWE) problem (Regev, 2005) is an average-case problem with strong security guarantee and high efficiency when parameters are properly chosen. Later its ring variant, Ring Learning with Errors (RLWE) was introduced in 2010 (Lyubashevsky, Peikert & Regev, 2013). Hardness of LWE and RLWE can be reduced to solve hard problems in regular lattice and ideal lattice (Micciancio, & Peikert, 2013). Since no classic or quantum algorithms can solve lattice problems and their versatility, LWE and RLWE are considered as important building blocks for post-quantum cryptography. Our public key cryptosystem is simple and analogous to the unauthenticated Diffie–Hellman Key exchange protocol and comes with a strong proof of security based on the Ring Learning with error problem, which is related to hard lattice problem. Ring Learning with Errors (RLWE) is a computational problem which is widely believed to be very difficult to solve. This problem is being used as the foundation for a new class of public key cryptosystems designed to withstand attack by a Quantum computer. The problem is generally described in the mathematical ring formed by polynomials of degree n-1 over a finite field such as the integer's mod a prime number q. The motivation behind selecting the RLWE-based construction in our work in contrast to the LWE-based construction is to improve the efficiency while maintaining essentially the same level of security. A major advantage for RLWE compared with LWE is that it has a much reduced key size, and this is more desirable for real world applications due to smaller communication and storage cost. The cryptographic primitives based on the LWE problem, which has been shown to be as hard as worst-case lattice problems such as the shortest vector problem (SVP) and the shortest independent vector problem (SIVP), generally have key sizes and computation times that are at least quadratic in the major security parameter n (Peikert, 2009). The RLWE problem deals with public key sizes that are smaller by n, which in this case corresponds to the ring dimension, and polynomial multiplications that can be performed using Fast Fourier Transform in $O(n\log n)$. The RLWE problem can be stated in two different ways. One is called the "Search" version and the other is the "Decision" version. The Search version of the problem can be stated as follows. Let $a_i(x)$ be a set of random but known polynomials from the ring of polynomials with coefficients from the integers mod q (i.e. F_q), $e_i(x)$ be a set random and unknown polynomials where the coefficients are constrained to be small over the integers (i.e. less that +/- an integer b with b much less than q), $s(x)$ be a single unknown polynomial which also has small coefficients relative to the same bound, b. And $b_i(x)$ be the set of polynomials $b_i(x) = a_i(x) \cdot s(x) + e_i(x)$. Given the list of polynomial pairs $(a_i(x), b_i(x))$ find the unknown polynomial $s(x)$. Using the same definitions, the Decision version of the problem can be stated as follows. Given a list of polynomial pairs $(a_i(x), b_i(x))$ determine whether the $b_i(x)$ polynomials were constructed as $b_i(x) = a_i(x) \cdot s(x) + e_i(x)$ or were generated with random coefficients from the integer mod q. The RLWE problem is proved to be hard using a quantum reduction from worst-case approximate SVP on ideal lattices to the search version of RLWE. It is also proved that the RLWE distribution is pseudorandom if the RLWE search problem is hard (Peikert, Regev, Stephens-Davidowitz, 2017).

A study of Security issues towards Distributed System

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ABSTRACT
Improvement of secured and trusted Distributed system is a basic research issues. This paper is a commitment towards the summarization of work completed in this field and in addition distinguishes new research lines. A few methodologies about security angles in Distributed system have been talked about, similar to confirmation based methodologies, improvement of trust based models, get to control based approaches, and so forth. A synopsis of these issues is given in conclusion area. Aside from this, many research lines about secure Distributed system are talked about.
Keywords:-Distributed System Security, authentication, cryptography, quorum, mobile agent, trust based models, access control

1 INTRODUCTION: - We are interested in the unique security issues that arise from the requirements of two fundamental goals, interoperability and transparency, for computer networks and distributed systems. Interoperability refers to the ability to have effective information exchange between hosts and between process in systems that have heterogeneous components. The effectiveness of information exchange must be augmented with security attributes. Transparency refers to the uniform view of a system that has transparent. Distribution of computation and resources. It is worthwhile to find out the effect of transparency on the design of a secure distributed system and whether the transparency concept should be extended to include security. To address these issues let us first consider the system architecture with embedded security features. The security methods in distributed system [1, 2, 44] are the critical issues. A few components of Distributed system security are recognized, similar to confirmation, authorization, encryption and framework security. In beginning days, the security administration condition depended on single authority frameworks yet now the attention is on the advancement of per action, experts and gatherings with shared responsibilities. The general security assaults on the appropriated frameworks are spying (increasing mystery data), disguising (making suppositions on the character of clients), and message treating (changing the substance of the message), replaying the message and forswearing of administrations. The dependability of dispersed frameworks is vital in a number of situations. For expressive economy the term security is utilized to speak to the two its conventional importance as well as those thoughts conveyed by the term protection. Before talking about the variables influencing security in appropriated frameworks, a review of circulated framework design is presented and utilized as a system for ensuing examination. This paper has been partitioned into 3 sections. Segment 2 clarifies different security parts of dispersed frameworks. Segment 3 concludes the new research lines in creating secure dispersed frameworks. Section 4 is conclusion and future extension.

2. SECURITY ASPECTS IN DISTRIBUTED SYSTEMS:-
Different kinds of security approaches are used to build a secure distributed system. These are authentication based, trust based, access control based, cryptography techniques based etc

2.1 Authentication Based Security:-
Authentication is process which allows a user to confirm his identity to an application [1]. An on request way revelation calculation has been proposed to empower spaces to safely find ways in the cooperation