

## Adaptive Routing for an Ad Hoc Network Based on Reinforcement Learning

Rahul Desai (Sinhgad College of Engineering, Pune, India) and B.P. Patil (Army Institute of Technology, Pune University, Pune, India)

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### Abstract

This paper describes and evaluates the performance of various reinforcement learning algorithms with shortest path algorithms that are widely used for routing packets throughout the network. Shortest path routing is simplest policy used for routing the packets along the path having minimum number of hops. In high traffic or high mobility conditions, the shortest path gets flooded with huge number of packets and congestions occurs, so such shortest path does not provide the shortest path and increases delay for reaching the packets to the destination. Reinforcement learning algorithms are adaptive algorithms where the path is selected based on the traffic present on the network at real time. Thus they guarantee the least delivery time to reach the packets to the destination. Analysis is done on a 6-by-6 irregular grid and sample ad hoc network shows that performance parameters used for judging the network such as packet delivery ratio and delay provide optimum results using reinforcement learning algorithms.

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### 1. Introduction

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# Analysis of Reinforcement Based Adaptive Routing in MANET

Rahul Desai, B P Patil

## Abstract

This paper describes and evaluates the performance of various reinforcement learning algorithms with shortest path algorithms that are widely used for routing packets through the network. Shortest path routing is the simplest policy used for routing the packets along the path having minimum number of hops. In high traffic or high mobility conditions, the shortest path get flooded with huge number of packets and congestions occurs, So such shortest path does not provides the shortest path and increases delay for reaching the packets to the destination. Reinforcement learning algorithms are adaptive algorithms where the path is selected based on the traffic present on the network at real time. Thus they guarantee the least delivery time to reach the packets to the destination. Analysis done on a 6 by 6 irregular grid and sample ad hoc network shows that performance parameters used for judging the network - packet delivery ratio and delay provides optimum results using reinforcement learning algorithms.

## Keywords

Ad Hoc Network, AODV, AOMDV, DSDV, DSR, CQ Routing, DRQ Routing, Q Routing

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# Prioritized Sweeping Reinforcement Learning Based Routing for MANETs

Rahul M Desai, B P Patil

## Abstract

In this paper, prioritized sweeping confidence based dual reinforcement learning based adaptive network routing is investigated. Shortest Path routing is always not suitable for any wireless mobile network as in high traffic conditions, shortest path will always select the shortest path which is in terms of number of hops, between source and destination thus generating more congestion. In prioritized sweeping reinforcement learning method, optimization is carried out over confidence based dual reinforcement routing on mobile ad hoc network and path is selected based on the actual traffic present on the network at real time. Thus they guarantee the least delivery time to reach the packets to the destination. Analysis is done on 50 Nodes Mobile ad hoc networks with random mobility. Various performance parameters such as Interval and number of nodes are used for judging the network. Packet delivery ratio, dropping ratio and delay shows optimum results using the prioritized sweeping reinforcement learning method.

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Rahul Desai & B. P. Patil

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### Abstract

In this paper, optimized reinforcement learning-based adaptive network routing is investigated. Shortest path routing is most suitable network routing algorithm for wired network but not suitable for any wireless network. In high traffic conditions, shortest path will always select the shortest path (in terms of number of hops)

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# Dual Reinforcement Q Routing for Ad Hoc Networks

Rahul M Desai, B P Patil

## Abstract

Ad Hoc Networks are infrastructure less network in which nodes are connected by Multi-hop wireless links. Each node is acting as a router as it supports distributed routing. Routing challenges occurs as there are frequent path breaks due to the mobility. Various application domains include military applications, emergency search and rescue operations and collaborative computing. The existing protocols used are divided into proactive and on demand routing protocols. The various new routing algorithms are also designed to optimize the performance of a network in terms of various performance parameters. Dual reinforcement routing is learning based approach used for routing. This paper describes the implementation, mathematical evaluation and judging the performance of a network and analyze it to find the performance of a network.

## Keywords

DSDV, OLSR, AOMDV, AODV, DSR, Ad Hoc Network, MANET, Q Routing, CQ Routing, CDRQ Routing

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# Routing Protocols for Mobile Ad Hoc Network - A Survey and Analysis

Rahul M Desai, B P Patil, Davinder Pal Sharma

## Abstract

Ad hoc networks are mobile wireless networks where each node is acting as a router. The existing routing protocols such as Destination sequences distance vector, Optimized list state routing protocols, Ad hoc on demand routing protocol, Ad hoc on demand multipath routing protocol, Dynamic source routing are optimized versions of distance vector or link state routing protocols. In this paper, existing protocols such as DSDV, AODV, AOMDV, OLSR and DSR are analyzed on 50 nodes Mobile Ad Hoc network with random mobility. Packet delivery ratio, delay, control overhead and throughput parameters are used for performance analysis.

## Keywords

DSDV, OLSR, AOMDV, AODV, DSR, Ad Hoc Network, MANET

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# Learning Based Route Management in Mobile Ad-Hoc Networks

Rahul M Desai, B P Patil, Davinder Pal Sharma

## Abstract

Ad hoc networks are mobile wireless networks where each node is acting as a router. The existing routing protocols such as Destination sequences distance vector, Optimized list state routing protocols, Ad hoc on demand routing protocol, dynamic source routing are optimized versions of distance vector or link state routing protocols. Reinforcement Learning is new method evolved recently which is learning from interaction with an environment. Q Learning which is based on Reinforcement learning that learns from the delayed reinforcements and becomes more popular in areas of networking. Q Learning is applied to the routing algorithms where the routing tables in the distance vector algorithms are replaced by the estimation tables called as Q values. These Q values are based on the link delay. In this paper, various optimization techniques over Q routing are described in detail with their algorithms.

## Keywords

Q Routing, Reinforcement, CQ routing, DRQ routing, CDRQ routing, DSR, AODV, DSDV

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**Spectral and Power Efficient Blind Channel Estimation Technique for MIMO-OFDM Communications**

**Renuka Bhandari and Sangeeta Jadhav**

**Abstract:**

Nowadays, massive MIMO (Multiple Input Multiple Output) is widely studied research domain in future wireless communications. There are two key performances needs to be considered while designing the MIMO systems such as spectral efficiency and power efficiency. The channel evaluation techniques play the important role in spectral and power efficiency performance. In this paper, we first proposed novel spectral efficient blind channel estimation technique using Independent Component Analysis (ICA). The proposed blind channel estimation algorithm uses the 3rd and 4th order HOS (higher order statistical) approach and pulse shaping to minimize the blind interference and Inter-Symbol Interference (ISI) effects. To reduce the errors, process of ambiguity removal introduced after the blind channel estimation. Secondly, to mitigate the problem of high PAPR, we introduced PAPR reduction method with blind channel estimation. For PAPR reduction, adaptive clipping technique used in which the energy constellation of every input symbol is utilized to compute the clipping threshold. The adaptive clipping method is combined with hybrid channel estimation technique to achieve the trade-off between spectral efficiency and power efficiency for MIMO. The simulation outcomes demonstrated that proposed PHICA (PAPR aware Hybrid ICA) method improves performance

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## Insight on Blind Channel Estimation of MIMO-OSTBC Using Higher Order Statistics with Kalman Filter (HOS-KF)

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### Abstract

A Blind channel estimation of Multiple-Input Multiple-Output-Orthogonal Space Time Block Code (MIMO-OSTBC), using Higher Order Statistics with Kalman Filter (HOS-KF), is proposed. It offers better performance, improvement in spectral efficiency and moderate computational complexity. This paper focuses on channel estimation without CSI information for fast time varying MIMO systems. It adds advantages of HOS as well as of KF. Minimization of cost function obtained by higher order kurtosis is done by Kalman filter. KF estimates the value after each iteration and then update it. Matlab simulation used to evaluate the channel estimation. Performance parameters, Bit Error Rate (BER) and Mean Square Error (MES) versus Signal to Noise Ratio (SNR) are plotted. Simulation results with different modulation schemes like M-QAM and M-PSK depict that proposed method outperforms as compare to traditional Independent Component analysis (ICA) and KF method in terms of BER, MES. Spectral efficiency also improves as no Channel State

scattering, communication suffers multipath fading. When signal reaches to receiving antenna, it is a composite signal of all multipath signals [3]. The multipath signals arrive at the receiver side have different delays and amplitudes which affect overall signal estimation as well as reliability of the system. Space-time Block Codes (STBC) is a method that receiver usually employed into systems to improve the reliability of data transmission using multiple antennas[4]. Advantages of MIMO systems include, Beam forming, Spatial Multiplexing and Spatial Diversity[5]. Spatial Diversity can be achieved with MIMO -STBC system. MIMO with STBC shows improved performance in fading channels. Tarokh et al.[6], suggested Space-Time Coding (STBC) and transmitter diversity with two transmitter antennas with maximum likelihood receiver presented by Alamouti [7]. After that Orthogonal Space-Time Coding (OSTBC) and Quasi-Orthogonal STBC (QOSTBC) schemes with more than two antennas are studied in[8][9]. Space-Time Codes (STCs) have been extensively and fruitfully initiated

Published: 05 November 2018

# Novel Spectral Efficient Technique for MIMO-OFDM Channel Estimation with Reference to PAPR and BER Analysis

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## Abstract

With emerge of increasing research in domain of future wireless communications, massive multiple input multiple output (MIMO) attracted most of researchers interests. Massive MIMO is nothing but high speed wireless communication standards. The performance of MIMO systems is based on techniques used for channel estimation. Efficient channel estimation leads to spectral efficient wireless communications. There are number of channel



## Spectral Efficient Blind Channel Estimation Technique for MIMO-OFDM Communications

Renuka Bhandari and Sangeeta Jadhav

### Abstract:

With emerge of increasing research in the domain of future wireless communications, massive MIMO (multiple inputs multiple outputs) attracted most of researchers interests. Massive MIMO is high-speed wireless communication standards. A channel estimation technology plays the essential role in the MIMO systems. Efficient channel estimation leads to spectral efficient wireless communications. The critics of Inter-Symbol Interference (ISI) are the challenging tasks while designing the channel estimation methods. To mitigate the challenges of ISI, we proposed the novel blind channel estimation method which based on Independent component analysis (ICA) in this paper. Proposed channel estimation it works for both blind and ISI cancellation. The proposed Hybrid ICA (HICA) method depends on pulse

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# Performance Evaluation of Routing Protocols in Large Size Disaster Scenario

Gajanan Walunjkar, Anne Koteswara Rao

**Abstract:** Peoples in the disastrous areas under collapsed buildings or landslides need to be rescued in seventy-two hours. Ad hoc networks have been proved to be suitable for various disaster scenarios since no infrastructure needs to be deployed for communication. In this paper, various ad hoc routing protocols such as destination distance vector routing protocol, dynamic source routing protocol, ad hoc on demand routing protocol etc. are discussed and analyzed in such disaster scenario using disaster area mobility model on large size. Disaster area mobility model is more desirable in such scenario. Also these protocols are compared using various performance qualitative and quantitative metrics such as packet delivery ratio, delay, throughput, control overhead and energy etc.

**Keywords :** MANET, DSDV, DSR, AODV, AOMDV, DM

## I. INTRODUCTION

Many people trapped in the disastrous areas may have a large chance to survive if they are rescued in 72 hours [1,2] (Golden 72 Hrs.). Communication is required at various levels among peoples for their rescue and relief operations. Due to the disasters, existing communication setup fails [3] and it is also difficult to set up a new infrastructure in short period of time. In order to simplify the communication process, ad hoc networks are very much useful in such

Update	Triggered to the neighbors			
Loop Free	Yes	Yes	Yes	Yes
Routing Overhead	High	Less	High	Less
Caching Overhead	Medium	Low	High	High
Throughput	Low	High	High	Low

Movements of nodes inside ad hoc network are characterized by mobility models [10]. Random Waypoint mobility model is the most widely used in ad hoc networks. Manhattan mobility model also allows nodes to move determined paths like vehicles. In Disaster area model, various action areas such as incident location, transport location, casualty's treatment area and hospital zone exists. All peoples trapped in disasters area and involved in rescue operations belongs to any of the above areas.

## II. TECHNOLOGY USED

In disaster area model (DM), the disaster scenarios are divided into different action areas [11] and the movements of nodes emulate the movements of ambulances taking injured people and other vehicles. Every person belongs to any of the



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## Performance analysis of routing protocols in MANET

Gajanan Madhavrao Walunjkar, Koteswara Rao Anne

### Abstract

Popularity of Mobile ad hoc network in research is due to their ad hoc nature and effectiveness at the time of disaster management when no infrastructure support is available. Due to the limited transmission range of wireless network interfaces, multiple network hops may be needed for nodes to exchange data across the network. In such a network, each mobile node operates as a router, forwarding packets for other mobile nodes in the network that may not be within the direct reach. Routing protocols developed for wired networks such as the distance vector or link state protocols are inadequate here as they not only assume mostly fixed topology but also have high overheads. This has led to several routing algorithms specifically targeted for ad hoc networks. In this paper, we include the MANET supported routing protocols and their performance analysis over different performance parameters such as packet delivery ratio, delay, throughput, control overhead and energy etc.

### Keywords

MANET, DSDV, DSR, AODV, OLSR, AOMDV

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In cloud computing environment, Load balancing is key challenge. To address above

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## Abstract

## Related research

# Ant Colony Optimization Algorithm for Composition of Web Service using Mobile agents based Semantic, WSDL and QOS analysis

Mr. Sunil R Dhore<sup>1</sup>, Prof. Dr M U Kharat<sup>2</sup>

Member IEEE, Research Scholar Sant Gadge Baba Amaravati University, Amaravati, M.S. India<sup>1</sup>

MET's Institute of Engineering, Bhujbal Knowledge City, Nashik, M.S. India<sup>2</sup>

**Abstract:** Building a composite web service as per the user's complex need requires using the multiple online web services available. Selecting the best web service for composition will become combinatorial problem leads to be the NP complete problem. To solve this problem we are proposing a framework for composite web service using ant colony optimization algorithm. For choosing the proper path selection in ACO, we are negotiating with individual web service to select it for the participation during composite web service. For negotiation we are using intelligent agents for analyzing web services for based on semantic, WSDL and QOS description. As per the profile of the users the negotiation agents are built for building composite web services.

**Keywords:** Mobile agent, web service composition, QOS, SOA, ACO, WSDL.

## 1. INTRODUCTION

Aim of building composite web service is to satisfy the customer's complex need. To fulfill the customer's complex need, single webservice will not be sufficient. So single composite web service may require multiple numbers of abstract web services. And for the single basic requirement multiple numbers of abstract web services are available. So it is challenging to select the best abstract web service out of these.

Also building a composite web service is not the straightforward. It is a combination of different abstract web services together. And these abstract web services are combining together in sequence, parallel or in combination. So to build such composite web service we have to construct directed acyclic graph (DAG) to combine different abstract web services in sequence/parallel/ combination.

To construct a DAG, we are proposing Ant colony optimization algorithm. And to select the proper abstract web service for participation in composite web service and to move forward during DAG creation using ACO, we are building agents to analyze abstract web service based on its features like WSDL Contents, Semantics and QOS parameters.

## 2. WEB SERVICE COMPOSITION

Sometime need of the end user will not be satisfy by the single abstract web service, so we need to combine multiple number of abstract web services together. The process of building such composite web service is called as web service composition (Fig, 01).

While building such composite web services, the combination of various abstract web services together are in sequentially one after the other or they may be combining in parallel or in combination of both.

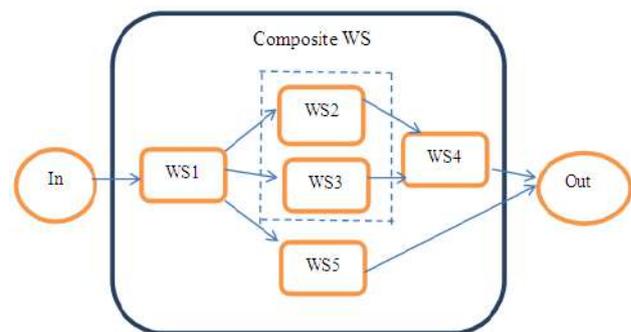


Fig.01: Composition of Web Service

## 3. SOFTWARE AGENTS [06]

A **Software Agent** is a computer program that acts for a user or other program in a relationship of agency. Software agents possess the following properties:

- 1. Locality Affiliation:** Agents are locality affiliated. Mobile agents are moved from one place to another during run time and task execution.
- 2. Role, Service Capacity:** Describes the kind of result an agent can produce It represents its functionality for task execution. It is sub divided into action type and task type.
- 3. Communication Behavior :** Each agent belonging to an instance of an agent system can communicate within its name space according to its behavior at any moment. The behavior of an agent determines whether it carries out tasks delegated to it in co-operation with other agents or whether it is capable of doing this on its own.
- 4. Negotiation Ability :** Negotiation ability describes the properties of an agent to execute a task collaborating with other agents and to negotiate this co-operation.
- 5. Delegation Ability:** Taking into consideration authority, agents can place and take on tasks. Delegation means that

# Analyzing Quality of Service Parameters of Abstract Web Services Using Software Agents for Building Composite Web Services

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Amravati , M.S. India

<sup>2</sup> MET's Institute of Engineering, Bhujbal Knowledge City,  
Nashik, M.S. India

**Abstract** - Composite web service is a combination of multiple abstract web services. To build a composite web service we have to combine multiple abstract web services together may be in sequence or in parallel. On the fly to select the best web service from the multiple abstract web services available for the same purpose is the challenging job and leads to the NP complete problem. So we are proposing an analyzing model of the abstract web services using software agents. Due to seamless integration of web services and mobile agents, agent based framework is a natural choice. We are proposing the analysis part of web services and users with the help of software agents. And decision taken by this analyzing agent will be used to select the best abstract web service which will be the part of composite web service. Analyzing agents use the QOS parameter and Characteristic of web services for selecting best web service.

**Keywords** - Mobile Agent, Web Service Composition, QOS, SOAP, WSDL, Restful Web Services, Abstract Web Service.

## 1. Introduction

Aim of building composite web service is to satisfy the customer's complex need. To fulfill the customer's complex need, single abstract webservice will not be sufficient. So single composite web service may require multiple numbers of abstract web services. And for the single basic requirement multiple number of abstract web services are available. So it is challenging to select the best abstract web service out of these. Also building a composite web service is not the straightforward. It is a combination of different abstract web services together. And these abstract web services are combining together in sequence, parallel or in combination. So to build such composite web service we have to construct directed acyclic graph (DAG) to combine different abstract web services in sequence/parallel/ combination.

In directed acyclic graph, each node is related to individual abstract web service which is the part of composite web service. To select individual abstract web service for constructing composite web service on the fly is difficult, because for each individual subtask of composite web service numbers of similar abstract web services are available. So we are taking the advantage of seamless integration of web services and software agents. We are proposing various mobile agents which will analyze individual abstract web services. To analyze abstract web services, we are using the unique features of web services based on its description, type and various quality of service possess by individual abstract web service. These intelligent agents are also using to priorities an users need of quality of service. As per the users expectation coordinating agents select the proper individual abstract web service to take part in composing a composite web service.

## 2. Related Work

Authors of Ref [01] concentrates on combining optimization and ranking based on non-functional QoS parameters to evaluate its quality. Ref[02] However use innovative idea for selecting best web service using the reliability issue for designing QoS-aware optimal selection scheme for web services with a trusted environment. We can also compare the web services based on the different types of web services, explain in Ref[05]. Author of Ref[06] presents a comparative performance evaluation of two Web service implementations: one is based on SOAP and the other on Representational State Transfer (REST). We utilized response time and throughput metrics to compare the performance of these Web services. They found that, on average, REST has better performance

## Learning Non-linear Dynamical Systems From Raw Images

Amit Chahar<sup>1</sup>, Anil Kumar<sup>2</sup>, Rohit Rajput<sup>3</sup>, Venkata Ramesh L<sup>4</sup>, Prof. Sunil Dhore<sup>5</sup>

<sup>1-5</sup>Computer Engineering, Army Institute of Technology

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**Abstract** —We introduce a method for model learning and control of non-linear dynamical systems from raw pixel images. It consists of a deep generative model, belonging to the family of variational autoencoders, that learns to generate image trajectories from a latent space in which the dynamics is constrained to be locally linear. Our model is derived directly from an optimal control formulation in latent space, supports long-term prediction of image sequences and exhibits strong performance on a variety of complex control problems. For capturing the information of non-linear object's behavior, we need to use high-dimensional data. Processing the high-dimensional data is expensive and not feasible. So, in this model, first Auto-encoder is used for dimensionality reduction, and after prediction method (transition mapping) is used, and the image reconstructed. We demonstrate that our model enables learning good predictive models of dynamical systems from pixel information only.

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**Keywords**—machine learning, autoencoder, neural networks, latent space, non-linear systems, prediction, dynamical systems.

### I. INTRODUCTION

Dynamical systems are mathematical objects used to model physical phenomena whose state (or instantaneous description) changes over time. These models are used in financial and economic forecasting, environmental modeling, medical diagnosis, industrial equipment diagnosis, and a host of other applications. If we have two short movies of billiards balls rolling around on a table without friction, we could not tell which was recorded first. Hence this system is stationary. On the other hand, if there is friction, then we are in the non-stationary situation, because the balls will slow down as time progresses, and their speed gives us a way of deducing when the observation was made.

A key challenge is system identification, i.e. finding a mathematical model of the dynamical system based on the information provided by measurements from the underlying system. In the context of state-space models this includes finding two functional relationships between (a) the states at different time steps (prediction/transition model) and (b) states and corresponding measurements (observation/ measurement model)[1].

Control of non-linear dynamical systems with continuous state and action spaces is one of the key problems in robotics and, in a broader context, in reinforcement learning for autonomous agents. A prominent class of algorithms that aim to solve this problem are model-based locally optimal (stochastic) control algorithms. When combined with receding horizon control, and machine learning methods for learning approximate system models, such algorithms are powerful tools for solving complicated control problems [3, 4, 5]; however, they either rely on a known system model or require the design of relatively low-dimensional state representations. For real autonomous agents to succeed, we ultimately need algorithms that are capable of controlling complex dynamical systems from raw sensory input (e.g. images) only. In this paper we tackle this difficult problem.

### II. NON-LINEAR DYNAMICAL SYSTEMS

A dynamical system will be defined to be a system in which the present state (the values of all of the variables and all of their derivatives) is somehow dependent on previous states of the system. A deterministic system will be taken to be a system in which the present state is entirely dependent on previous states of the system. A linear system is a system in which all of the dependence of the current state on previous states can be expressed in terms of a linear combination. A linear stochastic system is a system in which all of the dependence of the current state on previous states can be expressed in terms of a linear combination and the residual unpredictable portions can be expressed as additive, independent, identically distributed, random variables[2].

A nonlinear system is a system in which the dependence of the current state on previous states cannot be expressed entirely as a linear combination; even if some of the dependence can be captured in a linear combination of the previous states, something extra is required to capture all of the dependence.

Simulations of nonlinear dynamical systems have shown that nonlinear time series can be entirely deterministic, that is generated without any random component, and yet exhibit behavior which appears to have an error variance when analyzed by linear statistical methods. This work will present a variety of techniques for the analysis of nonlinear time series which have the potential to be modeled as signal portions of time series that are often discarded as noise. Learning non-linear dynamical models from very high-dimensional sensor data is even more challenging. First, finding (non-linear) functional relationships in very high dimensions is hard (un-identifiability, local optimal, over-fitting, etc.); second, the amount of data required to find a good function approximation is enormous. Fortunately, high-dimensional data often

**Augmented Reality in Computer Education using Android**Deep Narain Sodhi<sup>1</sup>, Anubhav Singh<sup>2</sup>, Vineet Chaurasiya<sup>3</sup>, Juhi Choubey<sup>4</sup>, Prof. N.K.Bansode<sup>5</sup><sup>1,2,3,4,5</sup> Army Institute Of Technology

**Abstract** — *Augmented Reality is a concept wherein one's perception of environment is improved by superimposing digital information like graphical, textual, or audio content, as well as objects onto a display screen. It is in between real and virtual reality, wherein virtual objects are seen in real world. The application will be mobile based.*

*The idea is to allow the user to view the virtual object in education in the real world using a marker based AR system. We propose that the system should be used in computer education by augmented animations of various parts of computer. It is not expensive as the user does not actually need to open parts of a computer, but instead just needs to view the animation.*

*The Android Application will scan the marker and the animation will be seen on the display screen of the mobile device along with the real environment.*

**Keywords**-virtual reality, real, marker, augmented, android

**I. INTRODUCTION**

Augmented Reality known as Mixed Reality combines virtual and real scenes to achieve that virtual ones are belong to the real world. Because of this integration it is being used in various applications like medical, education, and entertainment.

There are 2 ways in which this can be implemented:

Marker Based:

There are different types of AR markers which can be detected by a camera and used with software as the location for virtual objects placed in a scene. They are image descriptors or black and white images (features + key points)..Simple augmented reality markers can consist basic shapes made up of black squares on a white background. Different Markers can be created using simple images that are still read properly by a camera, and these codes can even take the form of tattoos.

The simplest types of AR markers are black and white images that consist of two dimensional (2D) barcodes.

Marker less:

A marker less AR application recognizes images which were not provided to the application beforehand. This is more difficult to implement because the recognition algorithm running in the AR application should identify patterns, colors or some other "features" that may exist in camera frames

**II. MARKER DETECTION, DESIGN AND REGONITION METHOD**

Markers are square and have a black thick border and black graphics within its white internal region. The advantage of using black and white color is to separate the marker from the background easily. In terms of projective geometry, the square markers in real world could not be a square after projecting it onto an image plane, in other words, the graphics which are internal in the markers often display in distortion. So it is necessary to unwrap these markers when we recognize them

The procedure of unwrapping these image is shown in the figure

After detecting the grabbed frame the calculation of the marker unwrapping can be described as follows:  $(x_c, y_c)$ ,  $i = 1, 2, 3, 4$  as the four corners of a marker which are acquired. These positions in the real world of the four corners are given by  $(x_m, y_m)$ ,  $i = 1, 2, 3, 4$ . Homography matrix  $H$  is calculated as shown in figure:

**Docker Management Using Libvirt API**Amit Chahar<sup>1</sup>, Ajay Shekhawat<sup>2</sup>, Ankit Mishra<sup>3</sup>, Komal Kumari<sup>4</sup>, Prof. P.R. Sonawane<sup>5</sup><sup>1,2,3,4,5</sup>Department of Computer Engineering, Army Institute of Technology, Pune, India

*Abstract—Docker automates the deployment of applications inside software containers by providing an additional layer of abstraction. Docker implements a high-level API to provide lightweight containers that run processes in isolation. It uses resource isolation features of the Linux kernel such as cgroups and kernel namespaces to allow independent containers to run within a single Linux instance, avoiding the overhead of starting and maintaining virtual machines.*

*Libvirt is used by the most clouds to give user access to the cloud and has bindings in other languages also like java, python, ruby. It support LXC (linux containers) but does not support docker containers. Initially docker used LXC as driver but because of it being managed by open source community, docker could not rely on it. So, docker developed its own driver libcontainer in go language.*

*Docker is todays emerging technology but clouds can support docker only by using their own apis specially designed for docker since libvirt does not support libcontainer. This increases the complexity of the cloud. Proposed solution is to implement docker api in c and integrate it with the libvirt api. Thus, clouds will have to give access to only libvirt without using any special api for docker. On the other hand, the docker interface will be generic for all clouds, thus user does not have to face the difficulty while migrating from one cloud to another.*

*Keywords— libvirt; linux containers; docker containers; libcontainer; cloud computing*

**I. INTRODUCTION**

Most commercial cloud computing systems, both services and cloud operating system software products use hypervisors. Enterprise VMware installations, which can rightly be called early private clouds, use the ESXi Hypervisor. Some public clouds (Terremark, Savvis, and Bluelock, for example) use ESXi as well. Both Rackspace and Amazon Web Services (AWS) use the XEN Hypervisor, which gained tremendous popularity because of its early open source inclusion with Linux. Because Linux has now shifted to support KVM, another open source alternative, KVM has found its way into more recently constructed clouds (such as ATT, HP, Comcast, and Orange). KVM is also a favorite hypervisor of the OpenStack project and is used in most OpenStack distributions (such as RedHat, Cloudscaling, Piston, and Nebula). Microsoft uses its Hyper-V hypervisor underneath both Microsoft Azure and Microsoft Private Cloud.

However, not all well-known public clouds use hypervisors. For example, Google, IBM/Softlayer, and Joyent are all examples of extremely successful public cloud platforms using containers, not VMs. Docker is an open-source project that automates the deployment of applications inside software containers, by providing an additional layer of abstraction and automation of operating-system-level virtualization on Linux. Docker uses resource isolation features of the Linux kernel such as cgroups and kernel namespaces to allow independent containers to run within a single Linux instance, avoiding the overhead of starting and maintaining virtual machines. Docker implements a high-level API to provide lightweight containers that run processes in isolation. Building on top of facilities provided by the Linux kernel (primarily cgroups and namespaces), a Docker container, unlike a virtual machine, does not require or include a separate operating system. Instead, it relies on the kernels functionality and uses resource isolation (CPU, memory, block I/O, network, etc.) and separate namespaces to isolate the applications view of the operating system. Docker accesses the Linux kernels virtualization features either directly using the libcontainer library, which is available since Docker 0.9, or indirectly via libvirt, LXC (Linux Containers) or systemd-nspawn.

The libvirt project develops a virtualization abstraction layer, which is able to manage a set of virtual machines across different hypervisors. The goals of libvirt are to provide a library that offers all necessary operations for hypervisor management without implementing functionalities, which are tailored to a specific virtualization solutions and which might not be of general interest. Additionally, the long-term stability of the libvirt API helps these management solutions to be isolated from changes of hypervisor APIs.

Most of the clouds use libvirt api for hypervisor management as libvirt gives a common interface to the user for all hypervisors. Since docker has stopped supporting LXC drivers because LXC drivers are maintained by open source community and therefore docker developers had to made frequent changes to the implementation. Libvirt only supports LXC drivers, therefore it is difficult to use docker on clouds. Also some clouds have separate apis for docker management. Therefore having separate apis of docker and libvirt are inconvient to both the cloud service provider and the user.

# Accessing and Modifying Sqlite Remotely for Catering Multi Client Access

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**Abstract:** SQLite is a lightweight database management system and a Stable serverless database with almost zero difficulty in installations. SQLite does not support client server facility due to the write lock issue. For expedite multi-client access to the central database, multiple instances of the database on the central system can be created and later integrating these instances to give the resultant product. Accessing these instances remotely would be a solution to the write lock issue. As a result of creating multiple instances of the database on the same system, there might be a heavy traffic which could lead to reduce performance. To handle this cloud computing concept of High Availability which refers to a system or component that is continuously operational for a desirably long length of time.

**Keywords—** Remotely Access, SQLite, High Availability

## 1. INTRODUCTION

A lightweight database system is a high-performance, application-specific Database Management system. It differs from a general-purpose (heavyweight) [1] DBMS in that it omits one or more features and specializes in the implementation of its features to maximize performance. Although heavyweight monolithic and extensible DBMS might be able to emulate LWDB capabilities, they cannot match LWDB performance.

SQLite is a software library that implements a SQL engine. It has been used with great success as on-disk file format: allows the developer to handle data in a simple way, but also have the use of database features (such as undo, redo, etc.). In embedded device environment, in which there is low-concurrency and there are little or medium size datasets, SQLite is the right choice. If we want to save the data in a common place, i.e., Remote Server until now there is no easy mechanism to implement this.

The need for storing information in remote server exists to have centralized access to data by the users. The idea of storing information in remote server is implemented using Web Services (plugin) which can save the data in the Remote database like SQL Server and retrieve as and when required. When a project is developed, a group of developers/testers are involved. They will need concurrent information for development which can be done using a centralized database. For example feedback is collected from different customers for a product and it is more feasible to store it in a centralized repository that can be used by the entire for improvements and further development. So we require a remote access to SQLite [2]

to be used by all of them. The relevant changes need to be reflected and others discarded. SQLite has write lock issues which have to resolve by creation of different instances of the database. Testers can access and debug the problems directly and provide the information without having to install the entire system or database files.

### 1.1 High availability

Virtualization, a technique to run several operating systems simultaneously on one physical server, has become a core concept in modern data centers, mainly driven by benefit of application isolation, resource sharing, fault tolerance, portability and cost efficiency. A special middleware, hypervisor, abstracts from physical hardware resources and provides so called virtual machines acting like real computers with their own (virtual) hardware resources. High availability system [3] design approach and associated service implementation that ensures a prearranged level of operational performance will be met during a contractual measurement period. Enabling high availability we can detect any point of failure to propagate reliable crossover, if needed. High availability is a characteristic of a system. The definition of availability is  $A_o = \text{up time} / \text{total time}$ . If (total time - down time) is substituted for up time then you have  $A_o = (\text{total time} - \text{down time}) / \text{total time}$ . Determining tolerable down time is practical. From that, the required availability may be easily calculated. Here a small network has made with a master, slave (replica of master) backing up data, controller and a user virtual machine. Controller will be constantly checking the master for downtime and doing crossover to slave in case tolerable down time is exceeded. For this purpose we will use open source tools like heartbeat, pacemaker and DRBD.

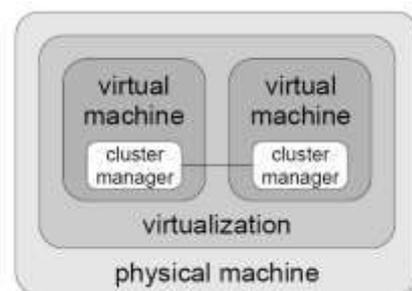


Fig. 1 Virtualization



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## RESEARCH ARTICLE

### User Analytics on Twitter Stream Data

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#### Abstract

Twitter, is one of the largest social media site that receives tweets in millions of data in every day in range of Petabytes per year. Big Data is a pool of information that is outsized and difficult to progression by data processing applications, Hadoop is a disseminated archetype used to handle the huge quantity of documents. It grasps the vast quantity of documents and carry out the procedures like documents analysis, outcome analysis, and records analytics. It is highly scalable computing platform. Productive E-commerce sites, Facebook, Twitter one of the largest social media site receives comments, tweets or customer reviews in millions every day in the range of terabyte or petabytes per day. Ideas and opinions of people are influenced by the opinions of other people. Lot of research is going on analysis of reviews given by people. We can collect the data from the social media site by using BIGDATA eco-system using online streaming tool Flume. This huge amount of raw data can be used for industrial or business. This Analytics paper provides a way of analyzing of big data such as Twitter data using Apache Hadoop which will process and analyze the tweets on a Hadoop clusters. In this paper, we are going to talk how effectively sentiment analysis is done on the data which is collected from the Twitter using Flume. Twitter is an online web application which contains huge amount of data that can be a structured, semi-structured and un-structured data. Twitter is also difficult due to language that is used for comments. So here we are taking sentiment analysis, for this we are using Hive and its queries to give the sentiment data based up on the groups that we have defined in the HQL (Hive Query Language). Here we have categorized this sentiment analysis into 3 groups like comments that are having positive, moderate and negative comments.

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#### Introduction:-

Big data is recycled ubiquitously at the present in disseminated archetype on web. BIG data is the group of collections of massive volume of data. So Big data came into picture in the real time business analysis of processing data. Some well-known internet companies like Google, Amazon, LinkedIn, Yahoo! etc. have generated a huge amount of structured and unstructured data every day. This exponential growth of data leads to some challenges like processing of large data sets, extraction of useful information from online generated data sets etc. Twitter.com is a popular microblogging website. Each tweets is 140 characters in length. Tweets are frequently used to express a twitter's emotion on particular subject. The upcoming of operational societal mass media and communication machineries has activated a quick rise in the stream of user produced content of several forms. Persons are precise their responses, desires and preferences through societal mass media via means of word-based piece of short nature relatively scripting extensive writing. We appeal groups complete through this old-fashioned way as G-friends, which stands for topographical geo location based groups. So Big data came into picture in the real time business analysis of processing data. Some well-known internet companies like Google, Amazon, LinkedIn, Yahoo! etc. have generated a huge amount of structured and unstructured data every day. This exponential growth of data leads to

**User Interface to evaluate Fuzzy Matching Results**Chirag Nagpal<sup>1</sup>, Neha Malik<sup>2</sup>, Ajit Singh<sup>3</sup>, Shushma Shirke<sup>4</sup>, Shinsmon Varghese<sup>5</sup><sup>1-5</sup>Dept. Of Computer Engineering, Army Institute of Technology

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**Abstract** —Entity Resolution is a challenging problem, even more relevant in today's time of big data. In this paper, we present a User Interface framework in order to perform and evaluate results of the Entity Resolution process. The user interface provides an intuitive experience to an end user to experiment with various parameters, and machine learning algorithms to perform fuzzy clustering based Entity Resolution.

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**Keywords**-component; formatting; style; styling; insert (key words) (minimum 5 keyword require) [10pt, Times new roman,Italic, line spacing 1.0]

**I. INTRODUCTION**

Entity Resolution is a challenging problem, Entity Resolution is a challenging Computer Science problem. In today's world of Big Data, and the Semantic Web, entity resolution has become an even more important problem to solve. Today, the internet provides extensive amount of data. This data, might be in the form of structured formats like SQL Tables, or maybe completely unstructured with multiple hierarchical structures.

This unstructured data, is a modern feature of today's world of Big Data, and any computational task requiring the exploitation of this data requires it to be arranged, systematically, such that standard algorithms can be easily deployable across a wide range of data sources. The unstructured and noisy nature of this data, also necessitates newer more robust approaches to solve the Entity Resolution problem.

Traditional ER approaches employ extremely naive comparisons between individual features in order to solve the ER problem. Thus a traditional ER approach, might involve the comparison of a combination of certain specific features from two individual databases. In case of a match, these records are grouped together, or in other words resolved into a single entity.

A common extension to such an approach is the 'Merge-and Purge' strategy in which records are compared, pairwise, and if found to be matched, they are merged into a single record. Such a strategy is computationally more tractable as compared to naïve pairwise comparison. [1]

While such an approach might work well, for well structured datasets, however, determining such crisp rules, to resolve unstructured datasets is a challenging task. This challenge stems from the fact that it is extremely difficult to determine a single rule or combination of rules, that can effectively predict a match with perfect confidence, and such a rule can obviously not be determined manually, owing to the possibility of large dimensionality of the data. On the other hand, the dataset under consideration might be incomplete, that is, might be missing in certain features, and hence a specific rule or set of rules may not be applicable. This is especially true in case of data crawled from the internet, like for example microblogs.

A case in example could be microblogs. Let us consider an Entity Resolution problem involving the resolution of all tweets posted at from a particular location. While in some cases, microblogs may contain specific features like the geo-location of posting, in other cases it might contain this particular feature. Thus a simple rule involving the resolution of all tweets posted at a particular area may not be adequate. Here, the match function would require a more sophisticated approach of looking at other features, like if the post is from the same user and the time difference between the various posts is minimal, we can predict that the posting location is the same.

Such complex relations between various features can not be modelled easily with simple feature subsets and require more complicated approaches. A reasonable approach here would be to leverage machine learning approaches in order to learn such complicated features to predict a match. In case we tried to model the problem above using a standard supervised learning model like decision tree, it would have been able to learn the complicated relations between various individual features in the features, thus able to come up with a representation for the problem. In the most obvious case a decision tree for this task would have looked at the location information, in case not present, it would then have tried to look for if the user is the same and then, the posting difference. In case this corresponded to the previously learnt values for these features, the algorithm would have been able to compute if there is a match.

In such a specialized, specific application, we require to model this problem in an unsupervised or semi supervised setting, in order to carry out the ER process, without the need of labelled training data. [2] In this paper, we present a framework to carry out the semi supervised pipeline to perform entity resolution. Our semi supervised pipeline depends



## Network Application Testing Platform using Openstack and OpenDaylight

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**Abstract** —The networking environment today is increasingly complex. The convergence of data center, business expansion and new service deployments need to combine several different technologies - including physical and virtual devices - into a single network infrastructure. These networks must handle massive amounts of traffic with critical applications on both issues to the point and multicast network strategies. You need high-capacity network devices to route and switch huge amounts of traffic. Network equipment manufacturers are positive that their equipment can not only handle the needs of a complex network infrastructure, but also easily expand - often at massive scales. suppliers and network service companies must be able to highlight their infrastructure to see if they can handle the traffic volumes and provide the best quality service.

With our project, we will make an assessment and gather the requirements to provide our developers, multi-node OpenStack test environments on demand where they can, in a whiteboard like fashion, configure different network functions, edit them in all different types of distributions. The main objectives are the ease and speed of the test lab configuration, safety, repeatability and cost.

Our benchmarks conduct functional and performance testing and probing the weaknesses and vulnerabilities. As such, we have to push the changes to a variety of environments with multiple physical and virtual components.

**Keywords**- OpenDaylight; Openstack; RESTful API; Virtual Machine; Devstack

### I. INTRODUCTION

A centralized platform for testing and analyzing the performance of network application is going to developed. The platform will provide the administrator with features to test:

1. Multiple OS support
2. Direction and rate of traffic flow
3. Resources required and usage
4. Security
5. Cost
6. Integration for already present and future technologies

It is done by using OpenDaylight Restful and neutron APIs which is the local API support provided for OpenDaylight and Openstack Integration.

### II. RELATED WORK

OpenDaylight is an open platform for network programmability to enable Software-Defined Networking (SDN) deployments on heterogeneous modern multi-vendor networks. OpenDaylight provides a platform abstraction model oriented service that allows users to easily write applications that work across a variety of hardware and South terminal protocols.

OpenStack is a platform for free and open-source software cloud computing, mostly deployed as an infrastructure -as-a-service (IaaS). The software platform consists of interrelated elements that control pools of processing equipment, storage, and network resources across a data center. Users manage either through a dashboard based on the Web, through command line tools, or through a RESTful API.

**Analysis of Cloud Computing Utilization from user's perspective using  
intelligent tool**

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Computer Department, Army Institute of Technology

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**ABSTRACT-** Cloud computing is a way of computing which includes sharing computing resources rather than having local servers or some personal devices to handle applications or store data. It is a prime need of today's IT world and in order to increase benefits, organizations are rapidly shifting to cloud computing. In this form of computing resources such as servers, storage and applications are made available to organizations through Internet. The vendor complete the request of the user through a package, the user procure the resources in the beginning and they don't know how much they are using ,so they end up paying for the whole package. In this paper we have made a novel attempt to propose a technique to calculate the real time utilization of cloud resources. Further, in this paper we have proposed an algorithm/tool for continuous updating of cloud resource's use and thus increasing the user's profit.

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**Index Terms-** Cloud Computing, Cloud Resources, Cloud Resources allocation, Cloud Resources analysis

**I. INTRODUCTION**

Cloud computing is the most prevailing technology that relies on sharing computing resources rather than having local servers or personal devices to handle applications. Users of cloud computing request for different computing resources and the cloud service providers pick up the required resources from cloud resource pool and provide these as per the requirement of individual user. In order to accomplish as many requests as possible, it is very much necessary to utilize cloud resources effectively and wisely. A calculated use of cloud resources helps the organization or an individual user to save their money by using resources only they required and also enhances the performances.

Cloud computing [1] is one of the prime need of today's IT world. Organizations are shifting to the cloud rapidly in order to increase their overall benefits. Cloud computing has Virtualization as its backbone. Cloud resources are provided on demand using the Internet and an on-running migration of resources is done by the cloud service provider.

So it is very important to monitor the cloud resource allocation and utilization. The very basic motivation behind this is a particular user procure certain resources from any vendor as per their use [2], but at the vendor end only that much resources are deployed which the user is actually using, so it is a notable loss at users end and user is unaware of it.

The major problem with the traditional monitoring system is that, they provide only domain specific information. For example, a networking tool monitors only the network packets. Therefore, these performance tools report resource utilization statistics and good view of individual components. But they fail to give a good view of entire cloud infrastructure.

The end users look for intelligent reports to actually point to what, where and when action is needed. So, it is essential to have a monitoring system that correlates all the components and give a consolidated report about the resource availability and consumption of resources in a cloud infrastructure so that, customers believe that they pay only for what they are getting.

This brings us to the problem how to measure the actual resource utilization as per user prospective, so as to provide user with an insight of their actual requirement which would in turn not only minimize their cost overhead and maximize their profit margins but also save them from probable exploits [3].

In this paper we have proposed algorithm to continuously monitor the utilization of cloud resources as per utilization and also provided with a solution, a tool, which would monitor the actual use of resource and provide user with useful insights.

**II. RELATED WORK**

This section discusses prior work related to our research.

**i) Cloudyn**

Cloudyn is able to complete various aspects of the proper cloud computing utilization. It optimizesthe cloud and ensure that the cloud deployment is optimally priced and utilized, it has also helped in cutting the costs and eliminating the shocking monthly bills. Gaining insight and visualizing the usage and performance trends all in one place is the new feature of the Cloudyn and it also helps in comparing clouds and research the deployment's performance.

**Web Framework for Data Deduplication at Scale**Chirag Nagpal<sup>1</sup>, Neha Malik<sup>2</sup>, Ajit Singh<sup>3</sup>, Shushma Shirke<sup>4</sup>, Shinsmon Varghese<sup>5</sup><sup>1,2,3,4,5</sup>Dept. Of Computer Engineering, Army Institute of Technology,

**Abstract** —In todays time of multiple heterogenous sources of data, data deduplication is a difficult challenge. We present a Web Based framework that utilizes the popular MVC paradigm to provide the end user with a functionality allowing Data Deduplication. In the backend the framework allows the use of distributed computing using a Map Reduce strategy to scale up our deuplication schme.

**Keywords**-component; formatting; style; styling; insert (key words) (minimum 5 keyword require) [10pt, Times new roman,Italic, line spacing 1.0]

**I. INTRODUCTION**

We live in the day and age of big data with multiple heterogeneous sources of data from the Internet of Things to the Semantic Web. With multiple such data records, there is inherent possibility of data redundancy in these strict schema driven databases. Thus a need is felt to utilize recent trends in machine learning techniques in order to resolve such inherent redundancies arising from various sources including human error.

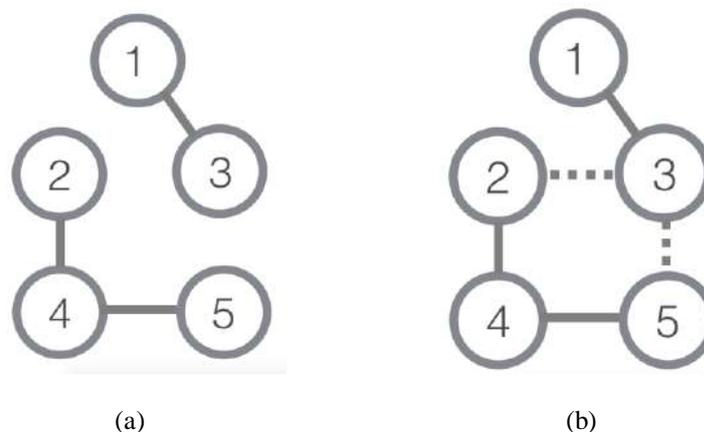


Fig. 1 (a) The graph nodes represent the entities before Data Deduplication. (b) Represents the records after Deduplication the dashed edges represents the records that are found to be similar using the deduplication framework.

In this paper we present a web based framework, along with a Map Reduce backend in order to perform this large scale fuzzy matching based Entity Resolution. The framework allows users without any prior domain knowledge of machine learning or distributed computing to perform data deduplication on these datasets. The web framework is flexible and allows decoupling of the underlying Map Reduce backend with a Model-View-Controller based frontend.

**II. MVC FRAMEWORK**

The MVC[1] is an extremely popular design pattern encountered in software development. MVC frameworks are the preferred for various large scale web platforms. MVC frameworks allows the decoupling of components into the application into three basic parts – The Model, The View and the Controller.

**2.1. Model**

It refers to the data of the application. The model comprises of the rules and logic that govern how data is stored and manipulated. Popular MVC frameworks support various different Model paradigms like RDBMS, where data is stored in strict schema driven relational databases, such a strategy is employed by SQL or Structured Query Language. Newer MVC frameworks also support the use of paradigms like NoSQL databases, which are extremely flexible in terms of the schema of the data to be stored.

**Hybrid App Suite for Medical Diagnosis using Naive Bayes' Classifier**

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*Abstract—Medical and Healthcare industry comprises of sectors of industries that focus on patient well-being and medical research. These industries make up about 10% of the GDP of any developing nation. In India, the worth of medical industry is about \$78 billion and it is expected to rise to \$200 billion by 2020 [15]. IT industry has touched almost every domain of industries, medical industry remains to be exploited. IT industry will help in automation, better record management, and research in the healthcare industry. With the traditional methods, chances of medical negligence and misdiagnosis are prominent. We can use information technology to facilitate medical practitioners by providing them an interface to make calculations on-the-go, retrieve medical records and provide diagnosis by eliminating guesswork. By making calculations automated, degree of error is drastically reduced, which increases precision. Chances of medical record loss can be handled by maintaining a central server. Also, confidentiality of medical records can be achieved. In the current scenario, applications have to be developed for every platform separately. This consumes both time and money. Our solution proposes a hybrid application that will run on every platform. The application development is faster, simpler, and more rapid and the application is easier to maintain. You can change platforms anytime you need, Cordova lets you build your application for more than one platform just by one adding line of code.*

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*Keywords—Hybrid application, Prediction, Cross-platform portability*

## I. INTRODUCTION

Medical practitioners require a lot of complex calculations in which the amount of precision expected is very high. Such calculations might involve medical inputs such as sugar level, haemoglobin, etc. The first part of our app suite facilitates that, providing on-the-go calculations to medical practitioners. This can help them to make medical decisions. The second part is related to medical diagnosis using Naive Bayes' classifier. Prediction can be done using this machine learning technique.

Both these parts come under the umbrella of a hybrid app suite which facilitates the use of the app on multiple platforms without the need of writing large pieces of extra code.

### A. Motivation

The future for medical apps is bright. There will coexist both native and web based apps. App stores will continue to thrive and the market for consumer directed health apps will thrive. However, apps directed at physicians will become increasingly better connected to patients clinical records and will more likely be distributed by hospitals and other provider institutions.

According to industry surveys, by 2018, more than 1.7 billion smartphone and tablet users will have downloaded at least one mobile medical app (MMA) [16]. This level of acceptance and adoption of medical apps means new trends in innovation, and low cost medical services. These apps often control human physiology and work on sensitive health data, thus it is necessary to have evidences of their trustworthiness before actual marketing.

### B. Literature Survey

Over the last fifteen years, IEC 62304 has become the benchmark standard for the development of medical device software, whether standalone software or otherwise, in both the EU and the US [17]. Leading industry innovation in software technologies has led key industry leaders and government regulators to recognise the emergence of numerous standalone medical software products that operates as medical devices. This has been reflected in regulatory changes. Example: European medical devices directive MDD/93/42, updated in 2007. In Europe, a guidance document has been published on this subject. [18] The quality management system requirements for manufacturing a software medical

**A Facebook Profile Based TV Shows and Movies  
Recommendation System**Prof S.R Dhore<sup>1</sup>, Abhishek Shukla<sup>2</sup>, Anil Kumar Pal<sup>3</sup>, Manish Kumar<sup>4</sup><sup>1,2,3,4</sup> Department of Computer Engineering, Army Institute of Technology, Pune, India

**Abstract** — Implemented and evaluated different algorithms in the context of developing a recommendation system based on data gathered from Facebook user profiles. In particular, we are looking at a Collaborative Filtering algorithms, a Content Filtering approach, and Naive Bayes, and comparing their performance in terms of standard measures. The algorithms draw from principles and techniques in Machine Learning, Information Retrieval, as well as Graph Theory. The Facebook graph API was used to scrape friend's Facebook profile data. This results in a dataset of Facebook user profiles in XML format, listing different attributes for a particular user. The 'liked' TV show and movies sections act as the labels for our training and test data, and the rest of the sections are used as the supporting attributes.

**Keywords-** Recommendation System, Collaborative Filtering, Content Filtering, Naive Bayes, Information Retrieval, Graph Theory.

**I. INTRODUCTION**

The traditional TV industry is facing threats and challenges due to the development of the mobile internet. This has happened due to the evolution of Big Data which is changing the traditional industry. For traditional TV shows, audience rating is the metrics whether the show is good or not. Therefore, how to improve the audience rating is an urgent issue for traditional TV shows and movies. This paper proposes a TV shows and movies recommendation system. This system is based on the machine learning algorithms which can automatically recommend TV shows and movies to the audience in accordance to their interest.

Recommendation systems are the one which empower users to use their enormous amount of data and make some informed choices in the future. This field of recommender system has gone through a lot of innovation and research. In the same spirit, this project focuses on building a recommendation system based on the data collected from Facebook profiles of several users.

**1.1 Goals and Objectives**

The main aim of this project is to predict on what genre of TV shows or movies a user is likely to be interested which will be based on their raw Facebook data and then recommending a set of related items to the user.

The objectives of the project are as follows:

1. Gathering of data from various Facebook profiles using Graph API v2.8.
2. Pre-processing the raw data using different filtering techniques.
3. Data Analysis using different Machine learning Algorithms. Building a recommendation system for TV shows based on data collected from Facebook profiles of several users.
4. Performance measurement and comparison of different algorithms.

**II. DATA SET FOR THE SYSTEM**

Data Set for the proposed system was captured using the Facebook Graph API. The Graph API is the primary way to get data out of, and put data into Facebook's platform. It's a low-level HTTP-based API that you can use to programmatically query data, post new stories, manage ads, upload photos, and perform a variety of other tasks. The Graph API is HTTP-based, so it works with any language that has an HTTP library, such as cURL and urllib.

As the newer Graph API v2.8 has a limited user profile information access policy. So, a user is only allowed to access his/her friend's user profile data. By using a python script we obtained data of our friends' profile. Most of these profiles had very less or no information. So, we discarded the profiles of people who listed less than two "likes". In the end, we had almost 900 user profiles to work with. Out of this we randomly selected 20% to be the test users.

**III. PREPROCESSING OF DATA**

As an initial step, various filtering techniques were applied on the acquired data i.e. the Facebook user profiles as well as the metadata on TV shows and movies. The preprocessing step is important to be able to treat the entire data uniformly. Following are the filtering techniques that have been applied on the data:

**An Intelligent Recommender System for Cloud Usage Data Using Predictive  
Analysis**Prof.M.B.Lonare<sup>1</sup>, Amit Kumar<sup>2</sup>, Krishna Chaitanya<sup>3</sup>, Shivam Kumar Rathee<sup>4</sup>, Yuvraj Singh<sup>5</sup><sup>1,2,3,4,5</sup>Department of Computer Engineering, Army Institute of Technology, Pune, India

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**Abstract** —Cloud computing allows tenants to rent resources in a pay as-you-go fashion. It offers the potential for a more cost effective solution than in-house computing by obviating the need for tenants to maintain complex computing infrastructures themselves. To achieve this benefit, the right amounts of computing resources need to be given to the applications running in the cloud. The amount of resources needed is rarely static, varying as a result of changes in overall workload, the workload mix, and internal application phases and changes. To avoid problems, the amount of resources allocated to applications should be adjusted dynamically, which brings two main challenges: (1) deciding how much resource to allocate is non-trivial since application resource needs often change with time and characterizing runtime application behaviour is difficult; (2) application resource needs must be predicted in advance so that the management system can adjust resource allocations ahead of the needs. Furthermore, resource-management systems should not require prior knowledge about applications, historical data such as application behaviour profiles, and running the resource management system itself (including its prediction algorithms) should not be costly.

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**Keywords--** Cloud Computing, OpenStack, Data Analysis, DevStack, Linear Regression, Nova, Cinder

**I. INTRODUCTION**

Cloud computing enables provisioning the user with a utility of cloud which might be a platform, software or an infrastructure as whole. Varying infrastructural and service tools may significantly impact the performance of the cloud, its overall usage and in turn, the cost an industry is expending out to purchase that cloud. Monitoring such changes is essential for the analysis of the relationship between the usage of the cloud and its users. Monitoring infrastructural resources is essential for the building up of frameworks that enables Service Level Agreements based on applications QoS requirements. Unless performance guarantees at the level of hardware resources like CPU, Memory and I/O Devices are not given, it becomes mandatory to have necessary monitors in place for the infrastructural resources. Both Cloud provider and clients are the beneficiaries of resource monitoring. Cloud providers have to monitor the current status of allocated resources in order to handle future requests from their users efficiently and to keep an eye on malicious users by identifying anomalous behaviour. The analysis of this data would help the client to buy the cloud with the optimised value of data required for the operations and cost cutting operation would be successfully implemented. The advent of cloud computing in the 20th century, initially lead to a small scale of transfer and sharing data between various users. Soon as the time passed by, storage and security of the cloud became the most important aspects to be taken care of and many industries started using clouds for their information storage. The concept of storing data in a remote location was new to the world, and this technology was supported by construction of huge data centres underground or in buildings, supported with high transfer rates of data using fibre optics. The industries today, use data centres which constitute of millions of hard disks storage and store trillion bytes of data. On a local level, whenever a person purchases a cloud worth a particular cost, the usage is limited to his or her needs. Sometimes the user requires fewer amounts for storage and sometimes more. The irregular use of data leads to the excess purchasing of the cloud which directly suggests that a user might be purchasing a higher amount but is using it less.

**II. PROBLEM DESCRIPTION**

In a Cloud, hosted applications such as a multi-tier websites may run on group of VMs that span multiple physical hosts. These VMs form a resource pool. Due to initial placement and load balancing, the actual deployment of these VMs can show an arbitrary topology on physical nodes. As the number of VMs increase, the cloud infrastructure is divided into sub clusters, each of which is responsible for resource allocation of one application. In this dissertation, we aim to design, implement and evaluate a resource management mechanism that indicates the user usage of the cloud over the period of time using metrics provided by OpenStack and Ubuntu and using data analysis provide the user an optimal solution. The goal of this project is to create an intelligent resource management scheme in a cloud platform. Uses the combined cloud utilization data, we want to create a usage model for a recommender system. Using this recommender system, the relevant modification is carried on the specific instance. A resource utilization report is presented to the user along with the model recommendations. The analysis step then uses a machine learning algorithms to make an Online Prediction Model. Using the prediction model, the needs of the particular instance are extrapolated and the necessary modifications are made for the resource allocation. Make a front-end for the user to manage his resource requirements based on the recommendations by the usage records.

## DPDK-Based Implementation Of Application : File Downloader

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**Abstract** — Implemented a file downloader using the DPDK network interface for rump kernel. The combined result is a userspace TCP/IP stack doing packet I/O via DPDK. DPDK is a framework used to provide a simple, complete framework for fast processing of packets in data plane development applications and the framework creates a set of libraries for specific environments. The DPDK implements a model known as run to compilation for processing of packets, where all resources must be allocated before processing packets by calling Data Plane applications, running on logical cores as execution unit. DPDK also uses a pipeline model which passes packets or messages between different cores via the rings.

**Keywords**-- Qemu/KVM, DPDK(Data Plane Development Kit), Rump Kernel, Open v-Switch, TCP/IP Stack

### I. INTRODUCTION

DPDK is used to provide complete framework for fast processing of packets in data plane applications[1]. DPDK framework creates an Environment Abstraction Layer (EAL) with the help of set of different libraries for specific environments, which is mainly be specific to a mode of the Intel architecture, Linux user space or a specific platform [1]. Make files and configuration files are used to creating and building these environments. To create applications using DPDK, once the EAL library is created, user links his application with the EAL library [1].

The DPDK implements a model known as run to completion model for processing of packets [1]. DPDK also uses a pipeline model which passes packets or messages between cores via the rings. This allows different types of work to be performed in stages via pipeline and may allow more efficient use of code on cores. Interrupts are not used in this model because of the performance overhead imposed due to interrupt processing.

For DPDK enabled application a DPDK network interface for rump kernel is created and the combined result is a user space TCP/IP stack doing packet I/O via DPDK. A rump kernel employs a mechanism for taking an monolithic operating system kernel(existing), leaving everything out except drivers, and those drivers are used as a library components.

### II. GOALS AND OBJECTIVE

The main goal of this project is to improve the performance of network application by fast packet processing using Data Plane Development Kit and better utilization of resources. At the end we will analyse and compare the Performance of Network Application working on traditional environment and a DPDK enabled environment.

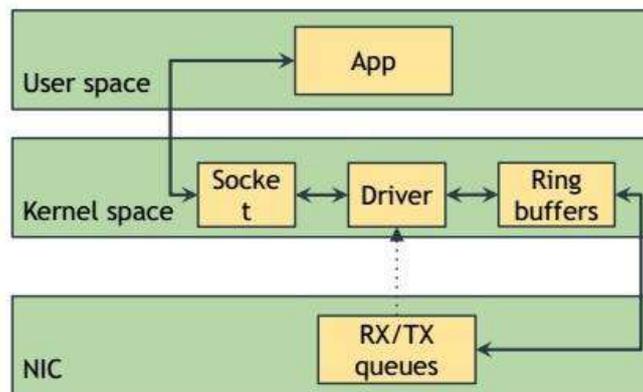


Figure 1. Packet Processing in Linux

# Heart Attack Prediction Using Deep Learning

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**Abstract** - Cardiovascular disease is one of the most heinous disease, especially the silent heart attack, which attacks a person so abruptly that there's no time to get it treated and such disease is very difficult to be diagnosed. The lack of specialist doctors and increase in wrong diagnosed cases has necessitated the need for building an efficient heart disease detection system. Various medical data mining and machine learning techniques are being implemented to extract the valuable information regarding the heart disease prediction. Yet, the accuracy of the desired results are not satisfactory. This paper proposes a heart attack prediction system using Deep learning techniques, specifically Recurrent Neural Network to predict the likely possibilities of heart related diseases of the patient. Recurrent Neural Network is a very powerful classification algorithm that makes use of Deep Learning approach in Artificial Neural Network. . The paper discusses in detail the major modules of the system along with the related theory. The proposed model incorporates deep learning and data mining to provide the accurate results with minimum errors. This paper provides a direction and precedent for the development of a new breed of heart attack prediction platform.

**Keywords:** Heart Attack Prediction System, Data Mining, Artificial Neural Network, Recurrent Neural Network, Gated Recurrent Unit.

## 1. INTRODUCTION

Cardiovascular diseases are one of the highest flying diseases of the modern world. According to a survey, about more than 17.7 million deaths occur all across the world annually due to heart diseases[1]. Of these deaths, an estimated 7.4 million were due to coronary heart disease and 6.7 million were due to stroke[2]. Heart Attacks are one of the most deadly diseases which can knock one down at any point of time without any invitation and silent heart attacks are something which most doctors are not able to predict. The lack of specialists and increasing wrong diagnosed cases have necessitated the need for building an efficient cardiovascular disease prediction system. This has led to research and development of new medical data mining techniques and various machine learning techniques. The main objective of this work is to identify the key patterns and features from the medical data using the classification algorithms and then to select the most relevant attributes for silent heart attack diagnosis. The use of Recurrent Neural Network will further enhance the accuracy of the results. While the implementation of such a system is not unprecedented, the existing systems have drawbacks and do not aim at finding out the possibilities of silent heart attacks. This paper aims to address these and

propose implementation of innovative features to develop a more comprehensive system.

## 2. LITERATURE REVIEW

Author	Purpose	Techniques used	Tool	Accuracy
M.A. Nishara Banu, B Gomathy	This system is used to predict the heart attack and also discussed various uses of various data mining algorithm for disease prediction.	C4.5 MAFIA K-Means clustering	Weka	89%
Aqueel Ahmed Shaikh Abdul Hannan	classification techniques in data mining and performance of classification among them	SVM Decision tree	R tool	91%
Rashedur M Rahman Farhana Afroz	Comparison of different data mining for diabetes diagnosis	Neural Network	Weka	85.83%
Nidhi Batla Kiran Jyoti	Analysis of Heart Disease Prediction using Different Data Mining Techniques	Naive Bayes Neural Network	Weka 3.6.6	96%

**Table 1** - Various ML techniques used for heart disease prediction

## 3. PRESENT SYSTEM

Present systems used for prediction of heart attack are failing to meet the desired accuracy in the results. As seen in the literature survey, the machine learning techniques used are pushing the accuracy till a certain limit. Moreover, the issue with the present heart attack prediction system is the uses of attributes. The attributes to be selected for the prediction of heart attack are the conventional ones and thus the results are generating wrong results many-a-times. The proposed model aims to extract the proper attributes from the datasets which will enhance the precision of the prediction. It will also provide the users with proper diagnosis so that the user understands the problem well without much difficulty.

## 4. PROPOSED HEART DISEASE PREDICTION SYSTEM

The project sets itself apart by harnessing the powers of both Deep learning and data mining. The paper proposes a system, with a strong prediction algorithm, which implements powerful classification steps with a comprehensive report generation module. The project aims to implement a self-learning protocol such that the past inputs of the disease outcomes determine the future possibilities of the heart disease to a particular user. The proposed model makes use of strong preprocessing tools so that the classification and prediction do not show any errors relating to the dataset. A huge no. of training sets will be used to make the prediction more and more accurate. Not only does the datasets but also the attributes to be used are selected taking into consideration the various important parameters and attributes.

# SSL Certificates using Block Chain Technology

Rushali Patil<sup>1</sup> Abhishek Chaudhary<sup>2</sup> Neeraj Lohia<sup>3</sup> Samridhi Kalra<sup>4</sup> Shivam Agnihotri<sup>5</sup>

<sup>1,2,3,4,5</sup>Department of Computer Engineering

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**Abstract**— The X.509 Public Key Infrastructure is centralized, weighing trust on single entity - Certificate Authority. A decentralized public key infrastructure for issuing SSL certificates is needed to overcome the flaws in the current X.509 PKI, which can help remove a single point of failure and in early detection of rogue certificates. Certificates will be signed by making a transaction. Domain owner will put up certificate along with signatures by trusted entities on their server, and clients will verify the integrity of this certificate that they receive by querying the smart contract on block chain.

**Key words:** X.509, PGP, PKI, Certificate Authority, Ethereum, Blockchain, Smart Contract, IPFS

## I. INTRODUCTION

There are around 1200 Certification Authorities (CA) and the security of Internet relies on the least trustworthy of them. Public Key Infrastructure is often considered as Achilles Heel internet. Our current PKI leaves our communication vulnerable to Man in the Middle Attacks (MITM) giving a false sense of security. Security can be broken by spoofing DNS and compromising Certificate Authorities, both of which are, although very difficult, but possible and has been done various times in past by malicious hackers, government or intelligence agencies either by infiltrating networks or using backdoors. A breached CA can sign malwares, making it appear as an authentic software. As years went by, authorities/individuals in power have abused their power to stay in power. ICANN, created by the American government, serves as the backbone of the Internet having ownership of root dns servers. Trust is disrupted. Instead of fixing and patching the loopholes again and again, a new infrastructure is needed. The future of Internet IS decentralized and open.

Pretty Good Privacy's web-of-trust model provided mechanisms to exploit the trust between different parties, however not specifying how trust should be established in the first place. Because of this there is slow adoption of PGP. What we aim to do is adapting PGP style web-of-trust backed by smart contracts to manage – publishing, signing, revoking keys – removing weight of trust from a single entity in the PKI at the same time increasing overall trust among the entities.

## II. EXISTING SYSTEMS

### A. Certificate Transparency

After the Diginotar hack, Google came up with a mechanism <sup>[22][23]</sup> to detect fraudulent certificates being issued. Its working describes a public ledger, in which all the certificates issued to all the domains are present, accessible to users and the domain name owners. Monitoring and auditing of certificates can alert domain name owners (at the earliest) when a certificate is issued on their name. The difference between this and blockchain

based solution is that Public ledger here is present on a central log server, means there will be very few of them (every CA will be expected to have log server up, however anyone can setup and run their own). CT can be implemented on blockchain, but CT does not prevent the attacks it just helps in early detection. Much more can be done if blockchain is used to change the PKI.

### B. Certificate Pinning

“Certificate pinning is a process of associating a host with its expected X.509 certificate or public key. Once a certificate or public key is known or seen for a host, the certificate or public key is associated or 'pinned' to the host. If more than one certificate or public key is acceptable, then the program holds a pinset. In this case, the advertised identity must match one of the elements in the pinset. This utility is enabled by default in most of the browsers. The only problem with certificate pinning is that when the certificate will be obtained from the host for the first time before it gets pinned it will be vulnerable to MITM attack. One walkaround for this is browsers having embedded certificates for websites.

### C. DNSSEC DANE

In 2014 it was found that emails to be send through Yahoo!, Hotmail, Gmail were being routed through rogue mail servers. DNSSEC was introduced to overcome these flaws in DNS. DNSSEC protects the query to Domain Name Servers by using digital signatures. It should be noted that it does not encrypt information just helps in validation using signatures. DNSSEC incorporates a chain of digital signatures into the hierarchy with each level owning its own signature generating keys. This means that for a domain name like www.example.com each DNS resolver must sign the key of the one below it along the way. Each DNS entity will sign its child's public key. Root zone will sign .com's public key, .com will sign example.com's public key. DANE (DNS-based Authentication of Named Entities) makes use of DNSSEC for secure communication between intended domain's server and clients by enabling administrator of a domain name to certify the keys used in that domain's TLS clients or servers by storing them in the DNS. DANE is backward compatible and will remove the need of CAs.

### D. Convergence

Convergence was designed to replace Certifying Authority with Notaries. Just like with a CA, client can choose to trust various Notaries. In current PKI a SSL certificate is signed by one CA, with convergence when client will be presented a SSL certificate from a server, it will check with multiple notaries whether they vouch for the certificate or not. From the result, the client can decide whether to trust the server or not. Major advantage of convergence over existing PKI is - when a CA is compromised and its certificate is revoked, all the

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## Recurrent Neural Network and its Various Architecture Types

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Abstract- Recurrent neural networks are networks with dynamic capabilities to generate and process temporal information. Recurrent neural networks are networks that can learn from their input with various architectures and identify outputs. The LSTM network model was the first RNN with the greatest achievement in pattern recognition contests in 2014. RNNs can be used in various architectural forms depending on the needs. Here we provide a brief summary of various RNN networks up to now with why? how? when? to use this network. Different architectures show that recurrent neural networks are mostly networks with feed-forward and if you want to store some information, feed-back.

Keywords- Recurrent neural network, RNN, LSTM, NTM, Neural.

### 1. INTRODUCTION



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**RESULTS OF IMPLEMENTING HYBRID CAT USING IRT AND NAÏVE  
BAYES**

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Shailendra Pratap Singh Sengar <sup>[4]</sup>; Tutu Kumari <sup>[5]</sup>

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**Abstract:** *With the rapid research happening in the field of education and testing many systems implementing the latest techniques like Item response theory and machine learning have been conceived. In this paper we will look at implementation of a system that aims at employing different fields of research to develop a comprehensive testing platform. The system sets itself apart by attempting to be self sufficient such that it requires little or no human intervention required. This is achieved through automatic question acquisition and classification through a community run forum and a dynamic database that automatically transforms itself in accordance with the trends in the test takers responses. It is based on Item response theory to get item characteristic classification for the question sets that allows for an efficient test generator that can effectively test users across a larger section on latent scale. It also provides a comprehensive result generation that informs the examinee about the various patterns in test thus allowing him to better prepare.*

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**Keywords:** *Item Response Model · Naive Bayes Model · CAT (Computer Adaptive Test) · 2 - Parameter Model · Recommendation System.*

**I. INTRODUCTION**

Many researchers and institutions have endeavored to provide advanced testing systems and platforms for informed learning. These systems while efficient suffer from drawbacks like they are difficult to maintain and require regular maintenance. They are often vulnerable to questions with outdated effectiveness i.e. while the questions are good at testing the targeted trait, over time these questions become known and their effectiveness is reduced. The proposed model in this paper tackles these problems while also providing the testing capabilities of other implemented system without any compromise. It also incorporates a comprehensive report generator [1] that analysis patterns of the examinee along with a comparative study against the top performers. The system is divided into the major modules namely the database manipulator module, the test module and the report module. The working of these modules will be explored further in the paper.

**II. PROPOSED SYSTEM**

The task separates itself by using both machine learning and IRT [2]. The paper proposes a framework, with an advancing database, which actualizes effective testing and scaling hypothesis while also implementing a complete report generator module. The undertaking intends to actualize a group run discussion that is utilized to populate the database where the inquiries are progressively scored. The proposed show gives a percentile score as well as an inside out analysis of the performance. It recognizes the patterns in the performance of the examinee thus providing an insight into how the examinee can improve his performance.

Actualizing of said system meets the objective of building up a framework with increased accuracy of estimating the learner's true ability while tending to the disadvantages of the current framework  
The proposed system can be broadly divided into three main modules.

- a) Database manipulator.
- b) Adaptive test and report generator.
- c) Forum.

Firstly, the forum module that employs the Bayes Model of classification. This module will be used to populate the database after correct classification of the questions picked from the forum.

Furthermore, we have the database control module, this module is in charge of the dynamic scaling of the inquiries in the database in light of their discrimination and difficulty. This scaling depends on the information about the response of various examinees on that inquiry. This information contains the quantity of right reactions recorded and the normal time to accomplish the said reactions.

The final module is the actual test that the examinee takes, this employs Item Response Theory Model and adaptive test principles to rate tested trait of the examinee and generate a comprehensive performance report.

# Review on IDS IN Wireless Network-MANET

**Prof.Sarika Patil<sup>1</sup>**

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*Abstract : Mobile ad-hoc network (MANET) wireless network used to transfer information from source to destination without using wire . Now a day's wireless networks are tremendously used all around because there is no need of fixed infrastructure to communicate. To establish the network need of transmitter & receiver and the processor battery power is also major concern. Applications of MANET in many real time applications like military surveillance, disaster management, air pollution monitoring etc. Due to open access network these network are more vulnerable to different types of attacks in MANET. Challenge is to focus on security of mobile ad-hoc network. . There are different types of attacks occurs in wireless network .Gray-hole attack, black-hole attack, wormhole attack , DOS attack, man in middle attack the major threats in the mobile ad-hoc network. In gray-hole attack packets are selectively dropped by attacker & confidential information not transmitted to receiver. This research paper on finding the grayhole attack in MANET using AODV routing protocol.*

**Keywords:** MANET, AODV, Black-hole-attack, Gray-hole Attack

## I.Introduction

In the next generation of wireless communication systems, there will be a need for the rapid deployment of independent mobile users. Significant examples include establishing survivable, efficient, dynamic communication for emergency/rescue operations, disaster relief efforts, and military networks. Such network scenarios cannot rely on centralized and organized connectivity, and can be conceived as applications of Mobile Ad Hoc Networks [1]. A MANET [2] is an autonomous collection of mobile users that communicate over relatively bandwidth constrained wireless links. Since the nodes are mobile, the network topology may change rapidly and unpredictably over time. The network is

decentralized, where all network activity including discovering the topology and delivering messages must be executed by the nodes themselves, i.e., routing functionality will be incorporated into mobile nodes. The set of applications for MANETs is diverse, ranging from small, static networks that are constrained by power sources, to large-scale, mobile, highly dynamic networks. The design of network protocols for these networks is a complex issue. Regardless of the application, MANETs need efficient distributed algorithms to determine network organization, link scheduling, and routing. However, determining viable routing paths and delivering messages in a decentralized environment where network topology fluctuates is not a well-defined problem. While the shortest path (based on a given cost function) from a source to a destination in a static network is usually the optimal route, this idea is not easily extended to MANETs. Factors such as variable wireless link quality, propagation path loss, fading, multiuser interference, power expended, and topological changes, become relevant issues [2]. The network should be able to adaptively alter the routing paths to alleviate any of these effects. Moreover, in a military environment, preservation of security, latency, reliability, intentional jamming, and recovery from failure are significant concerns. Military networks are designed to maintain a low probability of intercept and/or a low probability of detection. Hence, nodes prefer to radiate as little power as necessary and transmit as infrequently as possible, thus decreasing the probability of detection or interception. Types of different attacks in MANETS are Passive & Active attacks.

# Framework for Dynamic Resource Allocation and Efficient Scheduling strategies to enable Cloud for HPC platforms

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**Abstract** - Resource Scheduling and allocation is extremely important issue in cloud computing. Any computation is applied once there's ample or proportionate resources obtainable. Services square measure provided to the shoppers or finish users with the correct analysis of resources. Infrastructure as a service in cloud grabs a lot of attention in Cloud computing. To utilize resources a lot of with efficiency Associate in Nursing optimized programming rule is employed to deal with cloud programming issues. By deploying virtual machines in acceptable locations to boost the speed of locating best allocation methodology that intern allow most utilization of resources obtainable. The programming resources to beat unbalance in assignment drawback, during this parallel genetic rule idea is employed that is far quicker than ancient genetic rule Cloud computing plays an important role may be a model for sanctionative omnipresent network access to a shared pool of configurable computing resources. Any cloud provides services chiefly 3 ways code as a service (SaaS), platform as a service (PaaS) and infrastructure as a service (IaaS).

**Key Words:** Cloud computing; Resource Scheduling; VRaaS (virtual resource as a service); VMware; Parallel genetic.

## 1. INTRODUCTION

The cloud computing has nice potential of providing sturdy procedure power to the society at reduced value. The dynamic resource programming model for a public cloud that has varied nodes with distributed computing environments with many alternative geographic locations. To be competitive, firms should minimize efficiencies and maximize productivity. In producing, productivity is inherently joined to however well you'll optimize the resources you've got, cut back waste and increase potency. Finding the most effective thanks to maximize potency during a producing method is extraordinarily complicated. Even on straightforward comes, there square measure multiple inputs, multiple steps, several constraints and restricted. generally a resource affected programming drawback consists of: a group of jobs that has got to be dead, finite set of resources which will be accustomed complete every job, related to set of constraints that has got to be happy. Constraints essentially of 2 sorts in Temporal Constraints the time window to complete the task, Procedural Constraints is that the order every task should be completed and Resource Constraints is that the resource

obtainable with set of objectives to guage the programming performance. Clouds is accustomed give on-demand capability as a utility, though the belief of this concept will disagree among numerous cloud suppliers, the foremost versatile approach is that the provisioning of virtualized resources as a service (VRaaS). Cloud computing emerges as a brand new computing paradigm that aims to produce reliable, bespoke and QoS (Quality of Service) bonded computing dynamic environments for end-users. Cloud computing is that the delivery of computing as a service instead of a product, whereby shared resources, code and knowledge square measure provided to users over the network.

### 1.1 Connected Work: :-

All such systems have a typical goal like fault tolerance and parallel execution of tasks and that they square measure being employed in several fields. Open supply version of MapReduce i.e. Hadoop or the MapReduce were designed to run jobs in parallel in value effective manner victimization artifact servers. For simplicity Associate in Nursing example framework is MapReduce. Once job is given to that, it mechanically takes care of dividing the given job into tasks and spreading them across the obtainable servers. There square measure 2 programs concerned specifically Map and cut back for specific practicality. There square measure several alternative programs that coordinate with the roles of MapReduce nature. MapReduce is meant to run information analysis jobs on an oversized quantity of knowledge, that is predicted to be hold on across an oversized set of share-nothing artifact servers. MapReduce is highlighted by its simplicity: Once a user has work his program into the specified map and cut back pattern, the execution framework takes care of ripping the work into subtasks, distributing and execution them. One MapReduce job invariably consists of a definite map and cut back program. MapReduce has been clearly designed for big static clusters. Recently there was ton of analysis went on parallel processing and its implications and potentialities. Several systems came into existence for process MTC applications wherever multiprocessing of knowledge is crucial.

### 1.2 Challenges and Opportunities

They contemplate the amount of obtainable machines to be constant, particularly once programming the process jobs execution. Whereas IaaS clouds will actually be accustomed

# Lane Segmentation for Self-Driving Cars using Image Processing

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\*\*\*

**Abstract** - Technology is advancing day by day, more advanced cars are being built every year but still we are not able to reduce the no. of road accidents. Approximately 1.35 million people die each year as a result of road traffic crashes. Road traffic crashes cost most countries 3% of their gross domestic product. More than half of all road traffic deaths are among vulnerable road users: pedestrians, cyclists, and motorcyclists.

When the vehicle is four-wheeler and an accident occur than the chances of serious injuries or even deaths increases. We need more efficient systems which can prevent the accidents and help us to reduce them. One of the most common mistakes committed by human driver is talking on phone while driving or not paying attention on the road. Sudden change of the lanes leads to accident.

A lane detection system can be built and which can identify the lanes and indicate the driver on sudden alteration in the lanes. Most of the car companies have ongoing projects on these technologies. This can be done with the help of image processing.

## I. INTRODUCTION

A lane segmentation system is built using image processing. Image processing can be done with help of the python library like OpenCV. OpenCV provides various functions and tools to work on frames captured by the camera. With the help of OpenCV many complex calculations can be done easily.

For making a prototype we need a camera, a bot and a raspberry pi. The camera will be mounted on the top of the bot and the raspberry pi will be fit on it. The raspberry pi will be operated with the help of a battery. The camera will capture the live events and provide them to raspberry pi. The camera captures frames which are then passed to the raspberry pi which does further processing on the frames. We can even control the frame rate too. We need to import NumPy library in our code which provides a high-performance multidimensional array object, and tools for working with these arrays.

For better efficiency and good outcome, we need powerful cameras.

The model architecture is shown in figure 1.

### A. Morphological Transformations:

Morphological transformations are operations which are performed on the images on the basis of their shapes. The image is first converted in binary form and then the transformations are applied. Two inputs are given to the function. First is the original image and second is the kernel or the structuring element which decides the nature of the operation. There are many types of morphological transformations. The two basic types are Erosion and Dilation.



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## Machine learning based classifier model for autonomous distracted driver detection and prevention

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### ABSTRACT

*Recent researches and surveys have provided us with the evidence that distracted driver is a major cause of vehicle crashes all around the world. In-vehicle information systems (IVIS) have raised driver safety concern and thus, detecting distracted driver is of paramount importance. The project (or paper) shows a method of real-time distraction detection and initiates safety measures. In the realization of this project we have used Web-Cam, Raspberry Pi (a low cost, small size computing device), along with concepts of deep learning and convolutional neural networks. We classify drivers into multiple categories of distraction, some of them are texting, drinking, operating IVIS etc. Web-Cam feeds the classifier with real-time images of the driver of a particular vehicle. The system also constitutes a buzzer alarm which rings once the distraction is detected.*

**Keywords:** Machine Learning, Convolutional Neural Network, Classification, Hyper parameters.

### 1. INTRODUCTION

Distracted driving is characterized as a movement which redirects a man's concentration or consideration from his fundamental errand of driving. These sorts of exercises incorporate utilizing a cell phone, eating and drinking, discussion with co-travelers, self-preparing, perusing or watching recordings, modifying the radio or music player and notwithstanding utilizing a GPS framework for exploring areas. Among the greater part of the above, cell phone utilization is said to be the most diverting component. Diverted driving has been distinguished as an essential hazard factor in street activity wounds. Cell phone use has formed into an essential wellspring of driver diversion as it can prompt drivers to take their consideration off the street, consequently making vehicle tenants more helpless against street crashes. The utilization of cell phones while driving causes four kinds of commonly non-selective diversions – visual, sound-related, subjective and manual/physical. While visual diversions make drivers turn away from the roadway, manual diversions require the driver to grasp their hands off

the guiding wheel; sound-related diversions cover those and Sounds that are critical for the driver to hear while driving and intellectual ones incite the driver to consider an option that is other than driving.

A system with web-cam integrated to raspberry pi running python classifier can be used to capture the image and classifying it into either distracted state or safe driving state. If the driver is in a distracted state, a buzzer alarm is generated. For classifier, we have obtained the dataset of drivers driving in different states. This is fed in as our training data set and with an open source machine learning python library Scikit-Learn a classifier is generated to predict the distracted state of the driver. Following states of the driver is to be predicted: texting, talking to co-passengers, phone call, looking left or right, reaching back seat, self-grooming, operating IVIS and eating or drinking. We aim at building an integrated system of webcam and classifier model based on Convolutional Neural Network which would classify images based on different states of the driver. The training set used for building the model has been taken using a static driving



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## A non-intrusive approach for drowsy and drunk driving using computer vision techniques

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### ABSTRACT

*This paper presents a holistic, non-intrusive approach for drunk and drowsy detection of the driver using computer vision techniques of facial landmark detection and motion detection. The driver's continuous real-time video feed is observed with the help of a smartphone camera. A single scalar quantity, Eye Aspect Ratio (EAR) which characterizes persistent eye blinks continuously analyses this feed. Simultaneously the system checks the body and the head movements using the differential imaging technique, which operates in real-time. A severity score indicating the fitness to drive is generated cumulatively using both methods. The driver is notified with the sound of an alarm if the results are positive based on a threshold value of the severity score.*

**Keywords**— Computer vision, Real-time processing, Motion detection, Facial landmark detection, Eye Aspect Ratio, Severity score

### 1. INTRODUCTION

Drunk and drowsy driving are the leading causes of road accidents across the world. Klauer et al. [1] have found that drowsiness increases the risk of an accident up to six times, which is further compounded due to nighttime conditions or in situations without prior sufficient sleep [2]. It is a well-known fact that the influence of alcohol is one of the major causes of reduced vehicular control and increased risk of accidents. Numerous studies have established that the risks of road accidents, injury or death increase exponentially under the influence of alcohol [3]. In Europe itself, there is an estimation of 10,000 deaths each year because of drunk driving [4]. Alcohol-impaired driving accidents contribute to approximately 31% of all traffic casualties in the USA [5]. In China, Li et al. found that about 34.1% of all road accidents were alcohol-related [6]. All of these studies indicate serious human lapses and avoidable causes of death, which can be prevented by proper monitoring and alerting technology. Therefore, it is

essential to develop a holistic, non-intrusive system to continuously monitor a person's physical and facial movements and to alert them at critical moments to avoid road [17] and [18]; techniques using a stereo camera [18] and [19]. Some of these techniques have also been converted into commercial products such as Smart Eye [18], Seeing Machines DSS [19], Smart Eye Pro [18] and Seeing Machines Face API [19]. However, these commercial products are still limited to controlled environments and require laborious calibration techniques. Thus, there is a long way to go before a reliable and robust commercial product is built in this category.

The existing systems based on real-time driver monitoring, using image processing techniques are largely tackling one aspect of the problem, i.e. either drowsiness or drunkenness. To accidents, thereby significantly preventing serious injury and loss of lives.

### 2. RELATED WORK

Existing methods use both active and passive techniques to develop real-time monitoring systems. Active methods use special hardware such as illuminators [7], infrared cameras, wearable glasses with special close-up cameras observing the eyes [8], electrodes attached to the driver's body to monitor biomedical signals, like cerebral, muscular and cardiovascular activity [9] [10]. These methods provide reliable and accurate detection. However, the cost of such specialized equipment is a major drawback hindering their popularity. These equipment are also intrusive that is, it causes annoyance to the driver's body and hinders regular driving. The unusual effect of driving in the presence of invasive instrumentation reduces the drowsiness in testing and simulation conditions. Consequently, the efficacy of such models is limited in real road conditions. Most of them are yet to be effectively introduced in the market.

Passive techniques in monitoring systems majorly rely on the standard remote camera. A set of these passive methods are

# Person Identification using Deep Learning

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**Abstract**—In the present scenario, digital data generation, data consumption becoming necessary due to advancement in technology. The business process are taking advantage of the available data. The human data processing becoming important in various types of applications like person authentication, verifications automatically by the machines. One of the application is to identify the person automatically by the machine.

Face recognition technology is available for use for couple of years. The face recognition technology is limited by the use of the restricted environment. In this paper, the method for person identification in unrestricted environment is presented using deep neural network. The face recognition and body part recognition these two important steps are used to identify the person.

**Keywords**--Face recognition, deep learning, Person Re-identification.

## 1. INTRODUCTION

Identification of the individual person using various technologies becoming important due to the use of person identification in various applications like verification as airport, different unities, digital transactions, access to the restricted area or information.

The person identification problem has been studied for several years, but the human like performance for person recognition by the machine is not achieved. There are many challenges for the person identification such as size, color, orientation and occlusion. The face recognition, recently available for use in the restricted environment.

The person identification is done using face matching process. In this case, face images are stored in the face database. The unknown face image is matched with the face images available in the face database. The Face Recognition is implemented to person recognition but the constraints is the person should be close enough and also should front towards the camera. This process of face identification has limitations for real time face recognition application.

In surveillance application, person recognition becoming very important as video cameras are installed in different areas. Previous work related to the Identification of Person is done through Facial Recognition only and that in addition, when the person has to show himself in front of the camera with properly aligned face fronting camera. This approach was very tedious as each time person has to manually show himself in front of camera to mark himself present many areas. This produces large video data for the processing.

The person identification in surveillance video is challenging problem due to several issues like person orientation, scale, occlusion by other objects, lighting illumination etc. This paper the problem of person Identification using process of the person re identification is explored.

Person re-identification is the process of mapping images of the individual person captured from various cameras or in a different directions or in different situations or instances. Another way to define is allocating an identity (ID) to a person in multiple camera configuration. Generally the re-identification is limited to a minor duration and a small environment (area) covered by camera. Humans have that ability to recognize other persons by using descriptors based on the person's characteristics related to body like height, face, clothing, hair style and shade, locomotion(walk pattern), etc. and this seems to be an easy problem for humans but for a machine to solve this problem is extremely difficult.

In visual surveillance technique, it is very important to link or associate individual people across different camera orientations. Cross view individual person re-identification ensure automatic identification and structure of particular individual person-specific features or movements over huge expanded environment and it is important for surveillance used in many applications for example tracking people using multi-camera and in forensic search. Particularly, for doing person re-identification, one compares a query person (person to be identified) the image is captured by camera view against a database created of the many people captured in another view for creating a ranked list or array according to their comparison distance similarity index.

The most existing methods or approaches in order to perform ReID (re-identification) by changing visual appearance such as shape of the face, texture of the body and color of individual or multiple person's images. People's appearance is naturally limited because of the unavoidable ambiguities related to visual ability and untrust due to appearance



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## Tracing the original source of FMCG-SCM using Blockchain

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### ABSTRACT

*Fast Moving Consumer Goods come a long way from the production of their raw materials to finally being bought by the end user, that is, the customer. Their Supply Chain Management is a tedious task and doesn't really provide you with an auditable trail. The source and thus the quality of the product raises few questions. The paperwork involved in this leads to days of auditing for even a small discrepancy arising in the whole SCM. One of the obvious solutions to this is the digitalization of the whole process. But that still doesn't stop it from getting tampered. The truth still poses a question with the quality of the product being consumed by the end user. Adding another level of surety is only possible by ensuring that the data is not tampered with during the whole supply chain of the product. This is only possible by having a blockchain to moderate the whole process. This will not only make sure that the data regarding the product is true to its point but also make the auditing easy and fast in case of any discrepancy. Few western countries have already implemented blockchain for the products which require high quality throughout the supply chain. Since the type of supply chains vary and data privacy is required in some stages between different parties, private blockchains are preferred in such scenarios to create that balance between truth auditability and data privacy.*

**Keywords**— Blockchain, FMCG, Source truth auditability, Supply Chain Management

### 1. INTRODUCTION

Supply chain management of a fast moving consumer good is a long chain of the product preparation starting from its raw materials to the final consumption by an end user that is the customer. It begins from the manufacturing of the raw materials, which then move towards the processing units, distributors and then finally sellers. The chain isn't really that simple as it seems to be. Majority of tasks are handled by paperwork in small to medium scaled supply chains. The large ones, though with the facility of digitalization for their internal workings, don't provide with the concrete source of truth to ensure the quality of the food

being consumed by the customer. Having a quick look over the current supply chain and its working doesn't reveal much about their underperformance in real life. Though it seems a tedious work over a long chain, nothing much can be done over the operations and working involved in it. Though, the efficiency can be tuned by improving the time required to solve any discrepancy between the multiple parties involved in the whole chain by automating their asset transfer operations. But the actual benefit lies in the ability to trace to the original source and having the sense of reliability that the data isn't tampered with during the whole journey of product preparation. This will not only help the end user with a sense of satisfaction but will also force the intermediaries to focus on their quality control so that their contracts aren't affected.

The ability to have the above-mentioned functionalities without breaking the existing system is to have a continuous record of the transfer of assets taking place between the multiple parties along with the state of the raw materials and processed items. This is nothing but having a blockchain for the whole supply chain to make sure the data regarding the quality during the stages isn't tampered with. The smart contracts, that is, the contracts between the multiple parties get executed automatically on the transfer of assets, thus reducing the time it takes to do so via the traditional way. This blockchain ensures that there is proper accountability of the data being entered into it regarding the product at different stages.

But all this doesn't mean that the data can be made public regarding the whole chain. The contracts being executed are made after an agreement between the parties involved, that is, they have a proper channel of execution between them. Their data privacy is a point of concern for them and wouldn't want other parties to have a look into it. Therefore, to address this concern of the intermediaries, different types of blockchains are brought up called the private blockchains to address the enterprise level issues involved between parties with varied agreements and different level of privacies. These private blockchains, along with the advantages of public blockchains,



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# Implicit Aspect Extraction for Sentiment Analysis: A Survey of Recent Approaches

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## Abstract

The research in Sentiment analysis (SA) is in vastly growing stage as people become more expressive on social media, blogs, forums and e-commerce websites by sharing their opinions, reviews and comments. In Aspect-level SA opinions about various aspect or features of an entity is extracted. Users specify aspects by explicit words (i.e. Explicit aspects) or sometimes the aspects must be inferred from the text (implicit aspects). Detecting implicit aspects is challenging but very important and limited studies focused on the extraction of implicit aspects. This paper provides a survey on recently proposed techniques for detecting implicit aspects. We have classified the studies according to approaches they have followed, also specified limitations and future work stated by authors. We have discussed different issues in implicit aspect extraction which will give directions for future research.

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*Keywords:* Aspect Extraction; Implicit Aspects; Aspect based Sentiment Analysis

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## 1. . Introduction

Sentiment analysis (or opinion mining), is a field of research which deals with the analysis of user's opinions, sentiments expressed in written text. SA is currently very dynamic research area due to the fast growth of internet and users' active participation for sharing, commenting and discussing over blogs, forums, social sites and shopping portals. SA can be helpful for manufactures, governments, businesses to get the feedback /impact of their product, service or decision. Sentiment Analysis is done at document-level, sentence level, and aspect-level. In document-level

# Video Object Detection through Traditional and Deep Learning Methods

Sita M. Yadav, Sandeep M. Chaware

*Abstract: Object detection in videos is gaining more attention recently as it is related to video analytics and facilitates image understanding and applicable to . The video object detection methods can be divided into traditional and deep learning based methods. Trajectory classification, low rank sparse matrix, background subtraction and object tracking are considered as traditional object detection methods as they primary focus is informative feature collection, region selection and classification. The deep learning methods are more popular now days as they facilitate high-level features and problem solving in object detection algorithms. We have discussed various object detection methods and challenges in this paper.*

**Keywords :** Video Object Detection, Deep Learning Methods

## I. INTRODUCTION

Computer vision is a field in which, object detection from the video sequences is an interest point for many vision based application like, video surveillance, traffic controlling, action recognition, driverless cars and robotics. The task of object detection includes localization and classification. From video frames data is extracted to predict the objects in which task of drawing a bounding box around one or more object is called localization and task of assigning label is classification. The object detection from video sequences can be based on feature, template, classifier and motion. Various papers have discussed about role of moving camera and fixed camera in object detection. But object detection in videos which capture using moving cameras is less and work is still going on. Object detection becomes primary requirement for computer vision which helps in understanding semantic of images and videos.

## II. LITERATURE SURVEY

In [1] the author introduced method based on single deep neural network for detecting objects. The approach is based on SSD which use aspect ratio and scales for feature map, performance can be improved by using RNN. In [2], the authors have proposed a Region Proposal Network (RPN) which work on detection network with full-image convolutional features, hence gave cost-free region proposals. This paper showcases a deep learning based object detection method which achieves speed of 5-17 fps. [3] have proposed a framework by using object detection, classification and semantic event description. The event is

analyzed by integrating the object detection and scene categorization. The system can be improved by automatic scene learning methodologies.

The authors of [4] have proposed methods and architectures to understand videos. The architecture is given for automatically categorization and caption in the video. The system implemented on temporal feature pooling (TFP), 3D Convolution, frame majority and LSTM for classification. Microsoft multimedia dataset used, the output is the predicted video categories and video captioning. Better dataset cleaning is required along with focus regions. One frame per second extracted from video which may probably missed some important information. The various detection algorithms are explained using given algorithm but accuracy of detection is not discussed. [5] proposed a system to detect moving objects using background subtraction, edge detection and geometrical shape identification. If the object is moving in speed then this system does not give accurate result. [7] Suggested pedestrian detection method which separates the foreground object from the background by utilizing image pixel intensities. The foreground edges are enhanced by high boost filter. [8] the authors put forward object detection system using CNN. The neural network algorithms are able to handle the occlusions and camera shake problems, with use of frame difference method. However, proper analysis of training model is required. [9] introduces BMA (Block matching algorithm) for moving object detection. This method divide the video frames into non-overlapping blocks then matching is done in reference frame. The computational time for BMA is low and robust. However, further study is required for lossless compressed video based Background Subtraction (LIBS) method is used. [14][15] have given state of art region based object detection methods.

## III. FACTORS AFFECTING OBJECT DETECTOR

The object detection requires to identify the features that impact performance of detector with framework. Based on literature survey the various factors which affect detector performance are feature extractor, threshold decision for loss calculation, boundary box encoding, training dataset, data augmentation, localization factors and feature mapping layers.

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## Facilitating Secure and Efficient Health Information Exchange using Blockchain

Sagar Rane , Sanjeev Wagh , Arati Dixit



### Abstract

In traditional health information exchange activities in India, most patient i.e. end user data is shared either through paper records or verbally. Transfer of patients between different hospitals across the country ensues a transfer of medical information, which due to the above modes of transfer can get damaged or be only partially communicated. Even though the above model allows low-cost and confidential mode of data sharing, the paradigm increase in medical data over the years and the importance

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# Text Summarization Using Neural Networks

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**Abstract**— There are various news/articles which cannot be read completely in the hush of our daily schedules. Thus, summarization comes into picture. This paper focuses on summarizing a text using neural networks which creates a summary containing the important key points of the text/article. This summarization will be done using neural networks (word2vec model). It will focus only on English articles. The input given will be in .txt format. Thus it will make a lot easier to get a quick summary of the long articles and derive the conclusion about what is there in the articles and whether they are relevant for a user according to their interest.

**Key words:** Word2vec, Neural Network, Abstractive, Extractive, LSTM

## I. INTRODUCTION

As the amount of information on the web is increasing rapidly day by day in different format such as text, video, images. It has become difficult for individuals to find relevant information of the interest. When user queries for information on the internet he gets thousands of result documents which may not necessarily be relevant to his concern. To find appropriate information, a user needs to go through the complete documents which results in information overload problem which leads to wastage of time and efforts. To deal with this situation of dilemma, automatic text summarization plays a vital role [6]. Automatic summarization compresses a source document into meaningful content which reflects main thought in the document without altering information. Thus it helps user to grab the main notion within short time span. If the user gets effective summary it helps to understand document at a glance without checking it completely, so time and efforts could be saved. Text summarization process undergoes in three steps analysis, transformation and synthesis. Analysis step analyzes source text and select attributes. Transformation step transforms the result of analysis and finally representation of summary is done in synthesis step.

In an abstract summary, the summarized text is an interpretation of an original text. The process of producing involves rewriting the original text in a shorter version by replacing wordy concept with shorter ones[9].

## II. RELATED WORK

### A. Types of Summarization

A large document is entered into the computer and recapitulated content is returned, which is a non-redundant extract from the original passage. Automatic text summarization process model can be divided into three steps. First is the preprocessing of source text, second is interpretation of source text representation and source representation transformation to summary text representation with an algorithm and in the final step, summary text generation from summary representation [10].

Feature extraction for Wikipedia articles is done using ten different feature scores which is fed to the neural network and the neural network returns single value signifying the importance of the sentence in the summary[8].

There are two distinct types of features: non-structured features (paragraph location, offset in paragraph, number of bonus words, number of title words, etc.) and structured features (rhetorical relations between units such as cause, antithesis, condition, contrast, etc.) [2]

#### 1) Extractive Method:

Extraction is mainly concerned with judging the importance, or indicative power, of each sentence in a given document [1]. Extractive text summarization involves the selection of phrases and sentences from the source document to generate the new summary. Techniques involve ranking the relevance of phrases in order to choose only those most relevant to the meaning of the source. Extractive summarization is basically just picking up the words from the text as it is which are important and putting them in the summary. No interpretation of the text is done in this process. We also anticipate that shod sentences are unlikely to be included in summaries[3].

There are four major challenges for extractive text summarization as follows: identification of the most important pieces of information from the document, removal of irrelevant information, minimizing details, and assembling of the extracted relevant information into a compact coherent report[5].

#### 2) Abstractive Method:

Abstractive text summarization involves generating entirely new phrases and sentences to capture the meaning of the source document. This approach is commonly used by humans for getting the summary but it proves to be a challenging approach. Classical methods operate by selecting and compressing content from the source document. Abstractive summarization techniques tend to copy the process of 'paraphrasing' from a text rather than simply summarizing it. The abstractive method is more difficult and complex as compared to extractive. It copies the way human gets the summaries.

### B. Techniques of Summarization

#### 1) Bag of words:

This model is a simplified representation which is used by natural language processing and information retrieval (IR). A text which can be a sentence or a document is represented by bag (multiset) of its words, disregarding grammar and even word order but keeping multiplicity. In this approach, words are tokenized which are used for each observation and frequency of each token is found.

#### 2) TF-IDF:

Tf-idf refers term frequency-inverse document frequency, and the tf-idf weight is a weight often used in information retrieval and text mining. TF-IDF weight is a statistical measure which is used to evaluate the importance of a word in a document in a collection or corpus. The importance shows proportional behaviour to the number of times a word

# Devanagari Text Detection From Natural Scene Images

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## ABSTRACT

Text present in a camera captured scene images is semantically rich and can be used for image understanding. Automatic detection, extraction, and recognition of text are crucial in image understanding applications. Text detection from natural scene images is a tedious task due to complex background, uneven light conditions, multi-coloured and multi-sized font. Two techniques, namely 'edge detection' and 'colour-based clustering', are combined in this paper to detect text in scene images. Region properties are used for elimination of falsely generated annotations. A dataset of 1250 images is created and used for experimentation. Experimental results show that the combined approach performs better than the individual approaches.

## KEYWORDS

Colour-Based Segmentation, Devanagari Script, Natural Scene Images, Text Detection, Text Extraction

## 1. INTRODUCTION

Devanagari script is used in India for writing many official languages like Hindi (National Language of India), Marathi, Sindhi, Nepali, Sanskrit and Konkani (Jayadevan, Kolhe, Patil, & Pal, 2011). Official documents, instruction boards, street boards, banners etc. are generally written in regional languages. Though there is a significant improvement in printed script recognition from documents, there is lot of scope for research on regional text processing in scene images (Pal, Jaydevan, & Sharma, 2012). Camera captured scene images are complex due to dust, uneven light conditions, shadows, perspective distortions, poor quality etc. Also it is difficult to identify text with different styles, colours and sizes. Thus, it is very challenging to detect text in camera captured scene image as shown in Figure 1.

Rapid growth of multimedia and handheld systems demands more efficient techniques to process digital data. Text present in camera captured images is useful in many applications. An automatic text detection and recognition system can be used in various applications like content-based image searching, automatic navigation system, object recognition, text to audio conversion and language translation. Smart phone-based applications can be developed to translate information written in Devanagari script (Hindi, Marathi, Nepali, Konkani etc.) present in scene images to other target

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## Effect of chromium addition on properties of sinter-forged Fe–Cu–C alloy steel

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The present work deals with sinter-forged powder metallurgical (P/M) steels alloyed with chromium by addition of ferrochrome powder, which allows a close control over the chromium contents of alloy steels. Chromium contents can be varied by adjusting appropriately weighed ferrochrome powder in the P/M mixtures. Fe–Cu (2%) and C (0.7%) is the base composition for this P/M alloy steel. Study with the addition of 0.5% and 3% chromium by weight in the form of ferrochrome powder is carried out. The P/M alloy steel of base composition with no chromium content is also prepared for comparative study. The paper deals with these three alloy steels formed by the sinter-forging technique of powder metallurgy. The results of hardness and wear in hardened and tempered condition are reported in the present work.

*Keywords:* Powder metallurgy; sintered alloy steels; sinter-forging; ferrochrome powder.

### 1. Introduction

Gears, pistons, connecting rods are well-established powder metallurgical (P/M) products due to the features such as ease of formability, good strength and net shape production of parts at competitive cost.<sup>1</sup> Fe–C and Fe–Cu–C systems have been the focus of the P/M industry for meeting various automobile and other engineering requirements.<sup>2</sup> The elemental chromium containing P/M alloys steel can

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# Experimental Study of Oscillation Controlled Heat Transport Tube: An Application of Shuttle Heat Transfer

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## I Abstract

This paper presents an experimental study of heat transfer characteristics of oscillation controlled heat transport tube. The oscillation induced heat transport due to the reciprocating motion of a solid substance is observed in cryogenic refrigerator and heat transfer by such a mode is referred as a shuttle heat transfer. In this heat transfer a piston with axial temperature gradient reciprocates inside the cylinder with similar temperature gradient, and a combination makes remarkable increase in heat transfer in the direction of temperature gradient. The same principle is used in the oscillating flow heat exchanger the only difference is solid piston is replaced by moving liquid core, solid cylinder is replaced by the stagnant fluid present in the Stokes boundary layer and the required temperature gradient is maintained by connecting this system between two heat exchangers maintained at different temperatures. The mechanically operated oscillating mechanism is designed to obtain a frequency range of 0 to 4 Hz with stroke length of 1.5 cm to 6 cm. The different heat transfer characteristics are studied for different heat input, frequencies and tidal displacement. The experimental results for above mentioned cases are compared with modified Hausen's equation as proposed by Shin [3]. This experimental investigation indicates that the modified Hausen's correlation is directly applicable for heat transfer analysis in oscillation induced flow at heat source and heat sinks based on ratio  $L/S$ . Where,  $L/S$  is the ratio of length of cooling/heating pipe ( $L$ ) in heat source/heat sink to tidal displacement ( $S$ ).

## Notation

- $d$ : Diameter of flow tube (m)
- $f$ : Oscillation frequency (Hz)
- $h$ : Convective heat transfer coefficient ( $W m^{-2} K^{-1}$ )
- $k$ : Thermal conductivity ( $W m^{-1} K^{-1}$ )
- $L_s$ : Length of tube in heat sink and heat source (m)
- $L_c$ : Length of cooling tube in tube side of shell and tube heat exchanger (m)
- $L_h$ : Length of cooling tube in heating section (m)
- $Nu$ : Nusselt number
- $Pr$ : Prandtl number
- $Re$ : Reynolds number
- $r$ : Tube radius (m)
- $S$ : Oscillation tidal displacement (m)
- $Wo$ : Womersley number

## Symbol

Transition number

Experimental

transport rate than conventional heat pipes. In high capacity heat pipes maximum heat capacity is governed by wicking, boiling, entrainment limits, etc. Oscillating flow heat exchangers are capable of removing heat from a concentrated heat source and spread the heat over a larger area by mechanically oscillating fluid in a channel. Heat transfer phenomena due to oscillating flow are naturally complex and least understood. Significant studies have been reported on heat transfer in oscillating flow in the past by various researchers. Kurzweg [1] examined enhanced heat conduction through sinusoidal oscillatory flow in a circular tube connecting the two reservoirs which were maintained at different temperatures. They observed that the heat transfer enhancement is proportional to the square of the oscillation amplitude and is a function of tube radius, frequency, Prandtl number and on flow behavior. Nishio et al. [2] presented the effect of physical properties of the working fluid on the heat transfer enhancement in oscillation induced heat transport. They concluded that the fluids with  $Pr \approx 1$  are capable of maximizing effective thermal conductivity under optimum condition. With this consideration, water is the best fluid for such system. Shin and Nishio [3] numerically investigated heat transfer coefficient in heating and cooling regions and heat transfer rate of the oscillation controlled heat transport tube. Based on this numerical study and Hausen's correlating equation for laminar flow heat transfer in the tube, they developed a correlation equation for heat transfer coefficient. Patil and Gawali [4] experimentally investigated heat transfer enhancement factor in the oscillating flow heat exchanger using Kurzweg's and Nishio's correlations. They observed that heat transfer characteristics of oscillating flow heat exchangers are independent of how oscillations are generated. Based on experimental study and dimensional analysis they develop correlation for effective thermal diffusivity between heat source and heat sink in terms of dimensional less number namely Womersley number ( $Wo$ ) and transition number ( $\beta$ ).

## III Motivation and Objective

The objective of the present paper is to investigate the heat transfer characteristics due to the oscillating flow of water in the small circular tube. In particular, the effect of  $L/S$  on heat transfer characteristics in oscillation induced heat transfer tube is investigated. The results of the present study will be useful in the design of heat exchangers used in the oscillating flow conditions. This study will help to understand the mechanism of heat transfer in oscillating flow, which has many applications such as compact heat exchanger, internal combustion machines, cryo-coolers and Stirling engines. The experimental results are presented and the effects of various parameters are discussed.

## IV Experimentation

# Heat Transfer Enhancement of Electronic Circuits Using Novel Minichannel Heat Sink by Numerical Analysis

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**Abstract**— The low cost, simple fabrication and reliability of heat dissipation of heat sinks, a kind of heat exchanger, make them fit for use in the electronic devices. In the last decades, intensive attentions were spent on miniaturizing the electronic devices because of the high sophisticated micro- and nano-technology development. But the heat dissipation is still the major problem of enhancing the thermal performance the heat sink. Overheating may cause glitch or harm to hardware. In this work, a new novel design of heat sink namely Padma heat sink is developed and is compared with the conventionally used Parallel channel heat sink using both numerical as well as experimental methods keeping equal surface area of interaction of fluid with the sink. Finite volume method computational fluid dynamics technique is used to model single-phase forced convection for water-cooling laminar flow in both the heat sinks for different Reynolds number values. Results indicates that the performance of electronic circuits can be highly enhanced using Padma heat sink as compared to parallel channel heat sinks.

**Keywords**—Heat transfer, Minichannels

## I. INTRODUCTION

As electronic devices are becoming small and small each day, due to which they don't have that much area to dissipate heat. We in our everyday life is surrounded by power and semiconductor electronic systems which find widespread application in residential, commercial, military and space environments. As they are widely used, they need to be reliable and work efficiently in different environment conditions. The main factor which effect the reliability is the heat dissipation mechanism. The heat generated in the system is the difference between the input and output energy which must be efficiently dissipated in order to prevent the overheating and chip failures. The heat dissipation mechanism remains one the most discussed topic because it widely effect the efficiency of the heat sink, so it must be dealt in depth for the advancement of electronic equipment.

In today's technology, we are also focusing on using nanofluid in place of water or making some changes in the geometrical construction of the heat sink.

With rapid development of semiconductor engineering and microelectronic technique, the trend of electronic devices is towards miniaturization, high power density and high-performance quality. A rise of the clock frequency of highly integrated electronic circuits led to increased heat generation rates in electronic chips. Currently, chips are cooled by forced air convection, but this will not be sufficient for the next generation electronics. The conventional heat transfer method of forced air convection is reaching its thermal limit. There is a challenge to develop efficient methods for cooling of these high flux devices. Therefore, an efficient and compact cooling solution is required to maintain acceptable operating temperatures.



## Evaluation of alumina incorporated combined ceramic layer thermal barrier coating

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### ABSTRACT

In present work the coatings having lanthanum-titanium-aluminium oxide that is  $\text{LaTi}_2\text{Al}_9\text{O}_{19}$  (LTA) in combination with yttria stabilized zirconia (YSZ) and alumina ( $\text{Al}_2\text{O}_3$ ), were developed using plasma spray method. Thus the top coat comprises of LTA/YSZ/ $\text{Al}_2\text{O}_3$  ceramic top layer. The coatings were tested for type I hot corrosion in presence of  $\text{Na}_2\text{SO}_4$  and NaCl salts in 3:1 mass proportion at 900 °C for 100 h. LTA 150 (having LTA top coat of thickness 150  $\mu\text{m}$ ) as-sprayed and annealed samples have shown excellent hot corrosion resistance upto 100 h. XRD patterns indicate that the LTA and  $\text{Al}_2\text{O}_3$  phases were retained even after 100 h of isothermal hot corrosion with slight decrease in their peak intensity. Hot corrosion of alumina incorporated LTA coating resulted in the formation of  $\text{LaAlO}_3$ ,  $\text{Na}_2\text{Al}_2\text{O}_4$ ,  $\text{NaAlO}_2$ .

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### 1. Introduction

The performance and efficiency of a gas turbine and aero engine increases with increase in the inlet temperature to the turbine. By using the thermal barrier coatings, the operating temperature of gas turbine can be increased [1–5]. Thermal barrier coatings consist of an insulating ceramic top coat layer applied over a metallic bond coat [6]. The gas turbine engine is provided with the material systems capable of survival in harshest environments. Engine components are subjected to rigorous mechanical loading conditions, high temperatures, and thermal degradation [7].

The best compromise among these different requirements is presently offered by partially stabilized zirconia, 6 to 8 wt.%  $\text{Y}_2\text{O}_3$ - $\text{ZrO}_2$  (Y-PSZ), deposited either by the air plasma spray (APS) technique or by electron beam physical vapor deposition (EB-PVD) [8]. With the increasing operating temperature, the thermo-mechanical and thermo-physical properties of thermal barrier coating (TBC) changes. Also, sintering and creep process affects the thermal fatigue resistance and performance of TBC [9]. After Al depletion and thickening of thermally grown oxide (TGO) layer, other oxides such as Ni and Co containing spinels are formed [10]. The delamination and spallation of TBCs usually occur at TGO scales, the main cause is the oxidation of bond coat. The different thermo-mechanical properties such as coefficients of thermal expansion of ceramic layer, bond coat and alloy substrate, affects the

long term stability of TBC [11]. The coatings with different substrate alloys and different preparation techniques have different microstructure and properties [12].

Studies have been done to search a method to reduce the internal oxidation of the bond coat which is the main reason for TGO growth. Alumina layer acts as an oxygen barrier and retards the further bond coat oxidation [13].  $\text{Al}_2\text{O}_3$ /YSZ coatings have shown good spallation and oxidation resistance and increased densification and phase transition rate [14]. In oxidation test, the composite coatings of alumina as a top coat and the mixed YSZ alumina layer, showed better resistance [15]. Studies proved that the alumina incorporated NiCrAlY bond coat have better hot corrosion resistance than the YSZ incorporated NiCrAlY bond coat [16].

A number of ceramic materials have been suggested in the last decade as new TBC materials. It covers aluminates, doped zirconia, perovskites, pyrochlores, and fluorite [17]. As  $\text{La}_2\text{Zr}_2\text{O}_7$  (LZ) is having lower thermal conductivity than YSZ, it was proposed as a promising material [18]. The cyclic oxidation behavior of the double ceramic layer (DCL) coatings was studied by Zhenhua Xu, et al. The DCL coating shown better oxidation resistance compared to single ceramic layer (SCL) [19]. LZ and  $\text{LZ}_2\text{C}_3$  coatings were developed by EB-PVD and the hot corrosion behavior is studied, it has shown the best hot corrosion resistance with least degradation and spallation [20].  $\text{LZ}_3\text{Y}$  coatings prepared by EB-PVD have shown poor resistant to the attack of molten mixture of  $\text{Na}_2\text{SO}_4 + \text{V}_2\text{O}_5$  [21]. The DCL LZ/8YSZ TBCs has better thermal shock resistance ability at 1200 °C and 1000 °C. Thus DCL coating may be an important development direction [22].

LZ pyrochlore as a top coat material has revealed excellent high-temperature capability and high thermal stability [23]. H. Dong et al.,

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# Experimental investigation of heat transfer enhancement factors in the oscillating flow heat exchanger using Kurzweg's and Nishio's correlations

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## ABSTRACT

In the present work, an experimental investigation of heat transfer enhancement parameters of the oscillating flow heat exchanger using Kurzweg's and Nishio's correlations is carried out. An oscillatory axial movement of fluid is established within the flow tube using piston cylinder mechanism. The experiments are carried out for seven different frequencies, five tidal displacements and four heat fluxes. It is observed that at a constant tidal displacement ( $S$ ), experimental effective thermal conductivity ( $k_{eff}$ ) increases progressively with frequency ( $f$ ) up to a maximum and then decreases. The frequency corresponding to peak  $k_{eff}$  is an optimum frequency. In addition to this, it is also observed that with increase in  $S$ , the point of peak  $k_{eff}$  is shifted towards lower frequency. A similar trend is observed for axial heat flux ( $q_a$ ) and convective heat transfer coefficient ( $h$ ). Based on the dimensional analysis and experimental data, an empirical correlation is obtained for experimental effective thermal diffusivity ( $\alpha_{eff}$ ) as a function of the Womersley number ( $Wo$ ) and the transition number ( $\beta$ ). Finally the result shows that, in the oscillating flow heat exchanger,  $f$ ,  $S$ , Prandtl number ( $Pr$ ) of fluid, fluid thermal properties to wall thermal properties and the ratio of length of cooling tube in heat sink ( $L_c$ ) to  $S$  are primary influencing parameters.

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## 1. Introduction

Fluid flow and heat transfer in circular tubes, ducts and channels is easy to analyze and well established. However, analysis of heat transfer and fluid flow in oscillating flow is complex in nature due to the presence of more stringent time and spatial resolution present within the cycle. In oscillating flow, the flow condition changes cyclically. This results in near wall velocity overshoot, where maximum velocity no longer occurs at the center of the channel. This velocity profile has a significant influence on the heat transfer characteristics. Researchers have demonstrated that the oscillating flow heat exchanger has potential to transport heat at the rate higher than that in a conventional heat pipe. It is capable of removing heat from a concentrated heat source and spread it over a large area which is far away from the heat source. In oscillating flow heat exchanger, diffusion of heat in axial direction takes place by the combined effect of time dependent transverse conduction coupled with the axial convective heat transfer. However, it is

independent of how oscillations are generated. Since the fluid used in this type of heat exchanger is not constrained to the saturation temperature, unlike in case of heat pipe, the flexibility for selection of a working substance for various applications is greatly increased. This type of heat transfer method finds applications in the removal of heat from radioactive fluid without net mass transfer, in processes where, the natural convection process is not present and also in cooling of high heat flux generating electronic gadgets.

Heat transfer phenomena due to oscillating flow are naturally complex and least understood. Significant studies have been reported on heat transfer in oscillating flow in the past by various researchers. Kurzweg and co-workers [1–6] examined enhanced heat conduction through sinusoidal oscillatory flow in a circular tube connecting the two reservoirs which were maintained at different temperatures. They observed that the heat transfer enhancement is proportional to the square of the oscillation amplitude and is a function of tube radius, frequency, Prandtl number and on flow behavior. Compared to molecular conduction the enhanced axial diffusion is significantly higher in magnitude because of the high value of thermal diffusivity. This higher value of thermal diffusivity corresponds to the point at which thermal diffusion time equals to

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# Experimental study of heat transfer characteristics in oscillating fluid flow in tube

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# Experimental study of heat transfer characteristics in oscillating fluid flow in tube

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## ABSTRACT

In the present work, an experimental investigation of heat transfer enhancement parameters of the oscillating flow heat exchanger under different frequencies, tidal displacement, and heat fluxes is carried out. The effect of different parameters on experimental effective thermal conductivity and convective heat transfer coefficient in cooling region is studied using correlations given by different researchers. A correlation for experimental effective thermal conductivity in terms of  $S^2\sqrt{\omega}$  is derived based on experimental data. This correlation is useful for predicting the optimum value of  $S^2\sqrt{\omega}$  before onset of turbulence.

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programmable logical controller; oscillating fluid flow; experimental effective thermal conductivity; tidal displacement

## Introduction

Oscillating flow heat exchangers are advantageously employed as a substitute for a heat pipe; they provide a much higher heat transport rate than conventional heat pipes. In high capacity heat pipes maximum heat capacity is governed by wicking, boiling, entrainment limits, etc. However, oscillating flow heat exchangers are capable of removing heat from a concentrated heat source and spreading it over a larger area by mechanically oscillating fluid in a channel. The oscillating fluid has no net mass transfer, but it simply oscillates. Heat diffusion is enhanced by the axial mixing of fluid caused by rapidly changing velocity profiles in the fluid. Since the fluid used in this type of heat exchanger is not constrained to the saturation temperature, unlike in the case of a heat pipe, the flexibility for selection of primary coolants for various applications is greatly increased. The oscillating flow heat exchangers are capable of transferring heat to both sides of a heated region. This results in oscillation of maximum surface temperature along the heated region of the channel, which is advantageous over the unidirectional forced convection, where the maximum surface temperature occurs at the exit of unidirectional flow in cooling of high heat flux generating electronic gadgets. Oscillating flow heat exchangers have many important applications in the removal of heat from radioactive fluid without net mass transfer in processes where the natural convection process is not present, in compact heat exchangers used in cryocoolers, and in the design of Stirling heat machines. In addition to the heat transfer enhancement, oscillatory flow has many advantages in mass transfer. Oscillatory flow mixing has many advantages, such as efficient dispersion of immiscible fluids, uniform particle suspension, gas-in liquid dispersion, and multiphase mixing. An oscillating flow may be imparted by a reciprocating piston, fluidic oscillators, or electromagnetic pumps.

The flow oscillation offers an axial transport of heat in the presence of the temperature gradient set by the mean flow. These oscillations provide periodic variations in the transverse temperature

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# Accurate stochastic initial and final failure of laminated plates subjected to hygro-thermo-mechanical loadings using Puck's failure criteria

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## ABSTRACT

The second order statistics of first-ply and last-ply failure (FPF and LPF) response of laminated composite plate with random input parameters such as constituent material properties, plate thickness, volume fiber fraction and temperature difference, subjected to hygro-thermo-mechanical loading are investigated in this paper. Stochastic finite element method (SFEM) based on higher order shear deformation theory (HSDT) with material non-linearity via second order perturbation technique (SOPT) is formulated for computing mean and coefficient of variation (COV) of FPF and LPF using Puck's failure criteria. Failure strength of each ply and corresponding failure mode is predicted by using micro-mechanics based modeling approach. The effect of different environmental conditions, volume fiber fraction, lamination schemes, lamination angle, side to thickness ratio, different bi-axial loading on FPF and LPF response is investigated. The capability of the present SFEM in predicting FPF and LPF load statistics has been studied, by comparing the results obtained with the independent Monte Carlo simulation (MCS) technique. The predicted hygro-thermo-mechanical strengths of the several laminates are compared with the available experimental data and it shows good agreement.

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## 1. Introduction

It is a well-established fact that further progress in the direction of using laminated composite materials as an alternative to the conventional materials in various applications such as aerospace, naval, marine, automotive, space, etc. largely depend on better understanding of failure mechanisms under different environmental conditions. The inherent heterogeneous nature of composites and considerable amount of variations in fabrication processes, the scatter in the properties of its constituents (fibre and matrix) is unavoidable. The stacking of different laminae to form laminates gives rise to a considerable amount of variations in the stiffness coefficients of the laminates. Therefore, a factor of uncertainty is introduced in the accurate life prediction of the laminated composite structures acted upon by complex loading, due to the above mentioned variations in strength and stiffness properties. This is proven in World Wide Failure Exercise (WWFE) [1] that the interactive criteria describing the different failure modes are necessary for computing first-ply failure (FPF) and last-ply failure (LPF) of

laminated composite plates. Therefore, the accurate prediction of failure response up to LPF for maximum utilization of the available strength of laminated composite structures, calls for a stochastic failure analysis model, where the input system parameters are modelled as random variables (RVs).

Many researchers [2–10] have investigated deterministic response of laminated composite plate under hygro-thermo-mechanical loading. Almost all of them obtained the response of the plate in terms of deformation or stresses and very few researchers [7–9] extended the work up to failure, but limited themselves up to FPF only or used commercial software like ABAQUS/ANSYS for stress analysis. Ghazi [11] proposed a computational model for nonlinear stress-strain behaviour of composite materials. Yang et al. [12] investigated the effect of thermal residual stress on transverse failure of fiber-reinforced polymer matrix composites by computational micromechanics with finite element method. Failure analyses of fibre reinforce plastic by means of physically based phenomenological models, first time presented by Puck et al. [13–16] and extended further for 3-D stress analysis by Matthias et al. [17] using analytical method based on classical lamination plate theory (CLPT). Lee et al. [18] and Matthias et al. [19] implemented Puck's failure theory through FE commercial code

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# Optimal Selection of Steering Mechanism for Electric Vehicle

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# Tribological behaviour of uncoated steel and fluorocarbon coated steel under dry and lubricated sliding conditions

Akash Jayant Bodhale, R.B. Patil

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<https://doi.org/10.1016/j.matpr.2020.09.055>

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## Abstract

Due to positive tribological performance, fluorocarbon coatings have established an importance in many applications, as a possible replacement to enhancement and substitute traditional liquid lubricants. The literature in this area is to a certain extent limited, especially on the Tribological behaviour



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# Implementation of point interpolation meshless method for failure analysis of laminated composite beams

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

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## Abstract

The present study develops computationally efficient meshless model for the first-ply failure analysis and predicts the weakest ply, based on various failure criteria via one-dimensional, higher-order beam theory. The effective property of lamina is obtained with the help of micromechanics based Eshelby's-Mori-Tanaka model. The governing equation is obtained with the help of point interpolation method based on polynomial

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# Development and Validation of Nusselt Number Correlations for Mixed Convection in an Arc-Shape Cavity

R B Gurav, Mandar M Lele

**Abstract:** The analytical study has been performed to investigate the combined effects of lid movement and buoyancy force parameter on mixed convective flow in an arc-shape cavity. The dimensional analysis based on Buckingham  $\pi$ -Theorem is used in the present study. It results in correlations for Nusselt number in terms of non dimensionalized parameters, viz.  $Re$ ,  $Pr$ ,  $Gr$ ,  $\theta$  etc. The correlations developed are validated against the experimental data of horizontal arc-shape cavity and numerical data of inclined arc-shape cavity obtained from open literature. The correlation developed in the present study for horizontal arc-shape cavity is valid for wide ranges of  $Re$  varying from 30 to 1500 and  $Gr$  from 0 to 107. In inclined arc-shape cavity it is valid for  $Re$  varying from 30 to 1500,  $Gr$  from 105 to 107 and inclination angle from 150 to 600. The close agreement in the comparison between predicted results by correlation developed in the present study and reported  $Nu$  correlation shows the validity of the correlation.

**Key words:** Arc shape cavity, Buckingham  $\pi$ -theorem, Dimensionless correlation, Mixed convection,  $Nu$ .

## I. INTRODUCTION

The mixed convection process in lid-driven cavities has developed substantial importance because of its congruence to heat transfer performance and variety of applications like nuclear reactors, solar ponds, dynamics of lake and heat exchangers, wet clutches and solar collectors [1,2]. In order to analyze the flow of physics and heat transfer, experimental and numerical studies of mixed convection effect in rectangular and non-rectangular cavities have been reported widely in the literature. Mei-Hsia Chang et al. [4] studied the flow pattern and heat transfer of lid-driven flow inside the cavity. High  $Re$  number is used for analysis. Prasad and Koseff [5] performed experimental investigation of combined convection in deep rectangular cavities for  $Re$  varies from 0 to 12000. They obtained correlation for Nusselt number as a function of  $Re$ ,  $Gr/Re^2$  and depth aspect ratios. However, deep analysis the heat transfer characteristics and fluid flow in a complex-shape cavity with dimensional analysis is not studied. Chin-Lung Chen et al. [6] studied the mixed convection effect inside a lid-driven arc-shape cavity. Results show that the minimum  $Nu$  is found in the transition zone of buoyancy-dominated and the inertia-dominated situations. However the correlations for Nusselt number in terms of non dimensionalized parameters, viz.  $Re$ ,  $Pr$ ,  $Gr$  etc were not obtained in this paper which provides useful information for design applications. Chin-Lung Chen et al. [7] continued to study combined effects of natural and

Forced convection effects in an inclined lid-driven arc-shape cavity with three physical parameters including  $Gr$  ranging from 105 to 107,  $Re$  varying from 30 to 1500 and  $\theta$  from 150 to 600. Their results show that for all inclinations, average  $Nu$  increases as  $Gr$  increases. However the correlations for average Nusselt number related to inclination angles is not reported in this study.

The studies presented above are merely focused on numerical and experiential investigations of natural and mixed convection heat transfer inside the arc shape cavity. The objective of this study is to develop correlations using dimensional analysis to relate the variables of buoyancy effect and heat transfer characteristics of any flow undergoing mixed convection inside an arc-shape cavity. The set of dimensionless correlations relating average Nusselt number for mixed convection in a lid driven arc shaped cavity are developed using Buckingham  $\pi$ -theorem in the present study. Validation of the obtained  $Nu$  correlations for horizontal and inclined arc-shape cavity is also made to check their applicability for combined convection flows. The physical model of an arc shape cavity is subjected to moving lid is schematically shown in Fig.1. The profile of an arc shape wall is defined by the expression,  $(x-p)^2 + (y-q)^2 = r^2$ . In this analysis the ratio  $p/r$ ,  $q/r$  and  $r/L$  are fixed at  $1/2$ ,  $1/2\sqrt{3}$  and  $1/\sqrt{3}$  respectively. An arc-shape cavity of height  $D$  and width  $L$  is placed horizontally. A lid maintained at lower temperature  $T_L$  is moving from left to right with constant speed  $v$ . The lid speed can be varied to produce Reynolds number up to 1500. The bottom arc-shape wall of cavity is kept at higher temperature  $T_H$ .

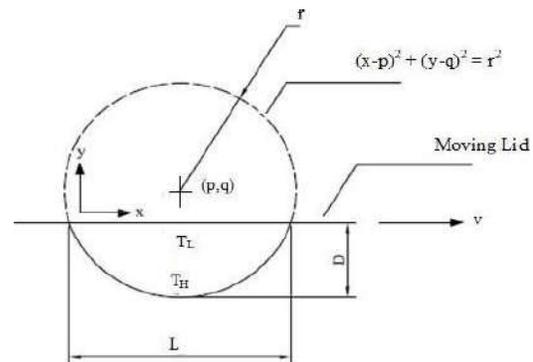


Fig.1 An arc shape cavity with moving lid

## II. DIMENSIONAL ANALYSIS AND DATA REDUCTION FOR MIXED CONVECTION IN ARC-SHAPE CAVITY

Revised Manuscript Received October 05, 2019

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Mandar M Lele, Professor, Department of Mechanical Engineering in MAEER's MIT COE, Pune.

## PORTABLE WATER COOLING SYSTEM USING DESERT COOLER

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### ABSTRACT

Water coolers are quite prevalent in areas with hot and dry climates. In such climates, cool drinking Desert water is also desirable. In the wake of climate change and rising awareness about green products, looking for ways to reduce consumption of electricity is the need of the hour. The goal of our work is mainly to design an attachment which will use basic laws of thermodynamics and design, to cool drinking water instead of consuming additional electricity. Our work is to design an extension device that is mounted on a desert cooler and uses the properties of certain materials to pass through the water cooled by the desert cooler during its usage. It includes design an extension device (accessory) that can be mounted on a desert cooler and utilizing the properties of certain materials to pass through the water cooled by the desert cooler during its usage. We analyze different geometries and materials for pipes to pass through the desert cooler's water. The analysis results serve as a proof of concept. By using this apparatus, a sufficient temperature drop is detected in our drinking water which passed through the piping of our designed accessory. We have analyzed different geometries and materials for pipes to pass through the desert cooler's water. The analysis results serve as a proof of concept. By using this apparatus, a sufficient temperature drop is detected in our drinking water.

**KEYWORDS:** Heat Transfer, Convection, Silencer Cooling, Delta Wing & Heat Dissipation

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### 1. INTRODUCTION

Desert coolers are devices that are providing cold air by using evaporative cooling of water. Cooling due to evaporation is different from the conventional systems used in air-conditioners. The air-conditioners are using the refrigeration cycles like, vapor compression refrigeration (VCR) or vapour absorption system (VAS). In evaporative cooling water absorbs the large amount of heat and evaporates by virtue of enthalpy of vaporization [1]. The dry air temperature moving around the surface gets reduced due to the phase change from water to vapour. This is the classic case of evaporation. This type of air cooling is using negligible amount of energy compared to refrigeration. Effective evaporative cooling is observed in extremely dry climates. It gives comfortable air-conditioning [2].

The cooling rate by evaporative cooling is largely depend the on the difference between dry bulb temperature (DBT) and wet bulb temperature (WBT) and also on the wet bulb depression. Evaporative cooling is the best alternative to the conventional vapour compression system and vapour absorption system in arid climates [3]. In the environment without arid climatic conditions the evaporative cooling system is beneficial due to proper humidity. Passive evaporative is an exceptional alternative to cooling system without any additional complex equipments and ductwork [4]. Evaporative cooling is most old and easiest water cooling method which is being used traditionally. Conventionally water is being stored in an earthen pot and it is being cooled due to evaporative

# HEAT TRANSFER ANALYSIS OF PIN FIN HEAT SINK (PFHS) WITH SPLITTER

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**Abstract:** The Fins are the extended surfaces that are extending from an object to enhance the rate of overall heat transfer within the exposed surfaces by accelerating the rate of convection. The rate of conduction, overall convection and radiation of the component results in the overall heat transfer. There are many ways by which the heat transfer rate can be enhanced. For natural heat transfer enhancement there should be higher temperature gradient between the components and surrounding. Also it can be enhanced by enhancing the heat transfer coefficient  $h$  due to convection. One more method is used to enhance the heat transfer rate is by increasing surface area exposed to heat. The heat sinks are now a day used as heat exchangers for removing the heat evolved in the electronic or even in the mechanical devices and it is transferred to the fluid used as heat transfer medium. The fluid used is mainly air or can be a coolant, liquid or gas. The heat is carried away from the component, and maintains the surface temperature and component temperature within optimum limit. The central processing units and graphics processor units of computers are cooled using such types of heat sinks. Under the present investigation, attempts have been made to maximize the heat removal through heat sink by varying the angle of splitter in a 'pin fin heat sink with splitter' and using staggered orientation of fins.

Keywords: Pin fin heat sink, Heat transfer, Splitter, Staggered fins

## 1. INTRODUCTION

Fluid flow and heat transfer analysis of Pin fin heat sink (PFHS) with splitter staggered orientation at varying angles and subsequent experimental validation of optimum configuration. To design a pin fin heat sink with optimum angle of splitter which gives maximum heat flow and reasonable pressure drop thereby increasing the efficiency of heat emission from the equipment in which heat sink is being brought into use. The air cooled heat sinks were famous in the initial period of heat transfer enhancement researches. With the inventions and enhancement in rate of use of electronic equipments, and the wild use of the various applications, the need for more and more heat dissipation is increased. With this the use of water became popular as another dielectric fluid. The dielectric fluid used is still in the single phase mode. Also, the requirement of all recent electronic gadgets needs the amplification of heat flux to  $100 \text{ W/cm}^2$ . It has increased the need to develop different cooling technologies like two-phase cooling. The preset study is based on developing the fins with splitter to increase the heat transfer rate for electronic cooling application. Experimental study is carried out and results of heat transfer coefficient are plotted

## 2. EXPERIMENTAL SETUP

Experimental investigation has been done on a  $150 \times 150 \times 60$  mm block of Aluminium using heating plate and various equipments as mentioned earlier in section. The main objective of this work is to find out the values of heat transfer coefficient 'h'.

Control Panel consists of a dimmerstat, ammeter, voltmeter, and temperature indicators. The experimental setup is made to study on various configuration of pin fin (Inline and Staggered), manufacturing of Model with best Heat transfer, experimentation and validation of results. Fig. 1 and shows the inline and staggered fin combination respectively. Fig. 3 to 7 shows the experimental set up.

## CFD ANALYSIS OF PIN FIN HEAT SINK USING SPLITTER

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India.

**Abstract:** Present work is based on the numerical analysis of pin fin heat sink using splitters. Splitters were provided on fins and the optimum angle is determined using CFD analysis. The splitter with fins are the extended surfaces that are extending from an object to enhance the rate of overall heat transfer within the exposed surfaces by accelerating the rate of convection. The rate of conduction, overall convection and radiation of the component results in the overall heat transfer. There are many ways by which the heat transfer rate can be enhanced. For natural heat transfer enhancement there should be higher temperature gradient between the components and surrounding. Also it can be enhanced by enhancing the heat transfer coefficient  $h$  due to convection. One more method is used to enhance the heat transfer rate is by increasing surface area exposed to heat. The heat sinks are now a day used as heat exchangers for removing the heat evolved in the electronic or even in the mechanical devices and it is transferred to the fluid used as heat transfer medium.

Keywords: Pin fin heat sink, Heat transfer, Splitter, Staggered fins

### 1. INTRODUCTION

Generally electronic devices are cooled using single-phase and two-phase cooling methods. Air cooling and cooling using dielectric fluid is popular trend. Due to increase in heat flux of electronic devices the single phase cooling using dielectric fluid is not sufficient [1]. This has laid the demand to go for two-phase cooling. Also increasing the heat transfer surface area is having many limitations due to space constraints.

Initially the longitudinal and rectangular plate fins were used to enhance the heat transfer area [2]. Also, new designs were proposed by combining the circular pins in the space available between longitudinal and rectangular plate fins [3]. It has contributed to increased heat transfer in limited area. This research has given new dimension to heat transfer enhancement. They have claimed 30% heat transfer enhancement compared to simple heat sinks. Few researchers have evaluated the pressure and the thermal conductivity by varying the pin sizes [4]. The thick circular pin fins showed the highest pressure with highest thermal conductivity. Y-shaped fin also tested using numerical analysis [8]. In recent years other type of heat sink that is pin fins heat sinks. They are of different shapers rectangular, cylindrical and rhombus also.

In present work the heat transfer analysis of pin fins is done by locating splitter behind the fins. The numerical analysis is done to find the best angle to be given to the splitter to have optimum heat transfer.

## HEAT TRANSFER ENHANCEMENT IN MOTOR-BIKE SILENCER USING DELTA WING VORTEX GENERATOR

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### ABSTRACT

A silencer is the passage through which exhaust gases leaves the vehicle after being combusted in the engine. The combustion temperature may reach close to 800°C. Even though engines are provided with fins to keep it cool with air flow, the exhaust gases are forced out of the chamber while they are still hot. Thus, the silencer also gets heated by the effect of these gases. Hence, there is a need to reduce the effects of harmful heated exhaust gases. Therefore, manufacturers provide chambers within stock silencers to curb sound and emission. The exhaust gases bounce off these chambers and thus tend to keep the silencer hot. Extreme heat can cause a host of problems and results in the reduction of engine performance. Also, excess heat generation may results in deterioration of motor oil properties and it can create deposits on the surface of intake valves. Deposits on the air valve affect the airflow inside the engine and it is the major reason of poor sealing of the entire combustion chamber. This series of events lead to misfire, rough idle and also reduced power and fuel economy. The hot spots on the silencer surface are reducing its life. The objective of this research is to increase convective heat transfer coefficient of air in the annular area of silencer and its enclosure sheet to enhance heat transfer using passive methods. Method employed to achieve these using delta wings as vortex generators on the enclosure sheet of silencer. We studied the flow behavior and convection heat transfer characteristics of fluid passing through an annular region between silencer outer surface and an enclosed sheet. The enclosed sheet is installed with delta wing attached on the surface facing silencer at an angle of attack,  $\alpha=45^\circ$  and aspect ratio,  $A=2.0$ . The use of delta wing increases convective heat transfer coefficient and increases over all turbulence thus improves heat dissipation through the spaced annular region. Heat transfer and flow pattern are obtained at varying velocities at an angle of attack,  $\alpha=45^\circ$ .

**KEYWORDS:** Heat Transfer, Convention, Silencer Cooling, Delta Wing & Heat Dissipation

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### 1. INTRODUCTION

The hot gases generated from combustion of fuel passes through the exhaust system of an automobile. A silencer is the passage through which exhaust gases leaves the vehicle after being combusted in the engine. The combustion temperature may reach close to 800°C. Even though engines are provided with fins to cool with the air flow, the exhaust gases are forced out of the chamber while they are still hot. Thus, the silencer also gets heated by the effect of these gases. The average operating temperature of most of bike silencer is around 130°C. An unavoidable side effect of silencer is back pressures due to this waste heat builds up on the silencer surface. If this waste heat cannot escape, it can overload the cooling system and can cause hotspots on the silencer surface.

Heat transfer augmentation or heat transfer intensification is the technique used for improving the heat transfer performance [1]. Improvement in performance of heat transfer aspect deals with improvements in factors like heat transfer coefficient  $h$ , pressure drop reduction and enhancement in the Nu number [2]. Vortex generator is

# A Review on AI based Predictive Battery Management System for E-Mobility

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## Abstract:

Abstract: The advancement in digitalization and availability of reliable sources of information that provide credible data, Artificial Intelligence (AI) has emerged to solve complex computational real life problems which was challenging earlier. The Artificial Neural Networks (ANNs) play a very effective role in digital signal processing. However, ANNs need rigorous main processors and high memory bandwidth, and hence cannot provide expected levels of performance. As a result, hardware accelerators such as Graphic Processing Units (GPUs), Field Programmable Gate Arrays (FPGAs), and Application Specific Integrated Circuits (ASICs) have been used for improving overall performance of AI based applications. FPGAs are widely used for AI implementation as FPGAs have features like high-speed acceleration, low power consumption which cannot be done using central processors and GPUs. FPGAs are also a reprogrammable unlike central processors, GPU and ASIC. In Electric-powered vehicles (E-Mobility), Battery Management Systems (BMS) perform different operations for better use of energy stored in lithium-ion batteries (LiBs). The LiBs are a non-linear electrochemical system which is very complex and time-variant in nature. Because of this nature, estimation of States like State of Charge (SoC), State of Health (SoH) and Remaining Useful Life (RUL) is very difficult. This has motivated researchers to design and develop different algorithms which will address the challenges of LiBs states estimations. This paper intends to review AI based data-driven approaches and hardware accelerators to predict the SoC, SoH and RUL of the LiBs. The goal is to choose an appropriate algorithm to develop an advanced AI based BMS that can precisely indicate the LiBs states which will be useful in E-Mobility.

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**Keywords:** Artificial Intelligence, Battery Management Systems, Electric-powered automobiles, State of Charge, Remaining Useful Life, State of Health, Field Programmable Gate Arrays, Graphic Processing Units, Application Specific Integrated Circuits, and Li-ion batteries.

Original Article | Published: 06 June 2020

## Automated macula proximity diagnosis for early finding of diabetic macular edema

Sarika B. Patil  & B. P. Patil

*Research on Biomedical Engineering* 36, 249–265 (2020) | [Cite this article](#)

225 Accesses | [Metrics](#)

### Abstract

#### Purpose

Diabetic retinopathy (DR) is non-recoverable in nature. One of the advanced sight threatening condition in diabetic patient is defined in terms of diabetic macular edema (DME), where the macula gets deposited with fluid rich in proteins called exudates. It is indisputably required to find and treat occurrence of exudates near macula in time, to avoid further complications of retina and vision loss at later stage. However, presence of various dark and bright lesions awakes the need of reliable macula and exudate detection process. Proposed work intends to present a robust, scale, and rotation invariant tool for early diagnosis of DME.

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# Retinal fundus image enhancement using adaptive CLAHE methods

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**Abstract:** To detect the effect of lifestyle related diseases like diabetes and hypertension on retina of a human eye, non-invasive techniques as fundus photography is playing a significant role. Early diagnosis of retinal complications such as Microaneurysms, exudates and hemorrhages often not directly discernible by clinical investigation has the potential to reduce the global burden of retinal diseases. The traditional retinal image enhancement algorithm - Contrast Limited Adaptive Histogram Equalization (CLAHE), the results are dependent on, choice of the clip limit (CL) and number of sub-images (N). We have proposed the modified versions of CLAHE named Adaptively Clipped - CLAHE (AC-CLAHE) and Fully Automated-CLAHE (FA-CLAHE), to reduce the problems due to these limiting factors. The proposed methods are found effective to enhance the contrast between the retinal landmarks and lesions on retina. To inspect the subtle details on retina, developed technique can be used directly in hospitals and at remote places as an assistance to doctors for Diabetic and Hypertensive Retinopathy screening.

**Keywords-** Adaptively Clipped - CLAHE, Fully Automated-CLAHE, Fundus photography, Microaneurysms, exudates, hemorrhages.

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## Automatic detection of COVID-19 disease using U-Net architecture based fully convolutional network

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### ARTICLE INFO

**Keywords:**  
SARS-CoV-2  
COVID-19  
RT-PCR  
U-Net architecture  
Deep learning

### ABSTRACT

The severe acute respiratory syndrome coronavirus 2, called a SARS-CoV-2 virus, emerged from China at the end of 2019, has caused a disease named COVID-19, which has now evolved as a pandemic. Amongst the detected COVID-19 cases, several cases are also found asymptomatic. The presently available Reverse Transcription - Polymerase Chain Reaction (RT-PCR) system for detecting COVID-19 lacks due to limited availability of test kits and relatively low positive symptoms in the early stages of the disease, urging the need for alternative solutions.

The tool based on Artificial Intelligence might help the world to develop an additional COVID-19 disease mitigation policy. In this paper, an automated COVID-19 detection system has been proposed, which uses indications from Computer Tomography (CT) images to train the new powered deep learning model- U-Net architecture.

The performance of the proposed system has been evaluated using 1000 Chest CT images. The images were obtained from three different sources - Two different GitHub repository sources and the Italian Society of Medical and Interventional Radiology's excellent collection. Out of 1000 images, 552 images were of normal persons, and 448 images were obtained from COVID-19 affected people. The proposed algorithm has achieved a sensitivity and specificity of 94.86% and 93.47% respectively, with an overall accuracy of 94.10%.

The U-Net architecture used for Chest CT image analysis has been found effective. The proposed method can be used for primary screening of COVID-19 affected persons as an additional tool available to clinicians.

# Power line interference removal from electrocardiogram signal using multi-order adaptive LMS filtering

K.S. Surekha and B.P. Patil

Published Online: 19 Feb 2021



Abstract & Keywords



## Abstract

Electrocardiogram (ECG) signals are susceptible to noise and interference from the external world. This paper presents the reduction of unwanted 50 Hz power line interference in ECG signal using multi-order adaptive LMS filtering. The novelty of the present method is the actual hardware implementation for power line interference removal. The design of adaptive filter is carried out by the simulink-based model and hardware-based design using FPGA. The performance measures used are signal to noise ratio (SNR), PSNR, MSE and RMSE. The novelty of the proposed method is to achieve better SNR by careful selection of the filter order using hardware.

## Keywords

adaptive filter, ECG, LMS filter, multi-order, power line interference, field-programmable gate array, FPGA, simulink model, signal to noise ratio, SNR, PSNR

## Information

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## Keywords

adaptive filter ECG LMS filter  
multi-order  
power line interference  
field-programmable gate array  
FPGA simulink model  
signal to noise ratio SNR  
PSNR

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## ORIGINAL CONTRIBUTION

# Process-Based Statistical Modeling for Ball Mill Machine to Improve Performance of Nylon Ultracapacitor

Laxman Shivaji Godse<sup>1</sup> · Vispi Neville Karkaria<sup>2</sup> · Mayank Jayant Bhalerao<sup>3</sup> · Parshuram Balwant Karandikar<sup>4</sup> · Neelima Ravindra Kulkarni<sup>5</sup>

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**Abstract** The generation of electrical energy from renewable energy sources is rapidly increasing across the world due to its many advantages. Renewable energy source is also known as clean energy source. The energy storage devices are playing an important role in both renewable generation and distribution of power. The energy storing devices also helps to improve stability of electrical power grid. The electrode, electrolyte and separators are the main components of ultracapacitors. The performance of ultracapacitors mainly depends on the properties of electrode material, the type of separator used, properties of electrolyte used and its concentration level. Nylon as a separator material for ultracapacitors is investigated. Various parameters of nylon-based ultracapacitors are compared with conventional polyethylene-based ultracapacitors. Very less research work has been done on the processing of electrode material. Ball milling is the most commonly used material processing method in energy storage devices such as ultracapacitors, battery and fuel cells. The effect of ball milling parameters on the performance of ultracapacitors needs to be investigated. Most

significant factors of ball milling parameters of electrode material for ultracapacitor are identified. Modeling of ball milling process on electrode material is done by using the statistical method- design of the experiment. The novel ball mill machine with some unique features is also presented. Pulse current density is taken as new output parameters which is more important than an internal resistance and specific capacitance. Most significant ball mill machine parameters are taken as input parameters and specific capacitance, internal resistance along with pulse current density are taken as output parameters for the modeling of nylon-based ultracapacitors.

**Keywords** Ultracapacitor · Electrode material · Process · Ball milling · Modeling

## Introduction

Electrical energy storage is still a peripheral part of a generation of energy. Fossil fuels, renewable energy and nuclear fuels are the main sources of energy from which

# Mitigation of sulfation in lead acid battery towards life time extension using ultra capacitor in hybrid electric vehicle

Anupama Singh <sup>a, c, \*</sup>, P.B. Karandikar <sup>b</sup>, N.R. Kulkarni <sup>c</sup>

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## Highlights

- An Atom Search Algorithm (ASA) based Hybrid Energy Storage System (HESS) is designed to enable proper charging and discharging controller for lifecycles of the lead acid battery.
- Lead acid battery is connected with Ultra-Capacitor (UC) through bidirectional DC-DC converter.
- The controller performed through the consumption of the Fractional-Order Proportional Integral Derivative Controller (FOPID) in the bidirectional DC-DC converter.

 Chemical Engineering  
& Technology

Research Article

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

Seema Mathew , Parashuram Balwant Karandikar, Neelima Ravindra Kulkarni,

First published: 27 May 2020 | <https://doi.org/10.1002/ceat.201900616>

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## Abstract

Supercapacitors can be used for portable energy storage applications. In this study, machine learning techniques are applied to optimize the process of preparation of supercapacitor electrodes from chemically activated carbon made from jackfruit seeds. Experimental trials were carried out using statistical design of experiments. Artificial neural network was employed to generate the process model and a multiobjective optimization was attempted by means of swarm intelligence and the Derringer's desirability function. The optimized electrode demonstrated high capacitance and low resistance making it suitable for supercapacitors. The algorithm developed in the study can be adopted by process engineers for efficient optimization.

# Fractional Order Control of Power Electronic Converters in Industrial Drives and Renewable Energy Systems: A Review

PREETI WARRIER<sup>1,2</sup> AND PRITESH SHAH<sup>1</sup>, (Senior Member, IEEE)

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**ABSTRACT** The power electronics industry is undergoing a revolution driven by an industry 4.0 perspective, with smart and green/hybrid energy management systems being the requirement of the future. There is a need to highlight the potential of fractional order control in power electronics for the highly efficient systems of tomorrow. This paper reviews the developments in fractional order control in power electronics ranging from stand-alone power converters, industrial drives and electric vehicles to renewable energy systems and management in smart grids and microgrids. Various controllers used in power electronics such as the fractional order PI/PID (FOPI/FOPID) and fractional-order sliding mode controllers have been discussed in detail. This review indicates that the plug-and-play type of intelligent fractional order systems needs to be developed for our sustainable future. The review also points out that there is tremendous scope for the design of modular fractional-order intelligent controllers. Such controllers can be embedded into power converters, resulting in smart power electronic systems that contribute to the faster and greener implementation of industry 4.0 standards.

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## A Novel Modulation Scheme of 8x8 MIMO in Industry 4.0

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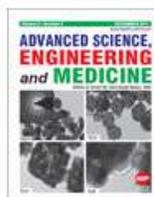
 <https://orcid.org/0000-0001-7369-0645>

### ABSTRACT

A key component in the usage of Industry 4.0 arrangements is the up and coming age of system network, LTE/LTE advanced today, and 5G, later on. Industry 4.0 is conveying private LTE arrangements today, as they trust it will give them an upper hand and a solid head start when 5G opens up. LTE uses multiple input multiple output (MIMO), a promising technique to accomplish the necessary data rate. This article presents consequences of 8x8 MIMO framework in fading channel utilizing V-BLAST by means of zero-forcing (ZF) with standard ZF. The relative investigation in the fading channel on account of symbol error proves V-BLAST by means of ZF has predominant execution than standard ZF finder. In addition to this, in order to support adaptive modulation, various M-QAM modulation schemes for these detectors are compared. This comparison shows 128-QAM performs superiorly to staying two. This investigation is carried out to help utilization of MIMO in LTE to support Industry 4.0.

### KEYWORDS

Industry 4.0, LTE, MIMO, V-BLAST, ZF



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International Journal of Innovative Technology and Exploring Engineering (IJITEE)  
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## Wireless Power Transfer Through Inductive Coupling For Aimds

Deepali A. Newaskar, B. P. Patil

*Abstract: For the patients with some cardiovascular diseases, implantable devices like implantable cardiac pacemakers and implantable cardioverter defibrillators play a very important role. The life of implantable device is limited by the life of battery and the size of implanted device is dependent on size of battery. More life of battery demands larger battery size. Since these devices are implanted inside the human body, they must be small in size as well as of long battery life. Wireless re-charging of such devices can only be the solution to reduce the size and increase life of AIMDs. Wireless recharging by magnetic resonance coupling in less time is expected and hence this topic is considered for more research to have uninterrupted power supply from battery. Selection of operating frequency for transfer of power wirelessly is of great concern as it requires attention towards certain guidelines as basic restrictions provided by International Commission on non-ionizing Radiation Protection (ICNIRP). With lower frequencies used for power transfer, the efficiency would be less whereas with higher frequencies efficiency would be higher but with the use of higher frequencies for power transfer certain biological issues needs attention like tissue heating. In the technique of wireless power transfer, the transmitting coil is assumed to be outside the body and receiver coil is considered to be inside the human body above the pacemaker shell. The efficiency of power transfer is affected by frequency for power transfer and distance between the two coils.*

*Keywords—*implantable cardioverter defibrillators, implantable cardiac pacemakers, operational frequency, wireless charging, wireless power transfer.

Iodine battery is around ten to twelve years. If by wireless power transfer the AIMD battery is recharged then the size of the AIMD can be reduced as battery consumes more space in any implantable device than other circuitry and so the size of implantable medical device is majorly dependent on the size of battery. Patients implanted with pacemaker or any other AIMD would not required to undergo further surgical treatment which could be life threatening for replacing the unit. To avoid the surgical treatment for the second time, which can be life threatening too, wireless charging of AIMD can be the best solution.

In vitro energy supply seems to be the best solution for researchers. With wireless charging, rechargeable batteries can replace primary batteries, wherein receiving circuit on the pacemaker will receive energy through electro-magnetic induction principle from transmitter coil placed outside or on the body. The primary circuit may receive energy from either sunlight (through solar cells) or through external battery or power supply [1]-[4].

Energy transfer through electro-magnetic induction principle can be of two types, non-resonance and the magnetic coupling resonance (MCR). In both types of wireless charging systems, a transmitting coil will be placed outside the body (vitro) and the receiving coil will be placed inside the human body (vivo). Pacemaker circuitry is hermitically sealed inside a titanium alloy case since titanium is ten times stronger than steel but it is very lighter than steel and is bio-compatible with the human body. The receiving coils must be placed outside the pacemaker shell

# Design and Implementation of Robust Navigation System Platform for Autonomous Mobile Robot

Deepak Kumar Yadav, Bharat Prasad Dixit, Pankaj Yadav, Gajanan R Patil, Jayesh Jain

*Abstract: An autonomous robot can navigate in a given region and reach to a specified location. The navigation system for these robots has to be reliable, versatile and rugged. In this paper, design and development aspects of such navigation system are discussed. A two level architecture is proposed for navigation of the autonomous robot. The low level controller (LLC) generates odometry data and implements closed loop feedback based PID algorithm. The high level controller (HLC) is used to generate velocity commands based on the path planned and inputs sensed from environment. The two controllers continuously exchange data with each other to reach the final destination. This navigation system platform can be used to develop autonomous mobile robots.*

*Keywords: Autonomous Mobile Robot, PID, Odometry, Robotic Operating System (ROS), High Level Controller (HLC), Low Level Controller (LLC).*

robots successfully moving over a rugged surface, avoid obstacles, follow a path as a coordinates given by a user. In this paper the design and simulation of reliable and robust navigation system for autonomous mobile robots is proposed. The navigation system described here is a part of general purpose mobile platform to be developed.

The rest of the paper is organized as follows. Section II gives related work in this area. Section III describes detailed architecture of the autonomous mobile robot. Section IV gives details about navigation system. Section V has discussion on implantation and testing. Finally section VI gives conclusion and future scope.

## II. RELATED WORK

The navigation problem involves various subtasks such as path planning, collision detection, search algorithms,

# Applications Of Ultra Capacitor In Indian Vehicles

Vishnu Kokate, RM Holmukhe, PB Karandikar, Saurabh, Nidhi Yadav

**Abstract:** Presently self-start two-wheelers, including motorcycles and scooters between 50 - 200 cc capacities, use standard lead-acid battery of 5, 9 and 12 Ah rating as the energy source. A battery is a well-known energy source, but it cannot supply a large amount of power in a short time. The size of the battery is decided based on the starter motor requirement. Further, deep discharge at the time of cranking reduces the life of the battery drastically as compared to normal use. Also, an extra factor of safety is provided for cold weather cranking performance, poor maintenance and end of life performance in view of deep discharge. Hence the battery becomes heavy and bulky. On the other hand, Ultra-capacitors can supply a large burst of power for short time but cannot store much energy, hence a limited number of starts. Decentralized Ultra-capacitors network is another major advantage in the future of automobile sector.

**Index Terms:** Battery, Solar-Panel, Self-Start, Ultra-Capacitors, two-wheeler, Decentralized Network,

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# Optimization Of Battery - Ultracapacitor For Electrically Operated Vehicle For Urban Driving Cycle In India

Vishnu Kokate, R M Holmukhe, P B Karandikar, D S Bankar, Ms. Poorva Aparaj

**Abstract:** Depleting fossil fuels will be a major challenge in front of coming generation. This is going to hit the transportation sector heavily. Compressed air vehicles and electric vehicles are seen as viable solution for future transportation. Electric vehicle system can be implemented from small vehicle to very large transportation system like train or aeroplane. Use of ultracapacitor is inevitable in most of the electrically operated vehicle as it is the only way to supply pulse current requirement of electric motor. Electrical energy storage is as persistent problem in electric vehicle. Battery has its limitations. Use of battery- ultracapacitor combination is most viable option. Optimization of battery- ultracapacitor rating is addressed in this paper.

**Index Terms:** Ultracapacitor, Battery, Electric Vehicle, urban transpiration

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International Journal of Innovative Technology and Exploring Engineering (IJITEE)  
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## Secure Radio Frequency Transmission for Paperless Voting System

Anshu Banerjee, Ananya Tewari, Renuka Bhandari

*Abstract: In any democracy, elections play an important role. If the traditional Electronic Voting Machine (EVM) is secured by encryption, it could be made more reliable. Traditional voting process provides security through the use of a paper audit trail which is not environment friendly making it unfit for use in the long run. This paper proposes the use of Blowfish algorithm for encryption along with secure transmission using radio frequency and verification of the cast vote. In this approach, the cast vote is encrypted using Blowfish encryption algorithm and transmitted to the server through radio frequency. At the server, the data is decrypted and sent back to be displayed on the screen of the EVM, eliminating the paper audit trail. This approach will account for a considerable amount of cost reduction without compromising on the security and sanctity of the election process.*

**Keywords:** Blowfish algorithm, encryption, radio frequency, decryption, cloud

Officer who watches the CU while the voting compartment houses the BU. Instead of issuing the ballot papers, the Polling Officer who is in-charge of the CU releases a ballot by pressing the Ballot Button on the CU. The voter then casts his vote by pressing a blue colored button on the BU against the candidate and symbol of his choice. In this way, the possibility of casting an invalid vote is completely eliminated as opposed to paper ballot system where invalid votes were cast in large numbers. This has enabled EVMs to reflect a more authentic and accurate choice of people. EVMs, also reduce the printing of millions of ballot papers needed for every election, and make the counting process very quick (result can be declared within 3 to 5 hours as opposed to 30-40 hours, on an average, under the conventional Ballot paper system).<sup>[2]</sup>

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## Design and Implementation of Black Box for Security and Monitoring of Automobile

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**ABSTRACT:** In a country with the third largest road network in the world, the total number of vehicles in India stood at 230 million out of which 60 percent are the personal vehicles. With increase in vehicles, the driving experience and safety of the commuters have become a major area of interest. Black Box are very common devices when it comes to aircraft but now, with growing atomization & traffic accidents these devices could also be used in automobile sector. The black box is a device which records all the information of a vehicle like speed, engine temperature, tire pressure, acceleration, headlight intensity, location, etc. All this data need to be stored but if the storage is on board the danger of losing it on accident was very prominent, so the data was stored on cloud by using Firebase. The other problem was placement and range of sensors as the device should work on terrains, like mountains or desserts, the sensors used must be able to withstand the various conditions it suffers. The other feature includes maintenance reminders and alerts provided for certain conditions. Maintenance reminders are used to alert the user about the vehicle servicing status, it then can be used to enhance or justify the resell value. Alerts are for parents/vehicle owners with transport corporation where the user will alert if the vehicle crosses certain limit.

**Keywords:** Low cost Black box, Servicing alerts, Global Positioning System(GPS), Monitoring, Accident Analysis, Automobile tracking



March – April 2020  
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## IoT based Animal Monitoring System

Shriya Nagrath<sup>1</sup>, Surekha K S<sup>2</sup>, Sadhika Parashar<sup>3</sup>, Preeti Kumari<sup>4</sup>

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### Abstract

The rate of loss of cattle due to various reasons like Stealing of herd, Attack by wild animals, Getting lost in dense forests, falling into rivers and ditches, etc. are predominantly increasing. These factors can be controlled or eliminated using tracking. This paper aims at achieving a viable solution to herder's problems of managing a large herd. We intend to minimize the loss of cattle and reduction of workload of herders. It is an inspiration from multiple international research papers and already implemented farm automation. Using this setup a herder can remotely monitor his/her cattle. He/She can monitor the cattle's heart rate and position. In case of an emergency, an alarm would be put off.

**Keywords;** wildlife monitoring, ESP8266 wifi module, heartbeat sensor, python, data analytics.



## Performance Analysis of 8 X 8 MU-MIMO in Uplink of LTE-A

Rajashree A. Patil<sup>1\*</sup>, P. Kavipriya<sup>2</sup> and B.P. Patil<sup>3</sup>

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**ABSTRACT:** The 3rd Generation Partnership Project (3GPP) uses radio access technologies Long-Term Evolution (LTE), and its advanced version, LTE-Advanced (LTE-A). Release-10 of 3GPP standards is called as LTE - A. As per the definitions of the International Telecommunication Union (ITU), it will be considered as a 4G technology because of its attainable performance. LTE/ LTE-A are rising communication technologies in transit toward 5G communication systems. In this paper performance analysis of MU-MIMO is carried out in LTE-A uplink. This research work deals with investigations based on the performance analysis comparison of Turbo coded MU - MIMO in LTE-A networks using Zero Forcing (ZF) and Minimum Mean Square Error (MMSE) receiver and tap delay channel models like VehA and VehB. Uplink throughput is evaluated in terms of Signal to Noise Ratio (SNR) with antenna configuration of  $2 \times 4 \times 8$  for uplink transmissions using MATLAB simulation and compared.

**Keywords:** MU – MIMO, LTE, LTE-A, VehA, VehB, Uplink.

International Journal of Innovative Technology and Exploring Engineering (IJITEE)

ISSN: 2278-3075, Volume-8 Issue-12, October 2019

# GWO Based Optimal Channel Estimation Technique for Large Scale MIMO in LTE Network

Rajashree A. Patil, P. Kavipriya, B. P. Patil

*Abstract: The Wireless Systems Are Employed With More Number Of Antennas For Fulfilling The Demand For High Data Rates. In Telecommunication, Lte-A (Long Term Evolution-Advanced) Is A Well-Known Technology Intended For Wireless Broadband Communication Aimed At Data Terminals And Mobile Devices. Multiple Input Multiple Output (Mimo) Technology Is Used By Lte Which Is Also Known As Fourth Generation Mobile Networks To Attain Very High Data Rates In Downlink And Uplink Channels. Though The Mimo Systems In Massive Mimo Are Provided By Multiple Antennas, The Design Of The Appropriate Non-Erroneous Detection Algorithm Is A Major Challenge. Also, With The Increase In Quantity Of Antennas, The System's Spectral Efficiency Begins To Degrade. So As To Deal With This Issue, A Proper Algorithm Has To Be Utilized For Channel Estimation. The Bio Inspired Algorithms Have Shown Potential In Handling These Issues In Communication And Signal Processing. So, Grey Wolf Optimization (Gwo) Algorithm Is Used In This Approach To Estimate The Most Optimal Communication Channel. Also, The Spectral Efficiency And Data Capacity Are Enhanced Using The Presented Approach. The Proposed Approach's Performance Is Compared With The Existing Approaches. The Simulation Result Exposes That The Presented Channel Estimation Approach Is Far Better Than Existing Channel Estimation Approaches In Performance Metrics Such As Bit Error Rate, Minimum Delay, Paper, Spectral Efficiency, Uplink Throughput, Downlink Throughput And Mean-Squared-Error.*

**Keywords:** Channel estimation, large scale MIMO, LTE, channel matrix, Wireless communication, antenna, Grey Wolf Optimization, Mean-Squared-Error and spectral efficiency.

Though LTE MIMO makes the system complex, it also is capable of providing some crucial enhancements in spectral efficiency and performance. An antenna technology for a wireless communication where both the source also known as transmitter and destination also known as receiver uses multiple antennas is known as MIMO (multiple inputs, multiple outputs). For minimizing the errors and for optimizing the speed of data, the antennas at the each end will combine. A large scale antenna systems is an extension of MIMO wherever the antenna at both ends (transmitter & receiver) are grouped together for attaining improved throughput and improved spectrum efficiency in a wireless communication system [1]. While using massive MIMO, it has features such as; TDD (time-division duplex) operation, Linear processing, Favorable propagation and scalable. In massive MIMO, it has the following challenges; Unfavorable Propagation, Pilot Contamination, New Designs and Standards are needed and Channel estimation for both TDD and FDD system protocols [2]. Channel estimation is one of the major challenges in a large scale MIMO. In base station (BS) it is necessary for valuing CSI (channel state information) for both protocols (TDD & FDD) for minimizing the overhead of the pilot and for improving the energy and spectral efficiency to enhance the overall performance of an large scale MIMO (massive MIMO) [3]. In TDD during the channel estimation process of uplink, the base station requires the CSI for identifying



International Conference on ISMAC in Computational Vision and Bio-Engineering  
 ISMAC 2018: Proceedings of the International Conference on ISMAC in Computational Vision and Bio-Engineering  
 2018 (ISMAC-CVB) pp 1845-1855 | [Cite as](#)

## GPU Based Denoising Filter for Knee MRI

Authors Authors and affiliations

Shraddha Oza , Kalyani R. Joshi

Conference paper  
 First Online: 02 January 2019

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Part of the [Lecture Notes in Computational Vision and Biomechanics](#) book series (LNCVB, volume 30)

### Abstract

MRI is a popularly used technique for diagnosing muscle and skeletal disorders, especially of the knee. For accuracy in diagnosis, the rician noisy knee image needs to be filtered using efficient denoising algorithm. In recent years, the spatial neighborhood bilateral filter is being explored by researchers for its capacity to retain edges and tissue structures. It is noted that increase in image resolution slows down performance of the bilateral filter effectively discouraging its use. The research work proposes a cost-effective accelerated solution to the problem by implementing CUDA-based bilateral filter as applied to T2-weighted sagittal knee MRI slice. The work suggests use of GPU shared memory for optimized implementation and better speedup. The speedup achieved for 3.96 Mpixel knee MR image is 114.27 times more than that of its CPU counterpart. The results indicate average occupancy of 90.15% for image size of 630<sup>2</sup> pixels, indicating effective parallelization. Also, over varying rician noise levels, the average PSNR achieved is 21.83455 dB indicating good filter performance.

### Keywords

Knee MRI Bilateral filter CUDA GPU Memory optimization Occupancy index



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## A Fast and Optimized Architecture to Perform Multi-Bit Permutation Operation

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### Abstract

The advanced bit processing operations implemented in the microprocessors and microcontrollers very inefficient. Normally programming techniques are used to emulate the complex bit-related operations. The bit manipulation functions are every now and then required in the areas that are eventually becoming very important. This paper is proposing a techniques which can directly support these bit operations in the form of multimedia shifter unit that can implement standard shifter operations in microprocessors and controllers. The design of the proposed shifter unit is based on the butterfly and inverse butterfly circuits. We show how the proposed design for new shifters can implement the standard multi-bit scatter and deposit functions found in some processors. The technique proposed in this paper for performing the two operations is based on only Mux. The design of Shifter-Permute functional unit is very challenging work towards its power consumption, speed and area. We have implemented 8-bit Shift-Permute functional unit for bit manipulation and have analyzed the proposed design with the existing design in terms of power consumption, speed and area. Here the circuits are implemented and analyzed by using VHDL and is synthesized by using Xilinx ISE and the targeted device used is Vertex 4 FPGA xc4vlx15-12-sf363 and the same is reflected in the mathematical model purposed for each circuit.

### Keywords

Control Unit, Data Reversal, Deposit, Extract, Multiplexer, VHDL.

Article

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# A Wavelet Based Hybrid Threshold Transform Method for Speech Intelligibility and Quality in Noisy Speech Patterns of English Language

 Springer

May 2020 · *Wireless Personal Communications* 112(2)

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## HYBRID TECHNIQUE FOR ECG SIGNAL COMPRESSION USING PARALLEL AND CASCADE METHOD

K. S. Surekha and B. P. Patil

<https://doi.org/10.4015/S1015237219500224> | Cited by: 0

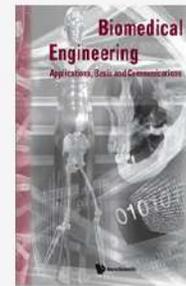
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### Abstract

The recording of electrical activity of the heart by using electrodes is known as electrocardiography (ECG). In long time monitoring of ECG, a huge amount of data needs to be handled. To handle the situation, an efficient compression technique which can retain the clinically important features of ECG signal is required. The continuous monitoring of this signal requires a large amount of memory. Hence, there is a requirement of compression. The compression of ECG signal using transforms in cascade is explored to incorporate the added advantages of both the transforms. This paper presents compression of ECG signal by hybrid technique consisting of cascade and parallel combination of discrete cosine transform (DCT) and discrete wavelet transform (DWT). The simulation is carried out using MATLAB tool. Various wavelet transforms are used for the testing purpose. The performance measures used are Percent square mean Root Difference (PRD) and CR to validate the results. The methodology using cascade combination proved to be better than the parallel technique in terms of Compression Ratio (CR). The highest CR achieved is 28.2 in the method using DCT and DWT in cascade. Different DWTs are used for the testing purpose. The parallel method shows the improved PRD as compared to the cascade method.



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## Fast Denoising Filter for MRI using Parallel Approach

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### Abstract

Real time medical image processing is necessary in the domain of remote medical care, diagnostics and surgery. To provide fast MRI diagnostics especially for neuro imaging, the research work proposes CUDA GPU based fast denoising filter with a parallel approach. Bilateral filter is the most suitable candidate for denoising, as it has unique ability to retain contours of soft tissue structures of the brain. The work proposes improvised memory optimization techniques for the GPU implementation to achieve superior performance in terms of speed up when compared with existing work. For a 64Megapixel brain MR image, shared memory approach gives speed up of 256.5 while texture memory usage with tiling approach stands the next in speedup with 42.16 over its CPU counterpart. The results indicate that in spite of increase in image size, the execution time of the filter does not increase beyond 500msec keeping the performance real time. © 2018 Institute of Advanced Engineering and Science. All rights reserved.

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# EFFECT OF NUMBER OF TURNS AND MEDIUM BETWEEN COILS ON THE WIRELESS POWER TRANSFER EFFICIENCY OF AIMD'S

B. P. Patil , Deepali Newaskar, Kunal Sharma, Tarun Baghmar and Mahesh Ku. Rajput

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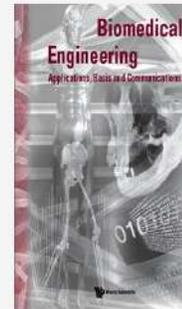
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## Abstract

Active implantable medical devices (AIMDs) like implantable cardiac pacemakers play very important role in extending lives of patients with some cardiovascular diseases. The life of implantable device depends on life of battery. If this device can be charged from outside with power transfer device, then the cost of surgical procedures for patient can be saved. One must ensure, while transferring this power there should not be any abnormal effect on human body tissues. Wireless recharging of such devices through magnetic resonant coupling is of concern and hence the topic of more research to have uninterrupted supply from battery. The technique of wireless power transfer, primary or transmitting coil is assumed to be on body and receiver coil is assumed to be inside the human body. Several critical aspects need to be studied while designing coil for wireless power transfer (WPT). One of which is choice of operational frequency. In this research experiment, designed circuit is tested for checking power transfer was studied. Effect of the distance between primary and secondary coil affects the efficiency of power transfer. Authors also tied to test this for using different medium like air, placing 80 GSM paper and cloth. It is found that the medium between the primary and



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## Spectral Efficient Blind Channel Estimation Technique for MIMO-OFDM Communications

Renuka Bhandari and Sangeeta Jadhav

### Abstract:

With emerge of increasing research in the domain of future wireless communications, massive MIMO (multiple inputs multiple outputs) attracted most of researchers interests. Massive MIMO is high-speed wireless communication standards. A channel estimation technology plays the essential role in the MIMO systems. Efficient channel estimation leads to spectral efficient wireless communications. The critics of Inter-Symbol Interference (ISI) are the challenging tasks while designing the channel estimation methods. To mitigate the challenges of ISI, we proposed the novel blind channel estimation method which based on Independent component analysis (ICA) in this paper. Proposed channel estimation it works for both blind interference cancellation and ISI cancellation. The proposed Hybrid ICA (HICA) method depends on pulse shape filtering and ambiguity removal to improve the spectral efficiency and reliability for MIMO communications. The Kurtosis operation is used to measure the complex data at first to estimate the common signals. Then we exploited the advantages of 3rd and 4th order Higher Order Statistics (HOS) to priorities the common signals during the channel estimation. In this paper, we present the detailed design and evaluation of HICA blind channel estimation method. We showed the simulation results of HICA against the state-of-art techniques for channel estimation using BER, MSE, and PAPR.

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# Novel Spectral Efficient Technique for MIMO-OFDM Channel Estimation with Reference to PAPR and BER Analysis

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Published online: 5 November 2018

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## Abstract

With emerge of increasing research in domain of future wireless communications, massive multiple input multiple output (MIMO) attracted most of researchers interests. Massive MIMO is nothing but high speed wireless communication standards. The performance of MIMO systems is based on techniques used for channel estimation. Efficient channel estimation leads to spectral efficient wireless communications. There are number of channel estimation techniques presented recently in literature with pros and cons. The recent method shows the spectral and bit error rate (BER) efficiency, however apart from this, there is need of improving the peak to average power ratio (PAPR). Recently we proposed, novel channel estimation method as the existing channel estimation techniques failed to effectively solve the inter symbol interference (ISI) problem. The presence of ISI in MIMO-OFDM may leads to worst performance. Our proposed blind channel estimation is combined with independent component analysis (ICA) hence this method is called as hybrid ICA (HICA) to minimize the ISI effect. The extensive simulation analysis of proposed HICA required to claiming the scalability as well as reliability. In this paper, proposed study on additional performance metrics such as PAPR and computational costs (energy) along with BER and spectral efficiency performances. The result claims that HICA is not improving the PAPR and energy performances significantly.

**Keywords** MIMO-OFDM · Channel estimation · Spectral efficiency · Error rates · ICA · Interference · PAPR



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## Insight on Blind Channel Estimation of MIMO-OSTBC Using Higher Order Statistics with Kalman Filter (HOS-KF)

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## Spectral Efficient Blind Channel Estimation Technique for MIMO-OFDM Communications

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### ABSTRACT

With emerge of increasing research in the domain of future wireless communications, massive MIMO (multiple inputs multiple outputs) attracted most of researchers interests. Massive MIMO is high-speed wireless communication standards. A channel estimation technology plays the essential role in the MIMO systems. Efficient channel estimation leads to spectral efficient wireless communications. The critics of Inter-Symbol Interference (ISI) are the challenging tasks while designing the channel estimation methods. To mitigate the challenges of ISI, we proposed the novel blind channel estimation method which based on Independent component analysis (ICA) in this paper. Proposed channel estimation it works for both blind interference cancellation and ISI cancellation. The proposed Hybrid ICA (HICA) method depends on pulse shape filtering and ambiguity removal to improve the spectral efficiency and reliability for MIMO communications. The Kurtosis operation is used to measure the complex data at first to estimate the common signals. Then we exploited the advantages of 3rd and

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## Performance Evaluation of Large MIMO

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Published online: 24 October 2018

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### Abstract

In wireless network, MIMO (multiple inputs multiple output) is an advance antenna in which multiple antennas are employed at basis and target terminals. The hopeful expansion of advance MIMO structure is to connect tens with numerous antennas. Particularly, when it united by synchronous development of a widespread quantity of client terminals then this contains numerous modernized throughput and energy ability. Whereas, if OFDM (orthogonal frequency division multiplexing) is diminishes the information rate, then the conventional MIMO can also be utilized to augment QoS at low information rate. In this research work, the framework stage implementation can be augmented by the exploitation of spatial multiplexing among antenna configuration of  $16 \times 16$  for downlink transmission and  $8 \times 8$  for uplink transmission and also explains about the implementation of MIMO set-up of LTE superior corporeal layer exploiting 64 QAM and 256 sub-carriers. The projected procedure can be take place in the operational phase of MATLAB and the implementation consequences were also examined.

**Keywords** MIMO-OFDM · QAM · LTE · MATLAB

<b>Title:</b>	American Sign Language Translator and Calling Device
<b>Author Name:</b>	Manisha Nilkanth, Gautam Kumar, Gokul Singh, Bikash Chandra Sahoo
<b>Abstract:</b>	ABSTRACT Communication plays a vital role in our life and in today's world there are disabled people (deaf, dumb, blind, etc.) who faces a lot of problems when they try to communicate with others. Sign language is one of the commonly used medium to establish communication among disabled and common people. This paper describes an aiding device for the deaf, dumb and physically challenged people. Such people are made to wear gloves fitted with flex sensors whose resistance changes with each gesture shown by them. Flex sensor produces a voltage change and the Raspberry Pi will process and display the codes corresponding to each gesture on LCD and the sound code is heard via speaker. The device gains more versatility by establishing communication via GSM. Keywords: Sign, Microcontroller, calling, communication
<b>Cite this article:</b>	Manisha Nilkanth, Gautam Kumar, Gokul Singh, Bikash Chandra Sahoo , " American Sign Language Translator and Calling Device " , IPASJ INTERNATIONAL JOURNAL OF ELECTRONICS & COMMUNICATION (IJEC), Volume 7, Issue 5, May 2019 , pp. 001-005 , ISSN 2321-5984
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## Adaptive routing based on predictive reinforcement learning

Rahul Desai & B. P. Patil

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■ 786

## Dual Reinforcement Q Routing for Ad Hoc Networks

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### Abstract

*Ad Hoc Networks are infrastructure less network in which nodes are connected by Multi-hop wireless links. Each node is acting as a router as it supports distributed routing. Routing challenges occurs as there are frequent path breaks due to the mobility. Various application domains include military applications, emergency search and rescue operations and collaborative computing. The existing protocols used are divided into proactive and on demand routing protocols. The various new routing algorithms are also designed to optimize the performance of a network in terms of various performance parameters. Dual reinforcement routing is learning based approach used for routing. This paper describes the implementation, mathematical evaluation and judging the performance of a network and analyze it to find the performance of a network.*

**Keywords:** Ad Hoc Network, MANET, Q Routing, CQ Routing, CDRQ Routing

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## Routing Protocols for Mobile Ad Hoc Network: A Survey and Analysis

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Corresponding author, email-desaimrahul@yahoo.com\*

### Abstract

*Ad hoc networks are mobile wireless networks where each node is acting as a router. The existing routing protocols such as Destination sequences distance vector, Optimized list state routing protocols, Ad hoc on demand routing protocol, Ad hoc on demand multipath routing protocol, Dynamic source routing are optimized versions of distance vector or link state routing protocols. In this paper, existing protocols such as DSDV, AODV, AOMDV, OLSR and DSR are analyzed on 50 nodes Mobile Ad Hoc network with random mobility. Packet delivery ratio, delay, control overhead and throughput parameters are used for performance analysis.*

**Keywords:** DSDV, OLSR, AOMDV, AODV, DSR, Ad Hoc Network, MANET

## Learning Based Route Management in Mobile Ad Hoc Networks

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\*Corresponding author, email-desaimrahul@yahoo.com

### Abstract

*Ad hoc networks are mobile wireless networks where each node is acting as a router. The existing routing protocols such as Destination sequences distance vector (DSDV), Optimized list state routing protocols (OLSR), Ad hoc on demand routing protocol (AODV), dynamic source routing (DSR) are optimized versions of distance vector or link state routing protocols. Reinforcement Learning is new method evolved recently which is learning from interaction with an environment. Q Learning which is based on reinforcement learning that learns from the delayed reinforcements and becomes more popular in areas of networking. Q Learning is applied to the routing algorithms where the routing tables in the distance vector algorithms are replaced by the estimation tables called as Q values. These Q values are based on the link delay. In this paper, various optimization techniques over Q routing are described in detail with their algorithms.*

**Keywords:** Q Routing, Reinforcement, CQ routing, DRQ routing, CDRQ routing, DSR, AODV, DSDV

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# Maximizing Throughput using Adaptive Routing Based on Reinforcement Learning

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## ABSTRACT

In this paper, prioritized sweeping confidence based dual reinforcement learning based adaptive routing is studied. Routing is an emerging research area in wireless networks and needs more research due to emerging technologies such as wireless sensor network, ad hoc networks and network on chip. In addition, mobile ad hoc network suffers from various network issues such as dynamicity, mobility, data packets delay, high dropping ratio, large routing overhead, less throughput and so on. Conventional routing protocols based on distance vector or link state routing is not much suitable for mobile ad hoc network. All existing conventional routing protocols are based on shortest path routing, where the route having minimum number of hops is selected. Shortest path routing is non-adaptive routing algorithm that does not take care of traffic present on some popular routes of the network. In high traffic networks, route selection decision must be taken in real time and packets must be diverted on some alternate routes. In Prioritized sweeping method, optimization is carried out over confidence based dual reinforcement routing on mobile ad hoc network and path is selected based on the actual traffic present on the network at real time. Thus they guarantee the least delivery time to reach the packets to the destination. Analysis is done on 50 nodes MANET with random mobility and 50 nodes fixed grid network. Throughput is used to judge the performance of network. Analysis is done by varying the interval between the successive packets.

Keywords – DSDV, AODV, DSR, Q Routing, CBQ Routing, DRQ Routing, CDRQ Routing

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## **Uncoded 8 X 8 MIMO Systems with ZF and V-BLAST with ZF Detection**

Article

### A Joint Channel Estimation and Data Detection for a MIMO Wireless Communication System via Sphere Decoding

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## Hybrid Compression Technique Using Linear Predictive Coding for Electrocardiogram Signals

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**B. P. Patil**

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### ABSTRACT

Linear Predictive Coding (LPC) is used for analysis and compression of speech signals. Whereas Huffman coding is used for Electrocardiogram (ECG) signal compression. This paper presents a hybrid compression technique for ECG signal using modified Huffman encoding and LPC. The aim of this paper is to apply the linear prediction coding and modified Huffman coding for analysis, compression and prediction of ECG signals. The ECG signal is transformed through discrete wavelet transform. MIT-BIH database is used for testing the compression algorithm. The performance measure used to validate the results are the Compression ratio (CR) and Percent Root mean square difference (PRD). The improved CR and PRD obtained in this research prove the quality of the reconstructed signal.

### Key words

Huffman encoding, Linear Predictive Coding, Compression

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## ECG Signal Compression using Parallel and Cascade Method for QRS Complex

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### Abstract

**Objectives:** In this paper we present, compression of QRS complex of ECG signal by hybrid technique. The methodology employs both cascade and parallel combination of DCT and DWT. **Methods/Statistical Analysis:** QRS complex is an important part of ECG signal used by doctors for diagnosis purpose. The transmission of QRS complex requires less memory and complexity as compared to the complete ECG signal. The methodology employs both cascade and parallel combination of DCT and DWT. The performance measures such as PRD (Percent Root mean square Difference) and CR (Compression Ratio) are used to validate the results. **Findings:** MIT-BIH ECG database is used for the study. The threshold based technique is implemented on both cascade and parallel system. The cascade technique shows improved CR and proved to be better than the parallel system in terms of storage and transmission. The lower value of PRD also demonstrates the improved quality of the reconstructed signal in the cascade and parallel system. **Application/Improvements:** The cascade system with a high CR requires less memory. Both the cascade and parallel system show good reconstruction quality with the low PRD.

**Keywords:** Cascade, ECG, Parallel, QRS complex

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# Insulation Assessment of Oil Impregnated Paper Condenser Bushings using Dielectric Frequency Response Technique

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## Abstract

**Objectives:** Investigation of insulation to judge the health of the condenser bushing with different techniques has been the area of interest for the researchers in recent past. Power transformers and their bushings are manufactured with oil impregnated paper insulation but their insulation integrity is comprised due to absorbed, residual or liberated moisture/ water which leads to further deterioration and catastrophic failure. **Methods:** Conventional measurement technique taken at rated power frequency only gives relative indication of specific dielectric properties and health of the condenser bushings. This article introduces a new approach for insulation assessment of the condenser bushings where OIP insulation as a key component has been investigated in a wide frequency response spectrum and to confirm the validity of this approach, measurements were taken on several condenser bushings of same type and age. **Findings:** The advance technique is a non-destructive method which evaluates the water concentration of the test object. The resulting curve is highly determined by the behavior of solid insulation and it is also sensitive to oil conductivity and insulation geometry of the bushing. Furthermore, the interpretation scheme related to dielectric response is explained. **Applications:** The signatures achieved helps in reliable data analysis and can be used in qualitative comparisons of bushings which compliments the available quality assurance techniques in the factory. This approach can also be used for frequent monitoring and effective moisture management at site.

**Keywords:** Condenser Bushing, Dielectric Spectroscopy, Insulation Assessment, Oil and Paper Insulation



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## Blind Channel Estimation Using Novel Independent Component Analysis with Pulse Shaping for Interference Cancellation

Authors

Authors and affiliations

Renuka Bhandari , Sangeeta Jadhav

Chapter

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## Abstract

Now days with the growing exposure of wireless communications, there is more focus on achieving the spectral efficiency and low bit rate errors (BER). This can be basically achieved by Space Time Frequency based Multiple Input Multiple Output (MIMO)-OFDM wireless systems. The efficient channel estimation method plays important role in optimizing the performance of spectral efficiency and BER. There are different types of MIMO-OFDM channel estimation methods. In this paper, we focused on designing efficient blind channel estimation method for MIMO-OFDM. Recently there has been increasing research interest in designing the blind channel based estimation methods. There are number of blind channel estimation methods introduced so far, however none of them effectively addressed the problem of Inter Symbol Interference (ISI). ISI may have worst impact on performance of channel estimation methods if there are not addressed by channel estimation techniques. In this paper we are designing the novel blind channel estimation approach using Independent Component Analysis (ICA) with both ISI cancellation and blind interference cancellation. This method is named as Hybrid ICA (HICA). HICA algorithm use the HOS (higher order statistical) approach and pulse shaping in order to minimize the blind interference and ISI effects. Simulation results shows that HICA is outperforming the existing channel estimation methods in terms of BER and MSE.

## Keywords

MIMO-OFDM Channel estimation Spectral efficiency Error rates ICA Interference

## **Prioritized Sweeping Reinforcement Learning Based Routing for MANETs**

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### **Abstract**

*In this paper, prioritized sweeping confidence based dual reinforcement learning based adaptive network routing is investigated. Shortest Path routing is always not suitable for any wireless mobile network as in high traffic conditions, shortest path will always select the shortest path which is in terms of number of hops, between source and destination thus generating more congestion. In prioritized sweeping reinforcement learning method, optimization is carried out over confidence based dual reinforcement routing on mobile ad hoc network and path is selected based on the actual traffic present on the network at real time. Thus they guarantee the least delivery time to reach the packets to the destination. Analysis is done on 50 Nodes Mobile ad hoc networks with random mobility. Various performance parameters such as Interval and number of nodes are used for judging the network. Packet delivery ratio, dropping ratio and delay shows optimum results using the prioritized sweeping reinforcement learning method.*

**Keywords:** Confidence Based Routing, Dual Reinforcement Q Routing, Q Routing, Prioritized sweeping

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## **Using OPENCV over MATLAB for Implementing Image Processing Application on CUDA GPU to Achieve Better Execution Speedup**

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**Abstract** - Digital Image Processing is significant for correct interpretation, analysis and enhancement of digital images. It has varied applications in the domain of computer vision, medical imaging, astronomical imaging, photography. Matlab and OpenCV are the two most popularly used toolkits for building the image processing applications. The purpose of the work presented here is to compare and analyse performance of these two platforms in the context of execution speed. A color (RGB color space) to gray converter was implemented using Matlab as well as OpenCV with CPU at the backend executing the code sequentially. The conversion speed was found to be much higher in case of OpenCV. The same converter was implemented using CUDA GPU, which gave higher speed up over its CPU version due to its extensively parallel architecture. The work highlights use of OpenCV library to be used alongside CUDA C for pre and post image processing functions executed by CPU, to achieve maximum speed up. In future, different optimization techniques for CUDA may be used to enhance the speed up.

**Keywords :** Matlab, OpenCV, CUDA, Color to gray converter

Considering the performance efficiency of Graphics processor for data parallel computations [5][6][10], in the proposed work, the color to gray converter was implemented also using CUDA C with GPU at backend. The speed up achieved was much higher as compared to CPU OpenCV version.

The work is presented in seven sections. The first three sections explain the basis for Matlab, OpenCV platforms and their comparison. Section IV briefly describes CUDA architecture. Section V gives details of the mathematical model used to implement color to gray converter. Section VI describes the experimental set up and section VII elaborately discusses the observations and conclusions drawn.

### **I. MATLAB**

MATLAB stands for MATrixLABoratory and the software is built around vectors and matrices. It has tool boxes which can be used for developing signal processing and image processing applications.

# ECG Signal Compression Using the High Frequency Components of Wavelet Transform

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**Abstract**—Electrocardiography (ECG) is the method of recording electrical activity of the heart by using electrodes. In ambulatory and continuous monitoring of ECG, the data that need to be handled is huge. Hence we require an efficient compression technique. The data also must retain the clinically important features after compression. For most of the signals, the low frequency component is considered as most important part of the signal. In wavelet analysis, the approximation coefficients are the low frequency components of the signal. The detail coefficients are the high frequency components of the signal. Most of the time the detail coefficients (high frequency components) are not considered. In this paper, we propose to use detail coefficients of Wavelet transform for ECG signal compression. The Compression Ratio (CR) of both the approximation and detail coefficients are compared. Threshold based technique is adopted. The Threshold value helps to remove the coefficients below the set threshold value of coefficients. Experiment is carried out using different types of Wavelet transforms. MIT BIH ECG data base is used for experimentation. MATLAB tool is used for simulation purpose. The novelty of the method is that the CR achieved by detail coefficients is better. CR of about 88% is achieved using Sym3 Wavelet. The performance measure of the reconstructed signal is carried out by PRD.

**Keywords**—ECG; PRD; transform

compression of ECG signal is to obtain maximum data reduction. At the same time, the clinically important features of ECG signal must be preserved after reconstruction.

The ECG signal is shown in fig. 1. It consists of P, Q, R, S, T and U waves. The first positive wave is the P wave. The QRS complex consists of Q, R and S waves. The wave is produced by ventricular activation. The T wave is produced by ventricular repolarization and it is a smooth dome shaped. The U wave follows the T wave and precedes the P wave of the next cycle.

This paper is structured as follows: section 2 describes the lossy and lossless compression techniques; Section 3 describes the performance measure to validate the technique used in this research; Section 4 covers the methodology. Results and discussion are covered in section 5 and 6 respectively. Conclusion and references are the concluding sections.

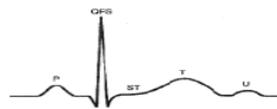


Fig. 1. The normal ECG

## Transform Based Techniques for ECG Signal Compression

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### Abstract

The recording of electrical activity of the heart by using electrodes is known as Electrocardiography (ECG). In continuous monitoring of ECG, huge amount of data needs to be handled. To handle the situation, an efficient compression technique which can retain the clinically important features is required.

In this paper, we propose various transform methods of compression and compare them based on the performance measure parameters such as compression ratio, PRD, PSNR. The best transform technique must be able to maintain the clinically important features for diagnosis purpose and achieve highest CR. The different transform based methods compared here are Discrete Wavelet Transform (DWT), Fast Fourier Transform (FFT), Walsh Hadamard transforms (WHT), and Discrete Fractional Fourier transform. The Wavelet transform shows the best results in terms of Compression Ratio (CR) & Percent Root mean square Difference (PRD). MIT-BIH ECG data base is used for the testing purpose.

**Keywords:** ECG, PSNR, PRD, transform

lead to decrease in storage space and also transmission cost. Lossless compression makes the original data to be perfectly reconstructed from the compressed data. We can achieve higher compression ratio in lossy compression method. Lossy compression method is suitable for compression of ECG signals.

Various compression methods used are:

- (i) Direct Method: The method is simple and the time domain signal samples are analyzed. Some of the examples of direct methods are AZTEC (Amplitude Zone Time Epoch Coding), ASEC, CORTES, FAN etc. [4, 8].
- (ii) Transform based method: The transformation of the signal takes place from one domain to another domain. Some of the examples of transformation method are Fourier transform, Wavelet transform [7, 9], Walsh Hadamard Transform, Fast Fourier Transform, Fractional Fourier transform etc.
- (iii) Parameter Extraction Methods: In this method a set of parameters are extracted from the original signal and used in the reconstruction process.

# An Iterative Semi-blind Channel Estimation for MIMO Wireless Communication System

Gajanan R. Patil

*Department of Electronics & Telecommunication Engineering  
Army Institute of Technology, Pune, Maharashtra, India*

**Abstract-** This paper presents a novel iterative approach to channel estimation for multiple input multiple output (MIMO) wireless communication system. The initial channel estimate is obtained using whitening rotation based orthogonal pilot maximum likelihood (OPML) semi-blind channel estimation (SBCE) scheme. The estimation is further enhanced using detected symbols iteratively. The performance of this scheme is compared with whitening rotation based OPML SBCE. The simulation study shows that this approach clearly outperforms the OPML SBCE method to the extent of achieving near optimal performance.

**Keywords –** Least Square, Multiple Input Multiple output, Singular Value Decomposition, Semi-blind Channel Estimation, Space Time Block Code, Training Based Channel Estimation.

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## Development of Activated Carbon from Ashoka Tree Leaves for Super-capacitor

IJCAT - International Journal of Computing and Technology, Volume 3, Issue 5, May 2016  
ISSN : 2348 - 6090  
[www.IJCAT.org](http://www.IJCAT.org)

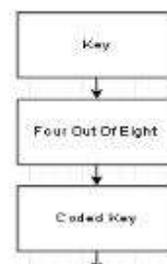
# Secret Image Transmission Using Carrier Image and Scan Patterns

<sup>1</sup> Vijay Karra, <sup>2</sup> Varun Bajaj, <sup>3</sup> Amrit Pratap Singh, <sup>4</sup> Vikash Singh

<sup>1,2,3,4</sup> Department of E & TC,  
Army Institute of Technology  
Pune, Maharashtra - 411015, India.

**Abstract -** In the world today, data encryption is essential to maintain privacy. We propose a technique in which the color table is used to generate a picture carrier, the carrier image is added to the original image. The encrypted image obtained is unclear and can't be seen. To make it even more secure model SCAN pattern is used to blend the pixels of the image. The resulting image is decrypted using the inverse of the scan pattern. Thus the carrier image and original image is obtained at the output.

**Keywords –** Picture Carrier, SCAN Pattern.



Article

## CENTRALIZED SECURITY SYSTEM BASED ON IoT

May 2016 · INTERNATIONAL JOURNAL OF RESEARCH IN ADVANCE ENGINEERING 2(3):15

DOI: [10.26472/ijrae.v2i3.47](https://doi.org/10.26472/ijrae.v2i3.47)

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**Amal Paul**



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## Wireless Network for Unmanned Ground Vehicle

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DOI: [10.26472/ijrae.v2i3.51](https://doi.org/10.26472/ijrae.v2i3.51)

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## Survey on Image Fog Reduction Techniques

<sup>1</sup>Pramila Singh, <sup>2</sup>Eram Khan, <sup>3</sup>Hema Upreti, <sup>4</sup>Girish Kapse

<sup>1,2,3,4</sup> Department of Electronics and Telecommunication,  
Army Institute of Technology  
Pune, Maharashtra 411015, India

**Abstract** - Image contrast often significantly suffers from degradation due to haze, fog or mist spread in atmosphere, and adds more atmospheric light that harms the visibility of image. In this paper, various methods for reduction of fog have been analyzed and compared. The methods described in this paper are immune to the bad weather conditions including haze, fog, mist and other visibility issues caused by aerosols. Furthermore, the most optimum method is determined for processing RGB images.

**Keywords** – *Image Defogging, Albedo, Dark Channel Prior, Transmission Map, Bilateral filtering, CLAHE.*

dust, ice, salt and other particles which are present in atmosphere, in order to form cloud. Fog forms when a cool, stable air mass is trapped underneath a warm and humid air mass, this process make substantial effect on images and lack visibility and visual vividness in a real time system.

In this paper, we explore and compare various technique like soft matting, dark prior channel to reduce foggy effect from the image.

## Technical Survey of Topics and Trends - Internet of Things

<sup>1</sup>Girish Kapse, <sup>2</sup>Subhash Reddy K, <sup>3</sup>Sudhanshu Singh, <sup>4</sup>Rohit Kumar

<sup>1,2,3,4</sup> Department of E&TC, Army Institute of Technology  
Pune, Maharashtra - 411015, India

**Abstract** - Internet of Things is a paradigm in which everyday objects are equipped with sensing, identifying, networking and processing features that can allow them to communicate over the internet, with other devices and services to complete some objective. This article talks about the current state of the Internet of Things, the current trends, describing challenges that threaten IoT diffusion, open research questions, future directions and compiling a comprehensive reference list to assist IoT enthusiasts.

**Keywords** - *IoT. Objects. Internet of Things<sup>[1]</sup>.*

Internet and Sensor Networks, is leading to new possibilities and visions. The possibility of a framework that would allow direct machine-to machine communication over the Internet has led researchers to envision the benefits of bringing more machines online and allowing them to participate in the web as a vast network of autonomous, self-organizing devices. While there is no universal definition for the IoT, this vision has produced a paradigm being referred to as the Internet of Things (IoT), the core concept is that everyday objects<sup>[2]</sup> can be equipped with identifying, sensing, networking

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# Synthesis, characterization and antimicrobial applications of zinc oxide nanoparticles loaded gum acacia/poly(SA) hydrogels

S.K. Bajpai <sup>a</sup>, Mamta Jadaun <sup>a</sup>, Seema Tiwari Dr. <sup>b</sup>

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**International Journal of Innovative and Emerging Research in Engineering**

e-ISSN: 2394 - 3343 p-ISSN: 2394 - 5494

**Controllable refractive index of PVA-Ag films**

Ms Mridula Chandola, Dr Seema Tiwari, Mr Raghu Babar, Mr Prakash Chikre, Mr Ganesh Mundhe, Mr  
Vithal Hivrale, Dr Sujata Marathe  
Department of Applied Sciences and General Engineering, Army Institute of Technology, Dighi, Pune-15, India

**ABSTRACT:**  
Silver nano particles were prepared by reduction of silver nitrate with trisodium citrate at 80°C. Aliquots of this nanoparticle solution were withdrawn at different stages of colour of nano particles, indicating the increasing sizes of the nano particles. These were mixed with 6% solution of polyvinyl alcohol to prepare polyvinyl alcohol-silver nanocomposite films by solution casting method. Nano composite films were characterized by X-ray diffraction and refractive index measurement. X-ray diffraction measurement of PVA-silver nanoparticle composite films revealed a strong peak at 2 theta value of 4.5° and a weak peak at 12.5° which are attributed to silver nano particles and a very weak peak at 20° characteristics of (101) plane of polyvinyl alcohol. Refractive index measurement showed birefringence of PVA-Ag films, with an increase in refractive index of films, with increase in time of withdrawal of nano particles, giving films with controllable refractive

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**Synthesis and Characterization of Nanocomposites for Drug Delivery Applications**

Seema Tiwari, Sujata Marathe, Mridula Chandola, Nikhil Thakur,  
Ravindra Rathore, Sandeep Garg  
Dept. of Applied Science & General Engineering, Army Institute of Technology, Dighi, Pune, 411015, India

**Abstract:** The use of nanotechnology for biomedical applications, has potential to change the landscape of the diagnosis and therapy of many diseases. Several therapeutic nanocarriers have been approved for clinical use. In this research paper polymeric biodegradable nanocomposites have been synthesized as a drug carrier for anticancer drug. Chitosan (CS) and sodium alginate (ALG) with different ratios were blended with different wt% of hydroxyl apatite by solvent evaporation method. Morphology and structure characterization of nanocomposites were investigated by X-Ray Diffraction (XRD), Scanning Electron Microscope (SEM) and Fourier Transmission Infra Red Spectroscopy (FTIR) respectively. Thermal property of nanocomposite was investigated by Thermo Gravimetric Analysis (TGA). The swelling behavior of the composites has been investigated I different pH medium of 1, 4 & 7.4. which revealed that out of the total possible swelling of polymer, 8 % is swelled in the 2 h period at pH 1.0 while 36 % was swelled in the next 2 h at pH 4.0. Finally, when the it was transferred into phosphate buffer of pH 7.4, it swelled 91 % in the next 6 h. This study gives a somewhat more realistic picture of release of drug from polymeric matrix also & probable in vivo behavior of the device in the gastrointestinal tract.

**Keywords:** Chitosan, Sodium alginate, Hydroxy apatite, Drug delivery

**1. Introduction**

Nanotechnology is defined as the science and technology involved in the design, synthesis, characterization and application of materials and devices whose smallest unit in at least one dimension is of the nanometer size (one-billionth of a meter) [1]. In last few years nanotechnology has grown by leaps and bounds, and this multidisciplinary field is undergoing development at a tremendous rate [2]. Nanoscience and

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Carbohydrate Polymers

Volume 153, 20 November 2016, Pages 00–05

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Synthesis, characterization and antimicrobial applications of zinc oxide nanoparticles loaded gum acacia/poly(SA) hydrogels

S.K. Bajpai<sup>a</sup>, Mamta Jadaun<sup>a</sup>, Seema Tiwari Dr.<sup>b</sup>

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Application of El-Zaki Transform in Cryptography

Shaikh Jamir Salim<sup>1</sup>  
Applied Science  
R C Patel Institute of technology,  
shirpur, India

Mundhe Ganesh Ashruji<sup>2</sup>  
Applied Science  
Army Institute of Technology,  
pune, India

Abstract

If you want to keep information secret, you have two possible strategies: hide the existence of the information, or make the information unintelligible. Cryptography is the art and science of keeping information secure from unintended audiences, of encrypting it. Conversely, cryptanalysis is the art and science of breaking encoded data. The branch of mathematics encompassing both cryptography and cryptanalysis is cryptology. In this paper we have to encrypt and decrypt a secret data using El-Zaki transformation and congruence modulo operator.

Keywords: Modern Sciences, Engineering and Technology.

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## On $k$ -Connected $\Gamma$ -Extensions of Binary Matroids

Y. M. Borse<sup>1\*</sup> and Ganesh Mundhe<sup>2\*\*</sup>

(Submitted by E. K. Lipachev)

<sup>1</sup>Department of Mathematics, Savitribai Phule Pune University, Pune, 411007 India  
<sup>2</sup>Army Institute of Technology, Pune, 411015 India  
Received January 30, 2017

**Abstract**—Slater introduced the point-addition operation on graphs to classify 4-connected graphs. The  $\Gamma$ -extension operation on binary matroids is a generalization of the point-addition operation. In this paper, we obtain necessary and sufficient conditions to preserve  $k$ -connectedness of a binary matroid under the  $\Gamma$ -extension operation. We also obtain a necessary and sufficient condition to get a connected matroid from a disconnected binary matroid using the  $\Gamma$ -extension operation.

**DOI:** 10.1134/S1995080218090226

**Keywords and phrases:** binary matroid, splitting,  $k$ -connected,  $\Gamma$ -extension.

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## Stochastic wavelets from minimizers of an uncertainty principle: An example

Ashok Kumar Singh and Hemant Bhate

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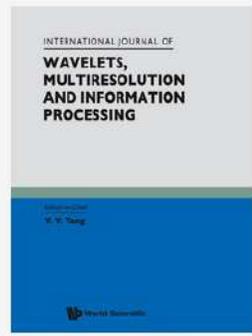
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**Abstract**

This paper proposes a method through which a family of wavelets can be obtained. This is done by choosing each member based on a random variable. The method is

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 **Carbohydrate Polymers**  
Volume 153, 20 November 2016, Pages 60-65

# Synthesis, characterization and antimicrobial applications of zinc oxide nanoparticles loaded gum acacia/poly(SA) hydrogels

S.K. Bajpai <sup>a</sup>, Mamta Jadaun <sup>a</sup>, Seema Tiwari Dr. <sup>b</sup>

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# On $n$ -connected splitting matroids

Y.M. Borse, Ganesh Mundhe

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## Abstract

In general, the splitting operation on a binary matroid  $M$  does not preserve the connectivity of  $M$ . In this paper, we provide sufficient conditions to preserve  $n$ -connectedness of a binary matroid under splitting operation. As a

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International Journal of Biological Macromolecules  
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## Controlled release of Doxycycline from gum acacia/poly(sodium acrylate) microparticles for oral drug delivery

S.K. Bajpai, Mamta Jadaun, M. Bajpai, Pooja Jyotishi, Farha Ferooz Shah, Seema Tiwari

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## Size Based Comparison of Colloidal Silver Nano Particles as Coolants

**Sachin Tanwade, Mridula Chandola\*, Vitthal Hivrale, Seema Tiwari, Sujata Marathe**  
*Department of Applied Science & General Engineering, Army Institute of Technology, Dighi, Pune, 411015, India*  
\*mchandola@aitpune.edu.in

*Abstract- Colloidal silver shows different colours with changing shape and size of nano silver particles. This is due to light absorption and scattering based on Plasmon resonance wavelength, which depends upon particle shape and size. This was studied using the visible spectrums of silver colloidal solutions, which showed strong absorbance at wavelengths 450nm to 520 nm, indicating the increasing sizes of silver nano particles. We have measured the rate of cooling of aqueous colloids, containing different sized silver nano particles, having the same concentration. The results strongly suggest increase in the rate of cooling with increasing size of nano particles, i.e. the aqueous nano fluid, having larger sized nano particles, are more efficient coolants.*

*Keywords- Silver nanoparticles, colloid, thermal conductivity, size dependence, cooling, absorbance, visible spectrometry.*

### I. INTRODUCTION

Low thermal conductivities of traditional coolants like water, ethyl alcohol or propylene glycol hinders the efficiency and compactness of heat transfer devices. In recent years, metal nano particle dispersed heat transfer fluids or nanofluids have found favour as coolants because of their increased heat transfer capabilities. [1][2] Nano particles have high surface to volume ratio and since their size is very small, a large number of nano particles are present on the surface. This enhances the conduction of heat in nano fluids, as heat transfer is a surface phenomenon. Thus, the size of nano particles plays an important role in the heat transfer mechanism.

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International Journal of Applied Engineering Research, ISSN 0973-4562 Volume 13, Number 11 (2018) pp. 9091–9102  
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## Wavelets As Minimizers Of Uncertainty From The Kinematical Group

Ashok Kumar Singh<sup>1</sup> and Hemant Bhate  
*Department of Mathematics, University of Pune.*

**Abstract:** In this paper we propose a method of obtaining a family of wavelets. The members of the family are tagged by the time parameter. We obtain these wavelets as minimizers of an uncertainty principle. The wavelets are

spatiotemporal wavelets in the field of geophysics to analyse multiscale phenomena in ocean currents. The authors in [14] attempt to understand brain function with reported success using spatiotemporal wavelet transform as compared





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## On $k$ -Connected $\Gamma$ -Extensions of Binary Matroids

Y. M. Borse<sup>1\*</sup> and Ganesh Mundhe<sup>2\*\*</sup>

(Submitted by E. K. Lipachev)

<sup>1</sup>Department of Mathematics, Savitribai Phule Pune University, Pune, 411007 India  
<sup>2</sup>Army Institute of Technology, Pune, 411015 India

Received January 30, 2017

**Abstract**—Slater introduced the point-addition operation on graphs to classify 4-connected graphs. The  $\Gamma$ -extension operation on binary matroids is a generalization of the point-addition operation. In this paper, we obtain necessary and sufficient conditions to preserve  $k$ -connectedness of a binary matroid under the  $\Gamma$ -extension operation. We also obtain a necessary and sufficient condition to get a connected matroid from a disconnected matroid using the  $\Gamma$ -extension operation.

**DOI:** 10.1134/S1995080218090226

**Keywords and phrases:** *binary matroid, splitting,  $k$ -connected,  $\Gamma$ -extension.*

### 1. INTRODUCTION

We refer to [9] for standard terminology in graphs and matroids. The matroids considered here are loopless and coloopless. Slater [12] introduced the point-addition operation on graphs and used it to classify 4-connected graphs. Azanchiler [1] extended this operation to binary matroids as follows:

**Definition 1** [1]. *Let  $M$  be a binary matroid with ground set  $S$  and standard matrix representation  $A$  over  $GF(2)$ . Let  $X = \{x_1, x_2, \dots, x_m\} \subset S$  be an independent set in  $M$  and let*

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**Abstract**

Slater introduced the point-addition operation on graphs to classify 4-connected graphs. The  $\Gamma$ -extension operation on binary matroids is a generalization of the point-addition operation. In this paper, we obtain necessary and sufficient conditions to preserve  $k$ -connectedness of a

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Environmental Nanotechnology, Monitoring & Management

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S.K. Bajpai <sup>a</sup>, Aniteshma Chanpuria <sup>a</sup>, Seema Dubey <sup>b</sup>

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**JES**  
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## Extrapolation of data by mathematical calculation for removal of Fluoride, Arsenic, Lead by Non-conventional (NLP, PLP, ALP) absorbents

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*Abstract - In the present study effect of PH solution has been studied for the removal of fluoride, lead and arsenic with the help of Neem Leaf Powder (NLP), Peepal Leaf Powder (PLP), Amla Leaf Powder (ALP, NLP, PLP, ALP leaves. The initial solution pH plays an important role in the adsorption of metal ions on various adsorbents. The Experimental results are summarized in the tables, it is having been observed that the % removal of lead and Arsenic is more dominant at pH - 6. adsorbed fluoride increased at lower pH in all cases that is at 2. The experimental values regarding removal of ions are extrapolated using MATLAB software to formulate corresponding quadratic equations. These equations can be used to interpolate the values of ions removal for pH values. The extrapolated values by MATLAB software helps, in theoretical calculations of the values without experiments, which in turn useful for the pilot project as well as to scale up the material at industrial level.*

decreased expressively in last decades, but for wood conservation its use is still same, but the influence of the arsenical compounds on the environment will remain for few years (Nadeem and Shafiq 2007; Faust et al. 1983). It is in group VA of periodic table and period 4 which arises in many minerals, mostly as As<sub>2</sub>O<sub>3</sub>. Ashes of coal also contain Arsenic. Most of the Arsenic compounds are strongly adsorbable to soil and because of this it cannot be transported to over long distance in groundwater and surface water. Arsenic is not good for skin, as it can damage the skin and have high chances of cancer.

**Lead:**  
Lead is one of the commonly available heavy elements in the environment (Greenwood and Eamshaw 1984). It is

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1 Nidhi Jain \*, 2Swati Shegane, 3Akhil Goplani,4Seema Tiwari,5Rutuja Shamkant amrutkar , 1235Bharati Vidyapeeth College of Engineering Lavale, Pune,4 Bharati Vidyapeeth College of Engineering Lavale, Pune-  
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# Stochastic wavelets from minimizers of an uncertainty principle: An example

Ashok Kumar Singh and Hemant Bhatte

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family of wavelets can be obtained.  
This is done by choosing each member based on a random variable. The method is preferred in situations where a single mother wavelet proves inadequate and an evolving sequence of mother wavelets is needed but *a priori* the next member in the sequence is uncertain. The adopted approach is distinct from the way spatiotemporal

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