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A STUDY ON USING RECYCLED TYRE RUBBER AS PARTIAL REPLACEMENT OF FINE AGGREGATE IN CONCRETE

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I. ABSTRACT

Solid waste disposal is a worldwide problem. If not properly disposed, these materials become sources of environmental pollution and the problems related to it. Various studies are done worldwide to dispose these solid waste materials by using them for partial or complete replacement of aggregates in cement concrete. Discarded tyre rubber is an important solid waste material that destroys the ecological environment.

The suitability of waste tyre rubber in cement concrete as a partial replacement for natural river sand. M40 grade of concrete is designed as per IS 10262: 2010, with water/cement ratios of 0.4. Water–cement ratios of 0.45 were studied. The designated mix contain 0%, 10%, 20%, 30%, 40% and 50 % of partial replacement of crumb rubber with fine aggregate by weight .Finally compared with normal concrete .The specimens with 0% discarded tyre rubber were taken as control mix. Tests were done to determine the compressive strength, flexural strength in concrete specimens. Test results of the hydraulic transport properties revealed that the addition of rubber particles tends to restrict water propagation in the cement matrix and reduces water absorption of the composite .The effects of rubber sand on workability, setting time, bleeding, density, strength, impact energy, impact load, toughness, ductility, shrinkage, abrasion resistance, freeze/thaw resistance, fire resistance, thermal insulation, carbonation resistance, corrosion resistance, water absorption, porosity, chloride ion penetration ,resistance to aggressive environmental, energy absorption, sound absorption, electrical resistance and cracking resistance of rubberized concrete.

Keywords – Rubber tyre,wire mesh, concrete element, compressive strength, Flexural behavior.

II.INTRODUCTION

A. Definition of concrete:

Concrete is defined as the combination the binding material cement, fine aggregate , coarse aggregate and water in defined ratio which is proposed for required strength.

B. Types of concrete:

- Normal concrete
- High strength concrete
- Stamped concrete
- Shortcrete
- High performance concrete
- Pervious concrete
- Limecrete
- Glass concrete
- Asphalt concrete
- Aerated concrete
- Rubberized concrete
- Geopolymer concrete
- Rapid strength concrete
- Fiber reinforced concrete

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STRENGTH CHARACTERISTIC OF GEOPOLYMER CONCRETE CONTAINING FIBERS AND RUBBER FOR PAVEMENTS

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I. ABSTRACT

India's economy is basically depends on road transportation, Most of the pavements are laid by bitumen's or concrete toping where sub-base and base course remains same. It is well know that bitumen pavement requires repair at regular interval to keep the pavement in good operational condition, And at the same time, the cost of bitumen is also going high, In case of cement concrete pavement, initial cost is high and it is well accepted that the cement concrete is week in flexural strength and it is difficult to go in for cement pavement in thick traffic because of concrete requires minimum of 7 days of curing, and traffic cannot be let with in that stipulated time. It is widely known that the production of Portland cement consumes considerable energy and at the same time contributes a large volume of CO_2 to the atmosphere

In this regards, the development of Geopolymer concrete is major technologies breakthrough promoting the use of industrial byproducts such as Flyash and GGBS in replacement of Portland cement concrete, also rubber and fibers used to increase the Mechanical properties of GPC

The two most important factors that govern pavement design are soil sub-grade strength and traffic loading. Depending on the strength of sub-grade soil, the layer thicknesses of flexible as well as rigid pavements are affected. IRC: 37 - 20015 uses soil sub-grade strength in terms of CBR; whereas IRC: 58 - 20026 uses the same in terms of modulus of sub-grade reaction (k). The traffic load is generally estimated from 3-day axle load survey. In the design of flexible pavements, traffic load is expressed in terms of million standard axles (msa); whereas it is expressed in terms of axle load distribution (ALD) in design of rigid pavements.

II. INTRODUCTION

Geopolymer results from the reaction of a source material that is rich in silica and alumina with alkaline liquid. It is essentially cement free concrete. This material is being studied extensively and shows promise as a greener substitute for ordinary Portland cement concrete in some applications. Research is shifting from the chemistry domain to engineering applications and commercial production of geopolymer concrete. It has been found that geopolymer concrete has good engineering properties with a reduced global warming potential resulting from the total replacement of ordinary Portland cement.

This study presents the results of an experimental investigation on the mechanical properties of Geopolymer Concrete. The study analyses of Crumb rubber and polypropylene fiber on the mechanical properties such as Compressive Strength, Split Tensile Strength and Flexural Strength of hardened GPC. Mixtures were prepared with alkaline liquid to binder ratio is 1: 2.5. Crumb rubber added was 3.5%, 5% and 7.5% by weight of fine aggregates.

Polypropylene fibers were added to the mix by 0.5%, 1%, 1.5% weight of binder. The mechanical properties of the specimens were studied up to 28-days of ambient temperature. Use of Flyash along with the GGBS as a base material it is able to produce the GPC of Compressive strength up to 45 Mpa at ambient curing, By adding fiber and rubber in normal GPC, Flexural strength achieved is 80% more than that of normal GPC. The results obtained from abrasion, Permeability, Water absorption test prove that, the GPC performs well as compared to that of cement concrete pavements.

Sustainable Business Practices Agile Organizations

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Dr. Sona Vikas, currently Associate Professor at IILM University, is a PhD in management from IP University Delhi. A UGC-NET Qualified, Gold medalist during post-graduation, she has over 19 years work experience in both industry and in academics. She is also a Master - Trainer for the CSR certificate programme of IICA, Ministry of Corporate Affairs, Government of India and conduct trainings on CSR for corporate professionals as well as MBA students. In her past employment, she has handled different administrative positions viz. Associate Dean - International Relations, and Public Relations Officer at University level and Programme Director - MBA at School level, headed the School of Management Studies as Asst. Dean, and was also the Head - Training & Placements. Her subjects of teaching interest are HRM, CSR, Business Ethics and Corporate Governance. She has more than 65 papers to her credit in International and National journals, edited books and conference proceedings. She is a passionate academician and is involved a lot in student mentoring.

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Social Media and Women Buying Behaviour

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Abstract

Purpose: *The purpose of this paper is to study social media and women's buying behaviour.*

Design/methodology: *Research design is based on exploratory and descriptive research from India on the basis of convenience sampling; with the sample size of 50 women's (20-40 age group) & data is analysed using simple tools like averages, percentages and measurement scales.*

Findings: *A comprehensive analysis was done for determining the role/impact of social media and technology on women buying behaviour, finally we could find that young adults were very much interested in purchasing through social media and they were interested in latest trends with lower prices followed by good quality and make the purchase decision, even celebrity endorsement influence them in purchases.*

Research limitations/implications: *The study is restricted to Indian women.*

Originality/value: *Technology and social media is the hot selling strategy used by all the marketers and business professionals, its need of the hour in today's world which has immersed completely into the lifestyle of the women. Considering this scenario, we could study and understand different roles played by social media and technology in influencing women buying behaviour, also with the help of 50 women's sample we*

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Insights of Smart City and Smart Shopping Techniques Using IoT

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Keywords— internet of things(IoT); sensors; smart city; internet; IoT services.

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Internet of Things (IoT) as Tool for Secondary Sector Industrial Supply Chain

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Abstract— Interconnection with objects is a reality, now you have access to a IoT of elements that facilitate the execution of the tasks of connection. The project of the Internet of Things (IoT) is making strides in the current world, and that within 5 years there will be a large number of Internet-connected objects creating information that will be useful to make better decisions over every lifestyle domains. There are social, economic, political and administrative environment around "IoT". Research is focused on generating strategies that allow "IoT" as a tool that optimizes supply chains (SC) within the secondary sector (SS). With this optimization it will be possible to obtain benefits such as cost reduction, opening new business process efficiency and more out of it.

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Modelling of Self-diagnosis Predictive Maintenance System using Industrial Internet of Things

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Abstract— With the advent of different Machine Learning algorithms, Internet of Things, the area of predictive maintenance has taken a lot of prominence in the last couple of years. It has remained a challenge for industries to adopt which method to fit, robust and provide most accurate methods for maintenance in an industry. Fault detection is one of the critical components of predictive maintenance, it is very much needed for industries to detect faults early and accurately. In production environment, to reduce the cost of maintenance, sometimes it is required to build a model with some previous data. In such cases, unsupervised learning would a better option for building a model. In this paper for maintenance purpose, temperature, vibration and acoustic data available during the run-time of the machine are recorded together. It is analyzed to predict the health of the machine to repair and replace the parts. At the end, the proposed methodology benchmarks different algorithms and chooses the final model.

Keywords— IIoT; Predictive maintenance; MQTT; Sensors; unsupervized learning; Signal conditioning

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Health Analysis and Natural Language Understanding using Machine Learning Approach

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Abstract— Rapid growth in digital life provides a group about our behaviour, beliefs, mood, and well-being. Natural language is used to represent human thoughts and human actions. This data provides some insight into the lives of patients outside the health care setting, and helpful for the understanding of mental health and emotional conditions. Here a recent advancement in using natural language processing and machine learning to provide insight into mental health of both individuals and populations is introduced. In this paper we present a statistical machine learning method to understand the natural health analysis and then translate them into object constraint language.

Keywords—natural language processing, statistical machine learning, object constraint language, health analysis

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Abstract— Interconnection with objects is a reality, now you have access to a IoT of elements that facilitate the execution of the tasks of connection. The project of the Internet of Things (IoT) is making strides in the current world, and that within 5 years there will be a large number of Internet-connected objects creating information that will be useful to make better decisions over every lifestyle domains. There are social, economic, political and administrative environment around "IoT". Research is focused on generating strategies that allow "IoT" as a tool that optimizes supply chains (SC) within the secondary sector (SS). With this optimization it will be possible to obtain benefits such as cost reduction, opening new business process efficiency and more out of it.

Keywords— Internet of Things (LOT); Supply Chain; Secondary Sector

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Modelling of Self-diagnosis Predictive Maintenance System using Industrial Internet of Things

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Abstract— With the advent of different Machine Learning algorithms, Internet of Things, the area of predictive maintenance has taken a lot of prominence in the last couple of years. It has remained a challenge for industries to adopt which method to fit, robust and provide most accurate methods for maintenance in an industry. Fault detection is one of the critical components of predictive maintenance, it is very much needed for industries to detect faults early and accurately. In production environment, to reduce the cost of maintenance, sometimes it is required to build a model with some previous data. In such cases, unsupervised learning would a better option for building a model. In this paper for maintenance purpose, temperature, vibration and acoustic data available during the run-time of the machine are recorded together. It is analyzed to predict the health of the machine to repair and replace the parts. At the end, the proposed methodology benchmarks different algorithms and chooses the final model.

Keywords— IIoT; Predictive maintenance; MQTT; Sensors; unsupervized learning; Signal conditioning

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Health Analysis and Natural Language Understanding using Machine Learning Approach

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Abstract— Rapid growth in digital life provides a group about our behaviour, beliefs, mood, and well-being. Natural language is used to represent human thoughts and human actions. This data provides some insight into the lives of patients outside the health care setting, and helpful for the understanding of mental health and emotional conditions. Here a recent advancement in using natural language processing and machine learning to provide insight into mental health of both individuals and populations is introduced. In this paper we present a statistical machine learning method to understand the natural health analysis and then translate them into object constraint language.

Keywords—natural language processing, statistical machine learning, object constraint language, health analysis

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104. NON LINEAR TIME HISTORY ANALYSIS OF REGULAR SHAPED, C-SHAPED AND L-SHAPED BUILDING BY USING ETABS

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Abstract— We all know that earthquake is one of the very important aspect to be considered During planning of any structure. In past time Lots of work has been reported by many researchers who worked to study the effect earthquake on structures with Different types of irregularities. By referencing their works the project is done using Non linear dynamic analysis using time history analysis in E Tabs 2015. In this paper three models of rectangular shape and L-shape and C-shape each of G+5 are taken for analysis. Each of the buildings are assumed to be in Zone V and having medium soil type. For time history analysis previous Elcentro earthquake 1940 data has been taken. In this study listed parameters are considered namely Maximum displacement and drift, Base shear, Maximum storey acceleration and Time period. From the study we come to know that Irregular shaped building leads to increase in displacement, story drift, storey acceleration, time period and member forces, but it reduces the base shear.

105. MICROSTRUCTURE AND MECHANICAL BEHAVIOUR OF NANO B4C REINFORCED ZINC-TIN ALLOY COMPOSITES

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The metal matrix composites are considered as sophisticated materials in the field of aerospace, aircraft and automotive, and other industrial considerations. The current work investigations are made to understand the impact of nano B4C particulates inclusion on the hardness and tensile behaviour of zinc-tin alloy matrix. Nano B4C particles of 500nm size were adopted as the reinforcement in the zinc-tin alloy matrix. Nano composites fabricated by using liquid stir melt method by taking 6 and 8 wt. % in the zinc-tin alloy matrix. Specimens were subjected for Microstructural characterization using scanning electron microscope (SEM) and energy dispersive spectroscope (EDS). Hardness and tensile were evaluated as per ASTM standards, scanning electron micro photographs revealed the uniform distribution of nano B4C particles in zinc–tin matrix alloy and particulates were confirmed by EDS analysis. Further, hardness and tensile properties like yield strength, ultimate strength of the foundation matrix zinc alloy is improved with the addition of nano B4C particulates.

106. OPTIMIZED STRATEGIC MODEL OF VOLTAGE PROFILE IMPROVEMENT IN DISTRIBUTION NETWORK

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In todays scenario, the situation of energy market deregulation, global warming and load growth, distribution network needs a well versed strategy to maintain the reliability and efficiency of the power service. Inclusion of solar photovoltaic system with Battery storage in coordination with distributed static compensator is a practical approach to reduce the power quality and reliability concern. In this an extended version of Non-dominated sorting genetic algorithm is used to optimally

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STUDIES ON MECHANICAL PROPERTIES OF BOTTOM ASH REINFORCED LM13 COMPOSITE

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Abstract

In recent decades, the application of composite is enhancing to a great extent in any of the field. MMCs with less expansive and low density increase the demand in industrial sector, which can be achieved by using Bottom ash as reinforcement. The Bottom ash is low density and inexpensive by-product procured during combustion of coal in thermal power plant.
In the present field of study, the reinforcement of bottom ash particles were prepared by ball milling to get a grain size of 74nm to 114nm. The prepared Bottom ash particle and LM13 were used to fabricate MMCs composite by liquid metallurgy i.e. stir casting method with varying Weight percent of Bottom ash particle from 0Wt% to 8Wt% in step of 2%. The different specimen were prepared as per ASTM standard by using cast ingots of composite to determine various mechanical properties and also noticed that the significant improvement of mechanical properties such as tensile, compression and hardness by varying Wt% of Bottom ash particle and also study the microstructure of composite to know the dispersion of bottom ash particle in LM13 matrix.

Selection and/or Peer-review under responsibility of 3rd International Conference on Recent Research Emerging Trends in Materials& Mechanical Engineering ICRRETMME-2019.

Keywords: *LM13 alloy, Bottom ash, Stir casting, Microstructure, Mechanical properties.*

1. Introduction

The term composite means a solid state material that exists when substances of different densities in dense, each with its characteristics are alloyed to create a substance, whose characteristics are supercilious to the actual component for any particular uses. Aluminium alloys have the properties like low density, corrosion resistance; wear resistance, low thermal coefficient of expansion compared with conventional metals and alloys which rendered it for various applications. Al2024 reinforced with Al_2O_3 particles as reinforcement up to 30 wt% prepared by vortex method and subsequent applied pressure and studied the effect of porosity and other properties [7]. In recent works

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Experimental Investigations on Al_2O_3 and Bottom Ash Reinforced with Aluminium Metal Matrix Composites for Structural Applications

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Abstract

Al-7075 is extensively used in transport applications like marine, automotive and aerospace, because Al-7075 alloys have good cast ability, high corrosion resistance and low density. The present work investigates the behaviour of aluminium metal matrix reinforced with Al_2O_3 and bottom ash to study mainly the strength aspects for structural applications. The addition of Al_2O_3 is varied from 2–6% percent by weight of aluminium matrix and keeping bottom ash constant in order to study the effect of bottom ash. Composite beams will be tested under flexural in order to evaluate their mechanical property such as load-deflection criteria. These results will be compared with those obtained from plain aluminium metal.

Selection and peer-review under responsibility of SIXTH INTERNATIONAL CONFERENCE ON RECENT ADVANCES IN COMPOSITE MATERIALS, ICRACM-2019.

Keywords: Aluminium 7075, Weight fraction, Mechanical properties and Stir casting process.

1. Introduction

Composite material is a material consists of two or more different phases (matrix phase and reinforcement phase) and having properties more significantly different from those of any of the constituents. Demand for developing metal matrix composites for use in high performance application have significantly increased in the recent years. The major advantages of aluminium matrix composites compared to unreinforced materials are, high hardness, high tensile strength and wear resistance. Because of these improved properties MMC's are increasingly being utilized in high technology applications such as aerospace, defense and automobile.

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Effect on Bearings in Rotating Components by Vibration Analysis: A Case Study in Steel Plant

B. K. Pavan Kumar, Yadavalli Basavaraj and M. J. Sandeep

Abstract In the present work, the condition of machines and structures are determined by the condition monitoring technique of rotating machineries through vibration analysis. Here, the amplitude and frequencies of vibrating machines play a key role in the judgement of predicting the condition of the machineries. Henceforth, we have selected critical equipment for the testing which includes mill stands of bar rod mill (BRM-2) from the steel manufacturing industry. Now the amplitude of the equipment was taken by using vibrometer at different parts of the equipment, then by the FFT analyzer, the comparison was made between the parameters like amplitude versus time and amplitude versus frequencies. At the end with the help of the plots obtained the critical part of the equipment which was responsible for vibration was identified. Finally, with the remedial methods, the vibration was reduced to the acceptable level.

Keywords Condition monitoring · Bar rod mill · Vibrometer · FFT analyzer

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The vibration plays an important parameter in the rotating machineries which can be sort out by using vibration measuring instruments which are plenty available. The equipment selected for the present work is vibrometer due to the availability and easiness in handling. This device provides the details of the vibrations from the machines, which are used for fault diagnosis and maintenance. The main aim of vibration monitoring is to make maximum availability, reliability, and efficiency from the installed plant machines, aiming at excellent results. Vibration monitoring has been used in the areas of steel, chemical, sugar, paper, textile, etc. A reduction in maintenance and management costs along with the increase of machine availability is usually expected when preventive maintenance is performed in parallel with condition-based maintenance [1]. The vibration signal analysis is one of the most important methods used for

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Maharaja Gowda B[a], Raghavendra Joshi[b], Kuntanahal Rajashekhara[c]

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In the present field of study, the reinforcement of bottom ash particles were prepared by ball milling to get a grain size of 74nm to 114nm. The prepared Bottom ash particle and LM13 were used to fabricate MMCs composite by liquid metallurgy i.e. stir casting method with varying Weight percent of Bottom ash particle from 0Wt% to 8Wt% in step of 2%. The different specimen were prepared as per ASTM standard by using cast ingots of composite to determine various mechanical properties and also noticed that the significant improvement of mechanical properties such as tensile, compression and hardness by varying Wt% of Bottom ash particle and also study the microstructure of composite to know the dispersion of bottom ash particle in LM13 matrix.

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Maharaja Gowda B[a], Raghavendra Joshi[b], Kuntanahal Rajashekhara[c]

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PERFORMANCE APPRAISAL FOR START-UP COMPANY

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Ballari Institute of Technology & Management, Ballari.

Abstract-Performance appraisal is a method of evaluating the behavior of employee in the company, normally including both the quantitative and qualitative aspects of the job performance. It is a systematic way of evaluating both work related behavior and potential of employees. It is a process that involves determining and communicating to an employee how he or she is performing the job and ideally, establishing the plan of improvement. Managers can use the information gained from performance appraisal for developmental purposes such as determining how to motivate a worker to perform at high level, evaluating which of worker's weaknesses can be corrected by additional training and helping the worker formulate appropriate career goals and for evaluative, decision-making purposes such as deciding whom to promote, how to set pay levels, and how to assign tasks to individual workers.

AN ANDROID APPLICATION FOR CURRENT UPDATES IN THE FIELDS OF SPORTS AND MEDICAL

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Abstract: In the past decade there has been enormous growth of data on the internet. Well-liked online websites produce huge amount of news articles every day but major disadvantage is people will not be notified about the information. Hence for how the user can fast access to the valuable information has become one of the hotspots. With the fame of android application, mobile devices can provide information at anytime. In this paper we propose a method for providing current updates from multiple websites. The main aim of this application is to access news fast. The basic concept deals with news updates, the admin will add all the news URL. This paper describes a model to perform categorization which extracts useful information for classifying a document into category by referring to URL. It allows the readers to read the news based on interest. This can be possible by enabling them to choose the categories of news such as sports and medical.

AUTOMATED MEDICAL LABORATORY REPORT SYSTEM

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ABSTRACT- This paper presents the ideology of automated medical laboratory report system. It is a web based application which allows the doctors, patients and pathological laboratories to work collaboratively. It is a web based information storage and information management system designed for pathology and diagnostic centers. It uses an efficient way of storing the patients' information along with their various test reports. The data are stored using a system that helps the user retrieve information quickly. By using the system an entity such as a diagnostic center can be more modular and organized. The system has been designed in such a manner that it takes care of all the needs of a typical diagnostic center and it is capable of providing easy and effective storage of information related to the patients. Doctors diagnose the patients and their test details are sent directly to pathologic laboratory. Patients need to complete their tests by visiting the laboratory; after their reports are generated it is sent directly to the doctor's registered mail-id. Doctor verifies these report and the prescription is sent directly to patient's mail-id wherein patients need not wait for long for doctors visit. These reports are stored for future usage. This application is user friendly and is capable of providing easier access to patients.

Keywords: Pathological laboratory, Automated System, Diagnosis, Test reports.

AN ANDROID APPLICATION FOR COLLEGE EVENT DIARY

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Abstract - Normally all the information of the college had been viewed in a hard file. While searching any information it is too difficult to access and takes a lot of time to search and manage. This paper is aimed at developing an Online College Event Dairy. It can be used for monitoring different events in the college. Students as well as co-ordinator can login to this application and then they can access or search the required information regarding events. Information about the events will be uploaded by coordinator and students can view and register to those events if interested. This application is developed for engineering college in order to maintain college events to reduce time and paper work. For this students must be registered after which they can access as well as coordinators modify as per the permissions given to them.

Key Elements: Android Application, Event Management, Event Results, Notification.

ASSURED FACET ATTESTATION USING NOVEL LIGHTENING

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Abstract-we are well aware of this world where the technology is growing to touch the sky in such a world security plays an important role not only security we need to achieve higher levels of security for that we are implementing a project called assured facet attestation using novel lightening where assured means secured facet means it refers to human face and attestation means authentication , to detect and compare human faces and human facial parts . we are implementing this project because the faces of every person is different and every human being facial parts differ in color shape and size so on. we thought of implementing a system in which it is trained in such a way that it uniquely identifies each and every individual by their different faces. hence achieving higher levels of security. It is used to provide secured phone access by setting up password to systems using our own faces that is the unique behavior of human characteristics, which cannot be cracked by anyone and is also used in identification of criminal where our system is capable to recognize that person in the case where his face is not visible properly but any part of his face like either eyes ,nose or mouth should be visible, so using this it recognizes that person from the database .our system basically detects face and its constituents and then compares with images available in the database under all lighting conditions independent of pose, orientation, texture color using viola jones and novel lighting techniques.
Keywords— security , Novel lightning, assured facet attestation, viola-Jones

SMART DEPARTMENT

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ABSTRACT- In current system, all the data regarding study materials, notices, university updates, previous year question papers has to be viewed in a hard copy or by going through many official websites, similarly at the same time while searching for any information, it is too difficult to access and is time-consuming process to search the particular website, hence in order to overcome these problems an android based smart phone application can be used to make this process easier, secure and error-free. This application provides students to easily access the results, get the university updates, notices from the department and notes and question banks from the respected faculty.

Keywords—Android application, Notices, Notes, QuestionPapers, Results, University updates.

ENERGY EFFICIENT RING BASED CLONE DETECTION PROTOCOL IN WIRELESS SENSOR NETWORKS

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ABSTRACT- In the present status of remote interchanges, Wireless Sensor Networks is one of the up-coming innovation which resulted in the advancement of system with numerous number of minor, low power, multitasking sensor hubs. WSN consists of communicable approach thus there is a need for security Wireless Sensor Networks(WSNs) which serves as supporting framework in gigantic applications. Secure correspondence in WSNs plays an important role as the data sent through these systems can be effectively caught or supplanted or adjusted. Clone attack is a node replication attack. A hacker can steal a node from the system and change information from stolen node and can reconstruct that node to make a clone of a stolen node. To shield arrange from clone attack is very important in WSN. The main goal of clone identification convention is to give solid assurance against clone attacks, high detection probability, low storage requirements with upgraded organize lifetime by expanding energy efficiency with distributed detection mechanism.

Keywords: Wireless sensor networks, Clone detection protocol, Energy efficiency, Network lifetime.

ANDROID BASED COLLEGE PLACEMENT APPLICATION FOR AN INSTITUTION-AN ANDROID APPLICATION

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ABSTRACT- Android Placement System aims at providing the Facility to automate and simplify the process of registration and list generation of eligible students for placement. This System do all work regarding placement like collecting student records, Authenticate & activate the student profiles, Notifying eligible students via automated E-mail message The main feature of this project is automatic email generation and sending. In this TPO will feed the criteria and the notification will be sent to the eligible students automatically. Students can directly apply for the company using the apply function which will be provided by the system. The application

also provides facility of maintaining details of students along with the placement records of the college. There is also facility of communication wall through which user can post their queries and answer them.. If placement process is conducted manually, then a lot of additional paperwork needs to be done; it requires a lot of time. This system will eradicate all manual work, by automating the information collection procedure, conduction of tests, displaying of results, as well as, storing it, notifying the eligible students via. Email and SMS, displaying the list of eligible students etc.

Keywords- Android, Student Analysis, Profile, Security.

WEB PORTAL FOR DOCTOR AND PATIENT COMMUNICATION - A WEB APPLICATION

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Abstract- Nowadays people are relying on technology which makes the work to be done at their fingertips. Modern technology is advancing day by day and has a major impact on the medical field. So, here we are implementing a web portal for an efficient doctor and patient communication for maintaining patients' information, patients' appointments, organ donation details, and helpdesk. This system helps us in reducing the manual work for maintaining records in files. Using this system data is maintained in database and data retrieving and updating becomes an easy process. Doctors and patients can view this data from anywhere and anytime easily. This is a better platform for organ donation and organ search. Helpdesk helps patients to get answers to their queries whenever necessary. In this paper, we are giving the introduction to the portal and literature survey which describes various portals and their importance. The limitations of the existing system are overcome by the proposed system.

Keywords- doctor and patient communication, patient health record, organ donation.

FRODO: FRAUD RESILIENT DEVICE FOR OFF-LINE MICRO-PAYMENTS

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ABSTRACT- Credit and debit card data theft is one of the earliest forms of cybercrime. Still, it is one of the most common nowadays. Attackers often aim at stealing such customer data by targeting the Point of Sale (for short, PoS) system, i.e. the point at which a retailer first acquires customer data. Modern PoS systems are powerful computers equipped with a card reader and running specialized software. Increasingly often, user devices are leveraged as input to the PoS. In these scenarios, malware that can steal card data as soon as they are read by the device has flourished. As such, in cases where customer and vendor are persistently or intermittently disconnected from the network, no secure on-line payment is possible. This paper describes FRoDO, a secure off-line micro-payment solution that is resilient to PoS data breaches. Our solution improves over up to date approaches in terms of flexibility and security. To the best of our knowledge, FRoDO is the first solution that can provide secure fully off-line payments while being resilient to all currently known PoS breaches. In particular, we detail FRoDO architecture, components, and protocols. Further, a thorough analysis of FRoDO functional and security properties is provided, showing its effectiveness and viability.

KEYWORDS*:* Micropayment Scheme, Point of Sale(PoS), resilient attackers, FRoDO protocol, and secure micro-payment.

PRIVACY PRESERVING ACCESS CONTROL SCHEME IN CLOUD

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ABSTRACT-The cloud services have become one of the attractive topic with the vast improvement of the cloud technology. The cloud based services furnishes users with benefit and it also brings many security problems. Hence, with the application of access control scheme, the user's privacy in cloud is secured and the cloud service gives a great significance to the users. In this paper, we present an access control scheme system with privacy protection based on privilege separation. The users are classified into two main domains: the private domain and the public domain. In the private domain, the read and write permissions for the users to access the data is granted respectively. The Key-Aggregate Encryption is utilised to grant the read access permission which improves the efficiency for accessibility. Also, with the use of Improved Attribute-based Signature, a high level of patient privacy is guaranteed simultaneously and this can determine the user's write access. An orderly attribute-based encryption is implemented for the users of public domain to avoid the issues of failure and complex key distribution. This method can achieve security in cloud as a result of performance testing.

FORGERY DETECTION IN TEXTUAL GRAPHICAL IMAGES

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ABSTRACT- Images are the medium of communication. But nowadays various tools are available that manipulates the image. So there is a need to detect the forged image so that image is not altered and we can be aware about the real and forged image. There are two types of image forgery detection copy move and image splicing, in this paper various attacks like blurring, noise, scaling, etc. may occur. The overview of forgery detection techniques, the basic flow of how the forged image can be detected is presented. And finally, it is concluded with the comparative study with some parameters, merits and demerits.

FARMVISOR - AGRICULTURAL BASED ANDROID APPLICATION

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ABSTRACT - The purpose of this paper is to create agriculture based jobs for farmers and providing financial support as well as providing affordable agriculture equipments and machineries. This is an android application with which the farmers can be benefitted as it will help the jobless farmers to find agriculture based jobs suitable to their skill set and receive investments from various investors across the country.

Keywords – Equipment; jobless; skill; investors; agriculture.

CITY SCALE TAXI RIDESHARING SYSTEM

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ABSTRACT-Continuous ridesharing is an administration that masterminds one-time shared rides on brief period. The taxi sharing framework that acknowledges taxi travelers' ongoing ride demands sent from cell phones and calendars legitimate cabs to get them by means of ridesharing, subject to time, limit, and financial requirements. The financial requirements give motivators to the two travelers and cab drivers travelers won't pay more contrasted and no ridesharing and get remunerated if their movement time is stretched because of ridesharing; cabbies will profit for all the bypass separate because of ridesharing. Taxi riders and cabbies utilize the taxi-sharing administration gave by the framework by means of a PDA App. The Cloud first discovers applicant taxis rapidly for a taxi ride ask for utilizing a taxi seeking calculation upheld by a spatio-worldly file. A booking procedure is then performed in the cloud to choose a taxi that fulfills the demand with least increment in movement separate. A ride ask for generator is produced as far as the stochastic procedure displaying genuine ride demands gained from the data` set. Tried on this stage with broad tests, our proposed framework showed its productivity, viability and versatility.

Keywords: Smartphone, Ridesharing,

FRAUD DETECTION IN HEALTH INSURANCE USING DATA MINING TECHNIQUES -A WEB APPLICATION

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ABSTRACT: Fraud is across the board and expensive to the social insurance protection framework. Extortion includes deliberate trickery or deception expected to bring about an unapproved advantage. It is stunning in light of the fact that the occurrence of health insurance fraud continues expanding each year. With a specific end goal to distinguish and evade the extortion, data mining procedures are connected. This incorporates some preparatory learning of human services framework and its deceitful practices, examination of the attributes of social insurance protection information. Data mining which is isolated into two learning strategies viz., supervised and unsupervised is utilized to distinguish deceitful cases. In any case, since every one of the above procedures has its own particular arrangement of focal points and drawbacks, by joining the benefits of both the systems, a novel cross breed approach for identifying deceitful claims in medical coverage industry is proposed.

Keywords-Data mining; Health Insurance fraud; Supervised; Unsupervised

EASY BLOOD MANAGEMENT SYSTEM
-A WEB APPLICATION& ANDROID APPLICATION

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Abstract: This online blood bank management system helps in managing various blood bank operations effectively. The project consists of a central repository containing various blood deposits that is available along with associated details. These details include type of blood, storage area and date of storage. These details help in maintaining and monitoring the blood deposits. The project
is an online system that allows us to check whether required blood deposits of a particular group are available in the mobile application. Moreover the system also has added features such as patient name, contacts, blood booking and even need for certain blood group is posted on the website to find available donors for a blood emergency. Easy blood is concerned with
finding the blood donors Who are nearer to the user location? For every two seconds there is a need of blood. More than 38,000 blood donations are needed every day.

Keywords-Blood, Database.

AUGMENTING DWELLER SEARCH-THROUGH WEB APPLICATION

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Abstract :In the globalized world, lots of people are well educated and employed. At some times, it becomes utter necessary for them to move to different cities. It is quite a tedious job for a person alone to search a rental house by moving from place to another in an unknown city. Apart from that, since they are not familiar with the localities and the actual distance from their workplace to the selected locality, there is a lot of ambiguity created within them whether to choose a locality which is nearer to their workplace and in the budget or to prefer their comfort and luxury. Augmenting dweller search helps the dweller to search a rental house quickly, easily and based on their requirements like-whether the house is nearer to the supermarket, how far the house is from their workplace, market, shopping complex, food court, bus stops, railway station etc. This application is trustworthy because a volunteer from their team will confirm that whatever is uploaded to the site is liable to believe. There are users or tenants can search a place that fulfills their requirements

Keywords: Rental application, Dweller Search.

BIDDING APPLICATION FOR AGRICULTURAL PRODUCTS USING AMAZON WEB SERVICES

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ABSTRACT: - The Objective of this work is to make farmers and agriculturalist to achieve best price for their products that they produce or sell. The salient features of this system is the bidding by which each owner/farmer attains their maximum price for their product with respect to their urgency .This also provides facilities for the clients to quote their price for bigger requirement by means of the tendering strategy which is the exclusive features in this application. By this method, farmers can realize the necessity of the people at any point of time. For authorization purpose, there is a membership facility to make sure they maintain loyalty. There is also an open forum in this application in which the registered users can interact with each other. This helps them to maintain business relationship between all the genuine members in this site.

Keywords:-bidding; auction; Agriculture products; Amazon elastic cloud; price, chat room, discussion forum.

UNIFIED CAMPUS

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ABSTRACT: Unified campus is an application that enables students to access the information about the admission, academics, placements, transport as well as the cultural activities. This application will help notify the students whenever there is shortage of attendance/internal marks, also notifies them about the updates from placement cell, sports or any other activities that is being held at the college. The main objective of this project is to add mobility and automation to the process of managing student information in an institute. In real world scenario such as college campus the information is in the form of notice, hand written manual, verbal message is being spread among the students. Today it is of the essence to not only use the predictable forms of the statement, but also new forms such as cell phone technology, for faster and easier communication among the students. The approach of communication is Android, the core idea of this project is to implement Android based mobile campus application for advancement of institution and educational system. The application will be used by students and management. In the traditional system, all the information is viewed in a hard file or in website. At the same time while searching any information it is too difficult to access and takes a lot of time to search from a particular website. Hence in order to overcome this problem a smart phone based Android application can be used to make this process easier, secure and less error prone.

Keywords: Android Application, Mobility, Automation, Technology, Secure.

AN ANDROID BASED CAR PARKING MANAGEMENT SYSTEM

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Abstract: The smart parking booking system provides users to easily book their parking space through online. This application overcomes the difficulties of finding a parking space in business complexes that unnecessarily consumes time. Hence this project offers a web-based reservation system where it is user friendly to view various parking areas and view whether space is available or not. If the booking space is available then user can book it for specific time and slot. The booked space will be marked as red and nobody can access for that specified time slot. When users view the registered slot icon it shows the detailed information about the registered slots. This system provides an additional feature of cancelling the bookings. Users can even make payment by online. After making payment, users get notification via SMS along with unique parking number

Key Elements: Car parking management, online parking, Parking notification.

TWO – FACTOR DATA SECURITY MECHANISM FOR CLOUD STORAGE SYSTEM

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ABSTRACT: In this paper we proposed two-factor data security mechanism with factor revocability for cloud storage system. Our system allows a sender sends an encrypted message to a receiver with the help of cloud system. The sender requires to know only the identity of receiver. To decrypt the cipher text, receiver needs two parts. The first thing is a unique personal security device or some hardware device connected to the computer system. Second one is private key or secrete key stored in the computer. (to decrypt the cipher text on the receiver end w eneed a secuiryt key and hardware device). It is impossible to decrypt the cipher text, once the security device is lost. In our system we propose a mechanism where once the security or hardware device is lost, the cloud server will revoke the device and execute some algorithms which changes the existing cipher text.

KEYWORDS: cloud storage system, cloud security, two-factor.

ANDROID BASED APPLICATION FOR DISASTER RECOVERY SYSTEM

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Abstract- This paper describes how to connect smartphones for providing communications in disaster recovery, via wireless networks, and implemented a system called TeamPhone. TeamPhone consists of two components: a messaging system and a self-rescue system. Messaging system is a way of communication between victims and the rescue workers. The victim sends the message through the messaging system to the rescue team. Self rescue system gathers the location of victim and sends the nearest rescue team for rescue.

Keywords—Smartphone, routing, disaster recovery.

WEB REVISITATION BY CONTEXT AND CONTENT KEYWORDS WITH RELEVANT VIEWS-A WEB APPLICATION

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Abstract: Going reverse to formerly viewed web page is a common yet edgy task for users due to the large volume of personally accessed information on the web. This web application facilitates humans natural process of recalling to re-visit the pages previously accessed by using web revisitation procedure called WebPagePrev throughout content and context keyword. A relevant views mechanism is also involved to facilitate users to acquire appropriate idea about the products. Compared with existing web revisitation tools, the projected WebPagePrev technique deliver the finest quality in search history, ranking and rating of the products. The context + content based re-finding used in this web application deliver the best performance compare to content based re-finding and contxnt based re-finding.

Keywords-Web revisitation, Access context, Page content, Relevant views.

A SECURED DATA SHARING SCHEME FOR MOBILE CLOUD COMPUTING

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ABSTRACT: Mobile Cloud Computing enables mobile users to store /access large data on the cloud and it helps to reduce the Running costs for computation intensive applications. These applications are not constrained by storage capacity on the devices because their data is now stored on cloud. In mobile cloud data security problem becomes more severe and prevents further development. Mobile devices face many resource challenges (battery life, storage, bandwidth etc.) so cloud computing offers advantages to users by allowing them to use infrastructure, platforms and software by cloud providers at low cost. A secured data sharing scheme is proposed in mobile cloud that adopts CP-ABE and it delegates the maintenance of access control tree structure to the proxy server and makes it secure data scheme.

WOMEN PROTECTION ANDROID APPLICATION

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ABSTRACT: Now a days women security has become majorproblem, and in today's world, use of smart phones by the people has been increasing rapidly and hence, a smart phone can be used efficiently for women protection purpose .At the time of emergency women will have no time to dial an emergency number .This paper describes about women safety ,by using electronic device i.e., android mobile in which it is used to intimate the registered contacts about the current location of the women who is in unsafe condition to provide safety to her. This application is designed specially for women security purpose . This application is purely based on GPS and GSM which tracks the current location of the women and as well as provides alerts to the registered contacts .The women can enter an emergency message which can be sent along with location to all the registered contacts .The security for women has become very poor and the need for this women security application plays a very helpful role for women security and safety purpose.. s

Keywords— Women security, Smartphone, Registered contacts , Database ,GPS(Global Positioning System),GSM(Global System for Mobile)

AUDIT FREE CLOUD STORAGE VIA DENIABLE ATTRIBUTE BASED ENCRYPTION

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ABSTRACT: Cloud storage services have become increasingly popular. Because of the importance of privacy, many cloud storage encryption schemes have been proposed to protect data from those who do not have access. All such schemes assumed that cloud storage providers are safe and cannot be hacked; however, in practice, some authorities (i.e., coercers) may force cloud storage providers to reveal user secrets or confidential data on the cloud, thus altogether circumventing storage encryption schemes. In this paper, we present our design for a new cloud storage encryption scheme that enables cloud storage providers to create convincing fake user secrets to protect user privacy. Since coercers cannot tell if obtained secrets are true or not, the cloud storage providers ensure that user privacy is still securely protected.

AUTOMATION OF STUDENT'S PERFORMANCE

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ABSTRACT: The study aims to determine student's performance. A automated software, measuring student's performance has been used to collect data from the teaching faculty through sheets and determine the success rate . The academic performance of the students is measured taking into account marks obtained during their complete course. The prediction of academic performance has assumed great importance in view of its practical purposes. Performance of student is very important for success of any educational institution.

KEY WORDS: Student's performance, Success rate, Enrollment Ratio, Academic performance.

ENERGY PROFICIENT SMALL RANGE MOBILE CLOUD SERVICE

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Abstract- Offload mobile technology is a concept which has the ability to access service from the near device without using the internet connection. Here our primary focus is to concentrate on optimum usage of battery life, as battery is one of the scarcely resource in the mobile phone. Our new scheme helps to share the necessary services by using short range wireless technology i.e. if there is a scarcity of a battery, then the program which needs to be executed can be sent to the near by device for execution and get back the results. As we know that the most of the application and operations being executed in cloud require the internet connection. It consumes more mobile battery energy for preparation to execute an operation rather an actual usage making it to drain more quickly. Offload mobile technology eliminates such unnecessary battery drain since it is used with in small range and expects services from neighbor devices not necessarily with internet. The application has to be installed on both ends of receiving and sending mobile phones which must have offline mobile machinery application running in order for transfers to complete. In this paper, we propose a new scheme of establishing a small range mobile cloud to provide essential services not necessarily with internet, comparison study of file sharing applications and analysis has been performed and presented in a graph. These file sharing applications helps the users for faster sharing rate among them using WLAN. They provide ease of access among multiple devices which are compatible .Many tests are conducted like transferring several types of executive files and then the results have been gathered. A comparative study of similar file sharing has also been done and the challenges or issues that are present concerned to them have been mentioned. The work primarily focuses on the commonly used file sharing applications in mobile devices worldwide namely SHAREit , Xender and Zapya.

Keywords: Mobile Cloud, Effective battery Utilization, File Sharing Applications, Data transfer rate, Neighbor Devices.

DESIGN AND DEVELOPMENT OF SKILL AND ACTIVITY TRACKING SYSTEM

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Abstract- Skill and Activity Tracker System (SATS) is an automatic system which helps employees and the managers in any functional organization. SATS helps to define the tasks in the organization and also provides the managers to track the hard work spent by the employee for that particular task. A report generation service is supported in SATS that allows the managers to analyze that the skills of the employee which are utilized and those which are not. This tool can help managers for effort estimation per task. This software provides employees to manuscript and analyze their efforts. Skill and Activity Tracker System (SATS) is an effective application that can be used in the organization for defining tasks with high clarity and also tracking the progress of each task. . The main purpose of this application is to provide help for anyone to interact with anyone, particularly in software industry by sending messages, receiving messages, open conversation forums to share their information and updating their tasks with current information. This system helps group of team members all over the world to communicate with each other. The application is for free of use provided the users have to sign with his/her details. maintain skill ordnance may not still be very usual in many companies, but patter into the power of skills (for business and competitive advantage) has put the exercise of skills tracking at the forefront of many an organizational agenda. Skills, which may otherwise go unobserved, can be leveraged and channelized towards the company's profit and on the road to recovery employee efficiency carried out by companies for improving employee productivity and workforce development.

A REVIEW ON A WEB APPLICATION FOR SMART CITY

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Abstract-This paper explains the different aspects for the transformation of a city into smart city. A Smart city is an innovative city which provides a platform to the citizens to improve their quality of life, ensuring that it meets the needs of citizens with respect to the problems relating to water supply, sanitation, power supply. It provides the gateway for citizens to pay taxes, provides the information of a particular area in a city. Smart city helps in utilizing the less man power and in reducing the paper work with respect to governance.

Keywords- Competitiveness, Environment, Good governance, Innovative, Quality of life

REDUCING THE SIZE OF UPDATES IN ANDROID APPLICATIONS USING DELTA++

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ABSTRACT : Android is an open source working framework for cell phones. Android builds up the a huge number of utilizations and are downloaded by a huge number of client. Each time refreshing the applications brings about expanding the system activity and load on cell foundation. Making and sending refresh patches enhances the android application refreshes. To accomplish this initially unloading the android application bundle and afterward compacting its components separately. Client would then be able to download a littler fix. Contrasted with Google savvy application this investigation expands the funds in cell arrange transfer speed utilize and it gives the lighter application server loads.

PROTECTED AND WELL-ORGANIZED DISTRIBUTION OF INFORMATION IN CLOUD USING REVOCABLE STORAGE AND IDENTITY BASED ENCRYPTION

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ABSTRACT: Cloud computing provides an adaptable and comfortable way for sharing a data, which brings different profit for both the civilization and distinct folks. But there exists a normal opposition for users to directly outsource the collective data to the cloud server since the information frequently contain treasured information. Thus, it is crucial to place cryptographically increased admission regulator on the collective evidences. Identity-based encryption is an accomplished cryptographically primitive to build a real-world data circulation system. Nevertheless, admission control is not inert. That is, once some user's agreement is perished, there should be a machine that can eliminate him/her from the scheme. Subsequently, the withdrew operator cannot contact both the earlier and next shared information. To this end, suggest a notion called revocable-storage identity-based encryption (RS-IBE), which can offer the onward/regressive safety of cryptograph by familiarizing the functionalities of user withdrawal and cryptograph text apprise concurrently. Besides, it presents an actual construction of RS-IBE, and verify its safety in the distinct safety model. The presentation assessments specify that the planned RS-IBE system has benefits in relations of functionality and productivity, thus it is possible for a real-world and profitable.

Keywords: Cloud computing, Cipher text, Revocable storage identity-based encryption, Diffie Hellman, RSA, AES

TESTEE –AN ONLINE APPLICATION SOFTWARE OF SOCIAL NETWORK FOR QUERIES AND ANSWERS

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ABSTRACT Testee an online application software of social network for queries and answers system play a important role in our day-to-day life for information and knowledge interchange. Users post questions and pick questions to answer in the system. Due to the rapidly growing internet users population and the number of questions, it is improbable for a user to stumble upon a question by chance that (s)he can answer. The primary objective of this project is to improve the performance of Q&A systems by actively forwarding questions to users who are capable and willing to answer the questions. To this end, we have designed and implemented Testee an online application software of social network for queries and answers system. Testee influences the social network properties of common-interest and mutual-trust friend relationship to identify an asker through friendship who have most likely wood to answer the question, and enhance the user security. We also improve Testee with security and efficiency enhancements by protecting user privacy and identifies, and retrieving answers automatically for recurrent questions. We describe the architecture and algorithms, and conducted comprehensive large-scale simulation to evaluate Testee in comparison with other methods. Our results suggest that social networks can be leveraged to improve the answer quality and asker's waiting time. We also implemented a real prototype of Testee, and analyze the Queries&Answers behavior of real users and questions from a small-scale real-world.

STUDENT PROJECT ALLOCATION AND MANAGEMENT THROUGH ONLINE TESTING SYSTEM

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Abstract-The enhanced student project allocation system, there is generic problem for the allocation of project to the student, where without no knowledge of the particular project. This paper is aimed at developing a web-based system which manages the activity of "Student Project Management" and "Online Testing". This system will deals with managing the database and maintain a list of all record of project team that have registered on this web application, conduct their online test and shortlisted according to the performance and team will be formed by the professor.

UNIFIED LOCALITY MANAGEMENT SYSTEM-AN ANDROID APPLICATION

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ABSTRACT: Online product delivery system is the most efficient online business in today's world. Various kinds of commodities can be ordered at anytime, anywhere and anything by just registering into the application. The commodities ordered may include grocery, medicines, fresh vegetables ,and the details of the DTH providers in a particular locality of the city. People opt for online shopping as it will be safe shopping time and the order can be placed anytime and anywhere. The existing online product delivery system is still lacking with some important aspects that are very crucial for the customer satisfaction. . Customers would find their experience most enhanced when the online ordering system give them the flexibility to choose their delivery method and receive the notification on the ordering status**.** Today the rapid change in the business environment is extremely important to be able to respond to client needs in the most effective and timely manner. This project allows viewing various products available and enables the registered users to purchase desired products instantly using online transaction or cash on delivery method. This project provides an easy access to Administrators and Sellers to view the orders done by customers.

A Research Paper on Advertising and Marketing to Female Consumers

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1. Introduction

With the advent of Television, Commercial Radio's, Cell Phones, Internet, LPG policy and the increase in standard of living, the tremendous changes in the buying behaviors of women are seen. This new environment changed the markets from seller's market to buyer's market and the marketers are made to strive for achieving sustainable competitive advantage for their survival.

These changes, challenges and growth have been initiating and accelerating the process of inexorable integration of markets, nation states and technology to a degree never witnessed before in the recorded history of mankind. The impact of them has been so comprehensive that no part of life across countries and continents can afford to be free from their influence.

All the business units which wish to survive and prosper in this changed business environment; without exception, have to change their approaches in all the functional areas of management. Those who are hesitant to change are sure to disappear. And the competition in the ultimate analysis is the market centric.

Marketers are able to influence the consumers if they are able to predict the consumer behavior. In these days of consumer-centric markets, the knowledge of the behavior of consumers is inevitable. Each consumer segment has unique needs hence an in-depth study of consumers and their behavior is necessary to design suitable products and to market them.

Marketers and advertisers need to be masters of fundamentals of human psychology that will be valuable in understanding, predicting and shaping human behavior. Principles that influence human psychology can be useful for marketers for motivating consumer purchase decisions.

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Comparative Investigations on Al7075 MMC reinforced with wt. %6 Al2O3 and B4C

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Abstract. MMCs are finding greater applications in aerospace, auto industries owing to their typical properties with respect to wear, mechanical and temperature resistance. The present study involves evaluation of microstructure, drilling, mechanical properties for Al7075 reinforced with Al_2O_3 content of wt.% 6.MMC and compare with Al7075 - 6% B4C composite for showing effect of reinforcement on drilling, mechanical properties. The composite samples were examined for mechanical, bending strength, hardness, elongation behaviour. Results revealed that uniform circulation of particulates in matrix structure with great bonding. Al7075 reinforced with 6% B4Cdisplays high mechanical strength, better elongation, high surface quality and low hardness is seen. Surface roughness test was carried on the basis of Taguchi's L9 orthogonal, and analysed by ANOVA, results specify maximum influence on surface roughness is due to speed for Al2O3. Further with B4C the surface roughness is affected by material, confirmation tests were also conducted for validation of process parameters.
Keywords: Al_2O_3, B4C, Al7075, Wear characteristics, Drilling Analysis

1.Introduction

The composites are playing a pivotal role in the present-day technology. Among several MMCs, Aluminium matrix composites are prominent possessing good mechanical properties and find major applications in the fields of aerospace and automobile. With the introduction of SiC, B4C, Al_2O_3etc as reinforcement the properties have enriched in terms of hardness, wear. Based on the type of alloying element various techniques like powder metallurgy, casting by stirring, squeezing can be adopted. Several researchers have made extensive investigations in the relevant area. Some of the works done are, Senerkarabulut et al [1]conducted mechanical tests with AA7039with SiC, B4C, Al_2O_3as reinforcements, concluded with results showing elevated hardness, elongation, TRS, prolongation with Al_2O_3reinforced composite exhibited better bonding better surface. K. Umanath et al [2] studies are with A16061-T6, silicon carbide (SiC), aluminium oxide (Al2O3) composite on wear safety. T. Rajmohan et al [3], M. Ramulua et al [4], A. Pramanik et al [5], A. Saravanakumar et al [10] tested

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Investigations on mechanical behavior of Al7075 - nano B_4C composites

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Abstract. The paper is the result of investigations made on microstructure and mechanical behavior of 3 and 6 weight percentage of nano sized B_4C particulate reinforced to Al7075 alloy composites. Al7075 matrix composite having nano boron carbide was fabricated by liquid stir casting method. The microstructure of the composites was examined by scanning electron microscopy. Further, mechanical behavior of Al7075 alloy, Al7075-3wt. % B_4C and 6 wt. % B_4C composites were studied. Tensile properties like hardness, ultimate tensile strength; yield strength, percentage elongation and compression strength were evaluated as per ASTM standards. Micro structural observation revealed uniform distribution of B_4C particles in the matrix. The analysis disclosed hardness, ultimate tensile strength, yield strength and compression strength of composites increased due to increase in percentage of nano boron carbide particles and percentage elongation of the composites decreased with increase in B_4C particulates in base alloy matrix.

Keywords: Al7075 Alloy, B_4C Nano Particulates, Ultimate Tensile Strength, Yield Strength, Stir casting, Percentage Elongation

1.Introduction

Aluminium based metal matrix composites (AMCs) have found greater applications in the field of automotive, aircraft industries owing to their low density and concomitant high wear resistance, strength, corrosion resistance, stiffness and thermal conductivity [1, 2]. AMCs are fabricated by incorporating micro and nano sized ceramic particles, such as SiC, Al_2O_3 and B_4C, into the aluminium matrix. Boron carbide is a superior reinforcement material due to its high hardness, low density, high strength, high wear and impact resistance, high melting point, low coefficient of thermal expansion and good chemical stability [3]. Pankaj et al. synthesized the A356-B_4C (4 wt %) and graphite

Investigations on mechanical behavior of Al7075 - nano B_4C composites

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Experimental Study on Dissimilar Friction Stir welding of Aluminium Alloys (5083-H111 and 6082-T6) to investigate the mechanical properties

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Abstract. Friction stir welding is an innovative technology in the joining realm of metals and alloys. This technique is highly economical and suitable especially for non ferrous alloys compared to ferrous alloys. It finds many applications in various fields of aeronautics, automobile, ship building industries etc. The paper presents the comparative results of mechanical properties such as tensile strength, microstructure, macro structure and hardness on the similar and dissimilar aluminum alloys AA5083-H111 and AA6082-T6 under certain selected variables - constant tool rotational speed, its tilt angle, welding speed using friction stir welding process. It is observed from the experimental results that joint efficiency of dissimilar aluminium alloys is higher than the similar aluminum alloys.

1. Introduction

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Experimental Study on Dissimilar Friction Stir welding of Aluminium Alloys (5083-H111 and 6082-T6) to investigate the mechanical properties

H M Anil Kumar *. V Venkata Ramana and Mayur Pawar

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Key words: **Magnetostrictive actuator, Coaxial coils, Step input, Inductance, Jiles-Atherton model, Quadratic magnetostriction model, Quality factor.**

I. INTRODUCTION

Magnetostrictive materials like Terfenol-D have attracted much attention due to excellent magnetostrictive properties. Particularly, the high displacement resolution, high energy density, high frequency bandwidth and short response time makes Terfenol-D material more attractive for sensors and actuators (Anjanappa and Bi, 1994). In line with, the different sensors based on magnetostrictive technology (Calkins, Flatau and Dapino, 2007; Ekreem et al., 2007), few direct and indirect techniques to measure magnetostriction (Ekreem et al., 2007) of a magnetostrictive material used for actuation have been addressed. The prospective use of Terfenol-D has been emerging significantly as it is evident from the various research publications. Based on stimuli generation and configuration in terms of force, stroke and frequency the strategy to select available actuator technologies (Poole and Booker, 2011), analytical approaches to compute magnetic field strength of laminated Terfenol-D eddy current losses into account (Zhifeng, Fuzai and Yang, 2009), electro-mechanical analysis on three types of biased magnetostrictive actuators to explore suitable configuration for providing large biasing fields (Lhermet et al.,1993) have been studied. Apart, the actuator using Terfenol-D material has been employed to neutralize aero elastic and vibration effects in helicopters and fixed wing aircraft (Giurgiutiu, 2000), feasibility of solid-state actuation in helicopter servo-flap for the active control of rotor blade (Giurgiutiu, Rogers and Rusovici, 1996) and emphasized the effect of heat generation from the solenoid that make actuators unreliable used in precision positioning applications (Dozor, 1998). In addition, the modelling of magnetostrictive materials has attracted increasing attention in recent years and considerably developed by improving the existing theoretical models. It is evident from the literature that the strong coupling between magnetic properties and mechanical properties of magnetostrictive materials can be understood through magnetostriction phenomenon. Many researchers have proposed different models to evaluate theoretically the magnetization using Jiles-Atherton field model for ferromagnetic hysteresis (Jiles and Atherton, 1983; 1984; 1986), apart the quadratic moment rotation model for magnetostriction and wave equation for displacement of a Terfenol-D material has been evaluated and showed that these results are in good agreement with the experimental data (Calkins, Smith and Flatau, 2000). This basic approach has been further implemented by Dapino, Smith and Flatau, (2000) and Dapino et al., (2000), in an improved form accounting the effect of applied pre-load on the Terfenol-D (Dapino et al., 2002). To study large deformation produced by magnetostrictive materials, the Euler coordinate system

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Optimization of Dissimilar Friction Stir Welding Process Parameters of AA5083-H111 and AA6082-T6 by CCD-RSM Technique

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Abstract The non-heat-treatable aluminium alloy AA5083 is used widely for marine applications because of its high resistance to sea water and industrial chemical environments. The heat-treatable AA6082 is regarded as structural material exhibiting medium strength and good resistance to corrosion and occupies incredible applications in construction industry. The joining of these alloys is bit challenging in the fusion welding process because of inevitable welding defects like porosity, cracks, distortion. The friction stir welding (FSW) is a potential solid-state joining process which is found more appropriate for such alloys. In this study, dissimilar materials such as AA5083-H111 and AA6082-T6 are selected for the FSW and based on design of experiments 31 trials were chosen with four varying input factors (tool pin profile, tool rotational speed, welding speed and axial force) at five levels to optimize the output responses, namely ultimate tensile strength (UTS) and percentage of elongation (POE). The central composite design (CCD) technique with response surface methodology (RSM) is applied using Design of Expert Version 11 software to develop second-order linear regression quadratic mathematical models using analysis of variance (ANOVA) in order to establish the relationship between input parameters and output responses. Further

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Design and Fabrication of Semi Automatic Wall Plastering Machine

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Abstract - The main aim of this research paper is to reduce the plastering work and cost by designing & fabricating the semi-automatic wall plastering machine. Automatic machines has been developed to automate the plastering work, so that there will be a saving of period, labor cost and getting good plaster finishing to the walls but problem addressed here is, it consumes a lot of power to lift the main chamber with cement mix to plaster the walls due to this electricity cost will be more. In order to overcome this problem, we are introducing a semi-automatic wall plastering machine, in this machine lifting of main chamber with cement mix can be done by manually by rotating the handle which is connected to worm wheel with steel rope drive mechanism. The pushing of cement mix in the main chamber is done by belt conveyer and rotor which is driven with the help of gear box sprocket, which is driven by electric motor.

Index Terms - Semi-automatic wall plastering machine, Fabrication, Plastering, AC Motor, Cement mix, Worm wheel.

Energy Utilization and Security Enhancement using Particle Swam Optimization (PSO)

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***Abstract*: Wireless sensor networks (WSN) have started appearing in our daily life including home, office, industry and vehicles to name a few. The incremental usage of WSN for environmental monitoring comes across various types of attacks and security threats. Due to its dynamic topology, highly decentralized infrastructure and resource constraint sensors, proper energy utilization becomes a challenging issue. Energy conservation measures are essential for increasing the lifetime of the Wireless Sensor networks and hence to improve the performance of WSNs. Here we propose an improved PSO-Based secured Clustering Energy Optimization algorithm for Wireless Sensor Network in which clustering and clustering head selection is done by using Particle Swarm Optimization (PSO) algorithm with respect to minimizing the power consumption in WSN.**

Keywords—LEACH, CH, PSO.

I. INTRODUCTION

Wireless Sensor Network is a network, which can self-organize themselves with a large number of small sensors. These sensor nodes could enhance the packet transmission among them within effective radio range in a way to sense, observe, and recognize the physical entity of the actual world environment. WSN has a huge number of sensor nodes to monitor their vicinity and passes the information either among themselves or to external base transceiver station. The best characteristics of these wireless sensor nodes include tiny size, low cost, low power, multifunctional performance processing, routing, etc., and easy communication within short distances.

Wireless sensor networks have become increasingly popular due to their wide range of applications. Energy consumption is one of the main constraints of the wireless sensor node and this limitation combined with a typical deployment of large number of nodes has added many challenges to the design and management of wireless sensor networks. WSN's are typically used for remote environment monitoring in areas where providing electrical power is difficult Therefore, the devices require to be powered by batteries and alternative energy sources[1]. Increased network lifetime, reliability, energy conservation in sensor nodes, and scalability are the main requirements for WSN applications. Because of the several conditions in the sensor nodes, WSN is facing various challenges such as coverage area, life time of network, and scheduling and data aggregation. In WSN nodes utilize disproportionate amount of energy for communication and the required energy in terms of battery power to transmit the packet will differ among the transmissions with respect to the distance between the nodes and hence therefore multihop communication is recommended.

Data transmission by hierarchical routing improves the lifetime of the sensor network by grouping a number of nodes into clusters. A head node is selected for each cluster known as Head cluster to collect the information from its members and transmit to the base station with a minimum cost of multihop transmission. Most of the algorithms such Low-Energy Adaptive Clustering Hierarchy, Hybrid Energy Distributed Clustering Approach (HEED), and so on, provide different energy effective methods that work at network layer by using different energy efficient routing algorithms and reliable communication mechanisms. The mechanisms described in these algorithms relatively decrease the utilization of the power in packet transmission and lengthen the life of the networks. The proposed work implements the PSO in clustering and for optimal selection of cluster head to enhance the improvement in the residual energy of node by sending a data packet to the cluster head which is located very nearest to the BT.

II. LITERATURE SURVEY

LEACH [Low Energy Adaptive Clustering Hierarchy][2] is a common clustering algorithm with the objective of improving the sensor network lifetime by cluster-based network architectures. LEACH is a cluster-based protocol that includes distributed cluster formation in which the nodes select automatically as cluster heads with some combinations.

The method used in LEACH is to run continuously and the cluster head probability for each period is selected to encourage that all nodes become a cluster head at least once within 1/P rounds, where P is the predetermined percentage of cluster heads. LEACH explains its operational methods into

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rounds, where all rounds consists of a initialization phase where clusters are formed and a steady state phase that include data communication process.

LEACH gives significant energy savings and delayed lifetime network over conventional multihop routing techniques, like as the Minimum Transmission Energy (MTE)[2] routing protocol. Second clustering protocol which motto is to improve the network lifetime is (PEGASIS)[3]. Power-Efficient involving in Sensor Information Systems (PEGASIS) uses a greedy algorithm to initialize nodes into a chain, each node transmits and receives from only one of its neighbors.

In all round, a randomly selected node from the chain can transmit the aggregated data to the base station but reduce the various number of nodes so it can communicate directly with the base station. The main target of hierarchical routing or cluster based routing is to perfectly maintain the usage of energy in sensor nodes by consider them in multi-hop communication within a proper cluster. Cluster formation generally depending on the energy reserve of sensors and sensors proximity to the Cluster Head (CHs).

Clustering acts an important role [4] for energy consuming in WSNs. With clustering in WSNs, energy consumption, network life time and scalability will improve. But only cluster head node per cluster [5] is needed to improve routing task and the remaining sensor nodes it forward their data to the head. Clustering has applications in high-density sensor networks, because it is very easier to handle a set of cluster representatives from each cluster than to manage whole sensor nodes.

In WSNs the sensor nodes are totally depending on resource which means they have less energy transmission power, memory, and computational issues. Energy consumed by the nodes for transferring information from sensor nodes to the base station is the important cause of energy depletion in sensor nodes. The advantages of Clustering are that it enables bandwidth reuse but will improve the system capacity [6].

III. Proposed Security Enhancement and Energy Utilization using PSO Algorithm

Energy consumed by sensor nodes should be minimum to increase the lifetime of network. In this paper we propose an improved PSO-Based secured Clustering Energy Optimization algorithm for Wireless Sensor Network in which clustering and clustering head selection is done by using Particle Swarm Optimization (PSO) algorithm with respect to minimizing the power consumption in WSN.

This is an enhancement of DSDV protocol by Particle Swarm Optimization (PSO) to increase the lifetime of network and the evaluation of proposed algorithm is considered using the performance metrics: Consumed Energy, Packet Delivery Ratio (PDR), and Average Throughput. PSO is a heuristic global optimization method which relies on Algorithm:

1. Nodes(N) are uniformly deployed in X*Y Region
2. Initialize the nodes with Energy (Eo) value
3. Determine the number of alive nodes
4. Compute distance, mobility, density values from other nodes and BS
5. if no. of nodes alive are greater than zero continue simulation else stop
5. Divide the region into sub region
6. Select a CH for each sub region based on remaining energy, distance,mobility,density from BS using PSO
7. Compute the fitness Kopt to divide each sub region into sub region parts based on number of nodes in the particular sub regions
8. Select CH for each sub region part based on remaining energy, distance ,density from CH of that particular
9. Determine the shortest multi hop path from each CH to BS using PSO algorithm
10. Run the simulation for 20s or 60s and get the results based on it

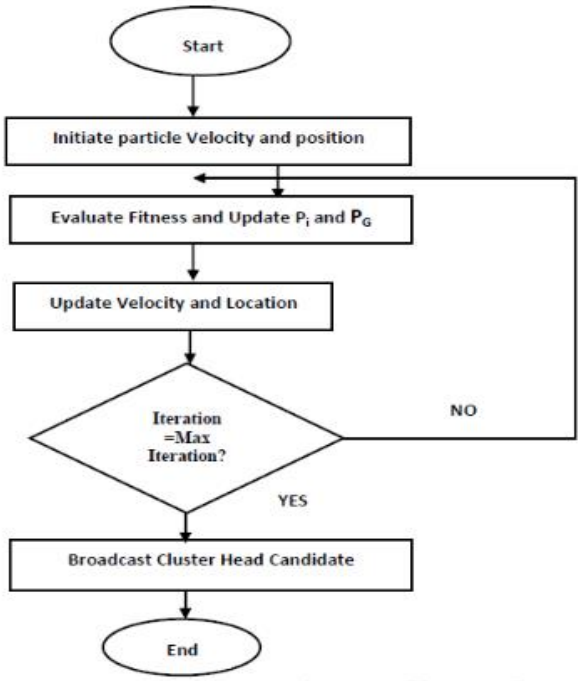

Fig 1: DFD of the proposed PSO algorithm

CONCLUSION

From the literature of Leach and other cluster based algorithm. we have a lot of benefit on PSO on other algorithm. Since with PSO we can build more application of such as power gathering and least spanning tree. By this application we can achieve the efficiency of WSN and also consumes the power delay of the information and increase the range of sensor nodes. Strong security mechanisms difficult by WSN leads to resource and energy utilization overhead resulting in fast discharge energy. Trustworthy and reputation has been used in literature to identify misleading nodes and it is improving overall network Quality of Service (QoS) by avoiding them.
This work recommends a trust mechanism for effective cluster head selection in a multi hop WSN using particle swam optimization algorithm. This method shows successfully avoids nodes with selfish behavior and malicious nature that enable Black Hole, Denial of Service, or packet dropping. Results illustrate improvements in the packet delivery ratio and energy utilization. Wireless sensor networks (WSNs) are used in several applications, namely, environment monitoring, disaster management, industrial automation, and medical electronics. Sensor nodes having many restriction like low battery life, less memory space, and small computing capability. To enable a wireless sensor network more energy efficient, Particle Swarm optimization technique has been applied to resolve many optimization issues in WSNs

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Offline Data Synchronization with Occasionally Connected Databases Using Smart-IPMS

R.M. Jagadish, L. Swarna Jyothi and Rohini Patil

Abstract We live in a world with an increasing number of connected computing resources. However, in many cases we cannot expect one hundred percent connectivity throughout. Applications may not be able to access network resources all the time without good network connectivity. A requested service could be busy, down, or just temporarily unavailable. The worldwide network is increasing rapidly. The devices connected to network are vastly different from desktop computers, because they are meant for different purposes. Their main purpose is to connect people to information. Social media, their work information and their emails are information sources. Offline data synchronization plays a vital role in ensuring efficiency in communication between the client devices and the web server in an environment with limited internet connection. This paper presents an algorithm for data synchronization in Insurance Policy Management System.

Keywords IPMS · Offline mode · Client · Server · Mobile database

1 Introduction

The client-server system relays on the availability of some form of network connection for proper functioning. A client-server depends on the internet, largely because all the resources it needs are external and they are accessed remotely. This

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means that without a network connection, the transaction progress may fail, or it may not go according to the way it is planned and most likely without intimation. In terms of the threshold of the kind of system acceptability and reliability, the client-server system does not guarantee the user the kind of standards that would be normally be expected in computing [1].

A conceptual model for this argument would be indicated as shown below (Fig. 1):

The conceptual model displays occasionally connected system in the upper part. They provide the user access to the system through the user interface and the GUI. The interface provides access to the backend.

The user interface facilitates adding a new record of a new client by field agent and processing is done by the user interface logic. A service agent is what checks for the connectivity with the database and makes the necessary calls like add, update or delete the record in the backend. When there is no active connection, the processing will not take place [2].

IPMS will be used as base example for the whole argument. In today's scenario the number of notebook computers, mobile phones that run on complex but reliable platforms has been growing and hence there is a compelling need to use them other than depend on the traditional bulky computers like the desktops [3]. The bulky computers have now been out-numbered in all the fields, and the smaller portable

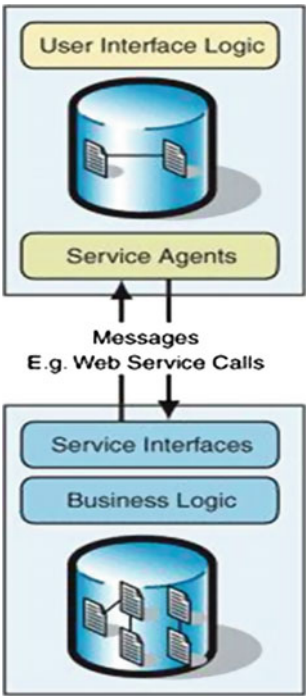

Fig. 1 A Conceptual model for occasionally connected systems

gadgets have become the order of the day in today's business and computing sectors and platforms.

The trend is very much useful in designing an efficient system for insurance sector, and similar other sectors. The insurance sector is largely dependent on the area of data processing, and the profitability of the sector is tied to the earnings from the sales realized from the payments of policies. So the management of policies needs to be done on the fly. The security and the efficiency of how that is handled are of paramount importance. The system, which handles the policies, is what can be referred to as the IPMS [4, 5]. This kind of a system allows the insurance details to be created, updated and to be expunged from the records. It is also possible to view the details of all the resellers, the agents, the policy holders of the company and all the information about the premium payments made by the clients. The only fundamental thing to be considered, is the user levels and to enforce authentication constraints to avoid the abrasion of data security per se.

2 Methodology

Proposed Smart-Insurance Policy Management System (Smart-IPMS) design forms part of the solution. This work will include the system's ability to manage the policy information just from anywhere instead of being tied to a single office location. The system will be aimed to reduce all the possible labors by a customer and the agent too. There will be a commendable reduction in the burden of a development officer/insurance policy agent in terms of reduced paperwork and in maintaining all policy information directly and into some form of electronic form. The field agents will get a connection to the database, and then synchronization will be initiated, and the handheld device will enable the field agent or whoever is using the device to upload the database automatically. The process will overcome data consistency problems. The final aspect that will be implemented in the design in addition to the 24/7 support is the provision to auto switch from offline mode to online mode [3].

Applications that are meant to use a data-centric approach are designed and coupled with a relational database management system (RDBMS). The RDBMS will be installed on a local client, and the system depends on the built-in capabilities of that database system which propagates the local data changes on the back-end to the server [6]. The database has to match the order so that the synchronization process updates data uniformly. It takes care of detection and resolution of any data conflicts in this form of architecture. The service-oriented architecture approach focuses more on the storage of information in the form of messages arranged in queues when the device is offline and it gets updated when the device has internet connection [7]. The approach is operational by the Google Gmail app on Android. The app updates all the emails in the inbox in database form, so that the client may read all mail updates even with no network connection. Soon after the network

connection is reinstated, the queued messages are sent to the server for reprocessing and the newer emails are added to the database.

The approach is data-centric which is more accommodative for an IPMS solution [8]. The major requirement for an occasionally connected system, in addition to the specified, supporting deliverables will be to design a Windows application that will sit on the client side. An application is installed to manage the user requests and those in the local database that stores the insurance policy data. The application synchronization will be enforced with the complex objects with write permission. The complex objects will come in handy to change and update data on both the sides [9].

Conclusively, it is vital to note that the trend in computing will have to be accommodative to the concept of occasionally connected systems architectures by all means. The Modules that work together to make it possible to realize much cheaper and more efficient IPMS. The proposed solution will be dependent on the concept of occasionally connected systems architecture. The initial objective has been attained through this efficacy and investigative report. Next stage will be implemented through design of a web-server, database, and a Windows application. The system is tested with appropriate data to prove efficacy.

3 Offline Data Synchronization Algorithm

Data synchronization is updating two or more databases with each other's changes. Client-server systems rely heavily on reliable network connections for it to function effectively. The need for connected network cannot be over emphasized in the client-server set up. Internet is an important component for any update to take place. Advancement in the information technology industry has revolutionized the way data synchronization is done.

The success of data exchange in an offline setup strongly depends on the following key issues of both the client and the server side system.

(1) Similarity of the database structure. If the client database structure corresponds to the server machine, then data synchronization will be possible whenever connection is established.
(2) How often is the offline data need to synchronized
(3) The cost and effort the one is willing to offer in establishing data synchronization
(4) The effort need for each synchronization session.

Offline data synchronization needs a system where in the backend and the front end has the same database structure and schema for data update and exchange to take place at both the ends of the system. Synchronization criteria of the offline data should use either time or internet connection factor. In time factor synchronization, the offline system should have an algorithm that will ensure the configuration of

user machine to synchronize data to the online database of the system. For instance an algorithm that will enable client machine to set a specific time in which synchronization of the daily business transaction with the online database; mostly synchronization is set to take place in the midnight when all the business transactions of the day are over.

This periodic synchronization of data is very useful especially when dealing with aggregate data. Aggregate data should be synchronized once so that discrepancies are avoided and data integrity is ensured. This will generate a reliable and accurate report in the daily business transactions.

Data synchronization based on internet availability can also be used to synchronize offline data. This can be achieved by designing an algorithm that will check on the network interface card of the client machine to detect any internet signal that is being received. Once the connection is detected data synchronization is initialized. Once synchronization has been initialized the data is organized into small jobs. The synchronized part will be aborted when internet connection is terminated abruptly while the job is still in process. Synchronized data should only be committed if and only if the job is completed successfully. The concept of jobs also require a well structured algorithm that can organize the process into smaller jobs that takes less time to commit data.

The algorithm shown below will perform data synchronization in occasionally connected systems.

//Algorithm for data synchronization in occasionally **connected systems**
DATA SYNCHRONIZATION PROCEDURE (CHECK, DETECT, START, SYNCHRONIZE); DETECT CONNECTIVITY;
IF CONNECTION DETECTED, THEN ESTABLISH SYSTEM CONNECTION;
IF ONLINE, THEN CHECK CHANGES;
IF CHANGES = TRUE, THEN
PROMPT: DO YOU WANT TO OVERRIDE IT WITH YOUR LAST CHANGES? IF OVERRIDE = YES, THEN
ORGANIZE DATA INTO SMALL JOBS;
IF JOB = DONE, THEN
START JOB SYNCHRONIZATION
IF JOB SYNCHRONIZATION COMPLETED = TRUE, THEN UPDATE CHANGES ELSE
TERMINATE THE PROCESS TO WAIT FOR CONNECTION,
RETURN;

IPMS enable both firms and insurance clients communicate effectively. IPMS provide quick response to any issues arising within the business line of the firm. A client will be able to confirm the value of his or her insurance cover. An insurance client can request his or her claims remotely using their mobile devices; the main challenge in doing this is the absence of a reliable internet connection in most remote places.

With IPMS, insurance clients will be able to request for their claims. In the normal scenario the requests to client's claims mostly use a computer machine that is connected via the internet to the central server of the insurance firm. Alternatively the customer uses a mobile device to access the services remotely. When mobile devices are used to access the services, offline data synchronization is very important. Since there are so many such devices that might be trying to access the server simultaneously this will cause delay due to data traffic caused by the many client requests. Data traffic is not the only reason for offline data synchronization, many places lack in internet connection and this can overcome by offline data synchronization for no matter how many requests are made. The data will be stored in the local database of the system that will synchronize with the online database when connection is detected.

4 Experimental Design and Implementation

The proposed system has three modules

- Admin module
- Agent module
- Customer module

The admin must login to the system. Admin is given privilege to add new schemes of insurances, edit and update the existing schemes. Admin is given privilege to add agents and also to edit or modify and update the agent details. Once the registration process is completed the Admin logs out of the system shown in Fig. 2. Agent must login to the system. Agent is given privilege to add customer or edit customer details regardless of network failure. Agent gets details of schemes introduced by admin and each time schemes are updated in local database of agent. Once the registration process completes the Agent logs out of the system shown in

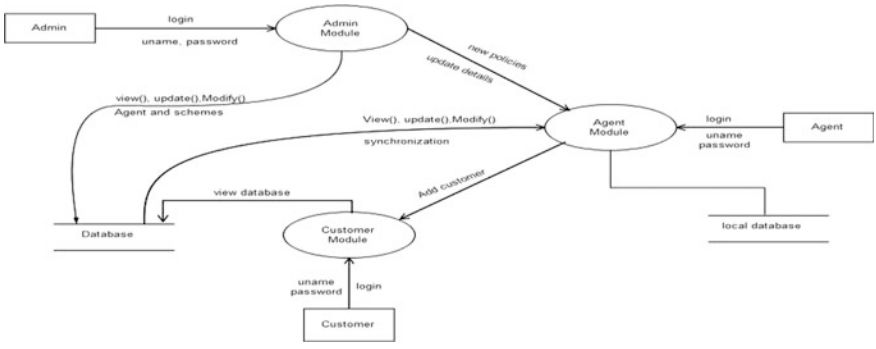

Fig. 2 DFD for Admin module

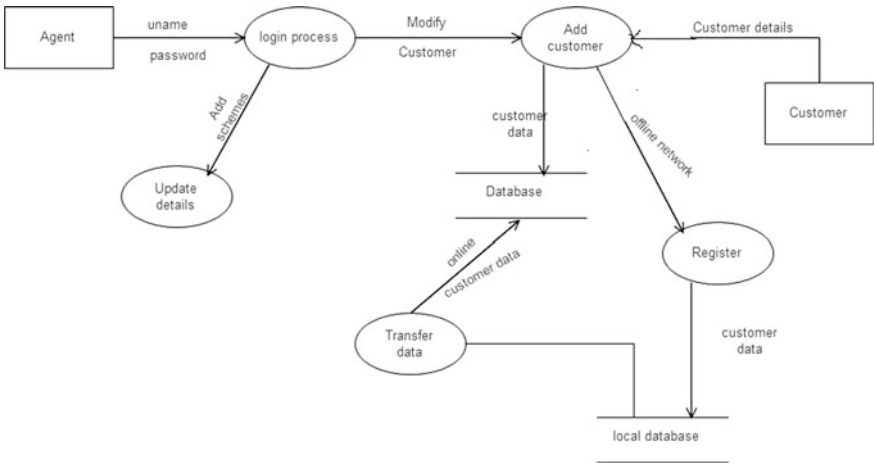

Fig. 3 DFD for Agent module

Fig. 3. Customer must login to the system. Customer after login can inquire about his account details such as schemes details by providing customer-id. Customer logs out of the system after request is processed.

Figure 4 Snapshot of customer registration during offline mode shows agent registering customer though there is no availability of internet.

Figure 5 Snapshot of database before synchronization shows that when registration is done offline the data i.e., customer details is not updated to database. But it is stored in local database.

Figure 6 Snapshot of database after synchronization shows that as and when the network is available the data i.e., customer details stored in local database is synchronized to database.

4.1 Availability Evaluation

The existing IPMS will depend completely on internet connection. In the proposed system the clients/agents continue to get service when internet/network goes off or server goes down. The system will switch to offline mode and the data given by the agent is stored in local database or as text files in the system which is updated as and when the network connectivity is available. The proposed system is 98 % available and efficiently utilizes network and time.

Fig. 4 Snapshot of customer registration during offline mode

c_id	fname	mname	lname	pwd	age	gen...	phone	policy...	nominee	pancard	city	state	lgname	agent...
183	vishwa	s	patil	vish	24	male	986378...	car	yuvaraja	567gw...	Bijapur	KARNA...	vish	2
184	shwetha	s	patil	shwet...	26	fem...	726329...	life	rohini	73792...	Bijapur	KARNA...	shwetha	2
187	anand	s	patil	anand	26	male	27889384	life	rohini	4834jndf	Bijapur	KARNA...	anand	2
188	rohini	s	patil	patil	24	fem...	741137...	jeevan	rohini	4256bhj	Bijapur	KARNA...	rohini	5
189	akshatha	k	k	aksha...	24	fem...	742289...	jeevan	rohini	62382...	Bijapur	KARNA...	aksha...	5
190	vishwa	s	Patil	vishwa	24	male	965350...	car	yuvaraj	234jbyb	Bang...	KARNA...	vish	5
191	ganaga	shank...	Patil	anand	45	fem...	983792...	life	shanka...	2382jjd	Bijapur	KARNA...	ganga	5
192	Shankar...	D	Patil	patil	50	male	782394...	home	rohini	788BHI	Bijapur	KARNA...	shank...	5
193	savitri	s	Patil	patil	26	fem...	962034...	jeevan	anand	23ahu	Bagal...	KARNA...	savitri	5

Fig. 5 Snapshot of database before synchronization

c_id	fname	mname	lname	pwd	age	gender	phone	policy_n...	nomin...	pancard	city	state	lgname	agent_id
183	vishwa	s	patil	vish	24	male	98637...	car	yuvar...	567gw5e	Bijapur	KARNAT...	vish	2
184	shwetha	s	patil	shwe...	26	female	72632...	life	rohini	73792...	Bijapur	KARNAT...	shwetha	2
187	anand	s	patil	anand	26	male	27889...	life	rohini	4834jndf	Bijapur	KARNAT...	anand	2
188	rohini	s	patil	patil	24	female	74113...	jeevan	rohini	4256bhj	Bijapur	KARNAT...	rohini	5
189	akshatha	k	k	aksh...	24	female	74228...	jeevan	rohini	62382...	Bijapur	KARNAT...	akshat...	5
190	vishwa	s	Patil	vishwa	24	male	96535...	car	yuvaraj	234jbyb	Bang...	KARNAT...	vish	5
191	ganaga	shan...	Patil	anand	45	female	98379...	life	shank...	2382jjd	Bijapur	KARNAT...	ganga	5
192	Shank...	D	Patil	patil	50	male	78239...	home	rohini	788BHI	Bijapur	KARNAT...	shank...	5
193	savitri	s	Patil	patil	26	female	96203...	jeevan	anand	23ahu	Baga...	KARNAT...	savitri	5
194	utkarsh	B	patil	patil	24	male	81479...	life	Abhi	465COM	Bijapur	KARNAT...	utkarsh	5

Fig. 6 Snapshot of database after synchronization

Table 1 Comparison of existing IPMS and proposed Smart-IPMS

	Existing system	Proposed system
Availability of systems	Not 100 %	98 %
Reliability and efficiency of system	Not 100 %	High
Can system switch from online mode to offline mode and vice versa	No	Yes
Offline application execution	No	Yes
Offline content available	No	Yes

4.2 System Comparison

See Table 1

5 Conclusion

Usefulness of offline data synchronization cannot be over emphasized. The existence of distributed systems has been made possible due to the capability of devices being able to send data from remote places to synchronize with data in an online server. This has been a mile stone in the information technology industry since multiple devices can synchronize offline data to one online server. This has greatly reduced inconvenience to the customer in data communication services since we do not need a dedicated network for data exchange and synchronization.

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Abstraction of Information Flow and Functional Dependency from a Restructured Legacy 'C' Program for Parallelization

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Abstract: The prologue of multicore architectures in the hardware computation industry has crafted significant challenge to the software industry working with single core sequential programs. Realizing the total potentiality of the multicore requires redefining software programming by initializing parallelization with decomposition of the software into functional modules amenable for multicore through parallel execution. The paper proposes a methodology which considers restructured legacy 'C' program as input and abstracts the complete design information (control and data) in the form of Information Flow Table (IFT). The IFT tabulates the ordered sequential flow of control and data along the program. The abstracted IFT is further used for analyzing the inter and intra control and data flow dependency amongst the computational units of the program, and realize the relations depicting the control and data dependency and capture the data influencing the behavior of the computational unit along its flow. These functional dependency relations further provide scope for the abstraction of functionality from the legacy program, inducing parallelization.

Keywords: Information Flow Table, Defined and Reference Variables, Inter control dependency, Explicit and Implicit Intra control dependency, Functional Dependency, Parallelization.

1. Introduction

The hardware computation industry over the years has witnessed technology advancement in the form of high performing single core processors, but this improved performance has also brought with it serious issues like power dissipation and no support for scalability. These performance limits of single core have obligated the software industry to shift from single core to the many cores processing like a multicore processor. Unlike single core processors, the multicore diverts more of the dependability for performance gains onto the software developer who directs work distribution within the cores. This necessitates the beginning of parallel programming and parallel execution of sequentially executing programs. The multicore adaption also requires the software developers to work on the existing software system to make it amenable for multicore architectures. This modification is significant and introduces new challenges, straddling the conventional legacy system. The legacy systems on the other hand are indeed undeniable, but have failed to keep in pace with the performance of the modern computation hardware with use of very incongruent technologies as compared to the present software. Added to this, the need based developments and negligence in maintenance of these systems has degraded their understandability and reliability thus developmental modification is important. The development cannot include major changes to the software which implies that a software developer, considering an evolution to multicore processors cannot adapt any parallel programming language or even redesign the system to support concurrency as required for multicore, rather work for the abstraction of the relevant information from the legacy system for parallel execution. This requires a technique of thorough program analysis to discover and exploit the parallel behavior embedded within the program through the abstraction of information flow sequence and the functional dependencies restraining this behavior. Reengineering is one such evolutionary approach that accomplishes this task.

Reengineering of the legacy system is a process beginning with restructuring of the legacy system to understand the functional behavior as well as implementation aspects of an existing system and to enhance the system performance by making it amenable to the advanced hardware computational technology without changing its functionality. Sprucing up the legacy systems may require a considerable amount of time and money but, it is superior to being operational with the old system.

Reengineering of legacy systems done so far have been successful in transforming the legacy systems from old or obsolete software to high performing modern software platforms, limiting execution of the program to only single cores. The main reason for this is the legacy 'C' programs which are believed to be not embedding any features compatible for parallelization or parallel execution on multicore. Also, the steady performance improvement in these systems in accordance with the Moore's law has until now

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suppressed the notion of inducing parallelization. But presently the single cores are facing lot of problems related to power consumption and scalability thus a shift towards multicore platforms with parallelism is inevitable. To accomplish this shift, developing the software from the scratch is a revolutionary approach, but with a resource like legacy system available with all the information hidden within, the need in this moment is to again consider reengineering with a new prospective.

Most of the works done on reengineering of legacy systems so far have aimed at increasing their performance for single core execution. This paper proposes a work which references the previous works only to focus on the exploitation of the embedded resources exhibiting the essence of parallelization, leading to parallel execution of the sequential programs, tasked for concurrent execution on multicore platforms.

This work accomplishes comprehensive analysis of a restructured legacy 'C' program to map out the complete behavioral descriptive information flow of the program flow (control and data), with absolute transparency, for the abstraction of the control and data dependencies depicted together as functional dependencies and represented in the form of functional dependency relations, thus giving scope for inducing parallelism.

2. Literature Survey

Lot of Research work has been done to reengineer the legacy 'C' programming system. In the paper[1][2], the author has developed a tool which helps for the abstraction of control flow graph and data flow graph from the input legacy 'C' program. The tool developed provides tabular representations of the graphs as Control Flow Table and Data Flow Table respectively, which provide scope for easy understanding and analysis of the input program. The methodology proposed in these papers is appropriately modified to suit for the abstraction of the Information Flow Table in the present work. The work of paper [3][4] proposes methodology to restructure legacy 'C' program with elimination or replacement of all those entities altering the structured sequence of program execution by an appropriate conditional or loop structure, at the very level of abstraction and in immediacy to the machine understanding. This work is considered as the base for the development of the proposed work. The paper [5] combines surveyed results from selected works discovering confrontation congregated in the process of parallelizing sequential codebases to finally evolve the sequential code into parallel form. Paper [6] presents an active approach for the identification of possible parallelism in sequential programs, automatically. It basically focuses on concurrent scheduling independently executing computational units from a program. [7] The author explains the handshake between program slicing and data dependencies. Dependency in this work leads to the computation of parameters for slicing. [8] This work intends to achieve implementation of parallelization using a task dependency graph. A parallel structure of the sequentially executing JAVA code is generated using a translator. The work in [9] presents a survey presenting any measure of relevance to the modern multicore embedded systems through different aspects considered over the time to detect and extract parallelism from sequential programs. [11] Presents an approach to mine several forms of parallelism from sequential 'C' code, applicable to extensive Android mobile devices. The works proposed in [5-11] are surveyed for understanding different techniques of parallelization of sequential programs and design a method for execution on multicore platform.

3. Proposed Methodology

The objective of this work is to consider the restructured program abstracted using the algorithm proposed in [3] as input to develop the Information Flow Table and recognize functional dependency relations. The process begins with the development of the IFT with thorough analysis input program.

3.1. Development of the Information Flow Table

The Restructured Program is thoroughly analyzed for the tabulation of the of the control structures, control flow sequence, data identified in accordance with the behavioral changes of the respective computation unit with data flow through the unit. The information comprehended during the analysis is configured in a tabular format as the Information Flow Table (Table 1). The IFT tabulation is achieved by bifurcating the recording of the flow sequence relative to control flow information and data information through the program.

Control Flow Information

Control flow information is the information captured from the program and stored as running information in the IFT**.** The part of the table tabulating this includes four columns as discussed [1].

1. Start: Start is the beginning line number of the restructured input program.

2. **End:** End is the point where the next control statement is encountered.

3. Transition1 (Tr_1): This indicates the line number of the control statement where it jumps if the condition of statement returns true.

4. Transition2 (Tr_2): This indicates the line number for control statement where it jumps if the condition of statement returns false (out of its loop).

Data Flow Information

In a programming system the flow of data is always in conjunction with the control flow order. This data along the program structure flows to either control the execution sequence of the control structures and functions or influence the behavior of the program computational unit in context with the embedded function, with its flow. Accordingly the data variables are identified as Control (Conditional or Iterative) variable or the Data (Defined and Referenced) variables [1]. The process begins in the control flow order where the information about the variables either control or data is tabulated along the line as depicted in table 1 and defined as follows,

1. Control variables:

i. Conditional control variables are the variables defining the execution condition within the construct.

ii. Iterative control variables are the variables defining the iterations within the transitional loop of a construct.

2. Data Variables:

i. Defined variables are the variables defining the function about any computational unit with their flow and whose value changes with the execution of the respective statement within the unit.

ii. Referenced variables are the variables used as reference values during execution of an operation in any computational unit.

3.1.1 Algorithm for development of the information

Input: Restructured 'C' program.

Output: Information flow table.

Step 1: Initialize the variables of the IFT.

Step 2: Parse the input program to find main ( )

If (main)

Start = line no of main

Else continue scan

Step 3: Parse to find functions or control structures

If found, End= line no of the construct.

Tr_1 = start +1 for normal control structures & start address of function definition for functions.

Tr_2 (under all conditions) =loop end + 1.

Next start= Tr_1 and end = line no of next control.

Step 4: Scan for variables. Identify and tabulate along their line numbers.

Step 5: To conclude, Start = (loop end +1) of the last control statement

End = End of function main

Step 6: If no controls present in the input program then, Start=start address of main ( )

End = loop end of function main ( )

(The variables if present are listed with their line no).

3.2 Inter and Intra control dependency and data dependency.

The defining of control and data dependency proves momentous in this context of the proposed work with development of the IFT. The restructured program to some extent provides for extracting syntactic dependency which further becomes vivid with defining control dependency, but to identify the semantic dependency within the scope of the program structure, defining of data dependency for the discovery of semantic dependences is vital. For the complete computation and utilization of the dependency information, it is necessary to realize the inter and intra dependency relations i.e. the dependency recognized between and within the computational units. Work is carried out in the paper for the computation of dependencies primarily beginning with the definitions of the dependencies as

1. Inter dependency: The dependency relating the controls within the scope of the program

2. Intra dependency:

i. Explicit intra dependency: The dependency relating controls within the scope of another control

ii. Implicit intra dependency: The dependency relating the executable statements of any independent control with the control itself. The work proceeds with recognition of functional dependency from the IFT.

3.3 Abstraction of functional dependency from the Information Flow Table.

The information embedded within a legacy software system represents the complete behavior of the software system and also is important for the developers and the development domain. The program and thus the system are always flexible and provide scope for the developers to make suitable changes in the long run of its use. With the technology enhancements in the hardware computation these developers may require changing of the work domain and in such conditions the software systems must again be flexible, providing scope to the developers to start with the existing systems and adapt them to the new environmental circumstances. For this the program representing the software system should be given an appropriate structure, maintaining the functionality

such that the developer carries it to any new domain or platform. The Information (control and data) dependency table is such a structure, which brings out the complete dependency details with respect to both the control and data flow along the program.

3.3.1 Algorithm for abstraction of functional dependency

Input: Restructured legacy C program and IFT

Output: Control and Data dependency table and functional dependency table.

Step 1: Scan the IFT for inter and intra dependency in the program.

Step 2: Identify the first control, treat it as entry point

Step 3: Check for inter dependency

Step 4: Continue to scan the IFT to find controls within the entry point. If found treat it as next entry point.

Step 5: Check for dependencies among other controls. Tabulate in accordance with the type of dependency identified.

If, execution of controls is influenced by V_{Cond} of any one of them, there exists interdependency.

Else if, a structure embedding computational unit has inner modules or loops with dependency between each other or with the main loop w.r.t control or data, then there exists intra dependency.

Else, No dependency exists and the controls are independently executing.

Step 6: Extract data from the various controls and tabulate in accordance with the controls.

Step 7: Data extracted in step 6 is used to abstract the functional dependency and is tabulated (Table 2).

4. Case Study

Restructured Input Program

```
1 void main()
2 {
3 int a,b,i,n,sum,add,func;
4 printf("Enter n value");
5 scanf("%d", &n);
6 clrscr();
7 if(n>0)
8 {
9 for(i=0; i<n; i++)
10 {
11 printf("Enter two nos");
12 scanf("%d%d", &a, &b);
13 sum=a+b;
14 printf("Sumof two nos = %d", sum);
15 }
16 for(i=0; i<n; i++)
17 {
18 printf("Enter two nos");
19 scanf("%d%d", &a, &b);
20 f=a+b;
21 printf("Sum of two nos=%d", f);
22 avg=f/2;
23 }
24 for(i=0; i<n; i++)
25 {
26 printf("Enter two nos");
27 scanf("%d%d", &a, &b);
28 f=a-b;
29 printf("Diff of two nos=%d", f);
30 }
31 }
32 else
33 {
34 printf("No is not valid");
35 }
36 }
```

4.1 Results and result analysis

4.1.1. Output Table1:

Line No	Control constructs & functions	Start	End	Tr_1	Tr_2	Variables			
						Control		Data	
						V_{Cond}	V_{Ite}	V_{def}	V_{ref}
1	main	1	7	8	32				
5	scanf							n	
7	if	8	9	10	16	n			
9	for	10	15	9		n	i		
		9	9	10	16				
12	scanf							a,b	
13	S_{13}							sum	a,b
14	printf								sum
16	for	16	16	17	24	n	i		
		17	23	16					
		16	16	17	24				
19	scanf							a,b	
20	S_{20}							f	a,b
21	printf								f
22	S_{22}							avg	f
24	for	24	24	25	31	n	i		
		25	30	24					
		24	24	25	31				
27	scanf							a,b	
28	S_{28}							f	a,b
29	printf								f
32	else	32	32	33	36				
		33	35	32					
		32	36 E						

Table. 1. Information Flow Table

Analysis of output table 1

The table 1 is the IFT which is a distinct tabulation of the entire information falling along the executable scope of the input restructured program. It records the detailed flow description of control and data information. It begins with function main and records its line number as the start and continues to record the start, end and transitions of each and every control structure and function (inbuilt or user-defined) in the program. Along with this it also records the data related to the control structures, present in different forms as defined and referenced with their respective line number. This control and data flow information abstracted in tabular form is used in the continuation work for identifying inter and intra functional dependency among control constructs and data variables and to abstract functional dependency relations.

4.1.2. Output Table 2:

The table 2 is an abstraction of the complete structural and behavioral description of the program in the form of dependencies exhibited by the controls and the behavior of the controls influenced by the data. It depicts the transition sequence of the control structures, dependency between them, binding structure and also the data flow through the constructs. The information represented by the table is used for identification of the functional dependency and thus deduce its relations.

Control at the entry point	Inter Dependency	Explicit Intra dependency (control constructs)	Implicit Intra dependency	Data Dependency
C_7	$C_{32} \leftarrow C_7$	$C_7 \leftarrow C_9, C_{16}, C_{24}$		
C_9	-	-	$C_9 \leftarrow S_{11}, S_{12}, S_{13}, S_{14}, S_{15}$	Sum $\leftarrow$ a, b
C_{16}	-	-	$C_{16} \leftarrow S_{18}, S_{19}, S_{20}, S_{21}, S_{22}$	f $\leftarrow$ a, b Avg $\leftarrow$ f
C_{24}	-	-	$C_{24} \leftarrow S_{26}, S_{27}, S_{28}, S_{29}$	f $\leftarrow$ a, b
C_{32}			$C_{32} \leftarrow S_{34}$	-

Table. 2. Control and Data dependency Table

Analysis of output table 2

The table 3 begins with tabulation of the control structure at the entry point. The conditional variable in the IFT recorded in accordance with the entry point control is used to trace whether the condition defined by the variable is influencing the execution of another construct within the scope of function main. If it influences any control, then they exhibit interdependency. Further IFT is scanned to find any controls executing within the entry point control and if found then their execution is influenced by it and there exists explicit intra dependency. If the inner controls also have controls within then the process is repeated by considering this as new entry point. This also exhibits intra control dependency. If any control is independent influenced only by the executable statements within it, then they share implicit intra dependency. The data is recorded and tabulated at all the levels of program execution. This leads to redundancy. This redundancy is minimized using the minimization technique proposed in paper [2].

The table 2 depicts notations 'C' implying control construct and 'S' for statements affect by the control construct.

Analysing IFT, it is understood that the control at line 7 i.e. C_7 is the entry point control, as it is the first one after function main ( ). The controls at lines 9, 16, 24 share explicit intra dependency with C_7.

Further all these controls, dependent on C_7 are scanned again to find more transitions, if transitions found then they are shown in the same way else if the loop is independent, then the statements share implicit intra dependency with the control. The type of dependency shared as discussed above lead to recognition of functional dependency relations.

Therefore from the table 2, the functional dependency (FD) relations are recognized as below

I. $C_7 \leftarrow C_9, C_{16}, C_{24}$

i. $C_9 \leftarrow S_{11}, S_{12}, S_{13}, S_{14}, S_{15}$

Sum $\leftarrow$ a, b

FD relation $C_7 \leftarrow C_9$ and $C_9 \leftarrow$ Sum, a, b (table 2)

$\therefore$ Controls C_7, C_9 and data (sum, a, b) are functionally dependent and constitute an independently executing structure in the input program.

Similarly other relations are as follows

ii. $C_{16} \leftarrow S_{18}, S_{19}, S_{20}, S_{21}, S_{22}$

f $\leftarrow$ a, b

Avg $\leftarrow$ f

iii. $C_{24} \leftarrow S_{26}, S_{27}, S_{28}, S_{29}$

f $\leftarrow$ a, b

Thus the proposed work finally accomplishes the task of abstraction of information flow and functional dependency from the input restructured legacy 'C' program.

5. Conclusion

In this paper a methodology is proposed for the abstraction of Information Flow Table from a restructured legacy 'C' program. The IFT depicts the control and data information flow along the program with absolute transparency. The methodology proposed works for all the input executable programs thus resulting in the abstraction of IFT in any case.

The IFT with detailed behavioral and data flow description of the restructured program is used for analysis of control (Intra and Inter) dependency and data dependency along the program flow, recognition of functional dependencies and functional dependency relations.

Future Scope:

The functional dependency relations obtained from the work done in this paper may be used for the abstraction of independently executing functional modules from the program, thus inducing parallelization in the sequentially executing program.

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Prediction of Crime Trends Using Mk-MC Technique

B.M. Vidyavathi and D. Neha

Abstract Day by day the quantum of data has been increasing not only in terms of user generated content in social media but also outside the social media, due to which the data has gone from scarce to superabundant that conveys new advantages to users. This explosion of data has made it difficult to handle and analyze huge datasets. Therefore, the techniques of Data Mining assist in exploring and analyzing enormous datasets and helps in discovering meaningful patterns. Clustering is one such task of Data Mining that gathers all the data and partitions it into various groups taking into account their similarity or closeness measure. Clustering in the field of Social Science is used in identification, analysis and detection of various crime patterns. This paper proposes the Modified k-means clustering technique which is applied on the fictitious crime data in order to identify various crime patterns or trends and make a variety of predictions from the analysis of different crime patterns.

Keywords Pre-processing · Data cleaning · k-means clustering · Modified k-means clustering

Acronym Mk-MC · Modified k-means clustering

1 Introduction

The days when an ordinary pen and paper were used to report a crime and in the coming days when the computers are used to record such crimes and used as a database are now gone. Essentially crime is an act which is considered illegal as per the law of the land concerning the countries and it is an act against the society.

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Crimes are committed due to various reasons such as poverty or political vindictiveness or due to religious bigotry or due to other complex reasons which include depression, alcoholism, drug induced, mental disorder, family conditions etc. Crimes committed now differ from country to country and very largely international crimes across all borders have affected every human life. Since crime is predictable that follows a pattern, for instance the Peshawar attack, Pathankot attack, Paris attack that took place recently, Times square attack and other growing concerns like theft, carrying arms, abuse of drugs and human trafficking, murders, burglary etc. there should be a need to identify such patterns and predict such crimes obtained from intelligent agencies. Therefore, crime pattern analysis or crime detection is a significant area for the intelligence agencies [1]. Identifying the crime characteristics is the initial step performed by the agencies. The role of a crime analyst differs from one agency to other as the information or knowledge collected by them is huge and also there is a complexity of relationship between these kinds of data. While some information is kept confidential, few becomes public data. Therefore storing and managing such information has to be done accurately and efficiently. With the rapid technological advances, the above pattern of the mind of a criminal can now be the subject matter or data by the recent innovative trends of storing the same in Data Mining. Clustering in Data Mining helps in performing crime analysis. In this work, the goal is to facilitate crime predictions and its patterns by applying the Modified k-means clustering (Mk-MC) technique. Using this technique, a variety of predictions can be made, which thus helps to reduce future crime incidents.

This paper is organized into the following sections: Sect. 2 contains the Literature Review. Section 3 contains the design and process explaining about the general working of the venture. Section 4 describes the pre-processing technique. Sections 5 and 6 describes the procedure to perform k-means and Modified k-means clustering technique. Section 7 describes the experimental results of the clustering techniques and their performances followed by the conclusion.

2 Literature Review

Zhang Haiyung [2] introduced the concepts of Data Mining and its applications and explained that transforming the data into valuable information and knowledge can be done by application techniques of Data Mining. Saurabh Arora, Inderveer Chana [3] and B.M. Vidyavathi, Neha. D [1] introduced about clustering and explained various clustering techniques which can help in the analysis of large quantities of data. Malathi and Dr. S. Santhosh Baboo [4, 5] presented a prediction model that searches for missing values and uses a clustering algorithm for the crime data. MV algorithm and Apriori algorithm were used to fill the missing values and for recognizing crime patterns that may help in giving accurate predictions. Using different Data Mining techniques, they developed a crime analysis tool that helps the criminal investigation departments to efficiently and effectively handle crime data

and patterns. M. Ramzan Begaum et al. [6] proposed techniques for developing a crime analysis tool and explained the types of crime and how it is handled by suitable data mining techniques. Jyothi Agarwal et al. [7] introduced a rapid miner tool that performs the k-means clustering technique to analyze the crime data and the analysis was done by plotting a graph considering various attributes for the identification of various crime trends. Shi Na et al. [8] proposed an improved k-means clustering approach to solve a data structure to store information during every iteration. Some of the results show that the improved method can effectively enhance the speed of clustering and accuracy thereby reducing the computational complex nature of the method. Zhang Chen, Xia Shixiong [9] and Yugal Kumar, G. Sahoo [10] proposed a new clustering method based on k-means that avoid randomness of the initial center thereby overcoming the limitation of the k-means clustering technique.

3 Design and Process

The General working of the venture are as follows:

- To analyse the crime activities using clustering techniques, a given description of crime such as location, time (day, month and year), type and physical description of the suspects are to be used as a record for creating a database [1]. The crime records are categorized into three entities and they are:
- Accuser's Personal Information (API): The attributes of API are as follows: Accuser's id, Name, Gender, Identification, Date of birth/Age, Height, Weight, Marital Status, Skin tone, Address, Phone number, Nationality, Background and other information.
- Crime Committed information (Crime Status): The attributes of CStatus are: Crime type, Crime Subtype, Weapons, Date, Time, Location, Status, Involvement in other activities, Number of times/repeat offenders and other information.
- In addition, the Crime types and subtypes are categorized into the following: Violent crime (Murder, rape, sexual assault, kidnap, stalking), Property Crime (Robbery, burglary, theft-electronic crime theft, identity theft), Traffic Violations (Reckless driving, speeding, property damage, driving under the influence of drugs and alcohol, hit and run), Sex Crime (Rape, sexual abuse, prostitution, child molestation, trafficking in women and children) and Fraud (Money laundering, Insurance fraud, corruption, trafficking in movies, music and other intellectual property).
- Criminal's Family Background: The attributes are: Father's name, Mother's name, Siblings, Family income and other information.
- The data collected by the user from various sources are susceptible to noisy, missing and inconsistent data (also called as dirty data) and may lead to low quality results. Therefore, transformation of the above data has to be done by

filtering the dataset according to the requirements called as the pre-processing phase.

- Pre-processing of the data consists of the following stages: Data Cleaning, Data Integration, Data Transformation, and Data Reduction.
- Data Cleaning technique is employed in this work to produce clean and error-free data.
- Clustering techniques are applied on the results that are obtained from pre-processing phase.
- k-means clustering and Modified k-means clustering techniques for this purpose are employed that groups the crime data into different clusters based on the similarity measure.
- Modified k-means clustering technique is employed to improvise the limitations of the k-means clustering technique.
- A statistical data is depicted by plotting a graph based on the results of the clustering process, for example, the percentage of crime occurrences.
- A user will be able to facilitate multiple predictions from the graph thereby monitoring various crime patterns.

4 Pre-processing Phase

Pre-processing is a technique of transforming the raw data obtained from multiple sources into an understandable format and preparing the data for further processing. In this work, Data Cleaning technique is employed to pre-process the fictitious crime data. Data Cleaning is a process of determining and detecting inaccurate, incomplete or unreasonable data and improving the quality of data by correcting the errors. To correct the invalid records, special algorithms like Brute Force Pattern Matching and k-nearest neighbor are used. Both the algorithms are used for detecting and correcting the errors. The Data Cleaning algorithm helps to do the following:

1. Detecting of Missing Values.
2. Detection of uniqueness.
3. Referential Integrity.
4. Duplication Detection.
5. Detection of Mis-spellings.
6. Detection of invalid and inconsistent data.

5 Clustering Phase (k-means Clustering)

k-means is a partitional clustering technique that partitions ‘n’ different types of data or observations into ‘k’ clusters. ‘k’ is the number of clusters into which the datasets have to be grouped or partitioned into and the value of ‘k’ has to be specified by the

user in advance. Once the 'k' value is specified or initialised, identification of seeds or centroids from the datasets by random observations and then assigning all the other remaining datasets to one of the seeds based on proximity to the seeds takes place. Euclidian Distance (Perpendicular Bisector) will be used as the distance measure to calculate the distance from the datasets to the seeds. Once the first set of clusters are obtained, the centroid for the clusters have to be calculated by adding all the data points present in the cluster(s) and assigning them as the seeds for the next iteration. In this way, different sets of clusters are obtained at every iteration and stops when none of the cluster assignment changes thereby producing final sets of clusters.

Some of the limitations of the k-means clustering technique are: The technique is applicable only when the numbers of clusters are defined by the user(s) in advance. Determination of the k-value is difficult. Randomly picking the cluster centers do not lead to a good result due to which calculating the distance from every data item to each cluster center during each cycle is a time-consuming process. When clusters are formed of different dimensions, the data elements present in clusters of different dimensions are not equal. The efficiency of clustering is affected since the execution time to perform the clustering is long.

6 Modified Clustering Phase (Modified k-means Clustering)

Figure 1 is a flow chart representation of the Modified k-means Clustering technique. In this technique, 'k' value i.e., the number of clusters are generated randomly without the user having to specify or initialize the value of 'k'. In order to generate an equal number of elements in the clusters, the size of the number of elements and the number of clusters have to be taken into consideration in order to decide how many numbers of elements need to be present in cluster(s). Selection of cluster centers or seeds is done by initialising a range of cluster centers rather than identifying the seeds by random observations. This will speed up the process of assigning the remaining observations to the seeds. Euclidian Distance will be used as the distance measure to calculate the distance from the data sets to the seeds in order to obtain different sets of clusters during every iteration and stops when none of the cluster assignment changes. This technique reduces the time taken taken to form different clusters thereby increasing its efficiency.

7 Experimental Results

The following figure and tables provided are the results obtained by applying k-means and Modified k-means Clustering techniques. The experiment was conducted by taking into consideration fictitious crime data. The collected data was first

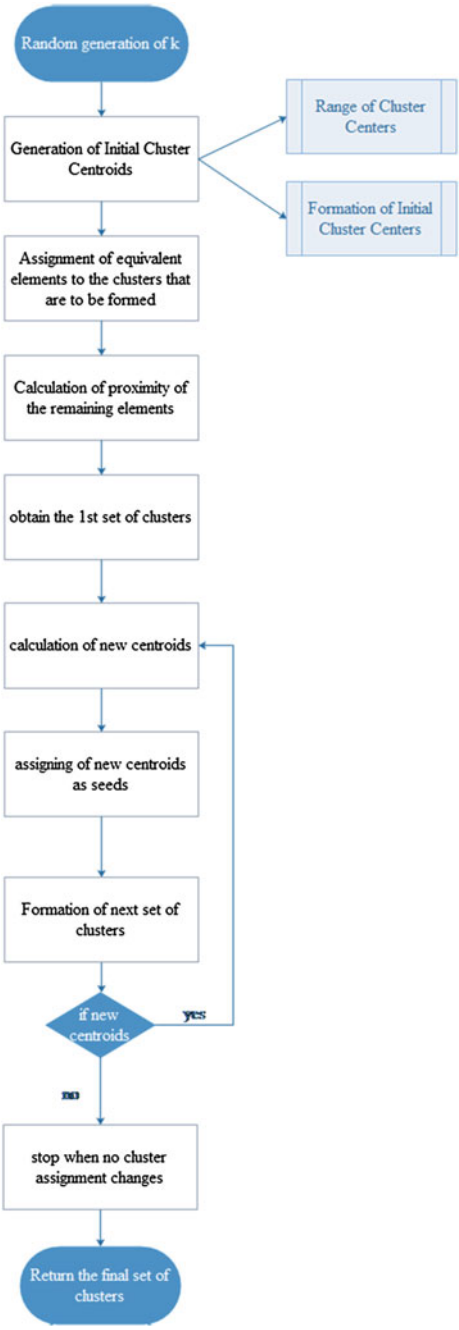

Fig. 1 Flow chart representation of Modified k-means Clustering (Mk-MC) technique

transformed into an understandable format by applying the Data Cleaning technique in order to subject it to further processing. The clustering techniques were applied on selected attributes of the pre-processed data.

- Result of the Modified k-means Clustering Technique

The graph plotted in Fig. 2 is based on the calculations of the Modified k-means clustering technique. The total numbers of crime records are 6 and numbers of clusters chosen randomly by the program are 2. The graph is plotted taking attribute Years (Date of Crime) on the x-axis and attribute Age on the y-axis. The final result is based on the assumption of the values assigned to both the axis is/are:

(1) Cluster 1 (represented by color orange) = Accusers of age group (15–20 and 21–25 years) committing different crime(s) in the year (1990–2000).
(2) Cluster 2 (represented by color red) = Accusers of age group (31–35, 41–45 and 56–60 years) committing different crime(s) in the year (2001–2015).
(3) The overall time taken by the Modified k-means clustering technique to form 2 clusters is 40 ms.

- Performance (Graph)

The datasets used for conducting pre-processing and clustering techniques correspond to fictitious crime data that are categorized into three different entities:

X AXIS	
Date Of Crime(Year)	Value Assigned
1990 to 1995	1
1996 to 2000	2
2001 to 2005	3
2006 to 2010	4
2011 to 2015	5
2016	6

Y AXIS			
Age	Values Assigned	Age	Values Assigned
15 to 20	1	41 to 45	6
21 to 25	2	46 to 50	7
26 to 30	3	51 to 55	8
31 to 35	4	56 to 60	9
36 to 40	5	61 to 65	10

Fig. 2 Graph plotted based on calculations of Modified k-means clustering technique (x-axis = year (date of crime), y-Axis = Age)

Table 1 Average time taken to perform clustering techniques for the different attributes

Datasets(n)	Number of Clusters(k)	Time taken (milliseconds)	
		k-means	Modified k-means
n = 10	k = 2–6	40	32
n = 20	k = 2–6	35	27
n = 30	k = 2–6	37	30
n = 40	k = 2–6	38	32
n = 50	k = 2–6	39	32

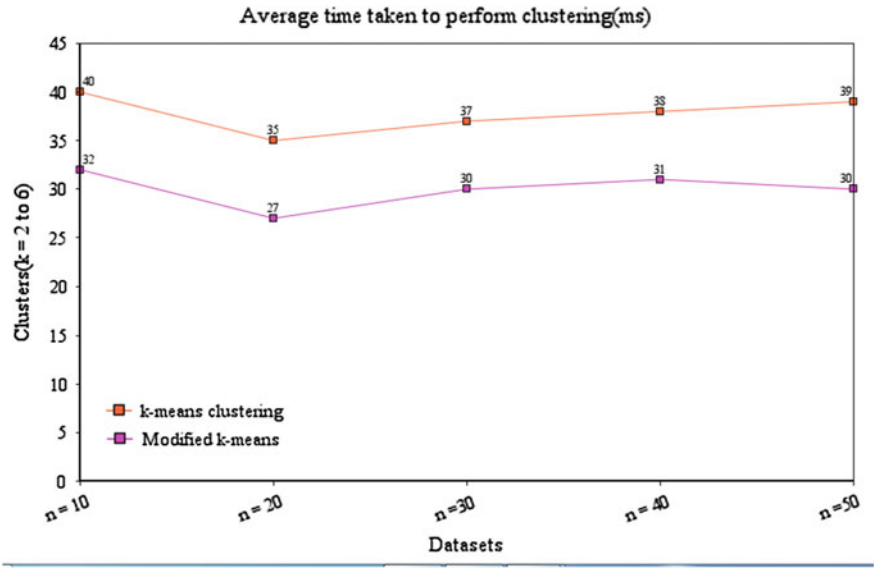

Fig. 3 Graph of average time taken to perform clustering techniques (comparison of the k-means and Modified k-means)

Accuser's Personal Information (API), Accuser's crime committed details (CStatus) and Accuser's family background. The attributes corresponding to these three entities are described in Sect. 3 of Design and Process

Table 1 records the average time taken to perform k-means clustering and Modified k-means clustering technique taking into account fictitious crime data (ranging from 10 to 50 records) and the numbers of clusters (ranging from 2 to 5) for different types of crime attributes. Based on the above table calculations, the performances of both the clustering techniques are measured (time taken). From the graph (Fig. 3), it can be concluded that the time taken to perform the Modified k-means clustering technique in the prediction of crime analysis is less that the k-means clustering technique.

Since this work is specifically taking into consideration fictitious crime data, the results are based on the assumptions of that data. Good results can be obtained and good predictions can be made if real crime data is used.

8 Conclusion and Future Work

Crime pattern analysis is an essential task where efficient clustering techniques can be applied. From the clustered results, it is easy to identify different patterns of crime, thereby making it easier for the user to make a variety of predictions. A comparison of different clustered results of our approach can be made based on their analysis i.e., time taken to form clusters. The results from the comparisons can be used for predicting future crime trends. Prediction methods do not predict when and where the next crime will take place; they only reveal a common pattern associated with time, place and risk that enable predictions to be made. Therefore, the intricate nature of the crime related data and its existing unseen relations within itself have made Data Mining a progressing field aiding the criminologists, crime investigation departments, police departments and other crime related departments. In view of advancement of technology, in future, there is every possibility of improvements to be made in the Modified k-means clustering technique. There is also a scope for better visual representation of graphic patterns of crime data which can help in making the analysis faster and easier suiting the requirements.

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Design of Auto Wakeup Alarming System for Commuters in Railway Sleeper Coaches

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ASTRACT: - Commuters need not worry any more about the arrival of their destination while they are sleeping. Train passengers will be able to wake up at the right time during the journey using the proposed device by setting their desired destination. Due to the magnification in internet's growth in the last two decades, people's expectation of getting connected to the internet independent of location is much higher. Connectivity is the vital requirement of the IoT. In the particular case of trains, providing internet access to passengers on board trains makes good business sense. **Communications in IoT are envisaged through protocols such as Message Queue Telemetry Transport (MQTT).** ***With the internet connectivity on the trains, the proposed device can access the location of the train from the NTES server and inform the commuter about the arrival of his desired destination. In some situations when the internet connectivity is missing the device uses GPS based module to get track of the location of the train. With the availability of internet connectivity inside rail coaches and even when there is no internet, we are proposing the design of an embedded device by using the GPS module in which the passenger has to just set his destination station and need not worry about missing the destination station even if in deep sleep. This Device keeps track the next station, if the next station is same as what the user has set in this proposed device, then it starts alarming to inform passengers as next station is destined for the passenger.***

KEYWORDS: WI-FI, IoT, GPS, MQTT

I INRODUCTION

India's rail transport is one of the largest and busiest rail networks in the world, Transporting more than nine million passengers daily. It works 24X7X365 without any interruption. Many passengers travel long distances more than 500 kilometers, which nearly take a couple of days to reach desired destination. The rail transport is the most chosen forms of long distance transport in most of the countries. Providing internet access for passengers can increase the revenue of the train company by attracting more travelers. Enabling people to continue their online lives whilst travelling on the train, the connected train helps monetize high bandwidth internet on a moving train where data and transactions are facilitated via a Wi-Fi platform. Passenger will be able to access high bandwidth, free Wi-Fi on the train, which includes high value special features. Additionally, the crew will be able to access more information and perform actions regarding the train, the business or the passengers.

II EXISTING METHOD

Indian railways have launched a service to inform the passengers regarding the arrival of their destination through a wake-up call on their mobile phones thirty minutes before the anticipated arrival of their destination. This service can be availed by making a voice call on railway enquiry number 139. The user should enter the data, such as PNR number, station name, STD code of station for calling up 139 for getting the wake-up alarm.

III. TECHNOLOGY OVERVIEW

All aspects of different Transportation systems can be assisted by IoT for inter and intra vehicular communication [2]. The Internet of things (IoT) is the inter-networking of various components such as sensors, cables, physical devices, electronic devices, wireless devices, vehicles, buildings and intelligent network connectivity which enable these equipments for data processing and exchange [3]. All these information sensing devices are connected to the internet through IoT for communicating using the approved protocols [1].

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Google Maps service is one of the popular free service provided by Google, which gives the provision of route planning for transportation. Developers can integrate Google Maps API into their software systems [4]. Google Maps has the GPS and turn- by- turn navigation features for mobility.

GPS is a device capable of receiving information from GPS satellites for finding the device's geographical position, irrespective of any weather conditions, any place on the Earth. The geographical position of the device can be displayed on a map using the appropriate software. The GPS system does not require the user to transmit any data and it operates independently of the internet. It was developed by the U.S government.

Message Queue Telemetry Transport (MQTT) is a lightweight protocol used for the connections with remote locations. MQTT is the most suitable protocol for devices that are resource constrained and for networks with low bandwidth. MQTT was primarily created by IBM and it is open source now. MQTT exists on the application layer of the OSI model and uses TCP layer suited below which provides reliability and security through the Secure Socket Layer [5].

IV PROPOSED METHOD

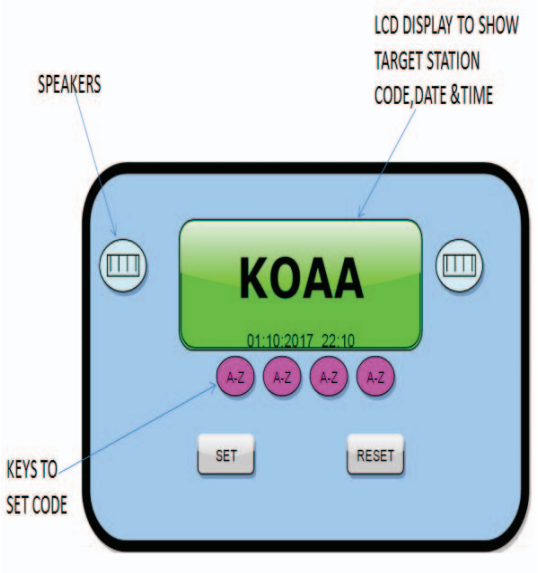

FIGURE 1 Proposed Device

In this method a design of the device is proposed in which passengers are required to set their destination station and this device keeps tracking the next station, if the next station is same as what the user has set in this device, then it starts alarming to inform passengers as next station arriving is the destination station. The device needs to be fixed side by side on each birth in sleeper coaches for easier access of commuters.

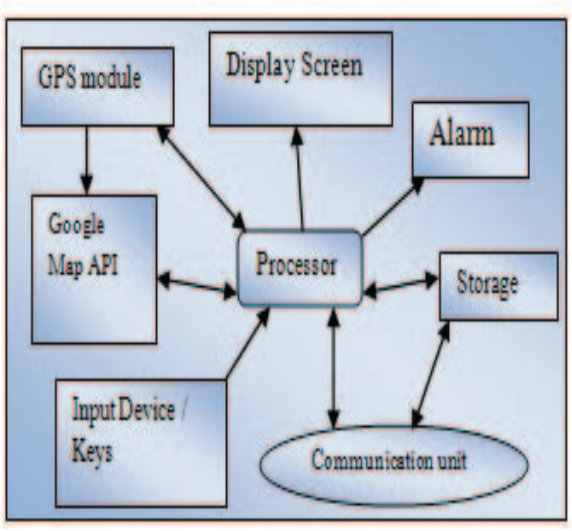

FIGURE 2 Architectural block diagram

- ✓ Display screen: It is a main interactive screen. Generally it displays the TARGET STATION code and current date and time.
- ✓ Sound alarm: It consists of sound speaker, which alerts the commuter to inform that the next station is the destination station, which is set by commuters.
- ✓ Processor: Processor is the main controller, which co-ordinates overall activities. Any low cost processor can be used such as (a) ATMEL 8051 Development Board +MAX232 & 89S52 Microcontroller IC Project Kit, (b) ATMEL 40 pin AVR Development Board Support ATmega 32/16/644vPin AVR Microcontroller, etc. can be used.
- ✓ Storage: Storage module consists of the static table having the fields such as station name, station code, longitude, latitude. The Processor constantly checks the information from GPS then it compares the longitude, latitude information in the table fields and matches with the desired destination. It gets updated automatically as the train approaches desired destinations. A processor constantly checks this, as and when it gets new station code from the server.
- ✓ Communication unit: This unit is directly connected to internal server, which is

located inside the train. Through this each device gets next station code or other information.

- ✓ Input device/keys: With the help of these keys, the commuter has to set this desired destination. User can set/reset the desired destination using these keys.
- ✓ GPS module: With the help of this module we will get the longitude and latitude information of the train.
- ✓ Google Map API: This API will take the input in terms of longitude and latitude from the GPS module and it will give the location name.

V WORKING SCENARIOS OF THE PROPOSED SYSTEM

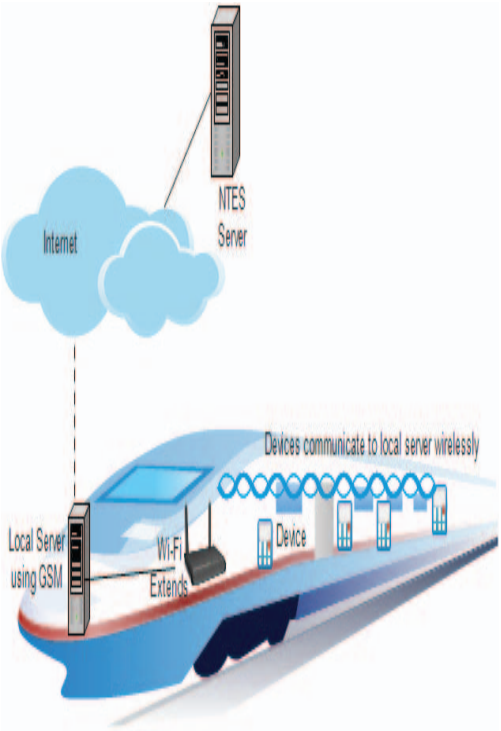

FIGURE 3 Overall Working Scenario

SCENARIO 1: WHEN THERE IS INTERNET CONNECTIVITY

When there is internet connectivity the system can use the information from NTES server and location information from the GPS module for getting the dynamic information of the train's position. The main steps could be like this:

- ➢ The proposed device is deployed inside the train boogies at every berth.
- ➢ The commuter sets the alarm to the desired destination.
- ➢ Communication unit starts communicating with the server located inside the train and dynamically updates the next station code from NTES database.
- ➢ Signal to the alarm is sent as soon as the next station matches to the desired destination set by the passenger.

SCENARIO 2: WHEN NO INTERNET CONNECTIVITY

When there is no internet connectivity, then the system uses the GPS based tracking and gets the longitude and latitude information from the GPS module. This information is matched with the information available from Google maps. The possible steps of the scenario are:

- ➢ The proposed device is deployed inside the train boogies at every seat berth
- ➢ Information about the various stations such as station code and station name, longitude, latitude is updated in the database on the storage device which the train is supposed to traverse remotely through the server.
- ➢ The train passenger sets the alarm to the desired destination.
- ➢ The processor starts communicating with the GPS module to get the longitude and latitude information of the train.
- ➢ Based on the longitude and latitude information fetched from the GPS module the name of the station is mapped to the local database
- ➢ Signal to the alarm is sent as soon as the next station matches to the desired destination set by the passenger.

VI CONCLUSION AND FUTURE WORK

This paper presents an idea for designing an embedded device which is intended to use in sleeper coaches in railways to intimate commuters regarding

the arrival of destination. As a future work, this design of the device can be used in the Smart Cities equipped with IoT infrastructure in transportation vehicles such as cars and buses to intimate the passengers not only about the arrival of the destination, but also to intimate about particular hotels, shops etc. on the way for the safe and comfortable journey.

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Comparison of Various Switching Techniques for 7-Level Cascaded Multilevel Inverter: A Review

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***Abstract*— Utilization of power semiconductor apparatus to enhance power quality may typically use active-power devices optimally operating with very high switching frequencies. This paper deals with comparison of various switching techniques like Stepped wave, In-phase Disposition carrier and Hybrid Level shifted carrier Pulse width modulation techniques for the control of a 7-level cascaded multi level inverter. Comparison is done in terms of design of the pulses and their operation.**

Keywords*— Cascaded Multilevel inverter (CMLI), Hybrid modulation, sequential switching pulse, Multilevel Sinusoidal PWM, Hybrid In-phase Disposition (HIPD).

I. INTRODUCTION

The multilevel converters achieve high-voltage switching by the use of series of voltage steps, each of the individual power devices are within the ratings. Among the multilevel inverters, the cascaded H-bridge topology is attractive in high-voltage applications, because it requires the least number of components to obtain the same number of voltage level.

High-voltage capability with voltage limited devices; low harmonic distortion and increased efficiency are some of the special features of multilevel inverter. The cascaded multilevel inverter appears to be superior to other at high-power rating because of its modular nature of modulation, control and protection requirements of each full bridge inverter [2-6]. Many new modulations have been developed to meet the growing number of MLI topologies. They are aimed to generate a stepped switched waveform that approximates an arbitrary reference signal with adjustable amplitude, frequency and phase fundamental component.

Most of the modulation methods developed for multilevel inverters are based on multiple-carrier arrangements with PWM. The carriers can be arranged with vertical shifts or with horizontal displacements. In this paper, vertical displacements is considered i.e., level shifted carrier. With the use of hybrid modulation the performance of the MLI is improved. It also has the advantage of equal power dissipation among the power devices in a cell.

Comparison of the 7-level cascaded multilevel inverter with stepped pulses, In-phase Disposition and Hybrid IPD in terms of the voltage levels and the harmonics content is considered.

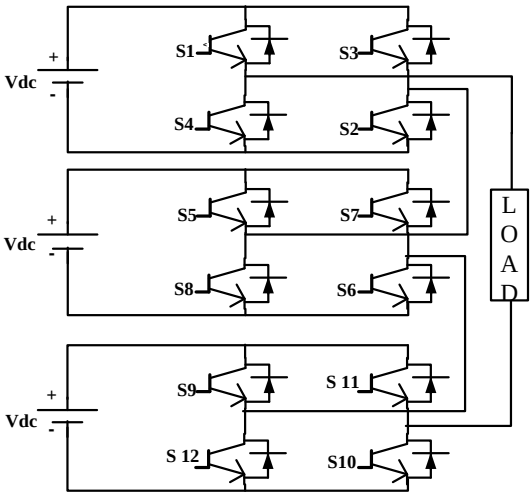

Fig.1. Schematic diagram of the inverter topology used to verify the proposed hybrid modulations.

II. PWM TECHNIQUE FOR CHB INVERTER

A. *Stepped Pulses*

The stepped pulses, this is the conventional topology for triggering of the cascaded multilevel inverter. Output voltage is a staircase wave, there will be rise of level with the pulse given to the corresponding H-bridge.

B. *In Phase Disposition PWM (IPDPWM)*

Fig.2 shows the in-phased disposition multi-carrier modulation scheme. A multilevel inverter with M no. of voltage levels it may requires (M-1) triangular carriers. In the

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Prediction of Blade Resonance of Cooling Tower Fans Using Vibration Analysis

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KEYWORDS: Cooling tower, Vibration analysis, Blade pass frequency, Cooling tower fans (A, B & C).

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A cooling tower is a heat rejection device that rejects waste heat to the atmosphere through the cooling of a water stream to a lower temperature. They represent a relatively inexpensive and dependable means of removing low-grade heat from cooling water. Cooling towers make use of evaporation thereby some of the water is evaporated into a moving air stream and subsequently discharged into the atmosphere. As a result, the remainder of the water is cooled down significantly. Vibration monitoring of cooling tower fans, gear boxes, shafts, and engines gives early warning of machine failures.

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Hot Strip Mill consists of ROT (Run Out Table) Cooling Tower (Which cools the sheet metal coming from finishing stand 6 to Coiling box) so after this cooling process the hot water enters into the induced draft counter flow cooling tower connected to it. It consists of 3 fans namely Fan-A, Fan-B and Fan-C.

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Fig.1 Run out table cooling system

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VIBRATION BASED CONDITION MONITORING FOR GENERATOR

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ABSTRACT

The new generation of condition monitoring and diagnostics systems plays an important role in efficient functioning of thermal power plants. Most rotating machine defects can be detected by such a system much before dangerous situation occurs. It allows the efficient use of stationary on-line continuous monitoring system for condition monitoring and diagnostics as well. Vibration monitoring for condition monitoring of turbine bearing can reduce expenses of maintenance of turbo generator in power plant as well as prevent unnecessary shut down of plant, which create the power crisis. The last decade has seen a large-scale growth in the requirement of uninterrupted power supply for industries, residential and commercial complexes and educational institutions. At many of these locations, standby power is provided by diesel-generator (DG) sets. Proper control and monitoring of these DG sets is an imperative, since any interruption in the supply caused due to improper functioning of the standby-unit, would lead to a loss of productivity.

KEYWORDS: Condition Monitoring, Diesel-Generator, Diagnostics, Rotating Machine, Vibration

INTRODUCTION

INTRODUCTION TO MONITORING

Monitoring is the systematic collection and analysis and information as a project progresses. It is aimed at improving the efficiency and effectiveness of a project or organization. It is based on targets set and activities planned during the planning faces of work. It helps to keep the work on track and can let management know when things are going wrong. If done properly, it is an invaluable tool for good maintenance, and it provides a useful base for evaluation. It enables you to determine whether the resources you have available are sufficient and are being well used, whether the capacity you have is sufficient and appropriate and whether you are doing what you planned to do.

Maintenance strategies are classified by three developmental stages:

- Break down maintenance
- Preventive maintenance
- Predictive maintenance

Break Down Maintenance

This provides the replacement of defective part or machine after the machine becomes incapable of further operation. Break down maintenance is the easiest method to follow and it avoids the initial costs and training personnel and other related upfront costs.

Analysis of six sigma methodology in exporting manufacturing organizations and benefits derived: A review

4 Author(s) Ravi Shankar Raman ; Yadavalli Basavaraj ; Aditya Prakash ; Akash Garg

View All Authors

Abstract:
The world has turned into a global village in the 21st century. Many industries have started manufacturing in their respective areas and providing products and services across the world. These industries are known as exporting industries. Such trading ventures have a high effect on the economy of the organization and in turn help in accelerating the industrialization procedure of a nation. Considering the worldwide situation, with the competition increasing day by day the expansion in rivalry requests the items and administration to be of the best quality. The need of a business methodology is of great importance. Six Sigma have been actualized in numerous enterprises all over the world over and has been demonstrated as a business technique that can give leap forward change to the business. This paper is a push to catch a review of the effect and practices that six sigma executions has at sending out enterprises. It additionally talks about the procedure by and large embraced, devices and methods utilized, benefits obtained and critical factors for successful implementation of this business strategy. In addition to these, it also gives the idea about the impact of selecting a particular methodology on the overall process which further directs the use of the same according to our need.

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SECTION I.
Introduction

A. Six Sigma (Definition)

Over the last three decades, Six Sigma has been executed by different segments including the administration parts. Creators have distinctive perspectives with respect to Six Sigma. Six Sigma has proved out to be helpful to an organization in multiple ways such as retaining the customers, completion of the project on time, in planning the strategy. The above factors have contributed in boosting the morale of the workers which makes the base for the growth of the industry. There are four surges of considered Six Sigma as 1) Statistical device 2) Operational rationality of administration 3) Business culture 4) Analysis approach. In the present scenario Six Sigma has formed into a various business system and giving achievement enhancements and advantages. However, different creators have their viewpoint and experience; some of them are introduced here. According to Polytip et. al[1] Six Sigma is a business framework with numerous measurable viewpoints, and it actually fits business frameworks of most organizations, it is a change drive, which can present a typical metric of the client, saw the quality, which ought to be appropriate to any size and sort of association.

Six Sigma is a business methodology that spotlights on enhancing client necessities understanding, business frameworks, efficiency, and budgetary

FABRICATION & ANALYSIS FOR SOME MECHANICAL PROPERTIES OF LM13 BASED MMCS RIENFORCED WITH BOTTOM ASH

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Abstract— In recent decades, the application of composite is enhancing to a great extent in any of the field. MMCs with less expansive and low density increase the demand in industrial sector, which can be achieved by using Bottom ash as reinforcement. The Bottom ash is low density and inexpensive by-products procured during combustion of coal in thermal power plant.

In the present field of study, the reinforcement of bottom ash particles were prepared by ball milling to get a grain size of 74 to 114 micron. The prepared Bottom ash particle and LM13 were used to fabricate MMCs composite by liquid metallurgy i.e. stir casting method with varying Weight percent of Bottom ash particle from 0Wt% to 8Wt% in step of 2.

The different specimen were prepared as per ASTM standard by using cast ingots of composite to determine various mechanical properties and also noticed that the significant improvement of mechanical properties such as tensile, compression, hardness and impact by varying Weight percentage of Bottom ash particle and also study the microstructure of composite to know the dispersion of bottom ash particle in LM13 matrix.

Keywords— Aluminium; Bottom ash; Stir casting; Microstructure; Mechanical properties;

I. INTRODUCTION

Literally the term composite means a solid state material that exists when substances of different densities, each with its characteristics are alloyed to create a substance, whose characteristics are superfluous to the actual components for any particular uses. The term composite more clearly refers to a structural material within which reinforcement such as Bottom ash is used and the engineering definition would go alongside. The principal of material system, created by mixing various constituents, which exists by varying in, forms a composite and dissoluble in nature. Composite can be fabricated with any of the combination such as metallic, organic, or inorganic; but the constituent making is most constrained. The matrix will have the major constituent for exist composite and give it a large form. Utmost structural constituents such as particulates, laminates or layers, lamina, flakes and fibers [9]. They identify the inside structure of the material composite. Typically, these are the additive phase.

II. AIM AND OBJECTIVE OF STUDY

LM13, Bottom ash alloy composites having 0wt%, 2wt%, 4wt%, 6wt% and 8wt% of Bottom ash particles were fabricated by liquid metallurgy (stir cast) method. The composite specimens were machined as per test standards. The specimens were tested to know the common casting defects using ultra-sonic flaw detector testing system. Some of the mechanical properties have been evaluated and compared with LM13 alloy. Significant improvement in tensile properties, compressive strength and hardness are noticeable as the wt % of the Bottom ash Fiber increases. The microstructures of the composites were studied to know the dispersion of the Bottom ash in matrix. It has been observed that addition of Bottom ash particles significantly improves ultimate tensile strength along with compressive strength and hardness properties as compared with that of unreinforced matrix.

III. FABRICATION OF COMPOSITE MATERIALS

This chapter describes the experimental procedure as adopted in the present project work. The equipment / instruments used for the various experiments in this work are

listed in a tabular form depicting their specific contextual uses, their specification and particulars.

A detailed report is also provided on the raw materials used for fabrication of the test specimen and the characterization of the raw material used for

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Dynamic Vibration Analysis of Gear Box Casing Using ANSYS Software

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Jr. Manager, Central Maintenance Department, JSW Steel Ltd, Vijayanagar Works, Bellary, Karnataka. India. [4]

ABSTRACT: This technical paper contains the application of ANSYS software and also FFT analyzer to determine natural frequency and mode shapes of industrial gearbox casing. In order to prevent the resonance of the gearbox casing it is necessary to find the natural frequency and mode shapes. From the result, this analysis can show the range of the frequency that is suitable for gearbox casing which can prevent maximum amplitude.

KEYWORDS: Gearbox casing, Natural frequency, Finite element analysis, Ansys, Mode shapes, FFT Analyzer.

I. INTRODUCTION

Noise and vibrations are the main reasons for failure of transmission system, minimizing the noise and vibration in power system is a constant development. Gear defects, internal exciting forces, load and speed variations on gears and gear meshing forces are major sources. Gearbox casing is the metal casing in which a train of gears is sealed. From the movement of the gear it will produce the vibration to the gearbox casing. The casing of gearbox is an important component in a gear box. The gearbox casing is mainly to accommodate and support gear train. Failure of casing may lead to major primary damage of the gearbox. Dynamic analysis of gearbox casing is very essential in order to decide appropriate dimensions and to predict the behaviour of casing under different operating conditions [1]. Most noise and vibration problems are related to resonance phenomena. Resonance occurs when the dynamic forces in a process excite the natural frequencies, or modes of vibration, in the surrounding structures. This is one reason to study the modes and second reason is that they form the basis for a complete dynamic description of a structure. To solve the fatigue failure caused by resonance, it is essential to carryout dynamic analysis and redesigning the existing gearbox casing [2]. The modeling was done in Pro/E software of version wildfire2.0 and manufacturing of complicated shapes and parts. Core cavity required for manufacturing of side engine cover of gear box casing was also prepared by manufacturing module of Pro/E. a prototype model has been manufactured and assembled in mini truck successfully [3]. The present gearbox casing is made using Solid Edge V 19.0 [4] and Nastran (NX8) softwares [5] and analysis is done in Ansys Workbench R 15.0. The optimization is based on the Ansys results, which can be used to enhance the efficiency of the gearbox design process [6].

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RUN OUT TABLE COOLING SYSTEM

Fig.1 Run out table cooling system

Experimental Study on Dissimilar Friction Stir welding of Aluminium Alloys (5083-H111 and 6082-T6) to investigate the mechanical properties

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Abstract. Friction stir welding is an innovative technology in the joining realm of metals and alloys. This technique is highly economical and suitable especially for non ferrous alloys compared to ferrous alloys. It finds many applications in various fields of aeronautics, automobile, ship building industries etc. The paper presents the comparative results of mechanical properties such as tensile strength, microstructure, macro structure and hardness on the similar and dissimilar aluminum alloys AA5083-H111 and AA6082-T6 under certain selected variables - constant tool rotational speed, its tilt angle, welding speed using friction stir welding process. It is observed from the experimental results that joint efficiency of dissimilar aluminium alloys is higher than the similar aluminum alloys.

1. Introduction

Scientist Wayne Thomas from "The Welding Institute (TWI)" of Cambridge University, England introduced the concept of Friction Stir Welding (FSW) in the year 1991. In this joining technique a non consumable tool (with a shoulder and specific tool pin profile), is rotated between the abutting faces of the materials to be joined. The joint is produced by means of frictional heat generated between tool and work material. In this process the design and selection of FSW tool pin profile is vital to produce weld joints with higher mechanical properties. Many researchers are indeed thought of the best design for tool pin profile in their investigations to boost up the tensile strength and other important parameters of the weld joint. Based on the literature survey, it is understood that the friction stir welding of various non ferrous alloys are being done with different profiles such as cylindrical, threaded cylindrical, taper cylindrical, triangular, square, pentagonal, hexagonal etc. Moreover the selection of material for FSW tool is also an important criterion to avoid the breakage of tool while in operation. Referring to the previous works, many researchers have selected high speed steel, high carbon and high chromium steels etc. by considering a variety of factors like rotational speed, feed/traverse speed, load, and tool tilt angles which have a major impact on joint strength. This FSW process is a solid state welding process where in metal is not actually melted but the joint is formed due to frictional heat generated between work piece and tool thereby reducing major defects such as cracks, blow holes, porosity unlike in fusion welding. FSW finds various applications in diverse sectors of industry, body shop, marine, rail and road vehicles, and containers for nuclear applications. Further many research investigations revealed that this FSW process successfully welded ductile and low melting metal alloys.

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ABSTRACT: This technical paper contains the application of ANSYS software and also FFT analyzer to determine natural frequency and mode shapes of industrial gearbox casing. In order to prevent the resonance of the gearbox casing it is necessary to find the natural frequency and mode shapes. From the result, this analysis can show the range of the frequency that is suitable for gearbox casing which can prevent maximum amplitude.

KEYWORDS: Gearbox casing, Natural frequency, Finite element analysis, Ansys, Mode shapes, FFT Analyzer.

I. INTRODUCTION

Noise and vibrations are the main reasons for failure of transmission system, minimizing the noise and vibration in power system is a constant development. Gear defects, internal exciting forces, load and speed variations on gears and gear meshing forces are major sources. Gearbox casing is the metal casing in which a train of gears is sealed. From the movement of the gear it will produce the vibration to the gearbox casing. The casing of gearbox is an important component in a gear box. The gearbox casing is mainly to accommodate and support gear train. Failure of casing may lead to major primary damage of the gearbox. Dynamic analysis of gearbox casing is very essential in order to decide appropriate dimensions and to predict the behaviour of casing under different operating conditions [1]. Most noise and vibration problems are related to resonance phenomena. Resonance occurs when the dynamic forces in a process excite the natural frequencies, or modes of vibration, in the surrounding structures. This is one reason to study the modes and second reason is that they form the basis for a complete dynamic description of a structure. To solve the fatigue failure caused by resonance, it is essential to carryout dynamic analysis and redesigning the existing gearbox casing [2]. The modeling was done in Pro/E software of version wildfire2.0 and manufacturing of complicated shapes and parts. Core cavity required for manufacturing of side engine cover of gear box casing was also prepared by manufacturing module of Pro/E. a prototype model has been manufactured and assembled in mini truck successfully [3]. The present gearbox casing is made using Solid Edge V 19.0 [4] and Nastran (NX8) softwares [5] and analysis is done in Ansys Workbench R 15.0. The optimization is based on the Ansys results, which can be used to enhance the efficiency of the gearbox design process [6].

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EFFECT OF TOOL PIN PROFILE ON DISSIMILAR FRICTION STIR WELDING OF ALUMINUM ALLOY AA 7075 T651 AND AA 6061 T6

H.M.Anil Kumar[1] and Dr.V.Venkata Ramana[2]

Abstract- Friction stir welding is a solid state welding process where in two materials are joined without melting the material. The process is well suited for non ferrous materials such as aluminum, copper, magnesium, zinc etc. It is an effective technique for joining dissimilar metal and alloys and finds its application in various fields such as aerospace and automotive industries. In this attempt is made to join aluminum alloy AA 7075 T651 and AA 6061 T6 condition by friction stir welding technique under different process parameters such as tool rotation speed (750 rpm to 1250 rpm), welding speed (90 mm/min to 110 min) and using five different tools pin profiles –threaded cylindrical (TC), triangular profile (TP), conical profile (CP), square profile (SP) and hexagonal profile (HP). The outcome of the experimentation indicated that square tool pin profile and hexagonal tool pin profile at the tool rotation speed of 1250 rpm and the welding speed of 110 mm/min respectively yielded good quality welds in contrast to other tool pin profiles.

Keywords – Dissimilar Friction stir welding, tool pin profile, tensile strength, microstructure

I. INTRODUCTION

Friction stir welding (FSW) is a solid state joining process developed at The Welding Institute (TWI), Cambridge, UK, in 1991. The process uses rotating tool which provides frictional heat and mixing to produce a weld between two metallic surfaces below their melting point. Since the process works below the melting point of the metals some of the defects like cracks, porosity and blow holes arising out of fusion welding process are eliminated. Koilraj et al [1] investigated the optimum values of dissimilar friction stir welding process parameters such as tool rotational speed, transverse speed, tool geometry and ratio between tool shoulder diameter and pin diameter for aluminium AA2219-T87 and AA5083-H321 alloy. The results indicated that optimum levels of the rotational speed, transverse speed, and D/d ratio are 700 rpm, 15 mm/min and 3 respectively. The cylindrical threaded pin tool profile was found to be the best in contrast to other profiles. The D/d ratio contributes 60% to the satisfactory welds.Govind Reddy et al [2] optimized the process parameters on the work on dissimilar frictions stir welding using AA2024-AA7075 aluminum alloy. In this work effect of tool rotation speed and welding speed on the tensile strength is investigated by developing mathematical model using response surface methodology and Nelder Mead algorithm.R Palanivel et al [3] studied the effects of tool rotational speed and pin profile on microstructure and tensile strength of two different aluminum alloys AA5083-H111 and AA6351-T welded by using friction stir welding under varying process parameters with different tool pin profiles. The results showed that the joint fabricated by Straight Square at the tool rotational speed of 950 rpm yielded highest tensile strength of 273 MPa. The two process parameters affected the joint strength due to variations in material flow behavior, loss of cold work in the HAZ of AA5083 side, dissolution and over aging of precipitates of AA6351 side and formation of macroscopic defects in the weld zone.D. A. Dragatogiannis et al [4] did the work on

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Experimental Study on Dissimilar Friction Stir welding of Aluminium Alloys (5083-H111 and 6082-T6) to investigate the mechanical properties

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Abstract. Friction stir welding is an innovative technology in the joining realm of metals and alloys. This technique is highly economical and suitable especially for non ferrous alloys compared to ferrous alloys. It finds many applications in various fields of aeronautics, automobile, ship building industries etc. The paper presents the comparative results of mechanical properties such as tensile strength, microstructure, macro structure and hardness on the similar and dissimilar aluminum alloys AA5083-H111 and AA6082-T6 under certain selected variables - constant tool rotational speed, its tilt angle, welding speed using friction stir welding process. It is observed from the experimental results that joint efficiency of dissimilar aluminium alloys is higher than the similar aluminum alloys.

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Study of Microstructure and Wear Behavior of Al-Si-Cu-Fe Alloy

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ABSTRACT: *Modified Al alloys are gaining emphasis in the past few years due to wide range of properties available for the engineering applications. These alloys are manufactured by spray forming process have superior properties over the conventional cast alloys. Hence an attempt has been made to summarize the work that has been carried out in the field of spray forming of hypereutectic Al–Si alloys and with other alloying elements such as Fe, Cu, and Mg. In this paperattention has been paid towards thestudy of alloy microstructure and comparison between spray forming process and conventional cast on the effect of load on volumetric wear rate, sliding speed on volumetric wear rate and load on frictional force.*

Key words: *Hypereutectic Al–Si alloys; Spray deposition; Microstructure; Wear properties*.

I. INTRODUCTION:

Tremendous improvements have taken place in the production of ferrous and non-ferrous metals and their innumerable alloys and this **"materials explosion"** have now reached astonishing levels compared with 19th century. As the technology improves newer materials emerges from metals to alloys, alloys to composites. Hypereutectic aluminum-silicon alloys containing 18 - 35% silicon possess very good wear resistance derived from the hard primary silicon polyhedral distributed throughout the matrix. It is a widely held view that refinement of the primary silicon phase, to produce a distribution of fine silicon particles, improves the wear resistance of a hypereutectic alloy. However, very little published information is available on the influence of structural modification on the wear resistance of these alloys.Spray forming is a relatively new metallurgical process for the manufacture of near net shaped metallic products with enhanced material properties and performance. In origin the processes are similar to powder metallurgy processing in that a metal part is built up by the consolidation of small droplets are particulates. This technique combines the metallurgical benefits of fast cooling during solidification to produce low segregation, refined microstructures with the cost advantages associated with near-net-shape processing. In this process a stream of liquid metal is gas atomized to form spray of molten droplets. The atomizing gas cools the droplets and accelerates them towards a substrate where they consolidate to form a thick deposit. Spray deposition is rapid solidification and therefore has significant advantages over conventional ingot metallurgy. Among the commercial Aluminum casting alloys perhaps Al-Si alloys are the most common particularly due to some very attractive characteristics such as good weld ability, high strength to weight ratio, excellent cast ability, and pressure tightness, low co-efficient of thermal expansion, good thermal conductivity, good mechanical properties and corrosion resistance. They are, therefore, well suited for aerospace

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Study of Microstructure and Wear Behavior of Al-Si-Cu-Fe Alloy

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Voltage estimation in smart distribution networks with multiple DG systems

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2 Author(s) Raghavendra P ; Dattatraya. N. Gaonkar **View All Authors**

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Steady state voltage rise problem resulting from the integration of DGs at lower voltage levels can be a major impediment to the growth of distributed generation capacity. With the steady implementation of the smart grid technologies throughout the existing distribution networks, the online voltage control can be achieved. The voltage profile has to be estimated first along the distribution networks for the online voltage control. In this article, a technique to estimate the voltage profile of a radial distribution network with multiple DG systems having different line section impedances with/without laterals is presented. The presented technique is based on estimation of voltages by remote terminal units (RTUs) placed at each DG and at each line capacitor. The presented technique tested on two radial rural distribution systems with/without laterals. Comparative results for different methodologies in estimating the voltage profile are presented. The simulated results using the above method are presented in this paper, considering the multiple DG systems with/without laterals. The reported results show that the method presented is capable of estimating the voltage profile along the distribution network with DGs for online voltage control.

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Simulation and analysis of common mode voltage, bearing voltage and bearing current in two-level and three-level PWM inverter fed induction motor drive with long cable

Sharana Reddy, Banakara Basavaraja

A Pulse Width Modulation (PWM) Voltage Source Inverter (VSI) fed induction motor drive has superior dynamic characteristics than sine wave driven induction motor. But it has a problem with induced bearing voltage and high frequency bearing current that flows through bearings due to parasitic capacitive coupling that results in premature bearing failure. In many industrial applications the PWM inverters and motors must be at separate locations thus requiring long motor cable, which contributes... CONTINUE READING

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Online voltage estimation and control for smart distribution networks

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Abstract The increasing deployment of Distributed Generation (DG) technologies introduces power quality challenges to the grid, in particular steady state voltage rise at the connection point for DG units. In most distribution networks, control and monitoring of grid parameters is missing, as well as system security is at risk. Smart grid technologies have the capability to realize the real-time measurements and on-load voltage controls. With the steady implementation of smart grid technologies throughout the existing distribution networks, the online voltage control can be achieved ensuring the power quality and voltage levels within the statutory limits. This study presents a methodology for the estimation of voltage profile in a smart distribution network with DG for the online voltage control, taking into account different line *X*/*R* ratios and laterals. This method is based on maximum and minimum voltage estimation by remote terminal units (RTUs) placed only at DG connected bus and at capacitor connected bus. Voltage regulation is carried out based on RTUs estimated values. This work is tested on two radial distribution networks with/without DGs and laterals. Comparative results for voltage magnitudes estimated with different methodology are presented. The reported simulation results show that the method presented is capable of estimating the voltage profile along the distribution network with DGs for the online voltage control, considering different line *X*/*R* ratios and laterals.

Keywords Distributed generation, Power quality, Smart grid, Voltage rise

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1 Introduction

Distributed generation (DG) installations are growing exponentially. The major driving forces of distributed generating systems are electricity market liberalization, developments in DG technologies and environmental concerns [1]. DG technologies offer a number of potential benefits in comparison to the conventional centralized systems [2–3]. Few of its benefits are lower capital cost, reduced high transmission and distribution losses, improved supply reliability and power management, reduced demand during peak times and better quality of power. While offering a numerous potential benefits, high penetration of DG units can cause several technical concerns [4–7]. Safety issues, thermal rating of equipment, power quality and reliability, system fault level, steady state voltage rise and system stability are the few factors that restrict the increasing penetration of DG systems. Steady state voltage rise at the connection point for DG units can be a bigger impediment to the growth of DG [6–8].

Traditional infrastructure of T&D networks were originally built to deliver electricity to end-use customers from remotely generated at large-scale power plants. Distribution network operators have to ensure the customer voltages well within the tolerance limit. High DG penetration in the distribution network alters the network flows, greater variation in voltage which in turn adversely affecting the quality of supply. In most distribution networks, control and monitoring of grid parameters are missing, as well as

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Experimental Implementation of Conducting Grease Technique to Reduce Bearing Voltage in a PWM Inverter Fed Induction Motor Drive

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Abstract

In this paper, an experimental performance of conducting grease bearing current mitigation technique is carried out. This technique reduces the bearing voltage to a level, below the dielectric strength of bearing lubricating film. It provides a solution to the bearing current damage caused by fluting, induced by Pulse Width Modulated (PWM) Voltage Source Inverter (VSI). An appropriate proportion of the graphite powder is mixed in steps with the lubricating grease. The influence of variable load operation on this technique is also discussed. Information regarding the Bearing Voltage Ratio (BVR) is obtained for different quantity of graphite powder mixed with the grease. A 2.2kW (3 HP), 415V, specially modified induction motor, PWM VSI and the graphite powder of size 0.5µmt are used.

Keywords: Bearing voltage;Common mode voltage; BVR; Conducting grease; Bearing current; PWM Voltage source inverter.

1. Introduction

The occurrence of bearing currents in an induction motor has been known for decades. Asymmetric flux distribution is the basis that causes bearing currents inside the induction motor [1]. It has been productively solved using advanced motor design and manufacturing methods. However, the problem arises unpredictably due to the installation of Variable Speed Drives (VSDs) for industrial and commercial applications using power electronic devices. VSDs are extensively used to achieve controlled output and desired efficiency. These drives are fed by

means of Pulse Width Modulated (PWM) inverters that use fast switching devices such as Insulated Gate Bipolar Transistor (IGBT) with a rise time of 0.1μS, which induces a common mode voltage (V_{cm}). A part of V_{cm} appears between shaft and ground as a bearing voltage (V_b) due to capacitor voltage divider action. When the V_b exceeds the dielectric strength of a lubricating film, break down of the lubricating film takes place and it results in high frequency Electric Discharge Machining (EDM) bearing current (I_b). Which causes pitting and fluting of the bearing races and it results in premature bearing failure [2]-[6].

The bearing current faults are most frequent in PWM fed VSDs, about nearly 30% according to an IEEE motor reliability study. The bearing currents cause bearing damage within 1 to 6 months of installation. In order to protect VSD investment, predictive maintenance is suggested to avoid costs associated with downtime and the lost product [7][8].

The EDM currents can be eliminated if a grounded Faraday shield built from copper foil tapes inserted into the stator slots, and extended to the overhung. Which interrupt the capacitive coupling between the stator winding and the rotor surface; the value of V_b has been reduced by 98%. At present, motors with a Faraday shield are not commercially available. It is a costly solution and it is difficult to implement [9][10].

Shaft grounding technique provides low impedance parallel path and diverting common mode current by shorting the shaft voltage to the ground. This is not an effective solution for the high frequency circulating bearing currents [11]. The conductive micro fiber shaft grounding ring is implemented to reduce the I_b damage. The microfiber brush does not eliminate the I_b because of occasional low impedance that occurs between the bearing balls and the bearing races [12].

Chen et al only state the conducting bearing lubricant as an alternate to avoid the shaft grounding with brush [2]. The conductive grease provides a low impedance path from the rotor shaft to the frame. The conductive elements may cause wearing bearing damage [8].The grease with an enough metallic elements to provide conduction without causing wearing bearing damage itself, is yet to be found [10]. In theory, the grease contains conductive particles; it provides the continuous path through the bearings and so bleeds off the V_b to the ground without causing damaging discharge [12]. The conductive grease provides a low impedance path as a shaft grounding brush [13]. The value of I_b can be reduced by using graphite powder, which reduces current density by increasing conducting area between the contact surfaces [14]. In all the above references and also from recent literature survey, there is lack of an experimental analysis using the conductive grease.

This paper presents an experimental analysis of the conducting grease technique using graphite powder. An appropriate proportion of the graphite powder is mixed with the lubricating grease. The influence of variable load operation on the magnitude of bearing voltage on this technique is also discussed. The information regarding BVR is obtained for different quantity of graphite powder mixed with the grease.

2. Common mode voltage, Bearing voltage and BVR

2.1. Common mode voltage

In a PWM inverter fed motor, an average voltage in a neutral point w.r.t ground is non zero and is known as common mode voltage, it is given by the equation (1)

$$V_{cm} = \frac{\left[V_{an} + V_{bn} + V_{cn}\right]}{3} \tag{1}$$

In the above equation V_{an}, V_{bn} and V_{cn} are the phase voltages generated by the PWM inverter.

2.2. Bearing voltage and BVR

The potential difference across inner and outer race of a bearing is known as bearing voltage (V_b) and is given by equation (2) [3] [4].

$$V_b = \frac{C_{sr}}{C_{sr} + C_{rf} + C_b} V_{cm} \tag{2}$$

$$BVR = \frac{V_b}{V_{cm}} \tag{3}$$

Where, C_{sr} is the capacitance between stator winding and rotor, C_{rf} is capacitance between the stator frame and the rotor and C_b is bearing capacitance.BVR is typically in the range of 1:10.Fig.1.shows common mode equivalent circuit.

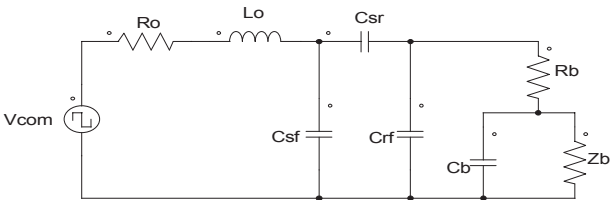

Fig.1. Common mode equivalent circuit

3. Experimental set up

The experimental set up shown in Fig.2 consists of a 3 HP (2.2kW), 4-pole, 50Hz, 415 V, star connected, squirrel-cage induction motor with ball bearings. The motor is fitted with a brush and a brush holder on both the drive and non-drive ends. To feed the motor, a commercially available, 3.67 kW (5 HP), 440 V, Voltage Source Inverter (VSI) (Danfoss) was used. In VSI Sinusoidal PWM (SPWM) technique with a switching frequency of 2 kHz was used. A 440V, 50Hz, 3-phase supply is given to the VSI.

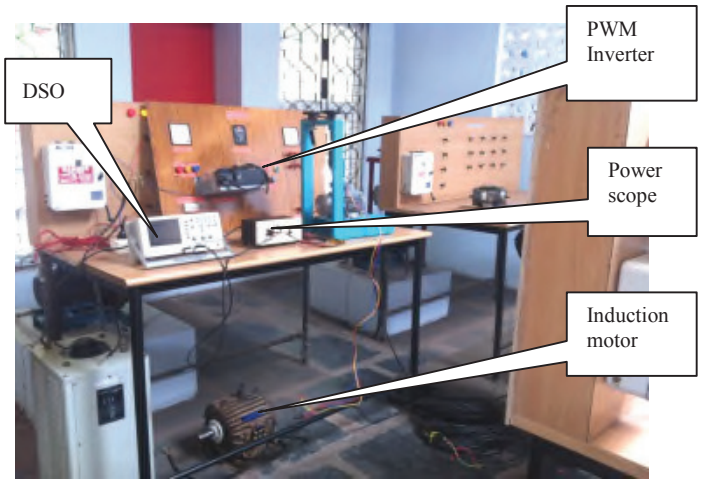

Fig.2 Experimental set up

An induction motor connected to the PWM ASD using a high frequency cable of length 12mt. Both the motor and the VSI were grounded to the grid earth. A Digital Storage Oscilloscope (DSO) (Gwinstek-1102-U), 250 Mega sample per sec., 2-channel was used to record and analyze the waveforms. A differential power scope (Anshuman),

2-channel, was used to provide high frequency isolation from the inverter with the DSO and the motor. The outer diameter around the bearing outer race on both sides of an end plate of a standard induction motor was slightly increased by machining. The proper insulation (i.e., a thick dielectric insulator) was placed around the outer race of the bearings at both drive and non-drive ends with this modification, the rotor is floating.

Both the drive end and the non-drive end bearings were removed safely from the shaft by applying a special technique. The new steel ball bearings 6205 had been greased with the conductive grease, formed by adding graphite powder of 0.5µmt size to the lubricating grease. Before the measurements were carried out, the graphite powder was mixed in steps of 0.2gm with 20gm of lubricating grease.

To facilitate the V_{cm} measurement, the motor was also constructed with an externally accessible stator winding neutral wire. The V_b was measured between shaft and the ground reference point. Placing the motor on the test bed ensures the ground current flow through the ground wire. The mechanical loading effect on the magnitude of V_b is carried out by direct loading method. It consists of applying the brake to a water cooled pulley and the spring balances $S_1$and S_2 mounted on the shaft.

4. Results and discussion

4.1. Constant load operation

Fig.3 shows the experimental waveform of the V_{cm} (peak) generated by PWM inverter. Fig. 4 shows the waveform of V_b with a peak value of 38V without the application of conducting grease, when the motor operating at 1500 rpm speed. This is above the allowable voltage of 0.5mV as per the IEEE112 standard and also 1 to 2V as per the manufactures allowable voltage for the Variable Frequency Drives (VFDs) [15] [16]. A peak voltage of 38V exists across the bearings, results in a flow of the high frequency EDM bearing current through bearings. The bearing doesn't survive any longer. The experimental results of conducting grease technique indicating peak value of bearing voltage waveforms are presented in figs. 5(a)-5(e). From figs.5 (a)-5(e) and table 1, it is observed that, as the quantity of graphite powder is added to the grease increases, the V_b decreases. It is due to; the graphite powder provides the conducting channel thereby, reducing the voltage built up between shaft and the ground.

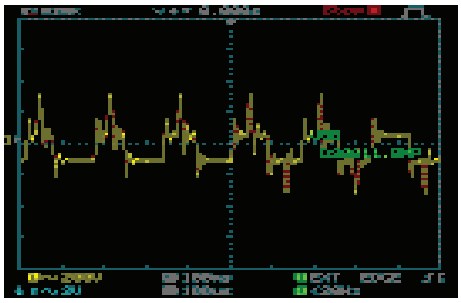

Fig. 3. Common mode voltage

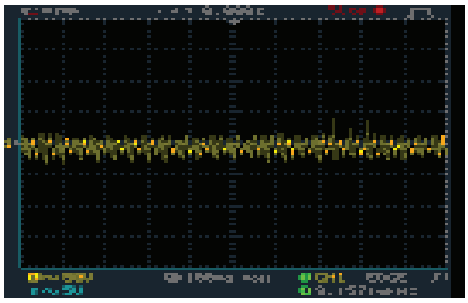

Fig. 4. Bearing voltage without conducting grease

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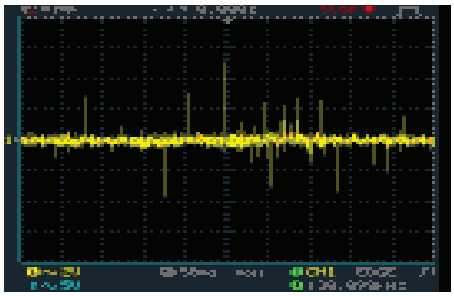
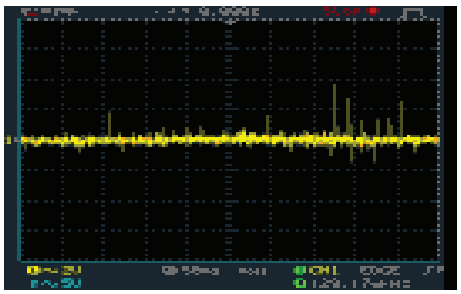
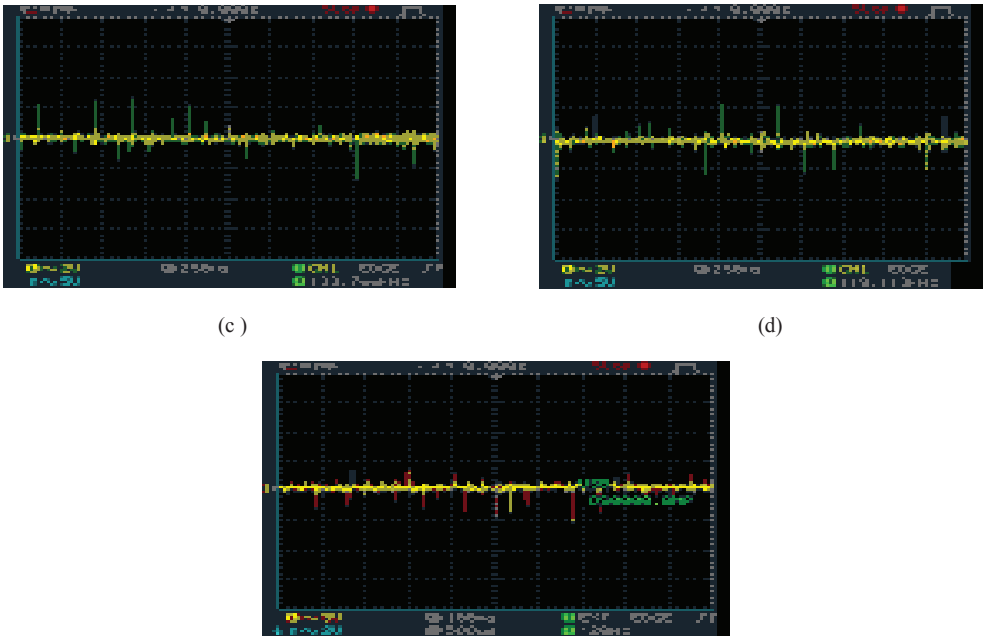


(a)



(b)



(c) (d)

(e)

Fig . 5. Experimental results of conducting grease technique a) V_b with 0.2gm of graphite powder b) V_b with 0.4 gm of graphite powder c) V_b with 0.6gm of graphite powder d) V_b with 0.8gm of graphite powder e) V_b with 1.0gm of graphite powder

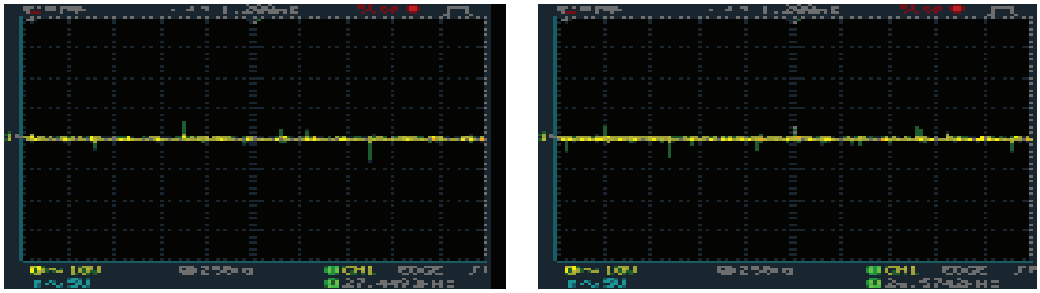
It can be seen that the BVR mainly depends on C_{sr} and C_b. In Fig.1 the dependence of the BVR acting on the bearings as a function of the C_b is presented. The value of BVR without conducting grease is 13.19%, which is above the normal range (max.10%) [5]. As the quantity of graphite powder addition is increased, the BVR gets reduced. However, adding more quantity of the graphite powder may cause wear and tear of the bearing races and balls (yet to be studied).

Table.1. Bearing voltage and BVR for different quantity of graphite powder

Common mode voltage (V_{cm}) (pk)	Quantity of graphite powder (gm)	Bearing voltage (V_b) (pk) V	BVR
288	without conducting grease	38	0.1319 (13.1%)
	0.2	5.04	0.0175 (1.75%)
	0.4	3.68	0.0127 (1.27%)
	0.6	2.64	0.0175 (1.75%)
	0.8	2.24	0.0077 (0.77%)
	1.0	1.5	0.0052 (0.52%)

4.2. Variable load operation

The rated current of the induction motor under test is 5A.Figs. 6(a) and 6(b) show the value of bearing voltage when the motor is operated at 50% (2.5A) loading and 100% (5A) loading respectively. It is observed from Figs.6(a) and 6(b) and table.2, the peak value of V_b for light load or no-load is 5.04V ref.Fig.5(b), for 50% (2.5A) of loading it is 4.2V and for 100% (5A) loading 3.5V. With an increase in the radial load on the bearings reduces the lubricating film thickness. The balls make direct contact with the races momentarily. In addition to that, the conducting grease further reduces the value of V_b considerably. The conducting grease technique under variable load operation has significant influence on the magnitude of V_b. Operating VFD under loaded condition itself provides mitigating effect of bearing current damage. Further as the load on the motor increased, for a fixed quantity of graphite powder added, the magnitude of V_b and BVR gets reduced significantly.



(a) (b)

Fig.6.Bearing voltage for conducting grease technique under variable load operation a) 50% loading (2.5A) b) 100% loading (5A)

Table.2. Bearing voltage and BVR under variable load operation

parameters	Without conducting grease	Conducting grease technique		
		Light load/ No load	50% (2.5A) loading	100%(5A) loading
Bearing voltage (V_b) peak V	38	5.04	4.8	3.6
BVR	0.131 (13.1%)	0.0175 (1.75%)	0.0166 (1.66%)	0.0125 (1.25%)

5. Conclusion

In this paper, an experimental performance on the conducting grease mitigation technique of bearing current damage in PWM ASD was carried out. The magnitude of the EDM bearing current depends on the existence of the bearing voltage. The minimum value of the V_b is 1.5V peak is recorded, which is below the dielectric strength of the bearing lubricating film and prevents the bearing current damage. The conducting grease technique under the variable load operation further reduces the value of V_b significantly. As the load on motor increases the thickness of lubricating grease decreases.

The value of BVR will not be provided on the motor specification. The BVR obtained in this paper can be used to predict the value of V_b with a known value of the V_{cm} at the stator terminals, which helps in implementing a suitable mitigation technique.

However, adding more quantity of the graphite powder may cause wear and tear of the bearing races and balls. The above mitigation technique prevents the dangerous EDM bearing current and enhances the bearing life there by improving the reliability of the ASD applications.

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116. Design and Analysis of Double Auto Shut off Valve for Scraper Installed in Scraper Board in Disc filter

Milind Deshmukh#, Anant Chipade
Department of mechanical engineering, Solapur University

Double piping auto shut off valve used in a disc type industrial filter. Which is stop flow coming to the filtration while scraper board is removing slurry and lime mud from filtration disc which are already in filter, so we can called this product as auto shut off valve .As it stopping flow coming directly to the filtration medium from inlet. The aim is to design the valve parameter and calculate the forces on piston and cylinder and seen the valve validation.

117. Implementation and Comparative Analysis of Multipliers on Spartan 6 FPGA

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Department of ECE, Ballari Institute of Technology & Management, Ballari,Karnataka,India.

This paper presents implementation and comparative analysis of Wallace tree, Booth and Vedic multipliers for radix-4 and radix-8 on Spartan 6 FPGA. Results obtained for radix -8 indicate that Booth multiplier is the most efficient multiplier in terms of power and area consumption while Vedic multiplier with adders has the least delay.

118. Power Quality Improvement of Grid Connected Wind Energy System

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Electrical Engineering Department
Fabtech Technical Campus of Research and Technology
Sangola, Maharashtra, India

Institutional and governmental support on wind energy sources, together with the wind energy potential and improvement of wind energy conversion technology, has led to a fast development of wind power generation in recent years. When Wind Energy is integrated with grid, the issue of power quality arises. Awareness of power quality is highly increased in a sensitive industry, where the standardization and performance is an important aspect. The connection of wind turbine to the grid affect's the electric grid power supply quality. The influence of wind turbine in grid system concerning power quality measurements are active power, reactive power, variation of voltage, flicker, harmonics, and electrical behaviour of switching operation. In this paper a control scheme for Battery Energy Storage System-Static Compensator is connected at a point of common coupling to mitigate the power quality issues. The STATCOM control scheme for the grid connected wind energy generation system for power quality improvement will be simulated using MATLAB/SIMULINK in power system block set. A marked reduction in the Total Harmonic Distortion is observed in source current of Wind Energy Generation System (WEGS) with the incorporation of this scheme. The development of the grid co-ordination rule and the scheme for improvement in power quality norms as per IEC-standard on the grid has been presented.

CONDITION BASED MAINTENANCE TO ENHANCE PRODUCTION

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Abstract

Maintenance is a part and parcel of an industry. The basic principle is to direct the efforts to upkeep the production facilities for their trouble free operation throughout its economic life cycle. The high costs of maintenance and downtime have made maintenance a critical factor in any industry. The importance of maintenance is not readily seen as that of production, but nevertheless its function are equally important to the continued well-being of the industry.

The need for maintenance requirement to any production cannot be taken in an easy way. With the increasing complexity and rapid change in technological developments, there has been a phenomenal increase in the pace and power of equipment and machinery. This has brought problems in mechanical devices and systems leading to losses in production due to breakdowns. Maintenance is the only way on application of which the gap between the achieved and achievable productivity can be minimized.

Condition based maintenance has developed into one of the most advanced maintenance techniques and it is a method of indicating, measuring and assessing the condition or change in condition of plant components or complete plant by means of certain parameters of unit like Vibration, Temperature, Noise etc.,

1. Introduction:

Maintenance is the characteristic of design and installation which is expressed as the probability that an item will be retained in or restored to a specific time within a given period of time when Maintenance is performed in accordance with prescribed procedures. The measurement and signal processing techniques, transducers, signal conditioners and signal analysis equipments are described, which are used in the condition monitoring.

WEAR BEHAVIOUR OF Al6061-SiC COMPOSITES

Shivaramakrishna A[1], Dr.Yadavalli Basavaraj[2], Dr. V. Venkata Ramana[3]

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ABSTRACT

Aluminium based composites are very popular in automotive and aerospace segments. In particular aluminium alloy-SiC composite systems are widely studied and seriously explored for various other applications in defense and space. However they have not been looked at as potential materials in naval and chemical applications where synergistic effects of both wear and corrosion need to be addressed to. This needs the assessment of wear behaviour of composites. From the survey, it is evident that major focus is on mechanical and corrosion properties of cast composites. However, meager information is available as regards the slurry erosive wear behaviour of cast and extruded metal matrix composites. In the light of the above, the present investigation is aimed at studying in detail the slurry erosive wear behaviour of cast and hot extruded Al6061 and Al6061-SiC composites in sand slurry. Al6061-SiC composites have been prepared primarily by vortex method. Hot extrusion of these composites and the matrix alloy has been carried out at 550^{0}C using a 500T hydraulic press. The cast and extruded composites have been subjected to Metallographic studies, micro-hardness, and slurry erosive wear test using sand slurry of different concentrations. The extruded composites exhibit better hardness, and there is a significant reduction in the slurry erosive wear rate of the composite with an increase in the percentage weight of the reinforcement. However, extrusion has a profound effect on the slurry erosive wear resistance of both the base alloy and the composites studied.

Keywords: *Slurry erosive wear, Extrusion, Composites, Silicon carbide.*

1. INTRODUCTION

Aluminum alloys have excellent mechanical properties coupled with good corrosion resistance. However, they possess poor wear resistance. To improve the above said property, researchers have successfully dispersed various hard and soft reinforcements such as SiC, Al_2O_3, glass, graphite, mica, and coconut shell char in aluminum alloys by different processing routes [1-3]. In recent years, considerable interest has been shown in extending the use of metal matrix composites in the marine environment [4]. This demands evaluation of corrosion as well as erosion-corrosion characteristics of the composite materials under simulated marine environment. A few studies have been reported by different investigators on erosive –corrosive wear behavior of Al alloy and its composites [5]. Erosion–corrosion of MMCs takes place

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A Review on Effect of Friction Stir Welding (FSW) Process Parameters on Mechanical Properties

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Abstract:

Friction Stir Welding (FSW), solid state welding process used for several industrial applications. It is an attractive technology for solid state material joining, contrary to conventional welding methods, having ability to produce welds with higher integrity and minimum induced distortion and residual stresses. In this paper, an attempt has been made to understand the operation of FSW, critical welding parameters. Further review of literature is made to understand the critical welding parameters which affect the mechanical properties, microstructure and weld quality.

Key Words: Welding,joint, parameter, material, mechanical properties

I. INTRODUCTION

Friction Stir Welding (FSW), being a novel process and facilitates welding various required for several industrial applications. It is an attractive technology for material joining, contrary to conventional welding methods, having ability to produce welds with higher integrity and minimum induced distortion and residual stress. FSW is a relatively new joining process produces no fumes; uses no filler material; environmentally friendly and can join several metal alloys such as aluminum, copper, magnesium, zinc, steels, and titanium. FSW sometimes produces a weld that is stronger than the base material. FSW is a solid-state joining process, where metal is not melted uses a cylindrical, shouldered tool with a profiled probe rotated and slowly plunged into the weld joint between two metal pieces of sheet or plate that are to be welded together . The parts must be clamped onto a backing bar in a manner that prevents the abutting joint faces from being forced apart or in any other way moved out of position.

Frictional heat is generated between the tool and material causing the work pieces to soften without reaching the melting point, and then mechanically intermixes the two pieces of metal at the place of the joint, further softened metal due to the elevated temperature is joined using mechanical pressure, applied by the tool.This leaves a solid-phase bond between the two pieces. Because melting does not occur and joining takes place below the melting temperature of the material, a high-quality weld is created. This characteristic greatly reduces the ill effects of high heat input, including distortion, and eliminating solidification defects.

Friction Stir Welding (FSW) was invented by Wayne Thomas at The Welding Institute (TWI) Ltd in 1991 and overcomes many of the problems associated with traditional fusion welding techniques such as shrinkage, solidification cracking and porosity. FSW is a solid state process which produces welds of high quality in difficult to weld materials such as aluminum and is fast becoming the process of choice for manufacturing light weight transport structures such as boats, trains and aeroplanes. Since its invention, the process has received world-wide attention, and today FSW is used in research and production in many sectors, including aerospace, automotive, railway, shipbuilding, electronic housings, coolers, heat exchangers, and nuclear waste containers.

PRINCIPLE OF OPERATION

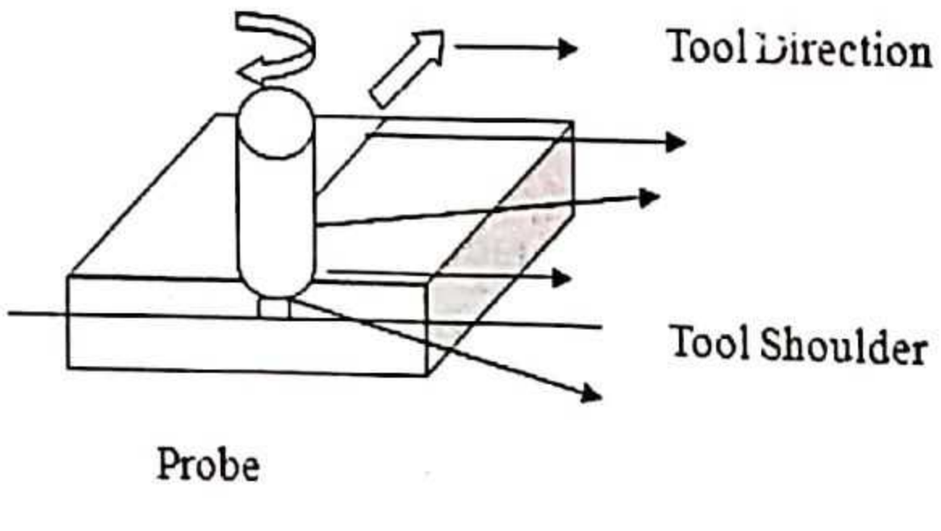

Figure1. Friction welding process

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Frictional heat is generated between the wearresistant welding components and the work pieces. This heat, along with that generated by the mechanical mixing process and the adiabatic heat within the material, cause the stirred materials to soften without melting. As the pin is moved forward, a special profile on its leading face forces plasticized material to

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Experimental Investigation of Mechanical Properties And Morphological Studies on Friction Stir Welded Aluminum 2024 Alloy

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[b] *Professor, Department of Mechanical Engineering, Ballari Institute of Technology and Management, Ballari 583101, India*
[c]*Professor, Department of Mechanical Engineering, Dayanand Sagar College of Engineering, Bengaluru 560078, India*

Abstract

In this research work, some important investigations were carried out to find out the changes in the macro, microstructures and mechanical properties of the Aluminum 2024 alloy. It is clearly understood through experimentation that friction stir welded components exhibits remarkable morphological and mechanical properties with proper selection of tool geometry, rotational speeds and feeds which greatly influence the weld quality and the weld strength . The present trialing uses taper cylindrical tool pin profile with different process parameter values under constant axial load of 3 kN were considered. Further the study reveals that tool rotational speed of 1000 rpm, feed rate of 30 mm /min are best suitable for the selected work material which produces tensile strength of 300MPa and high yield strength of 280MPa with parent metal along with marginal tunnel defect.

Selection and Peer-review under responsibility of International Conference on Processing of Materials, Minerals and Energy (July 29th – 30th) 2016, Ongole, Andhra Pradesh, India.

Keywords: Friction stir welding, tensile strength, tool profile, tunnel defect, feed, axial load, speed;

1. Introduction

Friction stir welding (FSW) is an innovative joining process which produces no fumes and no filler material is used. It is a environment friendly technique regarded as Green Welding. FSW process is used to join several metal alloys such as aluminum, copper, magnesium, zinc, steels, and titanium. This sometimes produces a weld that is stronger than the base material and is a solid-state joining process, where metal is not melted but the joint is obtained by frictional heat produced when a specially designed tool that rotates on to the work piece surface. The parts must be clamped onto a backing bar in a manner that prevents the abutting joint faces from being forced apart or in any other way moved out of position. The main advantage of the process is that the welding takes place without melting the base metal, thereby eliminating the welding defects like porosity, cracks etc in the welded joints.

Frictional heat is generated between the tool and wok material causing the work pieces to soften without reaching the melting point, and then mechanically intermixes the two pieces of metal at the place of joint, further softened due to the elevated temperature, joined using mechanical pressure, applied by the tool. This leaves a solid phase bond between the two pieces. As melting does not occur and joining takes place below the melting temperature of the material, a high-quality weld is created. This characteristic greatly reduces the ill effects of high heat input, including distortion, and eliminating solidification defects. The schematic diagram of the FSW process is shown in Fig 1.

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C.Vidal and V. Infante [2] optimized the friction stir welding process parameters for improving mechanical behavior of aeronautic aluminum alloy joints with minimum cost and time (AA2024-T351). The vertical downward forging force (890 Kg), tool travel speed (308 mm/min), and probe length (4.17 mm) are considered parameters for optimization using Taguchi and ANOVA method to find out the tensile strength, bending strength and hardness. They found that through Taguchi method probe

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A Review on Effect of Friction Stir Welding (FSW) Process Parameters on Mechanical Properties

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Abstract:

Friction Stir Welding (FSW), solid state welding process used for several industrial applications. It is an attractive technology for solid state material joining, contrary to conventional welding methods, having ability to produce welds with higher integrity and minimum induced distortion and residual stresses. In this paper, an attempt has been made to understand the operation of FSW, critical welding parameters. Further review of literature is made to understand the critical welding parameters which affect the mechanical properties, microstructure and weld quality.

Key Words: Welding,joint, parameter, material, mechanical properties

I. INTRODUCTION

Friction Stir Welding (FSW), being a novel process and facilitates welding various required for several industrial applications. It is an attractive technology for material joining, contrary to conventional welding methods, having ability to produce welds with higher integrity and minimum induced distortion and residual stress. FSW is a relatively new joining process produces no fumes; uses no filler material; environmentally friendly and can join several metal alloys such as aluminum, copper, magnesium, zinc, steels, and titanium. FSW sometimes produces a weld that is stronger than the base material. FSW is a solid-state joining process, where metal is not melted uses a cylindrical, shouldered tool with a profiled probe rotated and slowly plunged into the weld joint between two metal pieces of sheet or plate that are to be welded together . The parts must be clamped onto a backing bar in a manner that prevents the abutting joint faces from being forced apart or in any other way moved out of position.

Frictional heat is generated between the tool and material causing the work pieces to soften without reaching the melting point, and then mechanically intermixes the two pieces of metal at the place of the joint, further softened metal due to the elevated temperature is joined using mechanical pressure, applied by the tool.This leaves a solid-phase bond between the two pieces. Because melting does not occur and joining takes place below the melting temperature of the material, a high-quality weld is created. This characteristic greatly reduces the ill effects of high heat input, including distortion, and eliminating solidification defects.

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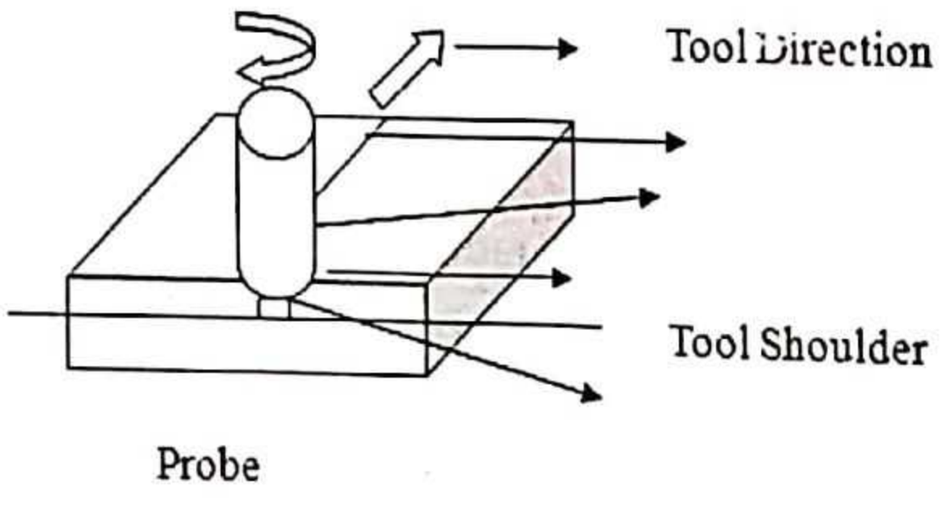

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Modeling and Dynamic Analysis of Gear Box Casing Using Finite Element Analysis

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KEYWORDS: Gearbox casing, Modeling, Natural frequency, Finite element analysis, Mode shapes, FFT Analyzer.

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To solve the fatigue failure caused by resonance, it is essential to carryout dynamic analysis and redesigning the existing gearbox casing. The gearbox casing is made using Solid Edge V 19.0 and Nastran (NX8) softwares and analysis is done in Ansys Workbench R 15.0. The optimization is based on the Ansys results, which can be used to enhance the efficiency of the gearbox design process.

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A very high vibration is observed in the Gear box in Bar Rod Mill (BRM) of JSW Steel Limited, Bellary at 1000-1100 cpm the velocity is 10.3 mm/sec. It was observed from vibration analysis spectrum (FFT analyzer) the dominant frequency was 1st gear mesh frequency and results of analysis shows that the gearbox casing was operating dangerously close to

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Experimental Investigation of Mechanical Properties And Morphological Studies on Friction Stir Welded Aluminum 2024 Alloy

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WEAR BEHAVIOUR OF Al6061-SiC COMPOSITES

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ABSTRACT

Aluminium based composites are very popular in automotive and aerospace segments. In particular aluminium alloy-SiC composite systems are widely studied and seriously explored for various other applications in defense and space. However they have not been looked at as potential materials in naval and chemical applications where synergistic effects of both wear and corrosion need to be addressed to. This needs the assessment of wear behaviour of composites. From the survey, it is evident that major focus is on mechanical and corrosion properties of cast composites. However, meager information is available as regards the slurry erosive wear behaviour of cast and extruded metal matrix composites. In the light of the above, the present investigation is aimed at studying in detail the slurry erosive wear behaviour of cast and hot extruded Al6061 and Al6061-SiC composites in sand slurry. Al6061-SiC composites have been prepared primarily by vortex method. Hot extrusion of these composites and the matrix alloy has been carried out at 550^{0}C using a 500T hydraulic press. The cast and extruded composites have been subjected to Metallographic studies, micro-hardness, and slurry erosive wear test using sand slurry of different concentrations. The extruded composites exhibit better hardness, and there is a significant reduction in the slurry erosive wear rate of the composite with an increase in the percentage weight of the reinforcement. However, extrusion has a profound effect on the slurry erosive wear resistance of both the base alloy and the composites studied.

Keywords: *Slurry erosive wear, Extrusion, Composites, Silicon carbide.*

1. INTRODUCTION

Aluminum alloys have excellent mechanical properties coupled with good corrosion resistance. However, they possess poor wear resistance. To improve the above said property, researchers have successfully dispersed various hard and soft reinforcements such as SiC, Al_2O_3, glass, graphite, mica, and coconut shell char in aluminum alloys by different processing routes [1-3]. In recent years, considerable interest has been shown in extending the use of metal matrix composites in the marine environment [4]. This demands evaluation of corrosion as well as erosion-corrosion characteristics of the composite materials under simulated marine environment. A few studies have been reported by different investigators on erosive –corrosive wear behavior of Al alloy and its composites [5]. Erosion–corrosion of MMCs takes place

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REALIZING CONCURRENT ENGINEERING IN PRODUCT DEVELOPMENT: A SURVEY ON TWO WHEELER AUTO INDUSTRY

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[1]Professor, [2, 3] Asst. Professor, Department of Mechanical Engineering,
Ballari Institute of Technology and Management, Bellary, 583 103, Karnataka, (India)

ABSTRACT

Introducing a new product with high level expectation of customer satisfaction is an intricate and immense challenge to the companies in present day aggressive business environment. Concurrent Engineering (CE) has a great deal of importance in design and development of new products in automobile industry and is posing an intense challenge to manufacturing firms in the wake of globalization. Success of concurrent engineering demands that key areas of product design and development of an organization are kept in spotlight concomitantly. The aim of the paper is to present survey results of major factors influencing the new product design and development in selected two wheeler auto industries. The survey presents its evaluation based on the data analysis using statistical tool with the help of primary data collected through a pre-tested questionnaire. The findings reveal that the application of concurrent engineering techniques, involvement of outsiders (customers, suppliers), and coordination of internal groups (design, manufacturing) etc., are prioritized by awarding first, second and third ranks further two wheeler manufacturing companies are realizing maximum benefits with the implementation of the concurrent engineering in new product design and development. The research also recommends that companies must focus on fragile areas of design and development, identify the appropriate revolutionary technologies for proto-typing and thus increase cost savings and reduce time to market, enhance the productivity ultimately satisfying the customer needs.

Keywords: Concurrent Engineering, New Product Development, Productivity, Technologies

I INTRODUCTION

The study of concurrent engineering (CE) and its implementation has been the greatest themes in the engineering sciences. Many disciplines have developed theoretical literature and empirical findings about the origin, expansion, transformation, decay, and refuse of the system. Concurrent engineering is indisputably the wave of the future for new product development for all companies regardless of their size, sophistication, or product portfolio. In order to be competitive, firms must alter their product and process development cycle to be able to complete diverse tasks concurrently. This new process will benefit the company, although it will require a large amount of refinement in its implementation. This is because concurrent engineering is a process that must be

Fracture Characterization and FE Simulation of Glass Fiber Reinforced Polystyrene Hybrid Polymer Composite

***Dr.Yadavalli Basavaraj*[1], *ShivaramaKrishna A*[2]**

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ABSTRACT

The reliability of aerospace and automobile structural components is now commonly assessed by fracture mechanics procedures. Fracture mechanics is an engineering discipline that quantifies conditions under which a load bearing body can fail due to the enlargement of the dominant crack. The central difficulty in designing against fracture in high strength materials is that the presence of a crack can modify the local stresses to such an extent that elastic stress analysis done carefully by the designers is insufficient. When a crack reaches a certain critical length, it can propagate catastrophically through the structure, even though the gross stress is much less than the nominal stress to cause yield or failure in a tensile specimen.

Key words: Fracture Mechanics, Stress Intensity Factor, Hybrid Composite, Composite Fabrication. Hand Lay-up.

1. INTRODUCTION

Fracture mechanics deals with the study of how a crack in a structure propagates under applied loads. It involves correlating analytical predictions of crack propagation and failure with experimental results.

Development of fracture mechanics and understanding of failure criteria has cleared a large part of ambiguity by enabling the designer to use a lower factor of safety there by reducing the cost of structural components.

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Performance studies on Photovoltaic Thermal (PV/T) Air collector.

[1]Shekar K[2]Shreeharsha B T [3] Fayaz
1,2,3 Assistant Professor, Department of Mechanical Engineering, Ballari Institute of Technology and Management,Bellary, 583 104, Karnataka

Abstract:

In recent years hybrid Solar Photovoltaic Thermal (SPV/T) Systems have emerged as promising method of harnessing solar energy into both electrical and thermal energy simultaneously. The SPV/T system allows enhancement in electrical performance of SPV systems by removing thermal energy and subsequently decreasing the operating temperature of the cell. The SPV/T hybrid systems can be used for building integration, active water heating and active air heating for both electrical and thermal energy needs. The present reported research investigates performance of hybrid SPV/T air collector based on experiments conducted on 100 Wp SPV system integrated with a Solar flat plate collector based drying system. The tests were conducted using a glass to glass semi-transparent polycrystalline silicon PV module and flat plate collector with fins for heat transfer enhancement. The performance study carried out at different solar insolation and mass flow rate of air indicated that thermal and overall efficiency achieved were 60 percent and 68 percent respectively for 0.05 kg/s and 0.035 kg/s flow rate of air.

Key words: *SPV/T hybrid system, plate temperature, overall efficiency*

1.0 Introduction

The current global Industrialization and economic growth have made electric power pool capacity addition crucial for sustained development of human community. The per capita consumption of electricity of the country is a benchmark of its prosperity and growth in the current world scenario. The use of electric power for thermal applications like water heating, crop drying and space heating constitutes a major part of the domestic energy consumption in India. The use of high grade electric energy for thermal applications involves a multistage conversion and hence not recommended owing to poor conversion efficiency.

Solar Photovoltaic Thermal (SPV/T) system converts solar radiation simultaneously into heat energy and electricity to deliver heat and power together. The SPV/T system prioritizes on electric energy and therefore, it is necessary to operate the PV modules at low temperature in order to keep the PV cell electrical efficiency at a sufficient level. The cost factor of SPV/T system is coupled with seasonal transients in solar energy availability, poor penetration of solar technologies in the Indian populace. In view of this there is a need to develop efficient and cost effective solar PV assisted thermal systems.

2.0 Literature Review

DEVELOPMENT OF POLYMER NANOCOMPOSITE WITH DIFFERENT POLYMERIC MATRICES

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Over the last decade, the concept of utilizing nanoparticles to enhance polymer performance has drawn a great deal of research interest. The science and technology of nanocomposites has created great excitement and expectations in the last five years. In addition to that, researches in this area have been focusing on the nanoscale second phase embedded in the polymeric matrix that gives physical and chemical properties that cannot be achieved by ordinary material synthesis methods.

The research activitywas addressed to the sol-gel synthesis of inorganic nanofiller has successfully prepared Magnesium oxide nanoparticle from Sol-Gel Method Compared with the conventional ceramic routes, such as co-precipitation, grafting, impregnation, the sol-gel exhibits many advantages, among them the low process temperature, the high control of purity, composition, microstructure and textural properties of the final material. Particularly, for metal-oxides this synthesis procedure allows to obtain materials characterized by a high dispersion of the active phase in the matrix on both molecular and nanometer scale. Moreover, the versatility of the sol-gel route makes possible to obtain the final material as powders, bulk and coating films. The polymer nanocomposites reinforced with low loading levels of Nano magnesia particle (2, 4, 6 & 8 wt %) were prepared by C.W. Brabender Plasticorder® conventional melt-blending techniques. The matrices of nanocomposites were polar polymethyl methacrylate (PMMA) and non polar polyolefins, i.e. High Density Polyethylene (HDPE). Two different

masterbatches were prepared: PMMA, HDPE Nanoblend was prepared.

Fracture Characterization and FE Simulation of Glass Fiber Reinforced Polystyrene Hybrid Polymer Composite

***Dr.Yadavalli Basavaraj*[1], *ShivaramaKrishna A*[2]**

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ABSTRACT

The reliability of aerospace and automobile structural components is now commonly assessed by fracture mechanics procedures. Fracture mechanics is an engineering discipline that quantifies conditions under which a load bearing body can fail due to the enlargement of the dominant crack. The central difficulty in designing against fracture in high strength materials is that the presence of a crack can modify the local stresses to such an extent that elastic stress analysis done carefully by the designers is insufficient. When a crack reaches a certain critical length, it can propagate catastrophically through the structure, even though the gross stress is much less than the nominal stress to cause yield or failure in a tensile specimen.

Key words: Fracture Mechanics, Stress Intensity Factor, Hybrid Composite, Composite Fabrication. Hand Lay-up.

1. INTRODUCTION

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Property aspects such as mechanical properties, Choice of standard, recycling and reusability, Durability, Environmental strength, Toughness etc.[1]

Interfacial interactions are crucial for the application of fiber-reinforced composites. The basic condition of the application of fiber-reinforced composites is perfect adhesion between the components. This is necessary to

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REALIZING CONCURRENT ENGINEERING IN PRODUCT DEVELOPMENT: A SURVEY ON TWO WHEELER AUTO INDUSTRY

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Ballari Institute of Technology and Management, Bellary, 583 103, Karnataka, (India)

ABSTRACT

Introducing a new product with high level expectation of customer satisfaction is an intricate and immense challenge to the companies in present day aggressive business environment. Concurrent Engineering (CE) has a great deal of importance in design and development of new products in automobile industry and is posing an intense challenge to manufacturing firms in the wake of globalization. Success of concurrent engineering demands that key areas of product design and development of an organization are kept in spotlight concomitantly. The aim of the paper is to present survey results of major factors influencing the new product design and development in selected two wheeler auto industries. The survey presents its evaluation based on the data analysis using statistical tool with the help of primary data collected through a pre-tested questionnaire. The findings reveal that the application of concurrent engineering techniques, involvement of outsiders (customers, suppliers), and coordination of internal groups (design, manufacturing) etc., are prioritized by awarding first, second and third ranks further two wheeler manufacturing companies are realizing maximum benefits with the implementation of the concurrent engineering in new product design and development. The research also recommends that companies must focus on fragile areas of design and development, identify the appropriate revolutionary technologies for proto-typing and thus increase cost savings and reduce time to market, enhance the productivity ultimately satisfying the customer needs.

Keywords: Concurrent Engineering, New Product Development, Productivity, Technologies

I INTRODUCTION

The study of concurrent engineering (CE) and its implementation has been the greatest themes in the engineering sciences. Many disciplines have developed theoretical literature and empirical findings about the origin, expansion, transformation, decay, and refuse of the system. Concurrent engineering is indisputably the wave of the future for new product development for all companies regardless of their size, sophistication, or product portfolio. In order to be competitive, firms must alter their product and process development cycle to be able to complete diverse tasks concurrently. This new process will benefit the company, although it will require a large amount of refinement in its implementation. This is because concurrent engineering is a process that must be

Development of Hybrid Aluminium Matrix Composite for Brake Disc

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Abstract: In recent years Aluminium Matrix Composites (AMCs) are used in verity of engineering applications. In this paper systematic investigations are carried out in order to develop the hybrid composite material suited for brake disc. The engagement surfaces of a brake rotor have typically been made of an iron bearing metal, such as cast iron, steel or stainless steel. Many patents have been related to specific rotor designs, geared toward elimination of galling and build up of material in the engagement surfaces. AMCs refer to the class of light weight high performance aluminium centric material systems. The present investigation relates to a brake rotor. Particularly, it relates to a brake rotor having an enhanced heat transfer. More particularly, it relates to a brake rotor comprising a composite of a low density metal and particles of a non-metal which is adapted to minimize adverse effects of galling on the engagement or braking surfaces of the rotor and to increase the heat flow away from the brake pad. The composition also greatly enhances the heat dissipation propensity of the rotor. The goal is to get the optimum material distribution to satisfy the objective functions: Minimum Weight and best Temperature distribution.

Keywords: Couple field analysis, thermo elastic instability (TEI).

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1. Introduction

Brakes can be comprehensively defined as devices used to dissipate kinetic energy by slowing down or stopping a moving element. Brake is used in all automotive vehicles, locomotives aircraft and some stationary machines. Many types of brakes are used now a days like band brakes, drum brakes, brakes electromagnetic brakes are most commonly used.

Investigation On Three - Body Abrasive Wear Behavior Of Glass – EpoxyComposite – A Taguchi Approach

Dr.Yadavalli Basavaraj[1],Pavan Kumar B K[2]

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Three – body abrsive wear behaviour of glass – epoxy composite has been investigated using dry sand rubber wheel abrasive wear test rig. The composite has been fabricated with hand layup technique. The effect of abrading distance, applied load and sliding speed on wear behaviour of composite has been studied. A plan of experimental based on the Taguchi technique was used to obtain the data in a controlled way. A L9 orthogonal array and ANOVA was to investigate which wear parameter mainly affects the abrasive wear of the composite. The result shows that the weight loss increases with increasing load, sliding speed and abrading distance has more effect on the abrasive wear of the composite.

Key words: Polymer Matrix Composite, Wear, 3 – body abrasive, Taguchi technique

1. Introduction:

Wear is defined as the progressive loss of material due to relative motion between the two or more surfaces[1]. Composites are favoured in tribo-applications because of the possibility of tailoring desired material properties with judicious choice of fillers and fibres in appropriate proportions in the composites. Tribo-properties are not intrinsic material properties and depend on several experimental parameters [2-4]. Indeed, compared to monolithic materials, wear resistance can generally be enhanced by introducing a secondary phase(s) into the matrix material. The wear properties can be varied substantially through changes in the microstructure, the morphology, volume fraction and mechanical properties of the reinforcing phase, and the nature of the interface between matrix and reinforcement[5-8].

Polymer matrix composites are subjected to abrasive wear in many engineering applications such as chute liners, conveyor aids, vanes, gears for pumps handling industrial fluids, sewage and abrasive contaminated water etc[4]. Many components of industrial machinery are often subjected to a severe and continuous abrasive wear process.

THE EXTRACTION OF RICE BRAN BASED BIODIESEL AND ITS PERFORMANCE AND EMISSION EVALUATION IN DIESEL ENGINE

RAVI G [1], VIJAY KUMAR BP[2] PURUSHOTHAM NAYAKA D S[3] ,

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***Index Terms*—Transesterification, rice branoil methyl ester, bio diesel and emission.**

INTRODUCTION

Energy crises and environmental air pollution are of alarming concern worldwide due to increase industrialization and the global trends of urbanization have totally disturbed the eco-balance and the balance of earth resources.

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Recent Developments In The Field Of Solar Water Heater Using Flat Plate Collector- A Review

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Dr P. Rhushi Prasad, Department of Mechanical Engineering, DONBASCO Institute of Technology, Bangalore, E-mail: rhushi_bec@rediffmail.com Mb: 9480345138

ABSTRACT

The developments are being carried out continuously in the field of cover materials, absorber plate materials, absorber and glazing coating etc. along with the changes in the design, fluid used for heat transfer. Number of studies have been carried out on thermal performance of solar water heater and found more increase in the thermal efficiency in comparison to conventional solar water heater. These studies include use of double side absorber plate, honeycomb material, nonmaterial and more efficient coatings. This paper presents an extensive study of the research carried out on solar water heater. In the present study, both experimental and theoretical developments in the field of solar water heater have been reviewed thoroughly.

KEYWORDS: solar water heater, transparent conductive oxides, nanofluid, TRNSYS

1. INTRODUCTION

Depletion of conventional energy resources and its adverse impact on environment have created renewed interest for the use of renewable energy resources. As a result, considerable research and development activities have taken place to identify reliable and economically feasible alternate clean energy sources. Purpose of solar water heater is to convert the solar radiation into heat to satisfy energy needs but with some limitations it is not being used on grid scale because of its poor efficiency and higher initial cost. So there is a requirement of advancement in the solar water heater using flat plate collector to overcome its limitations so that it can be used as a replacement of conventional heaters and power generation devices.

Solar collectors are distinguished as low, medium, or high temperature heat exchangers. There are basically three types of thermal solar collectors: flat plate, evacuated tube, and concentrating. Although there are great geometric differences, their purpose remains the same: to convert the solar radiation into heat to satisfy some energy needs. The heat produced by solar collectors can supply energy demand directly or be stored. To match demand and production of energy, the thermal performance of the collector must be evaluated. The instantaneous useful energy collected is the result of an energy balance on the solar collector.

The flat plate collector forms the heart of any solar energy collection system designed for operation in the low temperature range, from ambient to 60 °C, to ambient to 100 °C. A well engineered flat plate

Synthesization of Nano fluid and comparison of Overall Heat Transfer Coefficient in a heat Exchanger

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3 Professor, Department of Mechanical Engineering, Ballari Institute of Technology and Management, Bellary,583 104, Karnataka, India.
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Ultrahigh performance cooling is one of the important needs of present day industry. However for cooling purpose, low thermal conductivity is a prime limitation in developing energy efficient heat transfer fluids. To fulfill such requirements nano fluids play an important role. These nano fluids are engineered by suspending nano particles of sizes below 100 nm in heat transfer fluids (water, ethylene glycol, oil etc.). Innovative heat transfer fluids are produced by suspending metallic/non-metallic nano meter sized solid particles and many experimental works have shown that these nano fluids have substantial higher thermal conductivities compared to the base fluids and can change the thermal properties of the base fluids.The aim of this paper is to summarize some developments in research on the stability of nano fluids, enhancement of thermal conductivities, and heat transfer characteristics of alumina (Al_2O_3) based nano fluids. The Al_2O_3 nano particles in the range of 70 to 230 mesh size were used to prepare nano fluids with different concentrations, analyzed for better heat transfer coefficient and to validate, experiments were conducted to study enhancement in the heat transfer coefficient with a heat exchanger. It is observed that the overall heat transfer coefficient is considerably increased.

Key Words: *Nano fluids, thermal conductivity, volume flow, turbulent flow, Nusselt number, Reynolds number*

Introduction

Theidea behinddevelopmentofnano fluidsistousethemasthermofluidsinheatexchangersforenhancementofheattransfercoefficientandthust o minimize the size of heat transfer equipments. The important parameters which influence the heat transfer characteristicsofnano fluidsareitspropertieswhichincludethermal conductivity, viscosity, specific heat and density. The thermo physical properties of nano fluids also depend on operating temperatures of nano fluids. Therefore accurate measurement of temperature dependent properties of nano fluid is essential. Thermo physical properties of nano fluids are prerequisites for estimation of heat transfer coefficient and the Nusselt number. Lee et al (1998), Das et al (2000), Xuan and Roetzel (2003), and Choi et al (2003)haveinvestigatedonpropertiesofnano fluids

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Abstract:

Over the last decade, the concept of utilizing nanoparticles to enhance polymer performance has drawn a great deal of research interest. The science and technology of nanocomposites has created great excitement and expectations in the last five years. In addition to that, researches in this area have been focusing on the nanoscale second phase embedded in the polymeric matrix that gives physical and chemical properties that cannot be achieved by ordinary material synthesis methods.

The research activitywas addressed to the sol-gel synthesis of inorganic nanofiller has successfully prepared Magnesium oxide nanoparticle from Sol-Gel Method Compared with the conventional ceramic routes, such as co-precipitation, grafting, impregnation, the sol-gel exhibits many advantages, among them the low process temperature, the high control of purity, composition, microstructure and textural properties of the final material. Particularly, for metal-oxides this synthesis procedure allows to obtain materials characterized by a high dispersion of the active phase in the matrix on both molecular and nanometer scale. Moreover, the versatility of the sol-gel route makes possible to obtain the final material as powders, bulk and coating films. The polymer nanocomposites reinforced with low loading levels of Nano magnesia particle (2, 4, 6 & 8 wt %) were prepared by C.W. Brabender Plasticorder® conventional melt-blending techniques. The matrices of nanocomposites were polar polymethyl methacrylate (PMMA) and non polar polyolefins, i.e. High Density Polyethylene (HDPE). Two different

masterbatches were prepared: PMMA, HDPE Nanoblend was prepared.

Synthesization of Nano fluid and comparison of Overall Heat Transfer Coefficient in a heat Exchanger

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Abstract:

Ultrahigh performance cooling is one of the important needs of present day industry. However for cooling purpose, low thermal conductivity is a prime limitation in developing energy efficient heat transfer fluids. To fulfill such requirements nano fluids play an important role. These nano fluids are engineered by suspending nano particles of sizes below 100 nm in heat transfer fluids (water, ethylene glycol, oil etc.). Innovative heat transfer fluids are produced by suspending metallic/non-metallic nano meter sized solid particles and many experimental works have shown that these nano fluids have substantial higher thermal conductivities compared to the base fluids and can change the thermal properties of the base fluids.The aim of this paper is to summarize some developments in research on the stability of nano fluids, enhancement of thermal conductivities, and heat transfer characteristics of alumina (Al_2O_3) based nano fluids. The Al_2O_3 nano particles in the range of 70 to 230 mesh size were used to prepare nano fluids with different concentrations, analyzed for better heat transfer coefficient and to validate, experiments were conducted to study enhancement in the heat transfer coefficient with a heat exchanger. It is observed that the overall heat transfer coefficient is considerably increased.

Key Words: *Nano fluids, thermal conductivity, volume flow, turbulent flow, Nusselt number, Reynolds number*

Introduction

Theidea behinddevelopmentofnano fluidsistousethemasthermofluidsinheatexchangersforenhancementofheattransfercoefficientandthust o minimize the size of heat transfer equipments. The important parameters which influence the heat transfer characteristicsofnano fluidsareitspropertieswhichincludethermal conductivity, viscosity, specific heat and density. The thermo physical properties of nano fluids also depend on operating temperatures of nano fluids. Therefore accurate measurement of temperature dependent properties of nano fluid is essential. Thermo physical properties of nano fluids are prerequisites for estimation of heat transfer coefficient and the Nusselt number. Lee et al (1998), Das et al (2000), Xuan and Roetzel (2003), and Choi et al (2003)haveinvestigatedonpropertiesofnano fluids

Performance studies on Photovoltaic Thermal (PV/T) Air collector.

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Abstract:

In recent years hybrid Solar Photovoltaic Thermal (SPV/T) Systems have emerged as promising method of harnessing solar energy into both electrical and thermal energy simultaneously. The SPV/T system allows enhancement in electrical performance of SPV systems by removing thermal energy and subsequently decreasing the operating temperature of the cell. The SPV/T hybrid systems can be used for building integration, active water heating and active air heating for both electrical and thermal energy needs. The present reported research investigates performance of hybrid SPV/T air collector based on experiments conducted on 100 Wp SPV system integrated with a Solar flat plate collector based drying system. The tests were conducted using a glass to glass semi-transparent polycrystalline silicon PV module and flat plate collector with fins for heat transfer enhancement. The performance study carried out at different solar insolation and mass flow rate of air indicated that thermal and overall efficiency achieved were 60 percent and 68 percent respectively for 0.05 kg/s and 0.035 kg/s flow rate of air.

Key words: *SPV/T hybrid system, plate temperature, overall efficiency*

1.0 Introduction

The current global Industrialization and economic growth have made electric power pool capacity addition crucial for sustained development of human community. The per capita consumption of electricity of the country is a benchmark of its prosperity and growth in the current world scenario. The use of electric power for thermal applications like water heating, crop drying and space heating constitutes a major part of the domestic energy consumption in India. The use of high grade electric energy for thermal applications involves a multistage conversion and hence not recommended owing to poor conversion efficiency.

Solar Photovoltaic Thermal (SPV/T) system converts solar radiation simultaneously into heat energy and electricity to deliver heat and power together. The SPV/T system prioritizes on electric energy and therefore, it is necessary to operate the PV modules at low temperature in order to keep the PV cell electrical efficiency at a sufficient level. The cost factor of SPV/T system is coupled with seasonal transients in solar energy availability, poor penetration of solar technologies in the Indian populace. In view of this there is a need to develop efficient and cost effective solar PV assisted thermal systems.

2.0 Literature Review

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REALIZING CONCURRENT ENGINEERING IN PRODUCT DEVELOPMENT: A SURVEY ON TWO WHEELER AUTO INDUSTRY

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ABSTRACT

Introducing a new product with high level expectation of customer satisfaction is an intricate and immense challenge to the companies in present day aggressive business environment. Concurrent Engineering (CE) has a great deal of importance in design and development of new products in automobile industry and is posing an intense challenge to manufacturing firms in the wake of globalization. Success of concurrent engineering demands that key areas of product design and development of an organization are kept in spotlight concomitantly. The aim of the paper is to present survey results of major factors influencing the new product design and development in selected two wheeler auto industries. The survey presents its evaluation based on the data analysis using statistical tool with the help of primary data collected through a pre-tested questionnaire. The findings reveal that the application of concurrent engineering techniques, involvement of outsiders (customers, suppliers), and coordination of internal groups (design, manufacturing) etc., are prioritized by awarding first, second and third ranks further two wheeler manufacturing companies are realizing maximum benefits with the implementation of the concurrent engineering in new product design and development. The research also recommends that companies must focus on fragile areas of design and development, identify the appropriate revolutionary technologies for proto-typing and thus increase cost savings and reduce time to market, enhance the productivity ultimately satisfying the customer needs.

Keywords: Concurrent Engineering, New Product Development, Productivity, Technologies

I INTRODUCTION

The study of concurrent engineering (CE) and its implementation has been the greatest themes in the engineering sciences. Many disciplines have developed theoretical literature and empirical findings about the origin, expansion, transformation, decay, and refuse of the system. Concurrent engineering is indisputably the wave of the future for new product development for all companies regardless of their size, sophistication, or product portfolio. In order to be competitive, firms must alter their product and process development cycle to be able to complete diverse tasks concurrently. This new process will benefit the company, although it will require a large amount of refinement in its implementation. This is because concurrent engineering is a process that must be