3.3.3 Number of books and chapters in edited volumes/books published and papers published in national/ international conference proceedings per teacher during last five

Year	2018-19	2017-18	2016-17	2015-16	2014-15
No.	59	37	92	62	26

Book Chapter

2015-16

Sl. No.	Name of the teacher	Title of the book/chapters published	Title of the paper	Title of the proceedings of the conference	Name of the conference	National / International	Year of publication	ISBN/ISSN number of the proceeding	Affiliating Institute at the time of publication	Name of the publisher
1	Naveen Rathee	Digital Electronics and Logic Design II	NA	NA	NA	National	2015-2016	81-7684-697-X	Bharat Institute of Engineering and Technology	Satyaprakasan Publisher
2	K Arpita	English II	NA	NA	NA	National	2015-2016	NA	Bharat Institute of Engineering and Technology	Radiant Publishing House

3	Dr H P Srichand	A Textbook ofEngineering Mathematics III	NA	NA	NA	National	2015-2016	978-81-315-3400-7	Bharat Institute of Engineering and Technology	CENGAGE

Conference
2015-16

Sl. No.	Name of the teacher	Title of the book/chapters published	Title of the paper	Title of the proceedings of the conference	Name of the conference	National / International	Year of publication	ISBN/ISSN number of the proceeding	Affiliating Institute at the time of publication	Name of the publisher
1	Dr. C.S. Krishna Prasada Rao, J Balaraju, Anup Kumar Jana,et. al,"	NA	Application of taguchi technique for identifying optimum surface roughness in CNC end milling process	National conference on fast emerging trends in engineering & technology(NCOFEET)-BIET	National conference on fast emerging trends in engineering &	National	2015-2016	978-93-82829-43-0	Bharat Institute of Engineering and Techn	Spectrum Publication

				Hyderabad	technology(NCOFEET)-BIET Hyderabad				ology	
2	Dr. C.S. Krishna Prasada Rao, Dr. P Uday Bhaskar and B. Navyasree,et. al,	NA	Multilevel permanent magnet synchronous motor drive-analysis of high performance	National conference on fast emerging trends in engineering & technology(NCOFEET)-BIET Hyderabad	(NCOFEET)-BIET Hyderabad	National	2015-2016	978-93-82829-43-0	Bharat Institute of Engineering and Technology	Spectrum Publication
3	Dr. C.S. Krishna Prasada Rao, Dr. P Mallesham, et,al,	NA	New trends in Aircraft maintenance	National conference on fast emerging trends in engineering & technology(NCOFEET)-BIET Hyderabad	(NCOFEET)-BIET Hyderabad	National	2015-2016	978-93-82829-43-0	Bharat Institute of Engineering and Technology	Spectrum Publication

4	Dr. C.S. Krishna Prasada Rao	NA	Role of Documentation for weapon systems	National conference on fast emerging trends in engineering & technology(NCOFEET)-BIET Hyderabad	(NCOFEET)-BIET Hyderabad	National	2015-2016	978-93-82829-43-0	Bharat Institute of Engineering and Technology	Spectrum Publication
5	K Varun Chandra, K Sandeep, B Chandra Mouli	NA	Condition monitoring of a Lathe Gearbox through Vibrations using FFT Analyser	National conference on fast emerging trends in engineering & technology(NCOFEET)-BIET Hyderabad	(NCOFEET)-BIET Hyderabad	National	2015-2016	978-93-82829-43-0	Bharat Institute of Engineering and Technology	Spectrum Publication

6	B Suresh, Dr K Phaneendra Kumar, Dr N Srinivas Babu	NA	Literature review report on flexural fatigue testing by fiber reinforced polymer composites	National conference on fast emerging trends in engineering & technology(NCOFEET)-BIET Hyderabad	(NCOFEET)-BIET Hyderabad	National	2015-2016	978-93-82829-43-0	Bharat Institute of Engineering and Technology	Spectrum Publication
7	Dr Lachiram, P L Venkatrao	NA	Design and analysis of hemispherical composite random for underwater application	National conference on fast emerging trends in engineering & technology(NCOFEET)-BIET Hyderabad	(NCOFEET)-BIET Hyderabad	National	2015-2016	978-93-82829-43-0	Bharat Institute of Engineering and Technology	Spectrum Publication

8	B Indu Srija, Y Sailaj, K ratnababu, Dr Ram Subbaiah	NA	Evaluation of salt bath nitrided austentitic stainless steel specimen at low temperature	National conference on fast emerging trends in engineering & technology(NCOFEET)-BIET Hyderabad	(NCOFEET)-BIET Hyderabad	National	2015-2016	978-93-82829-43-0	Bharat Institute of Engineering and Technology	Spectrum Publication
9	G Rakesh Kumar, G Sainikesh, D Eshwariah, Dr Ram Subbaiah	NA	Material condition tailored to plasma nitriding process for ensuring wear resistance for austentic stainless steel	National conference on fast emerging trends in engineering & technology(NCOFEET)-BIET Hyderabad	(NCOFEET)-BIET Hyderabad	National	2015-2016	978-93-82829-43-0	Bharat Institute of Engineering and Technology	Spectrum Publication
10	G Tharun Kumar, A Siakiran Dr R Ganesh Dr R Subbaiah	NA	Effect of case hardening on AISI 316 LN austentic stainless steel by low temperature gas nitriding	National conference on fast emerging trends in engineering & technology(NC	(NCOFEET)-BIET Hyderabad	National	2015-2016	978-93-82829-43-0	Bharat Institute of Engineering and	Spectrum Publication

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11	BLN Krishna Sai, BVR Ravi Kumar	NA	A review of friction stir welding of dissimilar AA5083 and AA6082 Aluminium Alloy	National conference on fast emerging trends in engineering & technology(NCOFEET)-BIET Hyderabad	(NCOFEET)-BIET Hyderabad	National	2015-2016	978-93-82829-43-0	Bharat Institute of Engineering and Technology	Spectrum Publication
12	Vijay Babu, Dr Eshwar prasad Dr DV Ravishankar	NA	Study of process parameter involved in electrical discharge machining of tough material	National conference on fast emerging trends in engineering & technology(NCOFEET)-BIET Hyderabad	(NCOFEET)-BIET Hyderabad	National	2015-2016	978-93-82829-43-0	Bharat Institute of Engineering and Technology	Spectrum Publication

13	AVN Swamy Dipankar Das	NA	Transesterification of different vegetable oils to produce bio diesel by using methanol as catalyst	National conference on fast emerging trends in engineering & technology(NCOFEET)-BIET Hyderabad	(NCOFEET)-BIET Hyderabad	National	2015-2016	978-93-82829-43-0	Bharat Institute of Engineering and Technology	Spectrum Publication
14	K Sairam Goud, ISNVR Prasanth	NA	To prepare and compare the tensile properties on angleply orientaion on bi directional glass polyester composite laminates	National conference on fast emerging trends in engineering & technology(NCOFEET)-BIET Hyderabad	(NCOFEET)-BIET Hyderabad	National	2015-2016	978-93-82829-43-0	Bharat Institute of Engineering and Technology	Spectrum Publication
15	B roja T poojita K Kishore kumar	NA	Development of hybrid fibres reinforced composites based on glass and kenaf fibres	National conference on fast emerging trends in engineering & technology(NC	(NCOFEET)-BIET Hyderabad	National	2015-2016	978-93-82829-43-0	Bharat Institute of Engineering and	Spectrum Publication

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20	Govardhan, T., Choudhury, A and Paliwal, D.	NA	An investigation into defect induced excitations in rolling element bearings under dynamic radial load	IEEE International Conference on Industrial Instrumentation and Control	IEEE International Conference on Industrial Instrumentation and Control	international	2015-2016	978-1-4799-7165-7	Bharat Institute of Engineering and Technology	IEEE

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34	R. MadanaMohana	NA	Analyzing Internet DNS(SEC) Traffic With "R" For Resolving Platform Optimization	National Conference on Innovative Technologies in Big Data, Cloud, Mobile and Security (ITBCMS),	National Conference on Innovative Technologies in Big Data, Cloud, Mobile and Security (ITBCMS),	National	2015-2016	978-93-82829- 58-4	Bharat Institute of Engineering and Technology	NA

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39	J. Uma Mahesh	NA	Data Warehouse Conceptual Schema Modeling and Evaluation	National Conference on Innovative Technologies in Big Data, Cloud, Mobile and Security (ITBCMS),	National Conference on Innovative Technologies in Big Data, Cloud, Mobile and Security (ITBCMS),	National	2015-2016	978-93-82829- 58-4	Bharat Institute of Engineering and Technology	NA
40	, P. Srinivas Reddy, V. Satyanarayana	NA	KeyAggregate Searchable Encryption (KASE) for Group Data Sharing via Cloud Storage	National Conference on Innovative Technologies in Big Data, Cloud, Mobile and Security (ITBCMS),	National Conference on Innovative Technologies in Big Data, Cloud,	National	2015-2016	978-93-82829- 58-4	Bharat Institute of Engineering and Technology	NA

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42	R. MadanaMohana	NA	Privacy Preserving Applications in Data Mining	National Conference on Innovative Technologies in Big Data, Cloud, Mobile and Security (ITBCMS),	National Conference on Innovative Technologies in Big Data, Cloud, Mobile and Security (ITBCMS),	National	2015-2016	978-93-82829- 58-4	Bharat Institute of Engineering and Technology	NA
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44	Y. Sirisha	NA	Secured Mobile Cloud Using IRIS Recognition	National Conference on Innovative Technologies in Big Data, Cloud, Mobile and Security (ITBCMS),	National Conference on Innovative Technologies in Big Data, Cloud, Mobile and Security (ITBCMS),	National	2015-2016	978-93-82829- 58-4	Bharat Institute of Engineering and Technology	NA

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50	G.Kumaraswamy Rao	NA	Providing Protection to Security Convoys and Sport Arenas from RCIEDs by using Smart Jammers Mounted on UAVs	Proceedings of Fourth International Conference on Electronic Warfare EWCI	National Science Seminar Complex Indian Institute of Science, Bang ,EWCI-2016	National	2015-2016	051R077	Bharat Institute of Engineering and Technology	NA
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57	R. MadanaMohana	NA	Analyzing Internet DNS(SEC) Traffic With “R” For Resolving Platform Optimization	National Conference on Innovative Technologies in Big Data, Cloud, Mobile and Security (ITBCMS),	National Conference on Innovative Technologies in Big Data, Cloud,	National	2015-2016	978-93-82829- 58-4	Bharat Institute of Engineering and Technology	NA

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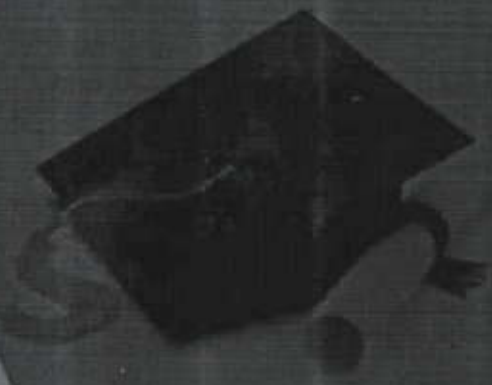

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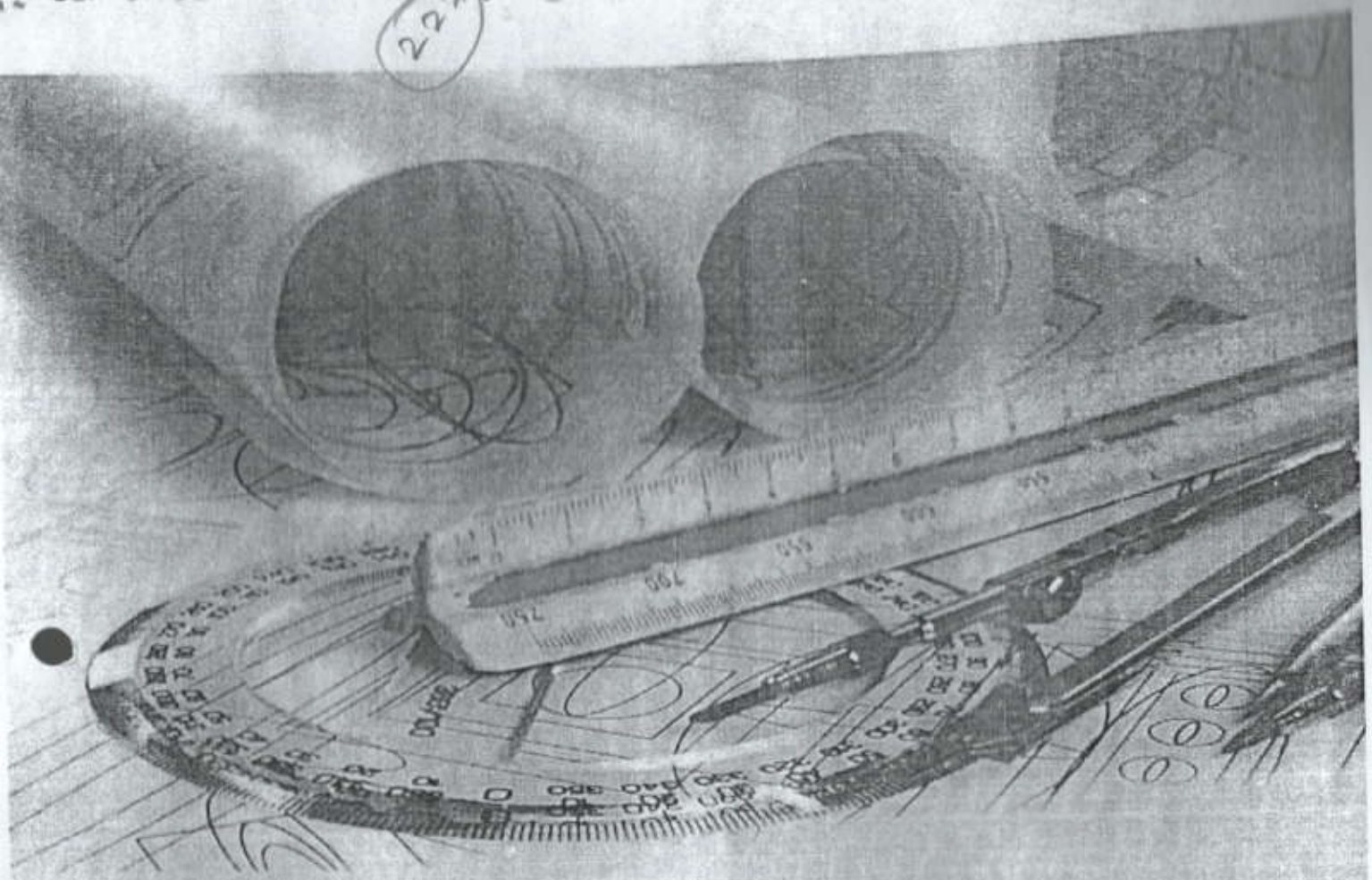

A Textbook of

Engineering Mathematics III

Hima Bindu • Gnana Prasuna • Srichand

Application of Taguchi Technique for Identifying Optimum Surface Roughness in CNC End Milling Process

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ABSTRACT

In order to build up a bridge between quality and productivity, the present study highlights optimization of CNC End milling process parameters to provide good surface finish. The Surface Finish has been identified as one of the quality attribute and directly related to productivity. An attempt will be made to optimize aforesaid quality attribute in a manner that could be fulfilled simultaneously up to expected level. The aim of this work is to apply Taguchi optimization method for low surface roughness values in terms of CNC End milling of Aluminium and Mild Steel. The milling parameters evaluated is cutting speed, feed rate and depth of cut. A series of milling experiments are performed to measure the surface roughness data. The settings of end milling parameters are determined by using Taguchi experimental design method. Orthogonal arrays of Taguchi, the signal-to noise ratio (S/N) ratio, the analysis of variance (ANOVA) are employed to find the optimal levels and to analyze the milling parameters on surface roughness. Finally confirmation tests with the optimal levels of cutting parameters are carried out in order to illustrate the effectiveness of Taguchi optimization method.

Key words: *CNC End Milling, Surface Finish, Taguchi Method.*

roduction

rface finish produced on machined surface plays an portant role in production. The surface roughness has a l influence on most important functional properties such vear resistance, fatigue strength, corrosion resistance power losses due to friction. Poor surface roughness l lead to the rupture of oil films on the peaks of micro gularities, which lead to a state approaching dry friction results in decisive wear of rubbing surface. Therefore shing processes are employed in machining in order to ain a very high surface finish. Surface roughness in End Milling depends on spindle rpm, feed, depth of cut, helix angle, lubricating oil etc., Among them mainly surface finish depends on spindle rpm, feed, depth of cut.

In order to infer the science behind the observed phenomenon, one has to plan and conduct the experiments to obtain enough and relevant data. This can be done by any one of the method as mentioned below:

Trial and Error Method

In this method we will perform series of experiments, each of which gives some understanding. This requires making

DFG Configuration	Parameter	Greedy Algorithm	Genetic Algorithm
DFG1C6	P	4	4
	T	18	12
	P_0	4	4
	T_0	10	10
	g_P	1.00	1.00
	g_T	0.56	0.83
	w_P	0.25	0.25
	w_T	0.75	0.75
	g	0.67	0.88
DFG10C4	P	25	22
	T	328	233
	P_0	22	22
	T_0	77	77
	g_P	0.88	1.00
	g_T	0.23	0.33
	w_P	0.25	0.25
	w_T	0.75	0.75
	g	0.39	0.50

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Role of Documentation for Weapon Systems

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ABSTRACT

Manufacturing activities throughout the world are witnessing rapid changes hitherto never witnessed, keeping in tune with never ending and ever changing demands of customers. This demands techno economic modern methods of design and manufacture for customised products. CIM and CAD/CAM are the universally accepted modern methods to control and integrate production activity right from design, documentation and manufacturing.

In the changing environment Designing, Analysis & Documentation plays a vital role to have more transperancy in Designing and detailing of Product Drawings, Tool Drawings, preparation and safe handling of Drawings and various documents for number of projects simultaneously, it is possible only through electronic media.

The procedure should be quite adaptable to restrict the access to specified persons only and also to have more control on security and safety aspects. It should be quite Operable and user friendly.

Bharat Dynamics Limited a pioneer in the manufacture of Weapon systems. Weapon systems constitures Missile and ground support equipment from which Missile is launched. The organization manufactures very short range, short range, medium range, long range, IRBM & ICBM Missiles.

The paper presents the CAD, CAM setup, and the Metaphase, a product Data Management Software which is used to support concurrent engineering process for manufacture of Weapon systems. By managing product description information and product development processes in the organisation. Data related to a product like product, tool drawings, Bill of Materials, Process Sheets, Specifications, Flow charts, Standards, QT/AT Documents, inspection and quality control reports besides the procurement information could be linked and readily made available are dealt.

INTRODUCTION

The economics of design are rapidly shifting as engineering costs continue to increase compared with decreasing costs of tools such as computers systems. As such, investments in computing environments emphasize an increase in an overall engineering productivity as the industry continues to benefit from advancements in cost effective, high compatibility Computer aided engineering applications software and computer systems. Computer aided design is a technology and application driven field by utilisation of which in industrial environment helps to close the gap between creating the technology and using it. During the last five decades there have been a tremendous developments in the field of CAD, CAM and CAE. All these fields have progressed in such a way that a lot of tasks are easily automated. There have been many advances made in finite element analysis also. The traditional approach for validating the design by building a prototype is avoided and directly product can be simulated to know how it will perform in a virtual environment. Thus, application of FEM range from deformation stress analysis to field analysis of heat flux, fluid flow and magnetic flux etc.

The Engineering Industry must leverage its information assets, which include a tremendous amount of Engineering skills, drawings, documents etc. Acquisition of tools to efficiently manage, distribute and modify these assets are essential. Of late, the Engineering Design is getting a shot in the arm by the fusion of three apparently different technologies and they are:

1. Computer Aided Design and manufacturing (CAD-CAM), with expertise in solid-surface-modelling, 'design productivity tools' and evolution of direct paths from CAD to analysis/manufacturing.
2. Computer Communication Net work (CCN), bringing about information highways based on high speed satcom and very high speed fibre optic

Multilevel Converter Fed Permanent Magnet Synchron
Motor Drive - Analysis of High Performance

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ABSTRACT

Multilevel converter technology has emerged recently as a very important alter of high-power medium-voltage energy control. The advantages of multilevel con switching losses, improved power quality, better electromagnetic compatibility, and capability. Several topologies for multilevel inverters have been proposed over most popular cascaded H-bridge apart from other multilevel inverters is the capab different dc voltages on the individual H-bridge cells which results in splitt conversion amongst higher-voltage lower-frequency and lower-voltage higher-freq In this paper Sinusoidal and third harmonic injected carrier based PWM techni shifted carrier PWM (PSCPWM) and level shifted carrier PWM (LSCPWM) are imp analysed the THD levels for different values of modulation index and switching f level shifted carrier PWM , in phase disposition (IPD), alternative phase opposite (APOD) and phase opposite disposition (POD) modulating technique is analysed using SIMULINK. finally Better modulating technique is applied to drive the five level bridge fed Permanent Magnet Synchronous Motor drive.

Introduction

Speed and motion control is required in large number of industrial and domestic applications. Ex: Robot, fans, washing m/c, mills etc. Markets for adjustable-speed drives continue to expand steadily in response to the well-recognized opportunities for major efficiency and cost improvements made possible by upgrading fixed-speed industrial process equipment to adjustable speed. Earlier DC motors have been used in industries for variable speed control applications. In 20th century induction motors had been the most popular electrical motors in domestic and industrial application due its simple construction, less maintenance, commutator less or slip rings, low cost and reliability. The drawback of induction motor are small air gap, less power density , the possibility of cracking the rotor bars due to hot spot at plugging and reversal , and lower efficiency and low power factor than synchronous machine. Due to this permanent magnet brushless motor has become more attractive option than induction motors. Other reasons are dropping cost of rare earth magnets and development in power electronics. The advancement in power el technology has made it possible to vary the fre the voltage. Thus, it made more extensive use in speed drive applications and the control of PM has become easier and cost effective, with the p of operating the motor over a wide range of speed still retain a good efficiency. In normal PM motor the motor is usually fed with pulse width-mo (PWM) voltages which cause sharp voltage wave (dv/dt) which appear across the motor terminals may cause the breakdown of motor insulation. In ad motor damages are reported due to the high-vo change rates (dv/dt) which produces common voltages across the motor windings [4]. High- fre switching increases the severity of this problem the increased number of times this common-mode v is applied in each cycle [1]–[4]. This is a matter of concern for variable-speed medium-voltage drives w the voltage levels are very high. The above problem be resolute by applying changeable voltage with low

New Trends in Aircraft Maintenance

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ABSTRACT

In the early days of aviation, owners and engineers concerning with in-flight failures and component reliability developed Maintenance Schedules to help prevent costly occurrences. As aviation grew and scheduled air transport arrived, safety, reliability and economics became important in order to attract passengers. It became apparent that to achieve a controlled balance between safety and economics, Regulatory Authorities were maintained standards and a level playing field existed for fair competition between operators. A Maintenance Schedule contains details of what is to be maintained on an aircraft and how often. As the aircraft consists of an airframe, engine, propeller and other equipment, there will be several sources of basic information. Not only will there be details of 'What and When' but also 'How' the parts are to be maintained; there are also details on the types of task that are to be performed. What to maintain, when to maintain and how to maintain, are the keys to the content of the Maintenance Schedules and a system was developed for Operators, Manufacturers and Regulators to share experience and knowledge on these very issues for new aircraft being developed. Some Commercial Air Transport operators may choose to maintain their aircraft in accordance with a Maintenance Programme. This is a 'real time system' which consists of a Maintenance Schedule and a whole group of review and management procedures to ensure that it remains realistic and effective. For example, the Air Navigation requires that an aircraft registered in a particular state of which a Certificate of Airworthiness is in force, shall not fly unless it has been maintained in accordance with a Maintenance Schedule approved by the Directorate General of Civil Aviation (DGCA) in relation to that aircraft and that Certificates of Maintenance Review have been issued certifying that a maintenance review has been carried out. The term "Maintenance Schedule" means the Maintenance Schedule together with any associated programme, such as the reliability programme, necessary to support the Maintenance Schedule. In this paper various maintenance activities will be discussed. They are A, B, C, D checks, reactive maintenance, preventive maintenance, predictive maintenance, reliability centered maintenance, terotechnology and total product maintenance.

INTRODUCTION

Aircraft maintenance is one of the most important activities of aircraft should never be underestimated. This is a set of activities that include inspection, reformation and repair of an aircraft. Aircraft maintenance is not only about replacing a part that is already damaged; this is also about cleaning and refueling. This should be done not only to large planes but also to smaller aircrafts. Maintaining of aircraft should be done as a compliance with the rules on aircraft guidelines. This is the reason why no company is exempted when it comes to this. There are different airworthiness authorities in the world whose job is to make sure that every part of aircraft must be in the safety and good condition. In aircraft maintenance, passengers or owner safety is more important than aircraft part safety.

One of the most important factors influencing the success of an airline is the maintenance of its aircraft. Only when the fleet is in a technically excellent state of care can the flying operations be run punctually and profitably. Internationally more than 22,000 mechanics and engineers are working in aircraft companies. The aircraft companies are world market leaders in aircraft technical services, in which maintenance plays a central role.

The maintenance of aircraft is differentiated into line maintenance and overhaul. The work that has to be done in the short term is called line maintenance. This means that the aircraft keeps to its usual schedule. The daily, weekly and monthly checks are carried out over night, the next morning the aircraft goes back into scheduled service. Merely the C-Check that is carried out about every one and a half years takes somewhat more than one day. For an overhaul, called the IL and D-Check, the aircraft is taken out of service for several weeks. With the overhaul, the D-Check, it is taken apart completely and put back together after every component has been checked, repaired or exchanged.

Rather, they wait for equipment failure to occur and then take whatever actions are necessary to repair or replace the equipment. Nothing lasts forever and all equipment has associated with it some predefined life expectancy or operational life. For example, equipment

Literature Review Report on Flexural Fatigue Testing by Fiber Reinforced Polymer Composites

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ABSTRACT

A residual face sheet dent on an indented or impacted foam-core sandwich structure [illegible] affects the residual mechanical properties and the detectability of the damage. However, [illegible] studies have not sufficiently addressed residual dent formation during unloading and [illegible] subsequent relaxation. This study quantitatively clarifies the mechanism underlying the [illegible] and the relaxation of a face sheet dent using a segment-wise modeling approach [illegible] formulated for honeycomb sandwich structures in our previous study. We utilize fully [illegible] foam-core sandwich beams under static indentation loading, focusing on the interaction [illegible] local deformations of the face sheet and crushing/ stretching of the core. This study begins [illegible] evaluating the indentation response using quasi-static tests. The indentation behavior is [illegible] predicted by extending our previous model. The underlying mechanism of face sheet dent formation and relaxation is quantitatively discussed from the viewpoint of a reaction force from the core to the face sheet. Whereas Perforation response and failure of sandwich panels with composite face sheets and aluminum foam core are investigated experimentally in this paper. Quasi-static perforation and low-velocity impact tests are carried out by using a material test system and a drop weight machine, respectively. The load-displacement response, energy absorption and energy absorbing effectiveness of sandwich panels are obtained and compared for quasi-static and impact tests. Effects of some key parameters on the overall energy absorption behavior of the panels are explored.

Keywords: *Sandwich, foam, impact, indentation, core crushing, face sheet dent, relaxation, modeling, Sandwich panel, aluminum foam, perforation, energy absorption, energy absorbing effectiveness factor.*

INTRODUCTION

Carbon Fiber Reinforced Plastics (CFRP)

Carbon fiber reinforced plastic (CFRP) is used in almost all modern commercial aircraft as a primary structural material. However, the potential capability of CFRP cannot be maximized under the conventional structural design concept, which consists of skins, stringers, and frames. One innovative structural concept is a foam-core sandwich structure. The integral construction consists of two thin face sheets and a lightweight foam core, which can considerably reduce the weight and the number of parts compared to conventional structures. However, since the composite face sheet is very thin and the lightweight foam core is weak, they can be easily damaged when an impact or indentation load is applied. As illustrated, the sandwich structure is deformed globally under localized transverse loading, and the upper face sheet, to which the load is applied, locally deflects against the lower face sheet, followed by through-thickness deformation of the core.

When the local deformation exceeds the elastic limit, [illegible] crushing and face sheet damage around the loading [illegible] occur. In contrast, under unloading, the face sheet deflects upward as the localized load decreases, and the crushed core, whose height in the stress-free state is lower than its uncrushed height, pulls the face sheet down. Finally, the face sheet stops at the position where the deflection of the face sheet and the deformation of the crushed core are in equilibrium. As a result, a residual dent remains after unloading. The core crushing and the face sheet dent significantly degrade the mechanical properties of the structure, even when the dent is small and barely visible. Furthermore, the face sheet dent depth determines the detectability of the damage by visual inspection during structural maintenance. Thus, residual dent formation is a key phenomenon under localized loading conditions. Many researchers have investigated the response of composite foam-core sandwich structures to localized transverse loading. Their studies include modeling the indentation response, offering insight into the mechanical behavior during loading, and the key parameters affecting damage

Design and Analysis of Hemispherical Composite Radome for Underwater Application

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ABSTRACT

Radome is a protection for antenna from environment effects. In this case the radome is used for protection of an Antenna which is mounted on a submarine on a mast. The radome has to be transparent for the antenna signals and at the same time it has to be structurally strong.It has to withstand the underwater pressure when the submarine is travelling under the sea at high depths.It is also to be designed to qualify the salty corrosive environment.The size and shape of the radome is arrived at by packaging the electronics by 3D modeling. Analytical calculations are done to check the displacement and stresses on the Radome. Finite Element Analysis is carried out by using Abaqus software. Results obtained from FE Analysis are verified with analytical results.

This paper covers the selection of materials, structural design, analysis and testing. FEA is adopted to verify the design and tests are conducted for validation and acceptance of radome.

Keywords: Radome, FEA, Fibre Reinforced Plastic, underwater application

Iitroduction

Radome (RAdar DOME) is used to protect the antennas from hostile environmental conditions and it is made of composite material.The task involves meticulous material selection, design and analysis based on strength and functional requirements, manufacturing, testing and proving the radome. The hemispherical radome is used for covering antennas which are part of Electronic Support Measure System consisting of radar signal communication. It is mounted on the hoistable periscope mast of submarine.

A submarine is a vessel that can submerge and navigate under water, it is armed with torpedoes or guided missiles and is used for warfare.The word submarine is derived from the words sub means below and marine is sea. The submarine was first used in world war-I. In military applications it is used for attack either on the surface or submerged, using torpedoes or (on the surface) deck guns. Submarines were also used for inserting and removing covert agents and military forces, for intelligence gathering, and to rescue aircrew during air attacks on islands, where the airmen would be told of safe places to crash-land so the submarines could rescue them. In civil applications they have a variety of uses, including tourism, exploration, oil and gas platform inspections, and pipeline surveys. The submarines are classified according to their use, size and depth of operation and the purpose of operation.

The design and development of radomes which protects the antennas from the environment is of equal importance and forms an integral part of Antenna. The design of these radomes is governed by the type of antenna and their frequency of operation, radiation pattern and signal processing methods to be adopted together with depth of operation of platform. The radomes need both electrical acceptance and mechanical validation which makes its design critical.

The use of exotic materials poses several manufacturing challenges during the fabrication stage of radome. A carefully designed structure is crucial for safety of the whole system as well as the platform itself. A mechanical failure of either the radome is not acceptable under any circumstances because it has direct effect on the platform survival. Hence well formulated acceptance tests are inevitable before induction on platform. A few literature is available on radomes for underwater

application. Lachiram et al.[1] have studied the development of exposed hardware for underwater applications and arrived the mechanical structures and their shape to be taken for developing radome for underwater applications.

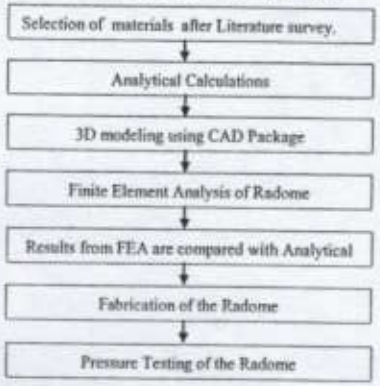
G.Gopal et al.[2] studied the usage of Finite Element Analysis for development of C-Sandwich radome for under water applications" and also discussed the material selection for the radomes.

M.Madhusudhana Rao et al., [3] studied about the failure of underwater shells subjected to high external pressure due to buckling and observed that the specific stiffness of the reinforcing fibre plays an important role and suggested high strength carbon epoxy shells with ultra high modulus fibres in the thickness portion and also for the circumferential stiffening rings would augment buckling strength considerably without any weight penalty.

N.S.Kumar et al., [4] studied on the different forms of metals, alloys, ceramics, polymers and composites for fabricating different components or systems used in Naval application. They discussed the use of polymers in the form of paints, seals, washer, sonar encapsulant, hose, adhesives for various applications such as under water weapons, submarine fire control systems.

Methodology

Steps involved in the Development of Hemispherical composite Radome for under water application



Selection of Radome Material

The primary consideration in material selection of radomes is its electrical properties. The radome material should cause less electrical characteristics distortion with minimum bore sight error, absorption and transmission losses. In case of radomes for underwater applications high mechanical strength is required. After extensive survey of radome materials, E-Glass reinforcement with Epoxy as resin and Syntactic foam as core material is considered for satisfying both electrical and mechanical requirements. [5]

Analytical Calculations

Analytical Calculations are done to theoretically estimate the stresses and deflections that are encountered on the radome under study. The objective of any analytical measurement is to obtain consistent and reliable data.

Load Cases : Three load cases are considered

i) Pressure acting due to radome platform travelling under water at speed of 25 knots (12.866m/s)

ii) Water head pressure acting on Radome (due to under water)

iii) Pressure acting due to wind speed @ 240 kmph (when object exposed to wind)

Of these three cases Case No (ii) is predominant.

Fluid Static Law : The fluid-static law states that the pressure in a fluid increases with increasing depth. In the case of water this is termed the hydrostatic law [6].

And the pressure is given by $p = \rho gh$

water head pressure on radome $p = \rho gh$

ρ = Density of sea water at average temperature of 3.88°C with Salinity of 34.78% = 1027 kg/m³ [7].

g = Acceleration due to gravity = 9.81 m/sec²

h = Water head (depth at which object is immersed) = = 450m (design)

$p = 1,027 \times 9.81 \times 450 = 4533691.5$ N/m² = 45.337 bar Since 1 bar = 100000 N/m²

Hence radome is designed to withstand static water head pressure of 45.337 bar. ≈ 45 bar

Design of Hemi-spherical Radome

Radome is considered as dome shape having ID (R) and thickness (t) to meet the electrical requirement and mechanical strength. The design of such structures is carried out very conservatively. Dome considered as thick

composite radome is the place of maximum Tsai-Wu index which is 0.59 from the analysis. This value has to be less than 1.Hence it is found to be within the limits.

Maximum Hoop stress obtained using analytical calculation considering composite as isotropic material is 32.7 MPa (Compressive). The layer stresses in Sxx & Syy direction are shown in Fig 7 & 8 respectively and the values are -38.7 Mpa and -77.6 Mpa which are well within the acceptable limits.

Fig 6: Contour of Tsai-Wu index of Radome

Fig 7: Sxx Layer stress on the radome

Fig 8: Syy Layer stress on the radome

Conclusion

The Maximum displacement obtained from analytical calculations and simulation are within the permissible limits. The maximum Tsai-Wu index on radome surface obtained by analytical calculations and by Simulation are both less than 1. The fabricated radome has been experimentally evaluated by pressure testing and no leakage was observed into the radome and it was able to withstand the design load. The stresses obtained on the radome are also below the acceptable limits. The difference in the results of Analytical and Simulation results are due to the formulae taken for isotropic materials. Hence the designed radome is safe against the underwater pressure and acceptable for installation on platform.

Acknowledgment

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Evaluation of Salt Bath Nitrided Austenitic Stainless Steel Specimens at Low Temperature

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ABSTRACT

The wear behavior of salt bath nitrided austenitic stainless steel specimens, AISI 316LN has been investigated under a dry sliding contact at constant load. The specimens were nitrided to various time parameters, in order to improve its wear resistance, and also to improve the life of the material. It was found that salt bath nitriding was effective in improving the wear behavior of stainless steel material. A low temperature salt bath nitriding has been carried out for two different specimens at 60 minutes (430°C), 80 minutes (430°C) and named as SBN 1, SBN 2 respectively. Untreated austenitic stainless steel was used as a reference material and underwent wear test for comparison with nitrided specimens. The nitrided specimens reveals that hard complex nitrides are formed which improves the surface hardness. Micro hardness measurements revealed a significant increase in hardness after treatment. The layers were characterized by optical microscope and scanning electron microscope analysis.

Keywords: *Wear, Salt Bath Nitriding, Surface hardness.*

Experimental Details

Materials

The material used in the present work was AISI 316LN austenitic stainless steel. The specimens were prepared in following forms. (i) Polished cylindrical disc specimen measuring 50 mm diameter and 10 mm height were used. (ii) Pin specimen with diameter 8 mm and height 30 mm were used with taper edged surface. The specimens for salt bath nitriding were considered and named as SBN 1 (60 min), SBN 2 (80 min) respectively.

Treatments

Prior to all treatments, the specimens were cleaned ultrasonically, rinsed and dried, with care taken to avoid finger contact. Before salt bath nitriding, the specimens were sand blasted, pickled in 15% sulphuric acid for 20 minutes. The samples were degreased using acetone and preheated in an air circulated furnace for 15 minutes. The nascent nitrogen diffuses into the surface of steel, when the specimens were immersed into solution which contains salts of nitrogen.

Wear Measurements

Wear tests were carried out on a pin on disc machine. A stationery pin was mounted horizontally against a vertically rotating disc. The disc is rotated at a constant speed of 1460 rpm at a constant load of 15 Kg, which was applied continuously for a fixed period of 7 minutes under dry conditions.

Hardness profile

The hardness profile salt bath nitrided AISI 316LN material was investigated using Vickers hardness tester. The hardness tests were performed under an indentation load of 150 grams for 15 seconds. For an untreated 316LN stainless steel specimen, the hardness was found to be 196 Hv. For SBN 1, SBN 2 it was found to be 1348 Hv, 1361 Hv.

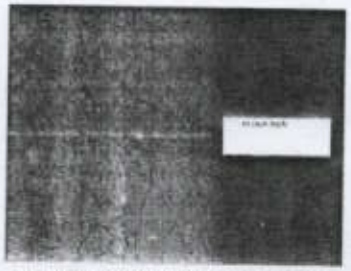

Fig 1: Untreated microscope results

Material Condition Tailored to Plasma Nitriding Process for Ensuring Wear Resistance of Austenitic Stainless Steel

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ABSTRACT

Plasma nitriding is one of the most important surface modification technologies. In this research, D.C. plasma nitriding of 316LN austenitic stainless steel was conducted at different gas pressures of 80Pa for 8h with plasma gas. The results showed that the thickness of the nitride layer could be significantly improved by using low gas pressure. Low-temperature plasma nitriding done at treatment temperatures below 450°C are known to increase the surface hardness of a AISI 316LN stainless steel coating to have about 1000 H_v. Vickers hardness and specific wear amount were improved by plasma processes. In addition, the thickness of the diffusion layers formed on the sprayed 316LN coatings was inferior to that of the corresponding diffusion layers formed on AISI 316LN steel specimens. The results were compared with untreated specimens. The results were concluded with optical microscope results and scanning microscope results.

Keywords: *Plasma Nitriding, AISI 316LN, low temperature, hardness*

INTRODUCTION

By case hardening the stainless steel, the hardness can be increased. Surface hardness can be increased by diffusion of carbon or nascent nitrogen. The salt bath nitriding is done at 450-540 °C for four different specimens and plasma nitriding is done at 500-5400 C for two different specimens. Nitriding is done in which hard complex nitrides are formed which improves the surface hardness. Non treated austenitic stainless steel specimen was used as a reference material. Wear test were also carried out for comparision. The layers were characterized by optical microscope, scanning electron microscope. Wear test were conducted to characterize the tribological wear behaviour.

Chosen for this work, on the basis of their application and availability, salt bath and plasma nitriding were done. In the current work, wear experiments were carried out on AISI 316LN material. The specimens were nitrided at different time period and wear test was conducted. Also the wear rate was investigated. Untreated specimen was used as reference material. The results are discussed using metallographic techniques.

Specimen Preparation

The specimens were prepared in following forms. (i) Polished cylindrical disc specimen measuring 50 mm diameter and 10 mm height were used. (ii) Pin specimen with diameter 8 mm and height 30 mm were used with taper edged surface. Two specimens for plasma nitriding were considered and named as PL 1 (10 hrs), PL 2 (20 hrs) respectively.

Hardness Profile

The hardness profile for the salt bath nitrided and plasma nitrided AISI 316LN material was investigated. SBN4 sample have imparted a good surface hardness, with maximum value of 1440 Hv and for PL 2 sample with a hardness of 1216 Hv.

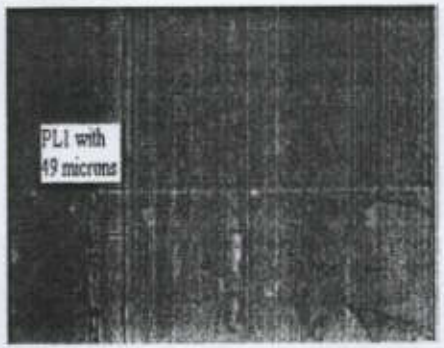

Fig 1: PL1 Microscope Results

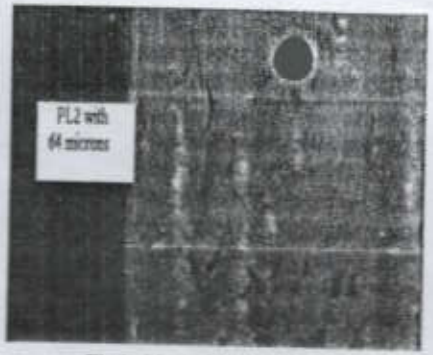

Fig 2: PL2 Microscope Results

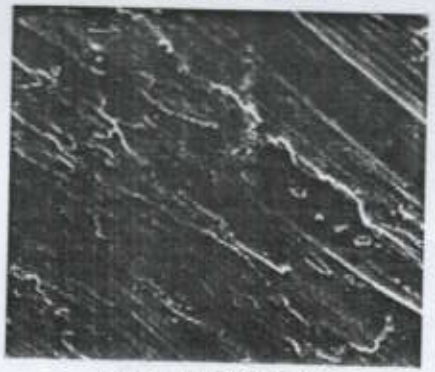

Fig.3: PL1 SEM Results

Fig 4: PL2 Microscope Results

Results and Discussions

The cross sectional microstructures of the plasma samples were analyzed. The observation could be attributed to the attraction between the alloying elements molybdenum with nitrogen. The two nitriding processes are both composed of an external compound layer and an underlying diffusion zone. When compared to nitriding time parameters, the compound layer by plasma nitriding is much thicker than that by salt bath nitriding. The plasma nitriding results were compared with the untreated 316LN specimen and it was found that, in nitride specimen, the mixture of chromium nitrides were precipitated on the surface, to improve the hardness of material. The wear rate of untreated specimen is specified to be lower that of nitrided material. Hence good surface hardness is obtained. The wear loss was found to be 0.0093 grams, 0.0089grams, 0.0073 grams, Untreated, PL 1, PL 2 specimens respectively. From the wear studies, PL 2 specimen results inferior wear performance and improves life of the material in plasma nitriding.

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Effect of Case Hardening on AISI 316LN Austenitic Stainless Steel by Low Temperature Gas Nitriding

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ABSTRACT

Gas nitriding process has been used to increase the surface hardness. In this study the technique is used to improve the wear resistance of AISI 316LN austenitic stainless steel. The paper presents the results of an investigation into wear behaviour of gas nitrided stainless steel. Stainless steel has a good corrosion resistance, where they possess a low hardness, wear resistance. By case hardening the stainless steel, the hardness can be increased. Surface hardness can be increased by diffusion of carbon or nascent nitrogen. The gas nitriding is done at 450 – 540° C for three different specimens. Nitriding is done in which hard complex nitrides are formed which improves the surface hardness. Non treated austenitic stainless steel specimen was used as a reference material. Wear test were also carried out for comparision. The layers were characterized by optical microscope, scanning electron microscope and XRD. Wear test were conducted to characterize the tribological wear behaviour.

Keywords: *Wear, Nitriding, Surface hardness, Stainless Steel, X-Ray diffraction.*

Experimental Details

Materials

The material used in the present work was AISI 316LN austenitic stainless steel. The specimens were prepared in following forms. (i) Polished cylindrical disc specimen measuring 50 mm diameter and 10 mm height were used. (ii) Pin specimen with diameter 8 mm and height 30 mm were used with taper edged surface. Three specimens for gas nitriding were considered and named as GN 1 (14 hrs), GN 2 (20hrs), respectively.

Treatments

Prior to all treatments, the specimens were cleaned ultrasonically, rinsed and dried, with care taken to avoid finger contact. Before gas nitriding, the specimens were sand blasted, pickled in 15% sulphuric acid for 20 minutes. The samples were degreased using acetone and preheated in an air circulated furnace for 15 minutes. The nascent nitrogen diffuses into the surface of steel.

Wear Measurements

Wear tests were carried out on a pin on disc machine. A stationery pin was mounted horizontally against a vertically rotating disc. The disc is rotated at a constant speed of 1460 rpm at a constant load of 15 Kg, which was applied continuously for a fixed period of 7 minutes under dry conditions.

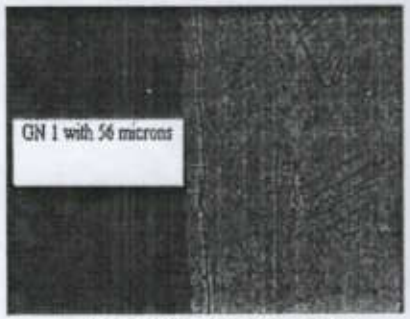

Fig 1: GN 1 microscope results

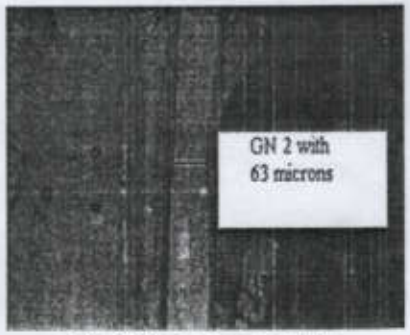

Fig 2: GN 2 microscope results

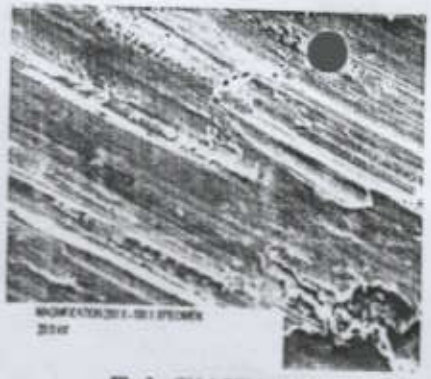

Fig 3: GN 1 SEM results

Fig 4: GN 2 SEM results

Hardness Profile

The hardness profile for gas and salt bath nitrided AISI 316LN material was investigated using Vickers hardness tester. The hardness tests were performed under an indentation load of 150 grams for 15 seconds. For an untreated 316LN stainless steel specimen, the hardness was found to be 196 Hv. For gas nitriding it was found to be 1192Hv, 1241 Hv respectively.

Results and Discussions

The specimen indicates that the nitrided case is composed of an upper compound layer with lower diffusion zone. The gas nitriding results were compared with the untreated 316LN specimen and it was found that, in nitrided specimen, the mixture of chromium nitrides were precipitated on the surface, to improve the hardness of material. The wear rate of untreated specimen is specified to be lower that of nitrided material. Hence good surface hardness is obtained. The wear loss was found to be 0.0068 grams, 0.0047 grams and 0.0032 grams for untreated, GN 1, GN 2 specimens respectively. From the wear studies, GN 2 specimen results inferior wear performance and improves life of the material.

Conclusion

The result of this work confirms that, gas nitriding has effectively improved its wear resistance. As the time for treatment increases, the case depth also increases. GN 2 specimen has a very good wear resistance. By comparing the two nitriding process from the wear test, GN 2 has improved the wear resistance and hence the life of the material is improved.

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A Review of Friction Stir Welding of Dissimilar 5083 and AA6082 Aluminum Alloy

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ABSTRACT

Friction Stir Welding (FSW) is a solid state welding process used for welding similar and dissimilar materials. The process is widely used because it produces sound welds and does not have common problems such as solidification and liquefaction cracking associated with the fusion welding techniques. The friction Stir Welding is a process involving plastic deformation of the materials to be joined. This process does not involve the melting of the materials to be joined. This thing makes this process suitable for joining the different materials having different mechanical and chemical properties and different material structure. The FSW of Aluminum and its alloys has been commercialized; and recent interest is focused on joining dissimilar materials. In particular, FSW has inspired researchers to attempt joining dissimilar materials such as AA5083 and AA6082. This dissimilar AA5083 and AA6082 is required in marine applications due to weight saving, corrosion resistance and extrusion requirements. In this paper, review the current research state of FSW between AA 5083 and AA6082 with a focus on the resulting weld microstructure, mechanical testing and the tools employed to produce the welds and also an insight into future research in this field of study.

Keywords: *friction stir welding;AA6082;AA5083;mechanical properties;microstructure;tools.*

Introduction

Nowadays, researchers have been focusing on developing fast and eco-friendly processes in manufacturing and this include Friction Stir Welding (FSW) and Processing (FSP). Friction Stir Welding (FSW) is a solid-state joining technique invented and patented by The Welding Institute (TWI) in 1991 for butt and lap welding of ferrous and non–ferrous metals and plastics. FSW is a continuous process that involves plunging a portion of a specially shaped rotating tool between the butting faces of the joint. The relative motion between the tool and the substrate generates frictional heat that creates a plasticized region around the immersed portion of the tool [1] .

A rotating tool is pressed against the surface of two abutting or overlapping plates. The side of the weld for which the rotating tool moves in the same direction as the traversing direction, is commonly known as the 'advancing side'; the other side, where tool rotation opposes the traversing direction, is known as the 'retreating side'[2].

Friction stir welding process uses a non-consumable rotating tool consisting of a pin extending below a shoulder that is forced into the adjacent mating edges of the work pieces as illustrated in Fig. 1. The heat input, the forging action and the stirring action of the tool induces a plastic flow in the material, forming a solid state weld [1].

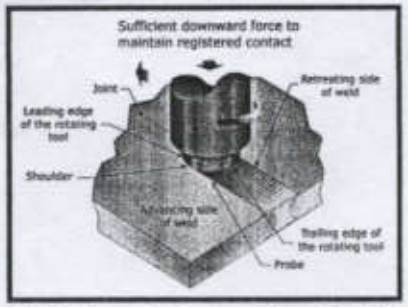

Fig.1: Schematic diagram of the Friction Stir Welding process

It was realized in the development of the FSW process that the tool design is critical in producing sound welds [1]. A basic and conventional design for a FSW tool is shown in Fig. 2 which consists of a threaded pin and a concave shoulder. FSW tools follow the same basic trends in terms of their shapes and geometries. They are generally comprised of three generic features including a shoulder, a probe also known as a pin and external features on the probe.

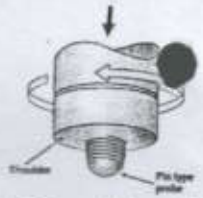

Fig.2: A Schematic View of FSW Tool

FSW has some distinct advantages over the other welding process [3]. The process has lower distortion, good dimensional stability, absence of cracking of all. There has been an increase in the research done in FSW.

When we talking about the friction stir welding of the different materials, there are the numbers of factors which mainly influence on the welding [4] and they are as follows:

i. The different deformation behaviors of the materials which are to be joined.
ii. Formation of detrimental intermettalic compounds.
iii. Differences in physical properties such as thermal conductivity.
iv. In two materials, which one should be at the advancing side and which one should be at the retreating side.

These factors can contribute to asymmetry in both heat generation and material flow during Friction Stir Welding. Hence these factors should be kept in mind before starting the welding. To deal with this the following review mainly provides the information about the joint configuration, mechanical properties, weld strength, joint efficiency etc. in joining of different materials/alloy by friction stir welding.

FSW joints usually consist of different regions as illustrated in Fig. 3 following the terminologies used by Thread gill [5] which include; the unaffected material or parent metal, the Heat-Affected Zone (HAZ), the Thermo mechanically Affected Zone (TMAZ) and the weld nugget.

Fig.3: Illustration of different micro structural regions in the transverse cross section of a friction stir welded material. A, parent metal or unaffected material; B, heat-affected zone; C, thermo mechanically affected zone; D, weld nugget

The Unaffected material or parent material is the material remote from the weld that has not been deformed. The Heat Affected Zone (HAZ) is the region, which lies closer to the weld-centre; the material has experienced a thermal cycle that has modified the microstructure and/or the mechanical properties. However, no plastic deformation occurs in this area. The Thermo Mechanically Affected Zone (TMAZ) is the region in which the FSW tool has plastically deformed the material, and the heat from the process has also exerted some influence on the material. In the case of aluminum, it is possible to obtain significant plastic strain without recrystallization in this region; and there is generally a distinct boundary between the recrystallized zone (weld nugget) and the deformed zones of the TMAZ; and the Weld nugget is the fully recrystallized area, sometimes called the Stir Zone (SZ) or Stir Nugget (SN), it refers to the zone previously occupied by the tool pin [1].

Many researchers have published reviews on friction stir welding and processing focusing on the tools employed, Friction stir processing [6], dissimilar alloys [1] and on aluminum alloys [2]. To the best of our knowledge, no review focusing on friction stir welding of aluminum alloy 5083 and 6082 has been published. Therefore, this paper critically reviewed the existing published literature by focusing on the recent work done on friction stir welding of 5083 and 6082 aluminum alloys. The rest of the paper is focused on the resulting micro structural evolution, the mechanical properties characterization and the tools employed to produce the welds between AA5083 and AA6082.Related Studies on Friction Stir Welding Between Aluminium Alloy 5083 And 6082

A. Mechanical Characterization

The knowledge of the mechanical properties of the dissimilar friction stir welds between 5083 and 6082 aluminum alloys is of importance to enhance their use in the marine and automobiles [7].

Beytullah Gungor *et al* [8] welded the similar and dissimilar of AA 5083-H111 and AA 6082-T651 using friction stir welding with the parameters of 1250 rpm of tool rotation, 64 mm/min welding speed and 2° tool tilt

Study of the Process Parameters Involved in the Electrical Discharge Machining of Tough Materials - A review

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ABSTRACT

This work deals with the review of various papers related to optimization of Electrical discharge machining process. EDM is a manufacturing process by which tool cuts the required shape into the work piece within a dielectric fluid. Short duration discharges are generated in a liquid dielectric gap which separates the tool and work piece. The material is removed with an erosive effect of the electric discharges from tool and work piece. The electrical discharge in the EDM process is a highly complex phenomenon to which scientific knowledge is incomplete at both macroscopic and microscopic level. A comprehensive study is needed to improve the surface of electric discharge machined work piece. A mirror-like surface can be achieved by adding powder into dielectric via EDM process. The parameters considered are pulse on time, pulse off time, nozzle flushing, polarity, peak current and concentration.

Keywords *: EDM, Polarity, dielectric fluid.*

Application of Taguchi Technique for Identifying Optimum Surface Roughness in CNC End Milling Process

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ABSTRACT

In order to build up a bridge between quality and productivity, the present study highlights optimization of CNC End milling process parameters to provide good surface finish. The Surface Finish has been identified as one of the quality attribute and directly related to productivity. An attempt will be made to optimize aforesaid quality attribute in a manner that could be fulfilled simultaneously up to expected level. The aim of this work is to apply Taguchi optimization method for low surface roughness values in terms of CNC End milling of Aluminium and Mild Steel. The milling parameters evaluated is cutting speed, feed rate and depth of cut. A series of milling experiments are performed to measure the surface roughness data. The settings of end milling parameters are determined by using Taguchi experimental design method. Orthogonal arrays of Taguchi, the signal-to noise ratio (S/N) ratio, the analysis of variance (ANOVA) are employed to find the optimal levels and to analyze the milling parameters on surface roughness. Finally confirmation tests with the optimal levels of cutting parameters are carried out in order to illustrate the effectiveness of Taguchi optimization method.

Key words: CNC End Milling, Surface Finish, Taguchi Method.

Introduction

Surface finish produced on machined surface plays an important role in production. The surface roughness has a vital influence on most important functional properties such as wear resistance, fatigue strength, corrosion resistance and power losses due to friction. Poor surface roughness will lead to the rupture of oil films on the peaks of micro irregularities, which lead to a state approaching dry friction and results in decisive wear of rubbing surface. Therefore finishing processes are employed in machining in order to obtain a very high surface finish. Surface roughness in End Milling depends on spindle rpm, feed, depth of cut, helix angle, lubricating oil etc., Among them mainly surface finish depends on spindle rpm, feed, depth of cut.

In order to infer the science behind the observed phenomenon, one has to plan and conduct the experiments to obtain enough and relevant data. This can be done by any one of the method as mentioned below:

Trial and Error Method

In this method we will perform series of experiments, each of which gives some understanding. This requires making

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Transesterification of Different Vegetable Oils to Produce Biodiesel By using Methanol as Catalyst

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ABSTRACT

Biodiesel has now proved its value as a fuel for diesel engines all over the world since a decade. The production of this type of biofuel is expected to increase in the near future. Biodiesel is produced through transesterification reaction of vegetable oil by using methanol solvent. Various large scale processes to produce fatty acid methyl esters from vegetable oils have been developed over a period of time. These processes use homogeneous basic catalysts such as caustic soda or sodium methylate which lead to waste products after neutralization with mineral acids. The glycerol is the by product in this process. This paper provides a general description of a completely new batch biodiesel production process, where the transesterification reaction is promoted by an methanol catalyst. Impurities are removed by decantation and filtration. The basic experiments are carried out in BIET chemistry laboratory.

Key words: *Methanol, ester , catalyst , transesterification, glycerol*

Introduction

Animal and plant fats and oils are composed of triglycerides, which are esters containing three free fatty acids and the trihydric alcohol, glycerol. In the transesterification process, the alcohol is deprotonated with a base to make it a stronger nucleophile. Commonly, ethanol or methanol are used. As can be seen, the reaction has no other inputs than the triglyceride and the alcohol. Under normal conditions, this reaction will proceed either exceedingly slowly or not at all, so heat, as well as catalysts (acid and/or base) are used to speed the reaction. It is important to note that the acid or base are not consumed by the transesterification reaction, thus they are not reactants, but catalysts. Common catalysts for transesterification include sodium hydroxide, potassium hydroxide, and sodium methoxide. Almost all biodiesel is produced from virgin vegetable oils using the base-catalyzed technique as it is the most economical process for treating virgin vegetable oils, requiring only low temperatures and pressures and producing over 98% conversion yield (provided the starting oil is low in moisture and free fatty acids). However, biodiesel produced from other sources or by other methods may require acid catalysis, which is much slower.

The transesterification reaction is base catalyzed. Any strong base capable of deprotonating the alcohol will do (e.g. NaOH, KOH, sodium methoxide, etc.), but the sodium and potassium hydroxides are often chosen for their cost. The presence of water causes undesirable base hydrolysis, so the reaction must be kept dry.

In the transesterification mechanism, the carbonyl carbon of the starting ester ($RCOOR^1$) undergoes nucleophilic attack by the incoming alkoxide (R^2O^-) to give a tetrahedral intermediate, which either reverts to the starting material, or proceeds to the transesterified product ($RCOOR^2$). The various species exist in equilibrium, and the product distribution depends on the relative energies of the reactant and product. Products of the reaction include not only biodiesel, but also byproducts, soap, glycerol, excess alcohol, and trace amounts of water. All of these byproducts must be removed to meet the standards, but the order of removal is process-dependent. The density of glycerol is greater than that of biodiesel, and this property difference is exploited to separate the bulk of the glycerol coproduct. Residual methanol is typically recovered by distillation and reused. Soaps can be removed or converted into acids. Residual water is also removed from the fuel. In this the basic experiments carried out in BIET chemistry laboratory are discussed.

Materials and Methods

Methanol and sodium hydroxide used are of analytical grade Sigma Chemical Co. Glass apparatus like round bottom flask; 250 ml distillation apparatus , separating funnel are made up of corning glass. Whatman No.1 filter papers are used. Hot water bath of Remi make is used. Easily available vegetable oils like palm oil, ground nut oil , caster seed oil and sunflower oils are used.

Experimentation

The transesterification reactions were carried out in a 500 mL glass round bottom reactor, provided with a thermostat, mechanical stirring, sampling outlet, and condensation system. The procedure followed is described next. The reactor was preheated to 75 °C, to eliminate moisture, and then 250 g of each vegetable oil was added. When the reactor reached the temperature established for the reaction, the methanol and the catalyst were added, in the amounts established for each experiment, and the stirring system was connected, taking this moment as time zero of the reaction. Each mixture was vigorously stirred and refluxed for the required reaction time. After the reaction finished, the excess methanol was distilled off. The transesterification product was allowed to stand in a separating funnel for glycerol separation. Due to strong emulsions formed in the case of the reaction products, glycerol was not separated only by gravity, and in order to separate it from the methyl ester phase, approximately 10 g of pure glycerol was added to the transesterification product, the separating funnel was shaken vigorously and the product was allowed to stand. The glycerol layer separated from the ester layer within an hour. The addition of pure glycerol to the mixtures, removes the residual catalyst and the soaps which have been formed during the transesterification reaction, thus creating a difference in the density between the two phases, and in this way making it easier for their separation by gravity. After separation of the two layers, crude methyl esters were washed several times (up to 10) with 50 cm3 of hot distilled water (50 °C) in a separating funnel until neutral pH. Finally, the water present was eliminated by heating at 110 °C.

The vegetable of 50 ml quantity is taken in a round bottom flask and 1% sodium hydroxide is added to it and a temperature of 60°C is maintained for about one hour . This reaction is like saponification reaction. Methanol of about 150 ml is added after cooling the reaction mixture to ambient temperature. The mixture is heated again to about 80°C and maintained about one hour. This reaction is commonly known as esterification reaction. The reactor contents are further cooled to ambient temperature . The cooled mixture is then separated in a separation flask. The bottom layer is heavier one and the top layer in the methyl ester.

Analytical Methods

Different properties of the raw materials were determined: density at 15 °C (EN ISO 12185), kinematic viscosity at 40 °C (EN ISO 3104), flash point (ISO 3679), iodine number (EN 14111), acid value (EN 14104), saponification value (AOCS CD3 1993), sulfur content (EN ISO 20846), water content (EN ISO 12937), pour point (ISO 3016) and carbon residue (EN ISO 10370). The average molecular weight of vegetable oils is calculated by $MW = 56.1 \times 1000 \times 3/(SV-AV)$, where AV (mKOH/moil, mg/g) and SV is the saponification value (mKOH/moil, mg/g) [20]

Results and Discussions

The major physicochemical properties of raw materials are given in Table 1. The kinematic viscosity of the oils varied between 29.0 – 33.0 cSt at 40 °C, while the sulfur content lay within the range of 0.23 – 5 mg/kg. The saponification value was found to be 170.0 – 195.0 mg KOH/g. The feedstock acid values obtained in this study differed significantly ranging from 0.22 to 1.0 mg KOH/g oil. Several studies have shown that the acid value of the feedstock for alkaline transesterification should be less than 1 mg KOH/g and that all raw materials should be anhydrous (water content < 0.3%) [21,22]. Thus, in the light of the previous discussion on the requirements for the feedstock acid values, it could be concluded that ground nut oil and mainly used frying oil had values above the recommended 1 mg KOH/g. With regard to the water content, which was in the range of 272 to 510 mg/kg, all feedstocks satisfied the above recommended limit for water content. Although the iodine number is not included in the properties that influence the transesterification reaction, it should be considered in determining the oil of choice. The product was tested in the Diesel engine of BIET thermal engineering laboratory in the ratio of 10:90 successfully.

Table.1 Physical properties of vegetable oils.

Property	Sunflower oil	Groundnut oil	Palm oil
Kinematic viscosity (cSt, 40 °C)	32.5	33.00	29.0
Density (kg/m3, 15 °C)	921.7	918.0	908.0
Flash point (°C)	272	242	260
Iodine number (cg I/g oil)	132	103	100
Acid value (mg KOH/g)	0.33	1.80	0.22
Saponification value (mg KOH/g)	192.1	170.0	193.0
Water content (mg/kg)	347	519	272
Sulfur content (mg/kg)	0.22	2.3	2.2

Conclusion

The two-stage transesterification of three vegetable oils with methanol was carried out on bench scale experiments using sodium hydroxide as catalyst. In order to obtain biodiesel with high purity, the reaction conditions, such as catalyst concentration, reaction temperature and molar ratio of methanol/oil, were optimized on the conversion of sunflower oil. The rest of the vegetable oils were converted to methyl esters under optimum reaction parameters. The optimized reaction conditions for one stage transesterification of vegetable oils were a 9:1 molar ratio of ethanol to oil, the addition of 1% NaOH catalyst, a 80 °C reaction temperature, and about 2.5 h of reaction time. The product was tested in the Diesel engine of BIET thermal engineering laboratory in the ratio of 10:90 successfully

Acknowledgement: The authors wish to thank BIET management for allowing to carry out the experiments

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To Prepare and Compare the Tensile Properties on Angle Ply Orientation on Bi-Directional Glass Polyster Composite Laminates

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ABSTRACT

This work investigates that the influences of angle ply orientation of stacking on mechanical properties of a E-glass general polyester and Isophthalic polyester composite laminate experimentally and comparing with the results with laminated software. He laminated software is developed based on laminate theory. Laminated Composite materials have characteristics of high modulus/weight and strength/weight ratios [1], excellent fatigue properties, and non-corroding behaviour. These advantages encourage the extensive application of composite materials, for example, in wind turbine blades, boat hulls, automobiles, water tanks, roofing, pipes and cladding, and aerospace. The understanding of the mechanical behaviour of composite materials is essential for their design and application. Although composite materials are often heterogeneous, they are presumed homogeneous from the viewpoint of macro mechanics and only the averaged apparent mechanical properties are considered. The most common method to determine these constants is static testing. In this work ten types of composite laminate specimens with different stacking sequences, i.e., (±00, ±100, ±300, ±400, ±450, ±550, ±650, ± 750, and ±900) are fabricated. In this work, the specimens are prepared in the laboratory using compression mould technique E- glass as fiber & with Polyester resin as an adhesive. The specimens are prepared for testing as per ASTM standards to estimate the tensile modulus

Key words: *compression moulding, Degree of orientation, E-glass, General purpose polyester, Isophthalic polyester, MEKP, stacking sequence, tensile property*

Introduction

The laminated composite materials usage is increasing in all sorts of engineering applications due to high specific strength and stiffness. Fiber reinforced composite materials are selected for weight critical applications and these materials have good rating as per the fatigue failure is concerned. Present work is aimed to analyze the mechanical behavior of a each laminate under tensile condition. Therefore here different types of composite laminates are selected for test specimens. The present project work mainly is focusing on development of manufacturing process and establishing critical test procedures for the polymer reinforced composite materials to be used in certain engineering applications.

A. Fiber

Glass fiber also called fiberglass. It is material made from extremely fine fibers of glass Fiberglass is a lightweight, extremely strong, and robust material. Although strength properties are somewhat lower than carbon fiber and it is less stiff, the material is typically far less brittle, and the raw materials are much less expensive. Its bulk strength and weight properties are also very favorable when compared to metals, and it can be easily formed using molding processes. Glass is the oldest, and most familiar, performance fiber. Fibers have been manufactured from glass since the 1930s.

Types of Glass Fiber: As to the raw material glass used to make glass fibres or nonwovens of glass fibres, the following classification is known: **1. A-glass :** With regard to its composition, it is close to window glass. In the Federal Republic of Germany it is mainly used in the manufacture [2] of process equipment. **2. C-glass:** This kind of glass shows better resistance to chemical impact. **3. E-glass:** This kind of glass combines the characteristics of C-glass with very good insulation to electricity. 4. AE-glass Alkali resistant glass. Generally, glass consists of quartz sand, soda, sodium sulphate, potash, feldspar and a number of refining and dying additives. The characteristics, with them the classification of the glass fibers' to be made, are defined by the combination of raw materials and their proportions. Textile glass fibres mostly show a circular

B. Properties of Glass Fiber

Glass fibers are useful because of their high ratio of surface area to weight. However, the increased surface area makes them much more susceptible to chemical attack. By

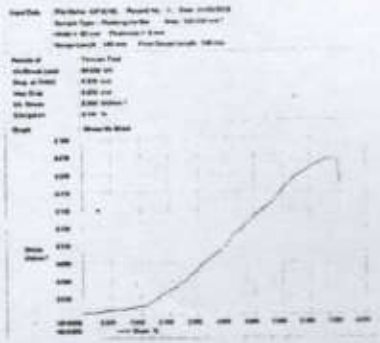

Fig.10: Graph between Stress and Strain for O0 orientation (GP)

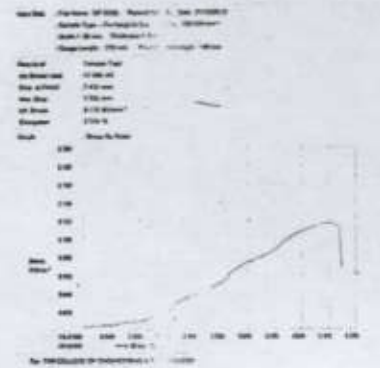

Fig.11: Graph between Stress and Strain for 3O0 orientation (GP)

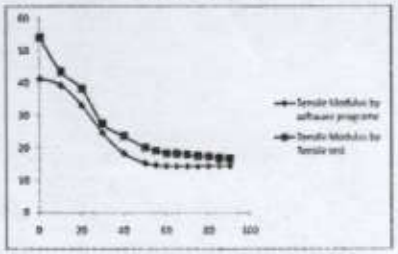

Fig.12: Comparison between Tensile modulus with Experiment and Software Programme

Conclusion

Experiments were conducted on Uni Directional Glass fiber and Polyester resin. Laminate composite specimens with varying fiber orientation to evaluate the mechanical behavior.. The values are compared with the prepared Laminate software and the experimental results are coinciding with the software results. Hence software is used to evaluate the tensile modulus of any orientation. And the results of Isophthalic resin are same as of that General purpose resin results because of specific gravity is same. It is observed from the result that glass/Polyester with 00 fiber orientation Yields' high strength when compare to other degree of orientations for the same load, size & shape In addition. Hence, it is suggested that fiber orientation with 00 is preferred for designing of structures like which is more beneficial for sectors like, wind turbine blades, Aerospace, automotives, marine, space and boat hull etc. Aerospace, automotives, marine, space and boat hull etc.

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Development of Hybrid Fibres Reinforced Composites Based on Glass and Kenaf Fibres

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ABSTRACT

Composites have receiving utmost Importance in today's scenario. Composites have a wide variety of applications in areas like aerospace, marine industry, automobiles and in engineering. They are considered because of their better mechanical properties. The present work deals with preparation of composites made of hybrid fibres as reinforcement and isopthalic resin as matrix medium. The reinforcement consists of glass and kenaf fibres. In this work how different laminas are prepared by varying the lengths of hybrid fibres. And in addition, other laminas are also prepared by considering glass fibres and kenaf fibre's individually. Later how these laminas are tested for different mechanical properties as per ASTM standards, and applications of these fibres.

Introduction

A composite is combination of two materials in which one of the materials, called the reinforcing phase, is in the form of fibers, sheets, or particles, and is embedded in the other materials called the matrix phase. The reinforcing material and the matrix material can be metal, ceramic, or polymer. Composites typically have a fiber or particle phase that is stiffer and stronger than the continuous matrix phase and serve as the principal load carrying members. The matrix acts as a load transfer medium between fibers, and in less ideal cases where the loads are complex, the matrix may even have to bear loads transverse to the fiber axis. The matrix is more ductile than the fibers and thus acts as a source of composite toughness. The matrix also serves to protect the fibers from environmental damage before, during and after composite processing. When designed properly, the new combined material exhibits better strength than would each individual material. Composites are used not only for their structural properties, but also for electrical, thermal, tribological, and environmental applications.

The interest in natural fiber-reinforced polymer composite materials is rapidly growing both in terms of their industrial applications and fundamental research. They are renewable, cheap, completely or partially recyclable, and biodegradable. Plants, such as flax, cotton, hemp, jute, sisal, kenaf, pineapple, ramie, bamboo, banana, etc., as well as wood, used from time immemorial as a source of lignocellulosic fibers, are more and more often applied as the reinforcement of composites. Their availability, renewability, low density, and price as well as satisfactory mechanical properties make them an attractive ecological alternative to glass, carbon and man-made fibers used for the manufacturing of composites. The natural fiber-containing composites are more environmentally friendly, and are used in transportation (automobiles, railway coaches, aerospace), military applications, building and construction industries (ceiling paneling, partition boards), packaging, consumer products, etc. And the use of glass fibers is to enhance the properties of the composite material. They provide more strength and they are stiffer than kenaf fiber. So we would like to prepare a composite material by using both kenaf and glass fibres.

Kenaffibres

Kenaf Fig 1, or its scientific name Hibiscus cannabinus L. is a warm season annual fiber crop closely related to cotton and jute. Historically, kenaf has been used as a cordage crop to produce twine, rope and sackcloth. Nowadays, there are various new applications for kenaf including paper products, building materials, absorbents and animal feeds. Kenaf has a single, straight and branchless stalk. Kenaf stalk is made up of an inner woody core and an outer fibrous bark surrounding the core. The fiber derived from the outer fibrous bark is also known as bast fiber. Kenaf bast fiber has superior flexural strength combined with its excellent tensile strength that makes it the material of choice for a wide range of extruded, molded and non-woven products. Kenaf fiber could be utilized

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Wavelet and Scalar Indicator based Fault Assessment Approach for Rolling Element Bearings

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Abstract

A failed rolling element bearing when removed from a machine mostly displays cracks and flaking. Identification of such defects along with the severity of damage may avoid malfunctioning and breakdown of machines. The aim of this paper is to diagnose bearing faults and asses the defect severity using vibration signal processing techniques. For this purpose, application of spline wavelets in finding the existence of flaws and use of scalar indicator in determining the severity of defect from initial stage of degradation has been illustrated. Parameters of spline wavelets have been identified on the basis of visual similarity, correlation coefficient and maximum mutual entropy. Further, a new scalar indicator has been developed to quantify the level of defect in the bearing. Results of analysis yielded adequate fault related information along with defect severity at inner race, outer race and rolling element components of a deep groove ball bearing.

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Keywords: Fault diagnosis; Spline wavelet; Time scalars; Rolling element bearing

1. Introduction

Today's industries employ complex rotary machines in which rolling element bearings have been considered as critical mechanical components. Malfunctioning and unexpected breakdown of such machines occur due to the presence of flaws in the components of bearing. Therefore, it has been always important to identify such faults

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Probabilistic Performance Evaluation of a 6.6MWp Solar Photo Voltaic ARHYAMA Power Plant- A Case Study

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ABSTRACT:

With the rapid depletion of fossil fuel reserves, it is feared that the world will soon run out of its energy resources. This is a matter of concern for developing countries whose economy heavily leans on its use of energy. Under the circumstances it is highly desirable that renewable energy resources should be utilized with maximum conversion efficiency to cope with the ever increasing energy demand. Further the global economic and political conditions that tend to make countries more dependent on their own energy resources have caused growing interest in the development and use of renewable energy based technologies. In terms of its environmental advantages, renewable energy sources generate electricity with insignificant contribution of carbon dioxide (CO2) or other greenhouse gases (GHG) to the atmosphere.

This paper presents the Probabilistic Performance Evaluation of a 6.6MWp solar photo voltaic ARHYAMA power plant located near Aler, Naldonda district , Telangana state, India. The plant is laid on 36 acres of land with a total of 542 structures. Each structure is made of 480X250W modules and is connected to an inverter of 11kv. So, there are 542 inverters in total. The inverters used are of string type. The total power generated from 23rd December 2014 to 8th February 2015 is 10,392,400kWh. The overall efficiency of the system is obtained as 15.96%. The Probabilistic Performance Evaluation, peak shaving, and reliability of the Plant are also presented.

Key words: solar photo voltaic, inverters, modules, reliability evaluation

2.Preparation of laminas with only glass fibres as reinforcement

As in Fig 7,About 10gms of glass fibres of length 6mm is taken. And about 200gms of isopthalic resin is taken and pour ed into the container containing fibres. They are mixed properly and 2% of catalyst and accelerator are added and mixed thoroughly. Immediately this mixture should be poured into the space whose cross-section is rectangular and of 3mm thickness. Proper care is to be taken to prevent formation of air bubbles in the lamina. This is allowed to get solidified for about 6 hrs. In the similar way laminas of each glass fibre of length 8mm and 12mm are prepared.

Further steps to be worked on

These laminas are to be tested for different mechanical properties as per ASTM standards, further details are to be found.

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Experimental Investigation on Phenolic Based Composites With Filler Material

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ABSTRACT

Phenolic based reinforced composite materials are gaining great importance in every field such as in the aerospace and automobile industry. The most significant and unique properties are high strength to weight ratio. Corrosion resistance, easy fabrication. Composite materials may have some problems such as fiber fraction, crack and delamination observed due to variety of foreign object, impact damage, poor fabrication process and fatigue from surroundings environment. In this experiment four laminates are considered and mixed with zirconium filler with variation in percentage. The test specimens are extracted from hand layup Phenolic based composite laminates as per ASTM standards to test physical and mechanical properties. Study of experiment reveals that the carbon/phenolic composites with zirconium filler exhibited better properties than the carbon/phenolic composites without zirconium filler.

Keywords: PAN Carbon fabric, Phenolic resin, hand layup technique, zirconium filler

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Introduction

PAN based Carbon fibers and their composites, particularly those with Polymeric matrices, have become the dominant advanced composite materials for aerospace application due to their high specific strength, stiffness and low weight. Phenolic based composite materials are play a vital role in many industrial applications such as aerospace applications, automobile industries, ship building, missile applications etc.,

Composite materials are defined any combination of two or more different materials at the macroscopic level [1]. The aerospace or missiles structures are require high strength, light weight and withstand the high temperatures. Phenolic based composites are widely used for thermosetting resins having the better mechanical properties [2]. In this experiment the PAN carbon fabric mixed with phenolic resin along zirconium filler material and make laminates cured in oven[3][4]. The test samples are extracted from cured laminates and ensured the physical properties and mechanical properties [4][5]. The experimental study reveals that enhance the physical and mechanical properties in with zirconium filler laminates.

Experimental Procedure

In this study the four types of laminates were considered, there are

(i) Carbon-Phenolic Laminate without Zr. Filler – (L_0)

(ii) Carbon-Phenolic Laminate with 5% of Zr. Filler – (L_1)

(iii) Carbon-Phenolic Laminate with 10% of Zr. Filler – (L_2)

(iv) Carbon-Phenolic Laminate with 15% of Zr. Filler – (L_3)

The following steps are involved in the experimental work.

1. Preparation of laminate
2. Sample preparation
3. Destructive tests

Selection of Materials

Since PAN based carbon fabric is very expensive, it is amorphous material for ablative purpose and is having vast applications in aerospace industry, and hence it is selected. Phenolic resin is the conventional matrix material

Statistical Approach of Improving Transient Stability With Distributed Compensator using Controllers

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ABSTRACT

Recent development of power electronics has introduced the use of flexible [illegible] transmission system (FACTS) controllers in power systems. High costs and reliability [illegible] have restricted their use in these applications. The concept of distributed FACTS (D-FACTS) is introduced as a way to remove these barriers. Long distance AC transmission lines are subjected to stability problems which limit the transmission capability A new device, the distributed static series compensator (DSSC), manufactured at low cost with desired power flow is effectively changing the line reactance This paper aims to enhance the transient stability of power system with the use of Compensator(DSSC).Experimental results from a prototype are presented which approve the DSSC ability for increasing transient stability margin of the power system.

Key Words: *Flexible AC transmission systems (FACTS), Distributed FACTS (D-FACTS), compensation, distributed static series compensator (DSSC), transient stability [illegible]*

Introduction

FACTS devices are based on application of power electronics and high voltage high power converters, which are in series or parallel configurations or a combination of both. These well-known devices effectively increase power handling capacity of the line and improve transient stability as well as damping performance.

Recently a new concept, designated as distributed FACTS (D-FACTS), has been introduced as a possible way to achieve more merits beside those raised by lumped FACTS devices [1]. Distributed Static Series Compensator (DSSC), as a new DFACTS device, is composed of a low-power single-phase inverter which attaches directly to the transmission line conductor [1].

With the aim of improving the transient stability, a supplementary controller has been designed and suitably combined to the main control loop of DSSCs. Simulation results exhibit the efficient influence of DSSCs in the transient stability augmentation and justifies its controller performance.

DSSC basic concept

DSSC concept has been originated based on FACTS devices, which is in fact a model of a SSSC [illegible] size, at a lower price, and with a higher capability. The distributed fashion of the DSSC contributes more [illegible] and improved controllability of power system.

Fig. 1 displays an imaginary schematic of [illegible] exploited in a power line so as to control the power flow by changing the line impedance. Each DSSC module is rated at about 10 KVA and is clamped around the line. The individually controlling of each module provides the opportunity to increase or decrease the impedance of the line or to leave it unaltered. With a large number of modules performing together, it will be feasible to yield substantial influence on the overall power flow in the line [4].

Fig.1: D-Facts deployed on power line

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Carrier Based Modulation for the SVM of the Matrix Converter

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Abstract— **A carrier based modulation of matrix converter is efficient modulation scheme as compared to space vector modulation. It also eliminates harmonics and unbalanced input voltages. It's a general pulse width modulation method using carrier based modulator for an easier matrix converter control. Simulation results are presented to validate its equality with SVM.**

Keywords—carrier based modulation; matrix converter; pulse width modulaiton;

I. INTRODUCTION

A Matrix converter is a direct three phase to three phase power converter with variable frequency and amplitude output voltage mainly used for induction motor speed drive. The matrix converter, shown in Fig. 1, is a direct three-phase to three-phase forced-commuted power converter which directly connects the mains power supply (r,s,t) to the motor (u.v,w) through nine fully controlled bidirectional switches. The input network (r-in, s-in, t-in) is connected to the matrix converter through an LC input filter as shown in Fig. 1. This converter, which can be decomposed in three "cells" as shown in Fig. 1, generates variable frequency and amplitude output voltages (limited to 86% of the input voltage amplitude with over-voltage modulation) with any three-phase electrical network.

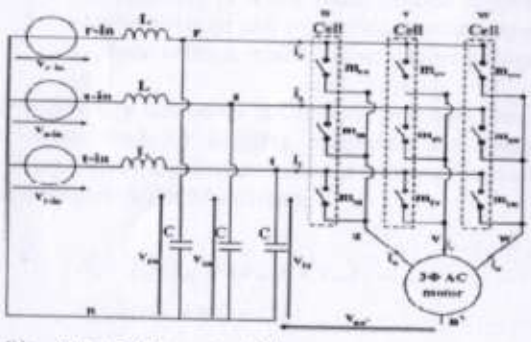

Fig. 1Matrix Converter Scheme

This converter is able to produce sinusoidal input currents, which limits the volume of the LC input filter. This converter has a high power density and a potentially high reliability since electrolytic storage capacitors are not required. Thus, it could become a compact industrial solution for adjustable speed drive applications feeding induction motors. The more useful and interesting modulations are the space vector modulation (SVM) and the rectifier and inverter vector (RIV) modulation. These modulations are based on graphical representation methods, duty cycle calculations, and sequenced states application to create the pulse width modulation (PWM). An 86% voltage ratio (rms fundamental output voltage divided by the rms input voltage) is obtained with these methods [1]. In fact, both modulations are equivalent and able to produce sinusoidal output voltages, even when there is unbalance or harmonics in the mains voltages. Since current references of the mains are chosen proportional to the input voltages, input currents are balanced and sinusoidal as long as the mains power supply is a perfect sinusoidal source. A PWM that limits the number of switching's during the modulation period has also been introduced with the SVM representation, using the calculated duty cycles and a defined switching table. These matrix converter modulations are efficient, but complex to understand, to synthesize compared to the three phase voltage source inverter (VSI) modulations, and thereby heavy to implement in digital processors. The carrier based modulations proposed in the literature are complex to implement into industrial process, by using a discontinuous carrier wave modulator or an asymmetrical one which needs to sum some duty cycles [1].

Symmetrical carrier based modulation has an easier implementation method. Moreover, an interesting approach has been introduced by Ishiguro for the matrix duty cycle calculation, as it limits the number of duty cycle calculations, but it does not propose a satisfying carrier-based modulator. The aim of this paper is to propose a scalar matrix converter modulation equivalent to the SVM ones in order to obtain the same electrical characteristics (same logic state at each time, same constraints, same efficiency, etc.), with a simple approach. First, this modulation method calculates duty cycles and generates the conversion matrix [M], by using the principle presented in limiting the number of calculations and introducing a virtual matrix converter for better understanding and computing of the matrix modulation.

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Probabilistic Performance Evaluation of a 6.6MWp Solar Photo Voltaic ARHYAMA Power Plant- A Case Study

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ABSTRACT:

With the rapid depletion of fossil fuel reserves, it is feared that the world will soon run out of its energy resources. This is a matter of concern for developing countries whose economy heavily leans on its use of energy. Under the circumstances it is highly desirable that renewable energy resources should be utilized with maximum conversion efficiency to cope with the ever increasing energy demand. Further the global economic and political conditions that tend to make countries more dependent on their own energy resources have caused growing interest in the development and use of renewable energy based technologies. In terms of its environmental advantages, renewable energy sources generate electricity with insignificant contribution of carbon dioxide (CO2) or other greenhouse gases (GHG) to the atmosphere.

This paper presents the Probabilistic Performance Evaluation of a 6.6MWp solar photo voltaic ARHYAMA power plant located near Aler, Naldonda district , Telangana state, India. The plant is laid on 36 acres of land with a total of 542 structures. Each structure is made of 480X250W modules and is connected to an inverter of 11kv. So, there are 542 inverters in total. The inverters used are of string type. The total power generated from 23rd December 2014 to 8th February 2015 is 10,392,400kWh. The overall efficiency of the system is obtained as 15.96%. The Probabilistic Performance Evaluation, peak shaving, and reliability of the Plant are also presented.

Key words: solar photo voltaic, inverters, modules, reliability evaluation

Design and Performance of 1MWp Solar PV Jurala Power Plant ,Mahabubnagar,Telangana State

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ABSTRACT:

Rapid technological progress, combined with falling costs, a better understanding of financial risk and a growing appreciation of wider benefits, means that renewable energy is increasingly seen as the best solution. Today's world needs uninterrupted qualitative electrical power supply with high reliability which plays a prominent role in the evolution of industry, agriculture sector. The electricity sector in India had an installed capacity of 258.701 GW as of end January 2015. Renewable Power plants constituted 28.43% of total installed capacity and Non-Renewable Power Plants constituted the remaining 71.57%. Electrical power that derived from fossil fuels is producing high pollution one side. On the other hand electrical power demand is continuously escalating day to day. Power generation from photo-voltaic cells can solve the above mentioned twin problem.

This paper presents a case study of 1MW solar photo-voltaic plant at Jurala, Mahabubnagar district, Telangana state, India. The methodology for design , performance, cost benefit analysis and peak load sharing during day time is narrated. It also improves power quality. A Realistic cost benefit analysis requires evaluation models that can recognize the erratic nature of solar/ PV system and its inter dependence of random variables inherent in them. For the proposed analysis a period of three years (2012, 2013, 2014) is considered. The annual average energy generated during the three years is 1682433KWh. The eco-friendly nature of Solar photo-voltaic system and its per unit cost benefit analysis are described. This study gives number of re-commendations to improve power output of solar photo-voltaic system.

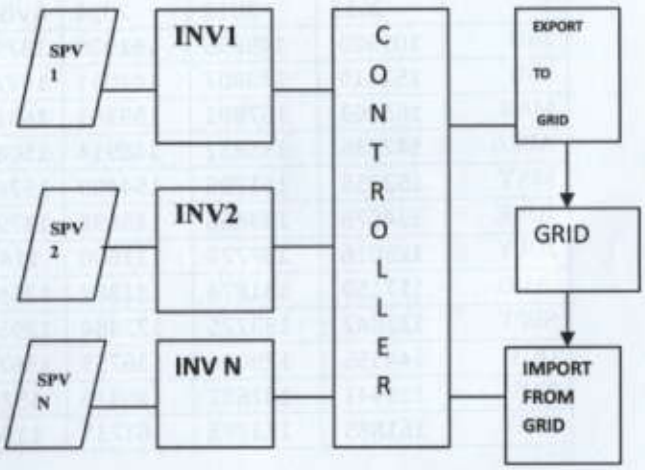
Keywords- *Photo voltaic, Insolation , Cost benefit analysis, Peak load sharing , Inverter.*

I. INTRODUCTION

1MW Solar Photo Voltaic based Power plant installed at Priyadharsini, Jurala Hydro Electric Project by APGENCO was commissioned on 29th, December, 2011. India has very good conditions for the development of solar photovoltaic power systems, due mainly to the high mean daily radiation and the 300 number of sunny days in most parts of the country. For this reason, the administration and companies working in the sector are developing policies and investing in photovoltaic solar power systems. One of the best features of rooftop solar PV systems is that they can be permitted and installed faster than other types of renewable power plants. They are clean, quiet, and visually unobtrusive. Solar PV Plants working is explained [1-5]. Keeping in view the impending shortfalls in conventional power generating sources, pollution and growing demand of energy, it is important to go for non conventional sources. In this research work to study renewable energy system which uses PV modules to convert sun light into electricity. Solar PV system is very reliable and clean source of electricity that can suit a wide range of applications such as residence, industry, agriculture, offices, rural water pumps, live stock.so on

Fig. 1.1 SOLAR PV 1MWp POWER PLANT,JURALA

Fig. 1.2 Block Digram of solar pv system



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Performance Evaluation of 100 KWp solar PV, Diesel Grid Connected Hybrid Energy System (IMAX Theatre)

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ABSTRACT

Since the recognition of the influence of human activity on climate change due to increasing use of fossil fuel energy, significant efforts are being devoted towards the development and implementation of renewable energy technologies that are harmless to the environment. One of the abundant energy sources is the sun, through photovoltaic (PV) panels and through thermal collectors. As per the Feb, 2015 Budget by 2022, the Indian Government announced plans to have 1,75,000 MW of renewable energy generation (100000 MW solar, 50,000 wind and 15,000 MW other technology). Solar energy will get the biggest in capacity 3,500 MW now to 1,00,000 in 7 years. India is generating 2,55,013 MW as on 29-12-2014 as per Ministry of power Government of India Website. In that renewable energy sources are 31,369 MW and solar is 3500 MW is about 1.37%. Indian government's plans to make India energy surplus using lion share of renewable energy by 2019.

This paper presents Performance evaluation of 100KWp solar photovoltaic power generation system on the roof of the IMAX theatre, Hyderabad, Telangana state, India. It is approved project of the Ministry of New and Renewable Energy (MNRE), implemented through Non-Conventional Energy Development Corporation of Andhra Pradesh (NEDCAP). The system was designed, installed and commissioned by YESSV Energy and Infrastructure (P) Ltd in 2011and working successfully working till today. The total power generation in one year nine months is 2, 49, 644kWh. The overall efficiency of the system obtained as 16.27%. The benefits of solar PV such as reduction in transmission losses, peak savings, and reliability of the Hybrid system are presented.

Keywords: *photovoltaic, solar plant, Inverters, peak savings, reliability*

Performance Evaluation of Classification Approaches for Single Label Learning Using R and WEKA

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ABSTRACT

The objective of this paper is to introduce, explain and compare the performance of single-labeled supervised learning algorithms in R language on benchmark single labeled datasets. Data is rich with hidden information that can be used for intelligent decision making. Classification is a form of data analysis that extracts models describing important data classes, the traditional classification algorithms like decision tree, random forest, support vector machine, naïve-bayes are used under inspection. We have considered four measures (sensitivity, specificity, accuracy, F-measure) of performance here, the observations of all dataset accuracies lead to infer that Random Forest outperforms the other classification methods. For more justification of our result we have implemented the same algorithms with same datasets in weka tool also.

Keywords: *Decision Tree, Random Forest, SVM, Naïve Bayes, R, Weka*

1. Introduction

Data classification is a two step process consisting of a learning step and classification step. Learning step is where classification model is constructed. Classification step is where the model is used to predict the class label for given data. Classification predicts categorical labels [4]. Classification algorithms aim at finding regularities in patterns of training data, this is one of the familiar and popular techniques in machine learning. The dataset is initially partitioned in to training set and testing set randomly and classifier is trained on the former. The testing set is used to evaluate the generalized capability of classifier.

1.1 R Language in Data Mining

The R language which is effective in statistical Analysis also provides effective handling of data mining algorithms [1]. It provides simple decision tree via Rattle package, Naïve Bayesian classifier via e1071 package, Random Forest classifier, and Support Vector Machines classifier is also done using Rattle package.

1.2 WEKA

Weka is a collection of machine learning algorithms for data mining tasks [8]. The algorithms can either be applied directly to a dataset or called from your own Java code. Weka contains tools for data pre-processing, classification, regression, clustering, association rules, and visualization. It is also well-suited for developing new machine learning schemes. J48 algorithm is used for decision tree, random forest algorithm is used for random forest, smo algorithm is used for support vector machine and naïve bayes algorithm is used for naïve bayes classifier.

2. Literature Review

There are many classification techniques that are developed for classification problems. Here are few discussions about considered algorithms.

2.1 Decision Tree

A decision tree is a flowchart like structure, where each internal node denotes a test on an attribute [6]. Each branch represents an outcome of the test and each leaf node holds a class label. Given a tuple X for which the associated class labels is unknown; the attributes values of tuple are tested against the decision tree. A path is traced from root to leaf node which holds the class prediction for that tuple. Decision trees can easily be converted to classification

Efficient Classification Techniques for Inforamtion Retrieval and Recognition: ASL

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ABSTRACT

This paper presents a novel method to recognize 32 unique ASL letters and numbers from images of signs, independent of signer and environment of image capture. Input images are mapped to the YCbCr colour space, binarized and resized to 70x70 px. Principal Component Analysis (PCA) is then performed on these binary images using their pixels as features. This method recognized signer-dependent signs with an accuracy of 100% and signer-independent signs with an accuracy of 62.37%, which increases to 78.49% if only dissimilar signs are considered.

Keywords: *SLR Systems; Image Processing; Principal Component Analysis, Support Vector Machine.*

I. Introduction

Sign Language Recognition (SLR) systems are technological contributions that enhance the lives of the hearing impaired. An ideal SLR system can enable its user to communicate with other users, computers and the Internet in their natural environment, while minimizing user constraints and bandwidth usage. They can also serve as tutors, providing immediate and accurate feedback for students of sign language.

Systems that focus on a specific mode of sign language communication called 'fingerspelling', in which words or sentences are spelt out, are particularly useful in this regard. This representation uses only hands, and the letters are signed using signs from the sign language manual alphabet. In many ways, fingerspelling serves as a bridge between the sign language and the oral language that surrounds it and thus, can also be used for representing words of the corresponding oral language that have no sign language equivalent.

One of the earliest works in SLR Systems was by [1], in which they used Hidden Markov Model to recognize 40 American Sign Language (ASL) signs. Accuracy of 99% was achieved when the user wore coloured gloves, and 92% was obtained without coloured gloves. Since then, several other studies have been performed on sign and gesture recognition. A survey of such methods employed in various sign language recognition systems has been performed by Ong and Ranganath [2]. These studies can broadly be classified as follows:

According to type of sign recognized - An SLR system can either aim to recognize static hand postures or the sign language alphabet from single-gesture images [3], letters with local movement using sequential feature vectors and dynamic information [4] [5], or sign language words and sentences, which includes local and path movement of hands, using segmentation and tracking of the hands, which are captured as real-time continuous signed videos [1]. Fingerspelling videos are a subset of such continuous signing videos, in which individual letter signs spell out words and sentences. Gesture frames need to be isolated from such videos before recognition, either by annotation [6], or through automatic segmentation methods [7].

According to capture method - Initial attempts at sign language recognition relied largely on sophisticated hardware to capture user input. These included data or cyber gloves [8], motion sensing input devices such as Kinect [9], etc. A later development was to use coloured gloves, which helped in isolating the high coloured hand area from the rest of the image [10] [11], as well as depth sensors [12]. However, due to the intense computational

Predicting the Usage of Smart Products Using R-language By Building a Classification Model Using Data Mining Techniques

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ABSTRACT

A SMART PRODUCT is one that is able to intermingle with human beings. Smart Products are not only simple products but with a bit of cleverness added to allow the user some flexibility in operation. Smart product adapts to the context of the user and does not force the user to adapt to it. Smart Products have a set of properties that makes them unique are Self Explanatory, Self Organizing, Extensible, Self Sustainable, device capabilities, functionality, integrity, user services, connectivity. The customer's ranking or priority while buying various smart products are changing day by day because of advancements in technology and customer mainly focus on the advanced features of the smart products they are buying. This paper mainly shows how affectively smart products are used by the customers and are ranked based upon their performance by using R language. By using R we can have a deep analysis over the various smart products and the user can be able to know the most widely purchased smart products according to their ranking. We can have deep analysis of Smart products using data mining classification & prediction techniques such as J48, boosted trees, RandomForest machine learning algorithms in R Language. R allows wide number of Smart products data and analyzes with in limited resources.

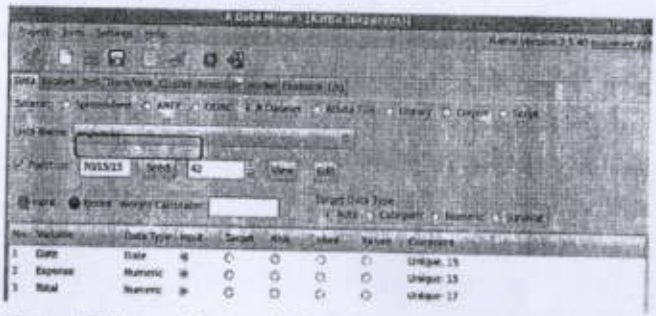
Keywords: *Data Mining, R-Language, J48, boosted trees, Random Forest, Rattle Package, Classification-Techniques, and Decision Tree.*

Introduction

R is a powerful language and environment for statistical computing and graphics. It is a public do- main (a so called \GNU") project which is similar to the commercial S language and environment which was developed at Bell Laboratories (for-merely AT&T, now Lucent Technologies) by John Chambers and colleagues can be considered as a different implementation of S, and is much used in as an educational language and research tool. The main advantages of R are the fact that R is freeware and that there is a lot of help available online. It is quite similar to other programming packages such as Mat Lab (not freeware), but more user-friendly than programming languages such as C++ or FORTRAN. You can use R as it is, but for educational purposes we prefer to use R in combi-nation with the Studio interface (also freeware), which has an organized layout and several extra options.R uses Data mining Techniques and classification techniques.

Rattle package: Rattle GUI is a free and open source software(GNU GPL V2) package providing a graphical user interface (GUI) for data mining using the R statistical programming language. Rattle is used in various situations. Currently 15 diverse government departments in Australia and around the world use rattle in their data mining activities and as a statistical package.

Rattle provides considerable data mining functionality by exposing the power of the R Statistical Software through a graphical user interface. Rattle is also used as a training facility to learn the R software Language. A Log Code tab is present, which replicates the R code for any activity undertaken in the GUI, which can be copied and pasted. Rattle can also be used for statistical analysis, or model generation. Rattle allows the dataset to be partitioned into training, validation and testing. The dataset can be viewed and edited. An option for scoring an external data file is present.



Data Mining: Data mining is a process of extracting knowledge from massive volume of data. It refers to the way of finding significant and useful information from a data base. The knowledge which is extracted can include patterns, association rules and different trends. Data mining is not confined to any particular organization instead it has many techniques used to explore knowledge hidden in any data. Different techniques used for digging the data out are artificial intelligence, statistical and numerical techniques and pattern recognition techniques. Using data mining techniques we examine the large pre-existing data

Abroad Education & Indian Education System-Using Data Mining Classification and Prediction Model Techniques by R Language

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ABSTRACT

Education System in recent years has been a progression, in Indian and Abroad Education system. In choosing a higher education institution by the students. The main key terms of choosing an institute are pursue knowledge, institute accreditation, institute ranking,freshman retention, graduation rates and strength of the faculty resources,location,feel of campus life,placement records, research activities, course duration, course outcome, academic offerings, activities and sports, cost of the availability of financial aid and etc.

This paper proposes to address the student mobility in selecting an institution to pursue higher education in abroad/India based on the above mentioned key terms by having a deep analysis using Data Mining Classification and prediction Model Techniques using R language with Rattle Package

Keywords: *Data Mining, R-Language, Rattle Package, Classification-Techniques, Decision Tree.*

Introduction to R and Rattle Package

a) **R Language:** R is a powerful language and environment for sta- tistical computing and graphics. It is a public do- main (a so called \GNU") project which is similar to the commercial S language and environment which was developed at Bell Laboratories (for-merely AT&T, now Lucent Technologies) by John Chambers and colleagues can be considered as a different implementation of S, and is much used in as an educational language and research tool. The main advantages of R are the fact that R is freeware and that there is a lot of help available online. It is quite similar to other programming packages such as Mat Lab (not freeware), but more user-friendly than programming languages such as C++ or FORTRAN. You can use R as it is, but for educational purposes we prefer to use R in combi-nation with the Studio interface (also freeware), which has an organized layout and several extra options.R uses Data mining Techniques and classification techniques.

b) **Rattle Package**: The aim is to provide a simple and intuitive interface.

That allows a user to quickly load data from a CSV file (or via ODBC), transform and explore the data, Build and evaluate models, and export models as PMML (predictive modeling markup language) or as scores. All of this with knowing little about R. All R commands are logged and commented through the log tab. Thus they are available to the user as a script file or as an aide for the user to learn R or to copy-and-paste directly into R itself. Rattle also exports a number of utility functions and the graphical user interface, invoked as rattle ().

Data Mining with R: This series aims to capture new developments and applications in data mining and knowledge discovery, while summarizing the computational tools and techniques useful in data analysis. This series encourages the integration of mathematical, statistical, and computational methods and techniques through the publication of a broad range of textbooks, reference works, and handbooks. The inclusion of concrete examples and applications is highly encouraged. The scope of the series includes, but is not limited to, titles in the areas of data mining and knowledge discovery. Methods and applications, modeling, algorithms, theory and foundations, data and knowledge Visualization, data mining systems and tools, and privacy and security issues which allows the Classification Techniques.

Data Mining with R we can do many things,

- data exploration/Knowledge exploration
- decision trees/classification
- k-means clustering and hierarchical clustering
- outlier detection

Using Data Mining Techniques to Build a Classification Model for Predicting Usage of Mobile Apps Using R Language

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ABSTRACT

using data mining techniques it is the practice of examining large pre-existing databases in order to generate new information. Suppose to build any classification model for predicting the data we perform some analysis in order to predict or classify new data. It is continuous with many applications to find out the performance analysis for various data sets. Here the main abstract of our paper is to Build Classification Model for Predicting Usage of Mobile Apps Using R Language. R is a open source programming language or a data mining tool used for Statistical Computing of any data sets. By building a Classification Model i.e. J48 and other data mining techniques SVM,PCA used for classification, Prediction and regression analysis over the mobile apps Using R. The customer's usage ranking or priority while downloading various apps and customer focusing advanced features of the downloading app. The R language which results deep analysis in the form of any statistical computing it may be decision tree structure or some of statistical graphs. By comparing this result the user can be able to know the most widely used app according to their ranking. With different apps this particular apps provides higher flexibility, functionality and user friendly than the other apps.

Keywords: *Data mining, R, Data classification, J48, SVM, PCA*

Introduction To R & Rattle Package

R: R is a open source programming language and software environment designed for statistical computing and graphics. The R language is broadly used among statisticians and data miners for rising statistical software and data analysis. Polls and surveys of data miners are shows that R's fame has increased significantly in recent years.

R- is an interpreted language; users naturally access it through a command-line interpreter

R-is an combined suite of software facilities for data manipulation, calculation and graphical display. It include

1. an effective data handling and storage facility,
2. a suite of operators for calculations on arrays, in specific matrices,
3. a large, intelligible, integrated collection of intermediate tools for data analysis,
4. graphical services for data analysis and present either softcopy or hardcopy,
5. a well-developed, simple and operational programming language which includes conditionals, loops, user-defined recursive function and input and output services.

Rattle Package: Rattle GUI is a free and open source software(GNU GPL v2) package given that a graphical user interface (GUI) for data mining using the R statistical programming language. Rattle is used in a diversity of situations. Currently 15 various government departments in Australia and around the world use rattle in their data mining actions and as a statistical package.

Rattle provides considerable data mining functionality by exposing the power of the R Statistical Software through a graphical user interface. Rattle is also used as a training facility to learn the R software Language. There is a Log file Code tab, which replicates the R code for any activity undertaken in the GUI, which can be duplicated and pasted. Rattle can be used for statistical study, or model generation. Rattle allows for the dataset to be partitioned into training, validation and verification. The dataset can be viewed and abbreviated. There is also an option for scoring an external data file.

Features of Rattle Package

- File Inputs = CSV, TXT, Excel, ARFF, ODBC, R Dataset, RData File, Library Packages Datasets, Corpus, and Scripts.
- Statistics = Min, Max, Mean, Missing, Medium, Sum, Variance.
- Statistical tests = Correlation, T-Test, F-Test, and.
- Clustering = KMean, Hierarchical, and BiCluster.
- Modeling = Decision Trees, Support Vector, Principle Component.

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VF-ATM: "Biometric Enabled Bank"

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Abstract— Today's world banking system and transaction is depending on traditional way like going with card type ATM and passbook, checkbook like that. There is number of ambiguity and financial loss is occurred. There is no single machine available which can do all sort of banking operation (deposit, withdraw, passbook print/issue, checkbook print/issue). Now the new era is coming to do banking operation in new way. In this paper, we propose the VF-ATM machine which is added integrated biometric technique in banking system. This device is not only replacement of ATM machine but also it is a combination of all banking operation. It is like mini bank. VF-ATM is truly deserving to devote the work of all banking operation by using integrated biometric of user. It will provide finest, strongest security, card less system in banking domain.

Keywords—Biometric identification, Numeric Voice Identification, Timer OTP, Voice Pin, VF-ATM machine, Encryption, Fiber Optic, Wireless.

1. Introduction

Today's banking system is made online, but is it online? Why this online system is comes? Basically intension behind to do online is keep preserve paper work i.e. paperless banking. Are we using paperless banking? But in current scenario also lots of papers are used. In An automated teller machine (ATM) system also not going to provide all sorts of banking operation. If it is online, then why we are facing the problem of waiting queue? If anyone wants to do cash deposit then he/she wants to go in the bank. If anyone wants to do passbook issue/print, checkbook issue/print then he/she wants to go in the bank. On most modern ATMs, the customer is identified by inserting a plastic ATM card with a magnetic strip or a plastic smart card with a chip that contains a unique card number and some security information such as an expiration date. Authentication is provided by the customer entering a personal identification number (PIN). Using an ATM, customers can access their bank accounts in order to make cash withdrawals, debit card cash advances, and check their account balance [1].

Voice-Fingerprint automated teller machine VF-ATM is a computerized telecommunications device that provides the clients of a financial institution with access to financial transactions in a public space without the need for a cashier, human clerk or bank teller. This device is capable to do transaction without using any plastic card or swap card. It is different than traditional ATM system on variety of concept.

1. Card less system, no need to bring plastic card or swap card.
2. .Passbook issue/print facility available.
3. Checkbook issue/print facility available.
4. Cash depositor.
5. Check depositor
6. Fund Transfer to any other bank.

A VF-ATM is voiced-based and finger print access control system, which is biometric in nature, will enable automatic verification of identity by electronic assessment of one or more behavior and/or physiological characteristics of a person in other to overcome the problems of smartcard access control in ATM. This technology developed a biometric access control system which is a biometric technique that offers an ability to provide positive verification of identity from individual voice, finger print, and other characteristics to access VF-automated teller machine. The VF-ATM operate integrated biometric authentication first speak the voice PIN if voice PIN is matched then enter the finger print and again finger print is matched then user go inside of VF-ATM function like choose the banks, choose the account

status, enter the amount, in that time VF- ATM machine OTP code generate and send user register mobile number after selecting enter the amount again demand enter the OTP code so user enter the OTP code then VF-ATM machine amount can have debited. Out of 15 Input chose any one or more than one for authentication process can complete according to user requirement OTP Code generate or not Generate totally depend on the user.

Market Survey

The fig 1.1 shows survey of ATM and VF-ATM machine, VF- ATM machine is more demand of the

Analyzing Internet DNS (SEC) Traffic with "R" For Resolving Platform Optimization

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Abstract

This paper proposes to use data mining methods implemented via *R* in order to analyze the Domain Name System (DNS) traffic and to develop innovative techniques for balancing the DNS traffic according to Fully Qualified Domain Names (FQDN) rather than according to the Internet Protocol (IP) addresses. With DNS traffic doubling every year and the deployment of its secure extension DNSSEC, DNS resolving platforms require more and more CPU and memory resources. After characterizing the DNS(SEC) traffic thanks to reduction in dimension and clustering methods implemented with *R* functions and packages, we propose techniques to balance the DNS traffic among the DNS platform servers based on the FQDN. Several methods are considered to build the FQDN-based routing table: K-means clustering algorithm, mixed integer linear programming, and a heuristic scheme. These load balancing approaches are run, and evaluated with *R* on real DNS traffic data extracted from an operational network of an Internet Service Provider. They result in reducing the platform CPU resources by 30% with a difference of less than 2% CPU between the servers of a platform.

KEYWORDS

Telecommunications; Internet; DNS; DNSSEC; Feature selection; Dimension reduction; Clustering; Load balancing; K-means.

1. Introduction

Domain Name System (DNS) (Mockapetris, 1987a,b) is the computer protocol that facilitates Internet communication using hostnames by matching an Internet Protocol (IP) address and a Fully Qualified Domain Name (FQDN), e.g., -www.google.com.‖ DNS servers, which host the IP addresses of the queried web sites—that is to say the DNS responses—are called *Authoritative Servers*. Because *Authoritative Servers* would not be able to support all end users' queries, the DNS architecture introduces *Resolving Servers* that cache the responses during Time to Live (TTL) seconds. Internet Service Providers (ISPs) manage such servers for their end users. Thanks to the caching mechanism, *Resolving Servers* do not need to ask *Authoritative Servers* if the response is still in their cache. This provides faster responses to the end user and reduces the traffic load on the DNS *Authoritative Servers*.

For multiple reasons, ISPs consider operating DNSSEC, the security extension of DNS defined in the standards (Arends et al., 2005a,b,c; Sawyer, 2005). With DNSSEC, a DNS response is signed so that its authenticity (generation by a legitimate Authoritative Server) and its integrity (nonmodification of response) can be checked. With DNSSEC, resolutions require multiple signature checks so that responses are around seven times longer than traditional DNS responses. Migault (2010), Migault et al. (2010), and Griffiths (2009) show that DNSSEC resolution platforms require up to five times more servers than DNS resolution platforms. Migault et al. (2010) measures that a DNSSEC resolution involves three signature checks and costs up to 4.25 times more than a regular DNS resolution. With the DNS traffic doubling every year and the deployment of its secure extension DNSSEC, DNS resolving platforms require more and more resources.

The operational problem faced is to reduce the resources needed by a resolving platform. The resolving platform consists of several DNS *resolving servers* behind a load balancer device. The load balancer splits the incoming traffic to distribute queries on resolving servers. The classical way of load balancing is performed by assigning a pool of clients to be served to each server.

One way to reduce the load on a server is to lower the number of resolutions. To reduce the number of resolutions, Migaultand Laurent (2011) and Francfort et al. (2011) evaluate the advantage of splitting the DNS traffic according to the queried FQDN rather than according to the IP addresses. This increases the efficiency provided by caching mechanisms, reduces the number of signatures to be checked, and can result in a 1.32 times more efficient architecture.

To design this new load balancing mechanism, we first need to characterize the DNS traffic and to evaluate how the DNSSEC traffic looks like. We perform data extraction from raw network captures taken from a DNS resolving platform. The main challenge here is to define the variables, which are taken and computed for each FQDN. The goal is to define a routing table mapping each frequently requested FQDN to a server of the resolving platform.

2. Data Extraction from PCAP to CSV File

To conduct this study, we first gather pieces of DNS data. They consist of real outbound and inbound DNS traffic of the platform stored in PCAP files. Then, for each FQDN found in a traffic sample, we compute a series of variables. Given the application considered, these variables are related to the FQDN's resolution cost.

A Novel approach for Service Providers in Cloud using Double Guaranteed Quality of Service (DG-QoS)

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Abstract: Cloud computing has become very popular in providing computing resources and services to customers on demand. From perspective of service providers profit is one of the most essential concern. On the other hand, only one long-term durable renting scheme is used to build a platform for cloud which failed in guarantee the service quality and leads wasting of resources. In this paper, a Double-Quality-Guaranteed resource renting scheme is designed in which first, a short-term renting scheme and long-term renting scheme are integrated to overcome the problem of existing issues. This DQG resource renting scheme can effectively improve the quality of service of all requests and reduce the wastage of resources significantly. Second, a service model is measured as M/M/m+D queuing model and the performance indicators which affect the profit of double renting scheme is analyzed, i.e., average charge, and the ratio of requests that temporary servers require. Third, a profit maximization problem is used in double renting scheme and the optimized configuration is obtained. Finally, a series of computations are performed to measure the profit of our proposed scheme with single renting scheme. The result shows that our proposed method not only guarantee quality of all service requests, but also achieve more profit than earlier methods.

I. PROPOSED METHOD:

A novel approach using Double-Quality-Guaranteed resource renting scheme is proposed and designed in which first, a short-term renting scheme and long-term renting scheme are integrated to overcome the problem of existing issues. This DQG resource renting scheme can efficiently improve the quality of service of all requests and reduce the wastage of resources significantly. Second, a service model is measured as M/M/m+D queuing model and the performance indicators which affect the profit of double renting scheme is analyzed, i.e., average charge, and the ratio of requests that temporary servers require. Third, a profit maximization problem is used in double renting scheme and the optimized configuration is obtained. Finally, a series of computations are performed to measure the profit of our proposed scheme with single renting scheme. The result shows that our proposed method not only guarantee quality of all service requests, but also achieve more profit than earlier .

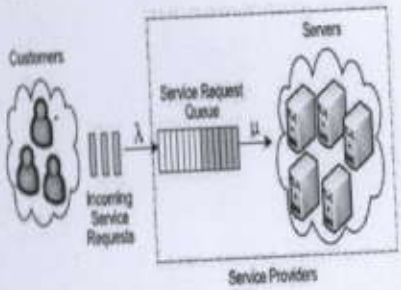

Fig 1. The multiserver system model

Algorithm: Double-Quality-Guaranteed (DQG) Scheme
m *no. of* servers are running on a multi server system and waiting for the actions to perform as mentioned :

1: Q is initialized as empty queue
2: **Event** – a service request is initiated then verify for server availability
3: **if** found then
4: Assign the service request to available server
5: **else**
6: record waiting time of server placed at the end of queue Q
7: **end if**
8: **End Event**
9: **Event** – when a server becomes idle
10: Search if queue Q is empty
11: **if** true **then**
12: Wait for a new request
13: **else**
14: first consider the request from queue Q and assign it to the server which is idle state
15: **end if**
16: **End Event**
17: **Event** – when deadline of a service request is achieved
18: Rent a temporary server to execute and release when the request is done.
19: **End Event**

II. SYSTEM DESIGN

The cloud services delivered by IT that are independent of location which provides dynamically, virtualized resources as a service over the Internet where end- users are not expertise in, or control over the technology infrastructure that supports them.

Modules

1. Queuing model.
2. Business Service Module
3. Cloud customer Module.
4. Infrastructure Service Provider Module.

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A Mechanism for Message Authentication and Integrity for Hybrid Crypto Algorithm

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Abstract - The immense usage of internet throughout the world has made it necessary to provide confidentiality, integrity and authenticity to the data that is exchanged over the network. In order to provide these functionality, experts often use cryptography, as it makes it possible to perform secure communication of data over insecure channel. Over the years many cryptographic algorithms has been developed to encrypt confidential message in-order to provide security. As integrity and authenticity of the message is equally important, the paper presents a security protocol enhancement that exhibits the properties to protect against attack from tampering, replay and a mechanism of verifying and assuring the source of message. The protocol uses hybrid cryptographic approach and utilizes keyed hash to assure message integrity and authenticity, along with use of Diffie-Hellman and RSA to provide protection against replay and protecting message using encryption respectively. The paper also presents the crypto timing details that were observed after implementing the proof of concept hybrid crypto algorithm.

Keywords: Hybrid cryptography, Key exchange, Asymmetric cryptography, RSA, Diffie-Hellman, Keyed hash

I. Introduction

Cryptography is a branch or part of cryptology in which encryption and decryption of original plain text is performed to make sure that the information is protected in a way that only intended recipients can access it [1]. It consist of the protocols, algorithm and strategies that invariably prohibit or lag unauthorized access to sensitive information and enable verification of every component in a communication [1]. Cryptography algorithms are typically based on two categories [2].

- Symmetric encryption (also referred as conventional encryption and single key) was the only type of encryption in use prior to the development of public key encryption in the late 1970s [2].

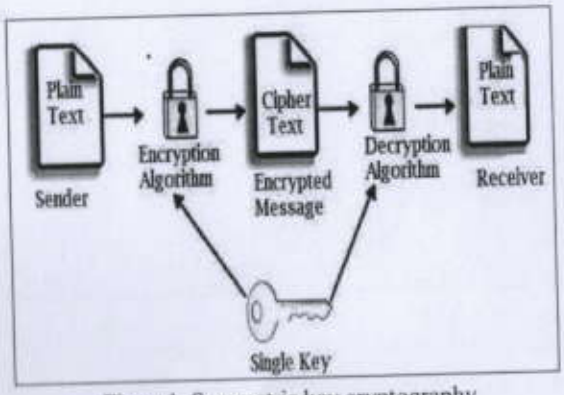

Figure1: Symmetric key cryptography

As shown in Figure 1: in symmetric key cryptography the sender and receiver uses the same key for both encryption and decryption of the original message.

- Asymmetric encryption (also known as public key encryption) uses different keys for encryption and decryption of the plain text [2].

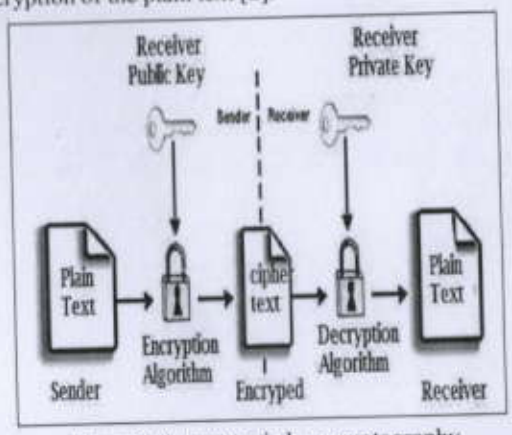

Figure2: Asymmetric key cryptography

In the Figure 2: sender uses a receiver public key to encrypt the plaintext and receiver uses her own private key to decrypt the message. The public key made publicly available whereas private key kept secret. Integrity is one of the five pillars of network security. It refers to a mechanism of ensuring that data is legitimate, correct and secure from unauthorized user alteration.

Clustering Categorical-Time Evolving Data from K-Means to Rough Set Theory Using Map-Reduce Technique

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Abstract— *Clustering is used to classify related data items under similar group but it fails to achieve well for big data due to massive time complexity of allocating unlabeled data point into proper cluster is big task in the categorical data domain, where real time data changes for every instance so for such scenarios in this paper using sampling and parallelization techniques from k-means to rough set theory by extending Hadoop Map Reduce programming we proposed to label the unlabeled data points. An analysis of projected approach to evaluate its efficiency over many other algorithms using standard data sets for testing and shows that the proposed sampling and parallelization technique can process big data efficiently.*

Keywords - Big Data, Data Mining, Hadoop Map Reduce, k- means clustering, rough set Theory.

1. INTRODUCTION

We are in the world where gigantic amounts of data are collected and analyzing this data is a critical task. In other words we can say that we are living in the data age in which peta bytes (1000 Terabytes) of data is generated from all needs of business, society, science and engineering, medicine etc., Businesses around the world wide are generating large collection of data sets such as sales transactions, sales promotions, stock trading records, product details, company profiles and their performance and customer feedback [1]. For example large stores online and offline like Walmart, amazon, flip-kart, e-bay are handling millions of transactions per day at various branches across the globe. Scientific and engineering applications are generating peta bytes of data by remote sensing, scientific experiments and engineering observations.

The communication networks carry hundreds of peta bytes of data traffic every day. Even the medical and health industry generate large amounts of data by medical records. Web Searches like Google, social media like Facebook, producing images and videos, blogs. These are the list of various sources that generate endless data in huge amounts. The organization face difficulties to create manipulate and manage the large datasets [2]. Thus extracting useful and valuable information from the huge data is difficult and led to data mining. Data mining makes a large collection of data into useful information referred as knowledge.

Clustering is a method for finding a collection of similar objects from a given data set. The algorithms that are developed for numerical data for clustering may be easy to use in normal conditions but not when it comes to categorical data [3], [4], [5]. Clustering is a challenging issue in categorical domain, where the distance between data points is undefined [1]. It is not easy to find out the class label of unknown data point in categorical domain.

Sampling and parallelization techniques accelerate the clustering [6], [7] and the data points that are not sampled are to be allocated into proper clusters. The data which depends on time called as time evolving data [8], [9]. For example, the buying preferences of customers may vary with time, depending on the current day of the week, availability of alternatives, discounting rate etc. [10] Since data is modified and thus evolve with time, the underlying clusters may also change based on time by the data drifting concept [11], [12]. The clustering time-evolving data in the numerical domain [13], [14] has been explored in the previous literature though not in the categorical domain. Categorical attributes also exist in real data with drifting concepts, for example web logs that record the browsing history of users, stock market details, buying records of customers often evolve with time. It is a challenging problem in the categorical domain therefore to evolve a procedure for precise categorization. Previous methods on clustering categorical data focused on doing clustering on the entire data set and drifting concepts were not taken into consideration. The objective is to propose a framework for performing clustering on the categorical time-evolving data.

One of data analysis techniques, rough sets based methods have been successfully applied in data mining and knowledge discovery during last decades [15], [16], [17] and particularly useful for rule acquisition [18], [19], [20] and feature selection[21], [22], [23]. To our Knowledge, most of the traditional algorithms based on rough sets are the sequential algorithms and corresponding tools only run on a single computer to deal with small data sets. To expand the applications of rough sets in the field of data mining and knowledge discovery from big data, we discuss about rough set based parallel methods for knowledge acquisition in this paper. Based on Map Reduce, we design corresponding parallel algorithm for knowledge acquisition on the basis of the characteristics of the data. The proposed algorithm is implemented on Hadoop platform [24] As a result, a rough set based method for performing clustering on the categorical time evolving data is proposed in this paper. This method find out if there is a drifting concept or not while processing the incoming data. However, in the categorical domain, the above procedure is challenging since the numerical characteristics of clusters are difficult to define. In this paper, a mechanism called rough membership function-based similarity is developed to allocate each unclustered categorical data point into the corresponding proper cluster.

Distributed Computing is a technology aimed at solving computational problems mainly by sharing the computation over a network of interconnected systems. Each individual system connected on the network is called a node and the collection of many nodes that form a network is called a

A Novel Approach for Solving the Problems Caused By Search History Using CLIR Tools and Basic Network Security Algorithms

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Abstract:-The field of computer science has taken the technology to an extent of high peaks by its vast and various applications and innovations in the terms of security, retrieval, data management, mining, softwares etc. When it is considered at any point of implementation of any computer science applications the security is the first and the foremost criteria that has to be considered. Generally, it is known that the retrieval of information and its strategies has been in its advanced stage. The information retrieval in these days is an easier task that has even become familiar to the illiterates and the unknown language users. This has been made possible by CLIR tools in the process of information retrieval. In this paper, it is discussed that what sort of security can be provided to the user from the unauthorized parties from accessing his search history and from this the searched documents. The basic algorithms of security like Pigpen will provide a solution to the problems that arise with the presence of search history in a search engine in the context of security. In this paper, the scope of preserving the confidential documents from being accessed by the unknown or other users can be avoided by the methodology.

Keywords: - CLIR, Pigpen, Search History, Unauthorized.

1. INTRODUCTION

Information retrieval is considered as an art of finding the documents that are of some uncertain structured text that will satisfy the need of information Moreover it deals with the storage and access to the information. The information Retrieval System uses different retrieval approaches like probabilistic, Boolean, etc[3]. The queries are processed in the natural languages and the required information is provided to the user in the form of the most relevant and ranked documents. The user can access the information to the queries provided by him to the system by various steps and complex algorithms. The general language used by the users to retrieve the information and give the queries is English. The primary goal [1] of Information Retrieval System is to satisfy the needs of the user by reducing the overload of his defined queries. This is done by the most important components of the like crawling, indexing, ranking and relevance feedback system for retrieving the information.

But, when the naïve user who doesn't has any prior or the basic idea of this English language need to retrieve the information, the followed process by the Information Retrieval System is CLIR. This is an acronym of Cross Lingual Information Retrieval. Here, the user query language [2] is different from the language of the documents. The CLIR approach has some basic steps to be performed on both the documents and the query that is defined by the user. But there are some situations where the people come across using of data. These people may be dealing with confidential information and this can be from the source of any search engine The persons after the considering the need of the information, browse some sites or any other documents. If these are highly confidential that are not to be known to the others and forgets to delete the search history due to which there is a breach to visited information of the document on the site. In such situations what are the information retrieval strategies that can be used so as to make a point of good security to the visited documents by making it not visible without deleting the history searched. For this problem, there is a scope of utilizing some basic ciphering algorithms and then building a cross language tool with its implantation.

2. CROSS LINGUAL INFORMATION RETRIEVAL

In search engines like Google, Bing, Yahoo etc. we can easily retrieve the information needed [11].Almost all the information in these search engines is available in the language of English. This is a problem to the persons who are unaware of the usage and understanding of the English language. Many Asian, African countries and Latin American countries have a large population where the people use various languages to communicate and the people in the rural areas are completely without any prior knowledge of English language. If these people want to browse the information, then it makes the task difficult to them since the queries cannot processed in the native language. For this type of problems, Cross Lingual Information Retrieval is the best solution [6]. The CLIR that has been designed accepts the queries in any of the following languages like Hindi, Telugu, Tamil, Bengali, Punjabi, Marathi etc[10]. This will fetch the documents in any of the said languages and processes the output to the user in the desired language that is of the query given one. The modules of CLIR that make it a complete tool are Input processing module, Search module and Output Generation module. The Input Processing module generally processes the given query, Search module is