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Index (2017)

3.4.6 Number of books and chapters in edited volumes published per teacher during the last five years

3.4.6.1: Total number of books and chapters in edited volumes / books published, and papers in national/international conference-proceedings year wise during the last five year

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Text Indpendent Speaker Recognition Using Wavelet Cepstral Coefficient and Butter Worth Filter

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***Abstract-*. In this paper an effective and vigorous method for text independent speaker identification is proposed to extract speech features. The objective of feature extraction is to extract features from speech and captures the unique characteristics of a individual speaker. The proposed method can be used in noisy environment with high degree of accuracy. The proposed method is based on the wavelet transform and the input speech signal is decomposed into various frequency channels. The purpose of Wavelet transform is to find the frequency spectrum while wavelet cepstral coefficient is used to capture the characteristic of the signal. It is more suitable than Fourier transform because it is restricted in both time and frequency whereas fourier transform is only restricted in frequency. The proposed method is capable to reduce the noise as well as also improves recognition effectively. Fuzzy rules are used for decision making. The proposed method is very useful in the field of forensic also. The performance of WCC is about 22% higher than mel- frequency cepstral coefficients.**

Keywords- Speaker Recognition, Wevelet transform, Cepstral Coefficient, Fuzzy Logic, Butter Worth Filter.

I. INTRODUCTION

Speaker recognition is a technique that is able to recognize the person; who is speaking based on individual information. Any speech has basic information about the words and the identity of the speaker like frequency, pitch, entropy etc and each speaker also has unique characteristics [1]. Speaker recognition systems are divided into two categories; text-dependent and text-independent. In text-dependent systems, a user has to speak some defined set of words, containing the same text as the training data while in text-independent system there is no limitation of text i.e. speaker can speak any word, therefore to recognize speaker in text independent mode is more challenging task. It can be used to verify a person and allow accessing various services like security controls, confidential data accessing through remote site, etc. Speech is the fundamental and most effective way of communication in real time systems. The research on speech has started in 18th century [2].

Automatic speaker recognition has a machine that is capable to recognize a person based on voice. Automatic speaker recognition includes two processes: speaker identification and speaker verification. The objective of speaker identification is to identify a person. In Speaker identification first speaker has to be enrolled in the system and then on the basis on feature extraction we determine which enrolled speaker has provided sound among a set of known speakers. Speaker identification is very useful in forensic and can also be used in applications that make our daily lives more convenient [3]. While in speaker verification the objective is to verify a person based on the test pattern. An important parts of a speaker recognition system is feature extraction because it converts the properties of speech signal that is used for pattern matching [1][4].

The speech can be represented in the simplest form with the help of spectrogram. The spectrogram is a grayscale image, whose pixel's intensities represent the energy content of the frequencies with respect to time [5]. Generally, speech recognition systems used Mel-Frequency Cepstral Coefficients (MFCCs) and fourier transform because it is useful for analysis of speech signals whose statistical properties are constant with respect to time or space However, wavelets represent non-stationary signals as sum of basic functions which are restricted in time. This can be derived from a single prototype function called the "mother wavelet". The basis functions or wavelets are formed by translating and dilation the mother wavelets therefore, in this paper we used Wevelet Cepstral Coefficient and result analysis shows that proposed approach is better than others exiting methods.

According to the literature, a text dependent speaker recognition system compares a sequence of features to a model of the user. So, for this purpose there are two methods that have been mainly used i.e. template based methods and statistical methods. Most popular template based model is Dynamic Time Warping (DTW) and Statistical based method Hidden Markov Models (HMMs) [6]. HMM is one of the most popular method because of flexibility; allow using speech units from sub-phoneme units to words. [7][8]. In this paper, a feature extraction algorithm is proposed. It is based on wavelet transform and combining both the wavelet transform and the wavelet cepstral coefficient at feature extraction phase. By the

Density Aware Position Based Routing (DAPBR) Protocol for VANET

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***Abstract*—Vehicular ad hoc networks (VANETs) have become a practical and valuable alternative for wide variety of novel applications in road safety, content sharing, payment at different commercial places, etc. Due to high mobility of vehicles resulting in frequent disconnections, geographic routing protocols are commonly preferred in VANETs as they do not require, route formation prior to forward as well as route maintenance. Most of the position based routing protocols adopt the greedy mode to establish the route and switch to some recovery mechanism like perimeter routing, in case of failure. However, if the probability of occurrence of perimeter mode is higher than the greedy mode, then the throughput as well as the end to end delay will be severely affected. This probability is highly influenced b y many factors where in density being the major among these. In this paper, we propose a routing strategy that uses the restricted greedy forwarding by considering neighborhood vehicles having a sufficiently d ense n eighborhood a nd t he l east v elocity variance with its own neighboring vehicles, as the next forwarder. The objective is to increase the longevity of the route and thus increasing the throughput without greatly affecting the end to end delay. The performance of the proposed approach is compared with GPSR and the simulation results are presented.**

Index Terms*—*Best fit forwarder; VANETs; DTN; Restricted Greedy Forwarder.

I. Introduction

Vehicular Ad hoc NETworks (VANETs) play key role in realizing any intelligent transportation system. These networks also have tremendous potential in applications targeting road safety, acquisition of current traffic a nd w eather information, sharing of multimedia information etc. The communication over VANET can be broadly classified i nto t wo different categories like Vehicle to Vehicle communication (V2V), Vehicle to Road Side Unit (V2RSU). In V2V communications, vehicles transfer information among themselves, without the help of road side unit. However, in the V2RSU communications, the road side units also become a part of, and actively participate in the VANET. In case of V2V communication every vehicle is considered to have been installed with various on board sensing units, which allow large scale sensing, decision making and controlling actions to perform a number of tasks that arises in wireless communication system.

Most of the research studies consider that, due to the high mobility factor associated with V2V communications, the packets are either get dropped due to connectivity issues, or the end to end delay is increased. Subsequently, lot of work in literature adopts greedy forwarding strategy [1] for their routing. Further, in case where end to end path may not be viable based on this strategy, these works defer the strategy and establish route based on the perimeter routing [2], instead. However, the shifting back to the greedy strategy will largely depend on time and mobility to make the neighborhood of the current forwarder conducive enough for such a shift. Failing which the current forwarder node is supposed to carry packets until a next forwarder is available which is nearer to the destination. The delay caused by this temporary hold in the forwarding of the packets may negatively affect the end to end delay. This paper targets to make the position based routing protocol adaptive to such variations in density and velocity in the network. The paper is organized as follows; section II describes the related work and motivation behind the work. Section III presents the notation and mathematical framework based on the density notion and also proposes the probabilistic evaluation of route life time. Section IV presents the proposed density aware routing protocol. In section V, we present the experimental evaluation of the proposed work. Finally section VI concludes the paper.

II. Related Work

VANET is the sub class of Mobile ad hoc network. A number of efficient routing algorithms have been proposed to send the packets from source to destination in MANET, like AODV [3], DSR [4], TORA [5] etc. These routing algorithms do not perform well in VANETs as compared to MANETs due to high mobility of the vehicles. Therefore, routing protocols for VANET need to be dealt separately, and are to be designed with mobility being the core objective.

The position-based routing protocol GPSR [1] depends on the location service. In this approach, the sender requires the position information of itself and the destination to initiate the message transfer. It uses two strategies to forward the packet from source to destination based on position information, one is greedy forwarding and the other one is perimeter routing. In greedy forwarding, the sender selects a neighbor as the forwarding vehicle if it has the shortest Euclidian distance to

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A Novel Approach for Salient Region Detection

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***Abstract*— Selective attention is a part of cognition process. An object in an image gets attention only if human eye attracts towards it. The brain relies on attention to detect salient part of an Image and filter out background details. The salient object detection problem is formulated as segmentation of Image to separate salient object from background. The proposed method is based on the feature used to measure human perception. The proposed method works in two steps, firstly the probable salient region is extracted based on human perception, then the color distribution is used to extract salient object. The efficiency and accuracy of proposed work measured on a standard database (MSRA).**

***Keywords*— peak signal to noise ratio; saliency map**

I. INTRODUCTION

The development of neuroscience and human psychology has given birth to visual saliency [1]. The human attention is attracted to visually salient object in a scene. The detection of a prey, predators, mates, or bloom in a cluttered world is important for growth of complex biological systems. The identification of visually vital object is useful in object based image retrieval, image compression based on object of interest and smart image resizing [2]. The visual saliency can be defined as class of being vital or striking. The visual saliency detection is a psychological process As an example, two persons may have different perception for same scene. The humans involve their perception while focusing on vital region, as well as salience is concomitant with an interaction of a stimulus with other stimuli. The detection of salient region of a scene deals with locating those vital locations which attracts human eye. The human visual system is more aligned to contrast and movement [3]. Thus, the salient regions are more perceptible in juxtaposition of two or more regions in an image. The visual saliency assessment is an area of research. The current research measures the saliency on the basis of color intensity, direction, depth information and motion cues. The Fig.1 reveals the salient region of the corresponding original image.

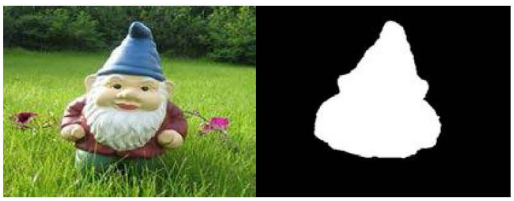

Fig. 1. Original Image and its corresponding salient region.

Classical methods used contrast, either local or global contrast to measure saliency [1, 4]. The repercussion of local methods is high contrast, edges and more noise, they diminishes flat regions in objects also, which results into detection of small objects [4]. The global methods highlight the boundaries of objects and suppress whole object area [4]. Other approaches are segmentation based [5]. These approaches solve the problem of object attenuation effectively. They are still unable to highlight the entire object when the inner region of object is not homogenous. Few techniques are based on supervised object detection. These methods result into high performance but the limitation of these techniques is prior training of detectors [6]. The key concept of contrast based method is to measure difference between color contrasts using various parameters. The various statistical parameters are used to calculate difference among color contrast of pixels. The mean, standard deviation, Gaussian filters, poison distribution are used generally [1].

The proposed method is based on contrast and segmentation. In [7], the local contrast of an image region with respect to its neighborhood is used to measure saliency. In [7], the difference between the feature vector of the pixels of a sub part of an image and the feature vector of its neighborhood is evaluated to measure saliency of the sub part of an image. The selection of feature vector is an issue of this method. In [8], the window of fixed size is used. The contrast between a few features of inner window with the collar of window is compared to extract salient region. The computation of these methods is very high. In [9], the problem of salient region detection is defined as binary leveling problem. The multi scale feature is used to measure saliency in this method. There are several important issues of [9]. It depends on non linear combination of multiple features. They used rectangular shape to detect salient region [9].

In this paper, we have used contrast, segmentation and statistical analysis to measure visual saliency. The proposed method prepares a probable foreground model with help of peak signal to noise ratio. The probable foreground model is further segmented using statistics to find salient region. The proposed method is validated and verified on MSRA [9] database. The results of proposed method are compared with the results of state of art methods.

The paper is planned in following order. The proposed method is explained with algorithm in section II. In section III, the performance of proposed method is validated using MSRA dataset. Section IV concludes the proposed method.

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A Robust Approach for Automatic Skin Cancer Disease Classification

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***Abstract*— Skin cancers particularly malignant melanoma is lethal and difficult to identify in last stages. The variation of stages (Squamous Cell Carcinoma, Actinic Keratosis Cell, Basal cell and Malignant Melanoma) of Skin Cancer is highly ambiguous and difficult to recognize. To clearly recognize the stage of Skin Cancer is primarily important for effective treatment, which cause in increasing the survival rate from Skin cancer. In this work, we propose a methodology to reduce the probability of false diagnosis. In the proposed methodology, the data set is first preprocessed using K-mean Clustering algorithm. This preprocessing helps to increase the rate of reorganization by removing all irrelevant texture. The preprocessed data is then used to extract the features. The classification results illustrate that the proposed method can considerably improve in classification of Skin cancer disease. The computed accuracy of classification for this algorithm is achieved up to 94.4%.**

Keywords*— K- Mean Clustering, Local Binary Pattern (LBP), Color Coherence Vector (CCV), Multi-Class Support Vector Machine (MCSVM).

I. INTRODUCTION

One of the most prevalent forms of cancer is Skin Cancer. It is found in nearly 50 percent of the total ratio of cancer patients [1]. Skin Cancer is usually found and categorized in various types such as Melanoma, Basal, Squamous, Benign, etc. From all the cancers found and detected until now, the type melanoma is one of the scariest type of cancer, as this cancer report's about 7300 deaths per year in US [2][3].

The malevolent melanoma is unfavorable kind of cancer and if detected in its advanced stage than rate of survival will increase near about 10 percent [4],[5]. The major question which arises is the discrimination between the metaphysic and nevi stage even by the expert dermatologist. Dermoscopy is an infiltrated skin diagnosing scheme such as the ABCD[5] rule which typically deals with the keen study done under the guidance of some expert dermatologist which analyze the irregularity, border, indiscretion in color variations and thickness and size of lesions under it and the 7-point check list, still the diagnosis is not fully reliable and can often be related with poor and insignificant reproducibility and accuracy rate, even the dermatologist expert in this field results 74-84 percent of their estimated rate of detection with outcome of approximately 86.9 percent. The statistical features of pigmented part (region) which was earlier detected using Surface Cross Polarization (XLM).

The structural and colors variation of lesions is the main peculiarity of skin cancer classification, which implies that diagnostic method based on number of features. Various quantitative studies for features extracted from images of Skin Cancer Spot [6], [7], [8], [9]. Various type of classifiers like ANN [10] and SVM have been used for classification into two-class classification problem. Xiaojing Yuan et.al [11] used "Binary SVM" and texture data on Skin Cancer spot physiology and with classification accuracy (86.9%) overall with the support capability of the DSS. Alc´on et al. proposed algorithm to find [12] healthy skin pixels with grayscale histogram and Gaussian-like distribution. Alc´on et al. method, improve the performance with morphological operation at post-processing stage. P. Cavalcanti et.al. used Nonnegative Matrix Factorization for segment pigmented skin lesions.

In this paper, proposed method is used to classify the stages of Melanoma diseases, which provide the hierarchy of paternal change in stages upto reached the final stage.

II. PROPOSED METHOD

The proposed method is clearly demonstrated through Figure 1. The proposed method consists of two phases. In the first phase skin cancer spot is extracted using K-Mean Clustering. In the second phase classification is performed using MSVM(multi-class support vector machine).

K-Means Foreground Extraction: This method is used to generate joined set of data in the form of clusters. The objective of clustering is to minimized the group variance. This minimization will help in segmentation process. The clustering of input images follow through following steps:

1. Select two different clusters *S1*and *S2* with specified centroids *C1* and *C2* respectively of each clustered randomly.
2. Map every image pixel p_k to its nearest class centroid *Ci* by calculating the histogram $H(Ci,P_k)$ with the distance value between each image pixel and class centroid *Ci*.
3. Iteratively calculate the new positions of centroid *Ci* by calculating the mean histogram $H(Ci,P_k)$ of the same group.
4. Repeat steps 2 and 3 till *Ci* will change.

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A NOVEL METHOD TO FIND OUT THE SIMILARITY BETWEEN SOURCE CODES

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Abstract— **Plagiarism is not only found in the academic work but also in the industries dealing with software designing. Plagiarism is becoming a serious problem for academician community. Academics can detect similarity of source code files with the help of plagiarism detection tools. In this paper we present JSIM (Java Similarity) tool to find out the Similarity between Source codes. Two source codes will be matched at function's level or method's level with the help of JSIM. With the help of JSIM tool teachers can find the similarity between source code and according to the similarity, teacher can easily give marks to the students in an assignment of programming subject.**

Keywords— Plagiarism: Source code plagiarism; plagiarism detection tool; Similarity detection

I. INTRODUCTION

Plagiarism detection is the process of recognizing and placing the plagiarism in a text or a document [1]. Plagiarism can be express as one of the electronic error which are similar to computer spamming, hacking, computer viruses, phishing, copyrights violation and others crimes [2]. Alan & James defined a copied code as a code which has been created from by another one with a tiny number of regular changes |26|. Regular changes are usually text exchanges which do not need a depth understanding for the semantic of code [26]. There are very high chances of 'Source Code' plagiarism in the Computer Science Field. At the time of preparing their assignments of programming language, the students generally copy the existing assignments on the same topic with some changes in variable's name or function's name and variable's value. So examining the authenticity of the assignments of 'Source Code' becomes a mammoth task for the instructors. Information and communication technology have tremendous potential for social impact, human development and improving the lives of people they serve Through ICT peoples are able to communicate in better way and can access relevant information. It also helps in developing collaborative and research skills [25].

Plagiarism discovery is the main problem to research centers, conferences and journals; they are using superior plagiarism detection tools to make sure that all given documents are plagiarism free, and to save the copyrights from contravention for the publishers. This research work presents the JSIM tool to identify similarity among source codes. We guess the similarity between two source codes written in java language at the level of functions or methods.

The remaining paper is prepared as follows. Section II simplifies the preceding work about Source Code Similarity Detection. Section III explained the Measurement of Source Code Similarity described in this paper. Section IV gives some contrastive experiments and discussion about the new technique. Finally in Section V we will present the conclusions and future work.

II. RELATED WORK

In this section we will explain a variety of research papers which are on the topic of source code plagiarism detection. Source code plagiarism detection method can be divided into different categories i.e. Natural Language Processing (NLP), Machine Learning Technique, Running-Karp-Rabin Greedy-String-Tiling algorithm, Character N-Grams, Data Mining, Latent Semantic Analysis (LSA) and Greedy String-Tiling etc.

Work done on Machine learning based technique includes [14].In this paper [14] authors have presented a latest plagiarism finding method and this method is based on machine learning techniques. In this paper |14| author have trained his system with the help of three algorithms that are Naive Bayes Classifier, K-Nearest Neighbor (KNN) and AdaBoost Meta-learning Algorithm. The system was designed and it is based on learning approach so it used the steps that are generating a set of tokens from the Source Code Files, Training Dataset, Implementing the System and Training the System.

Java programming language has been used for developing the entire system. The benefit of this paper is that this model is capable to get 86.64 percent correctness by using the same dataset as used by Lange and Mancoridis. According to the research paper published by Lange and Mancoridis their correctness was 55 percent. The weakness of this paper is that if programmers follow a few coding principles and source code formatting tools specified in their project then this model will not work properly.

Work done on NLP based technique include [15].In this paper [15] authors have developed a tool named as DeSoCoRe and we can discover source code re-use with the help of DeSoCoRe. The tool is working at the various level of functions. The outputs generated by this tool are easy to recognize to the reviewer.

The Framework of the DeSoCoRe consists of the modules that are Source code Splitter, Similarity Estimator and Pair Selector. Source code can be divided into functions with the help of Source code Splitter. After that divided functions will be compared with the help of similarity estimator. The similarity estimator firstly does the preprocessing of the function for removing of tabs, extra spaces and line breaks

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Robust Image Hashing based on Statistical Features for Copy Detection

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Abstract—**Image hashing is one of the emergent novel approaches used extensively in the field of image forensics apart from finding its place in many of the latest techniques of the area of image indexing, image retrieval etc. Image hashing is basically used to identify the duplicate copies of the original images. Most of the image hashing algorithms has their limitations in getting the desirable performance against a particular image processing attack i.e. rotation. In this paper, we have proposed image hashing technique dominantly based on statistical features of the image which is robust to almost all kind of image processing attacks including rotation. In our proposed algorithm input image is normalized by using resizing, Gaussian filtering, color space conversion from RGB image to YCbCr and only Y component is taken for hash generation. Radon transform is then applied to the preprocessed image to produce 2-D Radon coefficients. 1-D DCT is then applied to the Radon coefficients to produce column-wise DCT coefficients. Lastly first AC coefficient from each column are taken to form the row-wise vector which is used to extract four statistical features, Mean, Standard Deviation, Kurtosis & Skewness. The extracted features form the final feature vector which is used for image identification. Many experiments have conducted to compare the proposed technique with the state-of-the-art techniques and the results shows that proposed hashing is robust to normal digital operations apart from giving excellent result against rotation.**

Keywords—Image forensics, Statistical Features, Image hashing, Content based copy detection.

1. INTRODUCTION

The sophistication of unauthorized duplication and forgery techniques for multimedia content has always been a step ahead of copy detection and image forensic techniques [1][2]. Powerful image processing software is readily available which can be used to perform easy manipulations to images [3] and therefore it is very common to find a number of unauthorized copies of an original image. Protecting the copyright of an image is a matter of great concern [4] and thus finding the illegal copies have become an important issue for digital rights management [5]. To ensure that an image is original and not a modified version, image authentication techniques are required [6]. This leads to the broader concept of Image Forensics [7], which involves a combination of techniques used not only to verify the authenticity of an image but also to verify ownership and detect unauthorized copies.

Digital watermarking was one of the earliest image forensics techniques used, in which a signature is generated and appended within an image for identification [8]. Content based copy detection (CBCD) which is an alternative to digital watermarking does not depend on any signatures. Here the multimedia content itself is used to verify its originality [9] [10]. Recently, a significant amount of research has been undertaken to explore an extended version of CBCD termed as image hashing [11]. In image hashing, unique features which are extracted from images are represented in a way that they can be used for image identification [12]. This unique code used to identify the image is called an image hash. Ideally image hashes should be capable of discriminating between perceptually similar and different images i.e. the mechanism should exhibit robustness and discrimination properties. In addition, the method should be robust to image processing attacks besides fulfilling the properties related to specific applications.

The rest of the paper is arranged is as follows: Section 2 gives an overview of the literature pertaining to image hashing. Section 3 discusses the proposed image hashing technique. Section 4 presents the experimental results obtained for the proposed technique and Section 5 summarizes the results obtained.

2. REVIEW OF LITERATURE

Researchers have implemented many algorithms related to various aspects of image hashing. Some of the most notable algorithms categorized on the basis of transformation/functionalities used are as follows:

DCT based: Tang et. al. [11] proposed a hashing-based image copy detection method based on dominant DCT coefficients which have been proven to perform well in classification and in detecting image copies. Longjiang et. al.[13] proposed a robust approach based on the sign bit of the DCT. Roover et. al.[14] proposed a hashing technique based on DCT coefficients which is calculated on the basis of radial projections of the image pixel luminance values. Their results demonstrated that these vectors are specific to a particular

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Prioritizing and Optimizing Risk Factors in Agile Software development

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***Abstract*— To ensure success and quality of a software, early identification and prioritization of the risk is necessary. Risk impacts the cost and duration for of a software. As agile practices of software development prevail over traditional software development, so they are used in present scenario. This paper proposes an Agile based Risk Rank (AR-Rank) method for the prioritization of risk factors in agile software development. To reduce the impact of risks, the proposed method provides precedence ranking of risk factors from high to low. Therefore, the goal of proposed method is to provide minimum risk-free software on time with varying degree of flexibility. For optimization of risk factors, the Particle Swarm Optimization (PSO) is applied as an iterative approach. The proposal is compared proposed with various prevalent approaches as proposed in past.**

***Keywords*— Agile Software Development (ASD), Analytic Hierarchy Process (AHP), Leavitt's' model, Risk Factors**

I. INTRODUCTION

Agile methodology acknowledged to unpredictability [1] using iterative work process which is known as sprints. Nowadays Agile is the practice used by project developers to fulfill the primary goals of customer's satisfaction. Agile is both effective and maneuverable process which is light weight documentation [2] & sufficient. Many organizations adopt agile practice for software development process to deliver the project on time & faster than other approaches. [3]

For this purpose first is to identify & select risk factors and prioritize those risk factors to reduce the impact of risk. Ultimately the best set of selected risk factors is provided to enhance the proposed approach by others. Prioritization is a very important task as it reduces & optimizes the risk involved in real world problems & projects. So it is necessary to prioritize risk factors that are selected by the developers for the individual project.

The Objective of this paper is to propose a new approach for prioritizing risk factors through Particle Swarm Optimization (PSO) technique. PSO [4] Approach firstly introduced by Kennedy and Eberhart in 1995, who introduce particles swarms. PSO technique is used to resolve risk factor selection problem. Motivation to use particle swarm optimization is that it is easy to use & implement and independence of gradient information [5]. To give approximated rank of each factor, PSO is combined with AR-Rank method.

Ultimate goal of this paper is to prioritize risk factors in ASD [6]. Risk factors are identified & selected by expertise and then risk management techniques are applied to reduce the impact of risk. To enhance the quality of projects, a prioritization technique is used. First, we discuss the agile software development to reduce risk related to software development. Second we discuss different agile risk methodologies used by different researchers to resolve the problem of risk factors assigned to software projects. Third we introduce the 45 identified risk factors in ASD [6], derived from agile practices and principles. Then a selection of risk factors is done as a subset of identified risk factors for the current project. Fourth we propose an AR Rank method to prioritize risk factors in ASD. & then apply PSO technique to calculate the final approximated Rank associated with each risk factor.

II. RELATED WORK

A. Agile Software Development Methodologies

Agile software risk management is different from traditional and plan-driven methods so that risk factors are derived for ASD. Several agile practices are used in place of traditional methods to resolve customer dissatisfaction.
Different agile methodologies are derived as SCRUM, XP, and DSDM. [7]

1) *Scrum methodology:* Jean-Claude [8] uses Risk board to manage risk with identification, assessment and management of Risk in the first sprint. In [9], Ville Ylimannela proposed a model to manage risks in agile software development in which risk boards and notes are used to create risk matrix in the form of red and yellow sticky notes.

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A State of Art on Source Code Plagiarism Detection

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***Abstract*— Plagiarism is becoming a serious problem for intellectual community. The detection of plagiarism at various levels is a major issue. The complexity of the problem increases when we are finding the plagiarism in the source codes that may be in the same language or they have been transformed into other languages. This type of plagiarism is found not only in the academic works but also in the industries dealing with software designing. The major issue with the source code plagiarism is that different programming languages may have different syntax. In this paper the authors will explain various techniques and algorithms to discover the plagiarism in source code. So organization or academic institution can simply discover plagiarism in source code using these techniques. The authors will differentiate among these given techniques of plagiarism to discover how one technique is conflicting with the other.**

Keywords*— *Plagiarism; Source code plagiarism; Textual plagiarism;

I. INTRODUCTION

Plagiarism is derived from the Latin word "plagiarius" which means hijacker [21]. Plagiarism detection is the process of identifying and locating the plagiarism in a text or a document [1]. The approach for detecting the plagiarism depends on the type of plagiarism. The term "plagiarize" is classified as obtaining documents, code, image, ideas etc from different sources and passing them off as one's own with no citation [22]. Copying is a moderately prevailing problem in coding courses. A few researchers have been unavailable in the research of CPD (code plagiarism detection) since 1970s. Alan & James defined a copied code as a code which has been created from another code with a tiny number of regular changes. Regular changes are usually text exchange which do not need a depth understanding for the semantic of code [25].

Plagiarism in a work consists of language (communication), opinions, outcomes, written matters, graphic design, computer related programs, drawings, charts, graphics, artistic work, knowledge, teachings on paper work, electronic work or any other modern and fresh work produced and presented by anyone else. Plagiarism can be expressed as one of the electronic errors which are similar to computer spamming, hacking, computer viruses, phishing, copyrights violation and others crimes [2]. Plagiarism can be expressed as if one is copying the whole or partial works of others without citing them. In plagiarism, one can copy the original data from magazines, research books etc and paste it directly in their code with little or no modification.

When the students and researchers submit their projects or jobs then it is highly expected that most of them will copy their project or job from other sources because nearly all of the data is available on internet nowadays . It is easy for them to get data about any topic name using a search engine which they can use in their own work without citing the owner of the original document. This makes it utmost necessary to detect or avoid the plagiarism for education field. Plagiarism is a challenging task in some education field so to remove the plagiarism it is required from all fields of education that they use the tool that can find out plagiarism.

The rest of the paper is organized as follows. In Section II, Plagiarism detection methods are described. In Section III , we will. In Section IV we will discuss various application of plagiarism detection. In Section V, we will discuss the various approaches available. In Section VI , we will discuss comparative analysis of various research articles. In section VII we discuss about Issues & Challenges. In Section VIII we will conclude the paper.

II. PLAGIARISM DETECTION METHODS

The Plagiarism detection methods can be of two types that is Textual plagiarism and Source code plagiarism as described in the Fig 1.

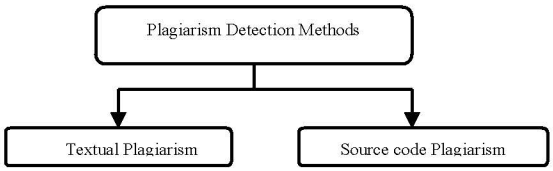

Fig. 1. Types of plagiarism Detection Methods

A. *Textual Plagiarism*

It is the Plagiarism in the text. This type of plagiarism is mainly done by the students while writing their assignments and by researchers while writing their research articles.

To detect this type of plagiarism, researchers have developed a set of tools that are able to detect the plagiarism

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Classification of Non-Functional Requirements from SRS documents using Thematic roles

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***Abstract*—The proposal presented in this paper is a combination of two approaches, i.e classification of Non-Functional Requirements for improving the quality of the software product and reducing the efforts of the analysts in identifying requirement sentences manually from the Software Requirements (SRS) Specification documents, with the help of rule-based technique using linguistic relations. Classification results on PROMISE corpus obtain Precision of 97% and Recall of 96%.**

***Keywords*—Software Requirement Specification (SRS), Non-Functional Requirements (NFRs), Thematic Roles, General Architecture for Text Engineering (GATE)**

I. Introduction

NFR defines the quality attributes of the system features [1]. Developers give more importance to the functional side of the software, underrating the non-functional quality attributes such as development cost and time which leads to project failure. Therefore, "classification of NFRs" from the SRS documents is becoming an area of concern in Requirement Engineering, hence is our goal along with prioritizing the requirements within the documents.

Remaining paper is structured as, Section II consists of related work, Section III explains the design and implementation of our rule-based approach and some background work associated to it, Section IV presents results and finally, Section V consists of some conclusions along with the future scope.

II. Related work

A number of attempts have been made to automate the process of identifying and classifying requirements from SRS documents using PROMISE corpus. Huang et al. [2] chooses stemmed words as a keyword with a high probability of occurrence in NFR sentences. If the frequency of chosen keyword crosses individual threshold then the system classifies it as NFR. Hussain et al. [3] used linguistic features to classify a requirement sentence into two classes FR and NFR using a decision tree classifier. Casamayor et al. [4] used TF-IDF technique with semi-supervised learning. Rashwan et al. [5], [6] detected NFR as Testable using thematic roles, this work is near to our proposal where thematic roles are used for categorization of NFRs.

III. Background work and Implementation

A. Requirements specifications

SRS documents are penned in natural language including both: NFR and FR sentences. The objective of this work is to back developers or designers to extract requirements from SRS automatically with machine processing by annotating them with different thematic roles based on ISO 9126 quality factors [7].

In this proposal, classification of NFRs is based on analyzing requirement thematic roles using General Architecture for Text Learning (GATE) [8] where each sentence is annotated by thematic roles using Java Annotation Patterns Engine (JAPE). The definitions of NFRs which have been used in the proposal are based on ISO 9126 standard [7] and ISO 25010 standard [9]. Quality factors which are used in this proposal as NFR are Functionality (Accuracy, Suitability, Security), Usability(Operability, Understandability, Attractiveness) and Efficiency(Time Behavior, Resource Utilization). The answer to the question why we have used these sub-classes only is that only those NFR sub-classes which are of higher priority according to ISO 9126 are considered.

B. Thematic roles

Thematic roles [10] are used to describe the thematic relations in the sentences written in natural language. Requirement sentences with annotated thematic roles can be used for analyzing the correct requirement type based on some fit-criteria. Fit-criterion for the NFRs is formulated by using IEEE definitions of different NFRs and mapping it with thematic roles. Then, annotating these sentences accordingly for those thematic roles. There are some basic thematic roles which are considered in this proposal are Agent, Theme, Goal, Instrument, Measurement, Action etc.

C. Implementation

The proposed design is shown in Fig. 1 which describes the three-phase implementation process, which starts from giving SRS or a corpus of multiple documents as an input to the first phase of the design for document pre-processing, then in next phase thematic roles annotation is done and lastly classifying annotated sentences into various NFR classes.

The first phase of the classification process, as shown in Fig. 1, contains typical text mining operations using ANNIE (a Nearly-New Information Extraction System) components [11]. Firstly, tokenization process in documents is carried out using ANNIE English Tokenizer PR which creates tokens among the text, then splitting of sentences using ANNIE Sentence Splitter is done and later, stemming takes place using Snowball

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A Hybrid Method for Image Categorization Using Shape Descriptors and Histogram of Oriented Gradients

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Abstract Image categorization is the process of classifying all pixels of an image into one of several classes. In this paper, we have proposed a novel vision-based method for image categorization is invariant to affine transformation and robust to cluttered background. The proposed methodology consists of three phases: segmentation, feature extraction, and classification. In segmentation, an object of interest is segmented from the image. Features representing the image are extracted in feature extraction phase. Finally, an image is classified using multi-class support vector machine. The main advantage of this method is that it is simple and computationally efficient. We have tested the performance of proposed system on Caltech 101 object category and reported 76.14 % recognition accuracy.

Keywords Segmentation · K-means clustering · Histogram of oriented gradients · Shape descriptors · Codebook

1 Introduction and Related Work

In computer vision, the problem of image categorization is very easy task for human being but it is very difficult to recognize and categorize an image for the machine. This problem becomes complex due to the several factors such as complex and cluttered backgrounds, position of an object, rotations, shape variations, illumination effects, and occlusion in an image. The segmentation of an image is problematic when image consists of several objects very close to each other or

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VDBSCAN Clustering with Map-Reduce Technique

Ashish Sharma and Dhara Upadhyay

Abstract Clustering techniques are used for the partition of the data points in clusters. In DBSCAN clustering algorithm, it deals with dense data points, but DBSCAN algorithm does not deal with varied density data. So, for variable density, VDBSCAN algorithm is suitable, since the existing VDBSCAN algorithm is unable to find the exact radius. The existing algorithm VDBSCAN is based on distance. Due to more distance and large data sets, some data points cannot become the part of any cluster. To overcome this problem, the map-reduce technique is used. Using map reduce, the values of k can be identified correctly. It provides a proper value of k on the basis of frequency. This new approach is relatively more effective than VDBSCAN.

Keywords DBSCAN · VDBSCAN · Map-reduce

1 Introduction

Today every business acquires a huge amount of volumes of data from different sources. The data is used for getting the right information and analysis. This analysis supports for effective decision-making. The main requirement of data analytics is scalability, simply due to the large volume of data that need to be extracted, processed, and analyzed in a time-bound manner. To do the right analysis on this data for the scalability, fault-tolerance, ease of programming, and flexibility point of view, the Map Reduce technique is more suitable because it can process massive amounts of unstructured data in parallel across a distributed environment [1]

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Motion Direction Code—A Novel Feature for Hand Gesture Recognition

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Abstract

Hand movements make the most critical aspect of identifying a hand gesture. We present a novel feature for analyzing the trajectory of the hand while performing the gesture. The proposed feature, called the motion direction code (MDC), returns a unique code which represents, in sequence, the direction of the hand motion while performing a hand gesture. Since the directions of hand motion are retained even if the gesture is performed by different users, it ensures user independence. This feature combined with other hand shape features provides efficient results for a user-independent system for hand gesture recognition in Indian sign language.

Keywords

Hand gesture recognition Indian sign language Hand motion trajectory

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Searching Made Easy:A Multithreading based desktop search engine

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ABSTRACT- This paper proposes the faster version of the searching tool used in desktops. The searching tool normally used is based on sequential search i.e. the drives are searched in a sequential manner one after the other which is time consuming. In this paper we have proposed a version based on the multithreading approach, the number of threads equal to the number of drives in the desktop are created. Since multiple threads can be executed simultaneously so all the drives are searched simultaneously rather than sequentially. The searching results are displayed to the user. The proposed version is checked multiple times on different desktops and results are obtained in the less time than the normal searching tool. The version is totally implemented in java, efficient and fast searching tool.

Keywords— Multi-threading, Searching, threads, Intranet Search

INTRODUCTION

With the advancement in technology, processors are becom- ing faster and faster, on the other hand, hardware products are becoming cheaper and cheaper. So, all the users have large storage space in their computers. With the increase in the storage space the number of files store in the computer is also increasing. If the user wants to search a particular file then it is a time taking task as all the drives need to be searched to find the desired file. Secondly the searching tool used in the desktops are based on sequential approach. The drives are searched in a sequential manner i.e. first one drive is searched then the other and so on. As a result the time taken to search the file is more. This time can be reduced if the task of searching the drives is performed simultaneously rather than the sequentially i.e. if all the drives are searched simultaneously then the searching time will definitely reduce. So, there is a need of a searching tool which can match the fast processing speed of the processors in today's world and reduce the searching time.

Here comes Searching Made Easy into picture. It is the searching tool which is faster than the searching tool used in the desktops. It is based on multi-threading approach. It searches all the drives simultaneously unlike the normal searching tools. The number of threads equal to the number of drives in the desktop are created and all threads are executed simultaneously as multiple threads can execute simultaneously thereby producing faster results. This tool is made in java. It is the fast and efficient searching tool that can be used to search any file in the user's desktop. Other feature of this tool is that it can be used to search other desktop by using sockets. Firstly, the socket needs to be created between the two computers- the one on which the user is giving file name to be searched and the other computer on which file has to be searched actually. The results are displayed back to the user. The results contain the complete path of the desired file. If the entered name of the file by the user is a substring in any file name that file is also displayed as a result. When the user clicks on the particular results that particular file opens up.

This paper describes the framework of the Searching Made Easy and also gives the algorithm used in this searching tool.

RELATED WORK

With the increase of data, there is a need of faster searching tool. There are a number of ways to search for a file in computers, and the search for the best is still going on. From those hundreds of different ways to search a file, here are some: (1) The author proposed a method to reduce the time spent on browsing search results using multi-threading approach [1]. (2) One author implemented multi-search engine algorithm. The algorithm created multiple threads to receive multiple requests and a different algorithm combined the result of different search engines [2]. (3) One method can be by using a data crawler that collects the data on the hard drive, the indexed and not indexed files are separated and the non- indexed added to a priority queue and then according to their priority the indexer will assign an index to these files and are then saved in the FireteX database. The user will enter the query in a user interface, it will then be converted into some formatted FireteX query and then it will search the FireteX database and the search results according to different ranking algorithms will be shown to the user in the user interface [3].(4)Another method of searching is by checking the logs file of the operating system and then create a table and then analyzing them and observing that the names of file contain synonymous words and then separating them to make the searching of the files contains these words easier [4].(5) Another method searches a file on a remote computer and sends file as an email to the user. It takes two input from the user-file name to be searched and the user email id. Mobile

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Hindi Roman Linguistic Framework for Retrieving Transliteration Variants using Bootstrapping

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Abstract

Worldwide and colossal development of Web clients utilizing all web based applications in their local dialects for looking and separating data is a rising examination issue in the field of transliterated data retrieval. There is a developing need to help neighbourhood dialects in all web based applications by utilizing Machine Transliteration. There is a gigantic measure of client produced content in Roman content almost for each dialects which are composed in indigenous contents for some reasons. In the light of this wonder, the web crawlers confront a non-inconsequential issue of coordinating questions and reports in transliterated space where transliterated content contain broad spelling variety. This paper portrays our proposed technique to deal with such variety through non-straight dimensionality lessening. The assessment of the proposed framework and the outcome got connotes the change in giving the likely varieties to a term which are further valuable in assessing the word variations with use of different character sets. This paper describes the proposed method to handle such variation through non-linear dimensionality reduction techniques which enhances the possibility of use of variations for a term giving flexibility to end user to represent any word in other possible versions other than specified standards

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Clothing Image Retrieval Based On Multiple Features for Smarter Shopping

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Abstract

Modern life is truly fast paced and lives of most people are overburdened. In such a scenario online shopping is a great and time saver. Ladies clothing cannot be easily specified like grocery or furniture items. Normally, ladies clothing has numerous characteristics that are hard to describe like texture, shape, color, print, length etc. In this work, we propose a way to search for clothes where the query is in the form of image in place of descriptive set of words. The first step of the procedure is to identify in accordance with the length of the dress and sleeves. Next features like color and texture are obtained. To detect the best close match, human intervention is not obligatory. A data set of 1500 images is created. The dataset is built up from craftsvilla, jabong, voonik,myntra, amazon, snapdeal, flipkart,fashionara, shoppersstop. The outcomes confirm a precision of 89.25% and recall of 87.00%.

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Keywords: image retrieval, feature extraction, pattern matching

1. Introduction

With the advent of smart phones and shopping android applications, online shopping has come in a big way. One can shop from the comforts of one's home – no travel time, no parking hassles and no going from shop to shop looking for a particular item. The internet has revolutionized shopping; online shopping has turned into the modern, current trend of shopping.

However, a major problem in online shopping is searching through a huge collection of items for a desired product.

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Selection of important features and predicting wine quality using machine learning techniques

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Abstract

Nowadays, industries are using product quality certifications to promote their products. This is a time taking process and requires the assessment given by human experts which makes this process very expensive. This paper explores the usage of machine learning techniques such as linear regression, neural network and support vector machine for product quality in two ways. Firstly, determine the dependency of target variable on independent variables and secondly, predicting the value of target variable. In this paper, linear regression is used to determine the dependency of target variable on independent variables. On the basis of computed dependency, important variables are selected those make significant impact on dependent variable. Further, neural network and support vector machine are used to predict the values of dependent variable. All the experiments are performed on Red Wine and White Wine datasets. This paper proves that the better prediction can be made if selected features (variables) are being considered rather than considering all the features.

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Keywords: Linear regression; neural network; support vector machine; wine quality

1. Introduction

Today, all type of industries is improving by adopting new technologies and applying these in all areas. These technologies are also helpful to enhance the production and making the whole process smooth. But, still there are different areas, which demands human expertise such as product quality assurance. Nowadays, it becomes an

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Linguistic Structural Framework for Encoding Transliteration Variants for Word Origin Detection using Bilingual Lexicon

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ABSTRACT— Global and tremendous growth of Internet users using all internet based applications in their native languages for searching and extracting information is an emerging research issue in the field of transliterated information retrieval. There is an emerging need to support local languages in all internet based applications by using Machine Transliteration. There is a huge amount of user generated content in Roman script nearly for every languages which are written in indigenous scripts for many reasons. In the light of this phenomenon, the search engines face a non-trivial problem of matching queries and documents in transliterated space where transliterated content contain extensive spelling variation. This paper describes our proposed method to handle such variation through non-linear dimensionality reduction. The experimental results suggest substantial improvement in suggesting the variations for a term which are further useful in query processing by normalizing the term equivalence for a word, especially when the search query can have multiple possibility of variations representation.

Key Words— **Transliteration, Term Variations, Word Identification, Roman, Character mapping.**

I. INTRODUCTION

Most of the Indian languages like Bengali, Malayalam, Gujarati and other Indian languages, are written using indigenous scripts. In current scenario on internet many user generated contents posted on facebook , tweets and blogs are written using Roman script due to various socio-cultural and technological reasons. This process of phonetically representing the words of a language in a non-native script is called transliteration. Transliteration, especially into Roman script, is used abundantly on the Web not only for documents, but also for user queries that intend to search for these documents. More often there exist multiple Roman script transliterations for the native terms; for example, the word Paani ("Water" in Hindi and many other Indian languages) can be written in Roman script as paanii, paanie, paanee, paanei and so on. This roman representation of a word in different formats and in different variations creates a term matching problem for search engines to match the vernacular script query with the documents in multiple scripts taking into account extensive spelling variation. Roman Transliteration is presently used everywhere on the Web not only for document searching , but also for formulating user queries for searching documents on the web. As there is no standard methodology exists for writing a particular word using roman therefore transliterated content will always have the problem of extensive spelling variations as any native term can be transliterated into Roman script in many ways. Transliteration process become difficult in presence of noisy words and out of vocabulary words which are present in the documents. Out of vocabulary (OOV) words are problematic in bilingual information retrieval. The OOV words are named entities, like number, technical terms and any acronyms. Recent literature describes that a larger part of web content is available in roman form and is reachable only when the users request for these information using roman based queries for searching the data.

As the volume of information available in local or regional languages grows, there is a need for tools and techniques to utilize efficient searching by using local languages or using mixed script However, as we find in this paper, mixed script present various challenges that the current approaches for solving bilingual spelling variation and its transliteration in IR are unable to address perfectly, especially because most of the transliterated queries have query formulation problem in context to spelling variations in terms of writing a query. In this paper, we introduce the problem of mixed script query formulation and related research challenges.. As many as9% of the unique queries have one or more Hindi words transliterated into Roman scripts, of which only 32% queries are pure NEs (name of people, name location and name of organization). On the other hand, 33% of the queries belong to the entertainment domain (parts of song lyrics and movie dialogues), which provide complex and ideal examples of transliterated queries. Hindi song music is also one of the most

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DPEGASIS: Distributed PEGASIS for chain construction by the nodes in the network or in a zone without having global network topology information.

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***Abstract*—In the energy constrained environment of wireless sensor networks, energy efficiency is of prime concern. PEGASIS is a centralized energy efficient routing protocol that has been proposed in the literature. We present a distributed PEGASIS (DPEGASIS) that not only organizes the nodes in a chain form but is also suitable for large networks. DPEGASIS can also be used with other recently proposed PEGASIS based protocols that divide the network in some sectors or slices and then form a PEGASIS chain in each of the sectors. DPEGASIS can be used to automatically construct a chain in a distributed manner in each of these sectors/slices. If these sectors/slices change dynamically during network operation then DPEGASIS can be used to automatically reconstruct the chain in each slice/sector.**

***Index Terms*—Wireless sensor network, Routing, Energy-efficiency, PEGASIS, DPEGASIS, PEGASIS for large networks, Distributed PEGASIS, Chain Construction, Clustering.**

I. Introduction and Related Work

Wireless Sensor Network (WSN) consists of resource constrained nodes that sense some phenomenon like temperature, pressure, humidity, seismic radiations, etc. These sensor nodes are generally deployed in hostile environments of forests to detect forest fires, etc. [1], [2]. As the nodes are constrained in terms of energy, memory and processing capabilities, the sensor nodes transfer the sensed data for processing to the sink through multi-hop path. Multi-hop transmission is more energy efficient than direct transmission as the energy consumed in transmission is directly proportional to some power of the distance (usually proportional to the square of the distance) [1], [2].

A lot of multi-hop routing protocols have been proposed in the literature. Lindsey and Raghavendra in [3] proposed a multi-hop routing protocol (referred to as PEGASIS) that constructs a multi-hop path to the sink in the form of a chain using a greedy approach. The chain construction starts from the farthest node from the sink. Then the node that is closest to that node connects to the chain. This process repeats until all the nodes of the network connect in the form of a chain. A node is selected as a leader node to transmit the data to the sink. A node with number $i \bmod N$ is selected as a leader node in round i where N is the total number of nodes in the network. Whenever a node has to transmit data, it forwards the data to the next node on the chain. The next node aggregates the received data with its own data and forwards the aggregated data to the next node on the chain. This process repeats to the leader of the chain which then forwards the data to the sink. All the nodes on a chain take turns to transmit the data to the sink so as to lead to uniform average energy consumption among the nodes. PEGASIS is energy efficient as the data is only forwarded to the next node on the chain which is probably at the minimum distance as the chain is constructed using a greedy approach. Moreover, each node receives data from at most two nodes which results in energy saving in receiving packets. Besides, instead of transmitting all the received data, each node aggregates the received data with its sensed data. This transmission of aggregated data results in less transmission energy consumption. However, in PEGASIS, due to the greedy approach of chain formation, there can be few long paths on the chain. Therefore, few nodes will have to transmit over long distances and hence will die out faster. Moreover, in PEGASIS, as each node take turns to transmit data to the sink, the nodes that are further away from the sink will die out faster on account of transmitting over a long distance. Besides, there is reverse flow of data in PEGASIS. Data of the nodes close to the sink may be transmitted backwards to some other leader node further away from the sink, and then it is transmitted to the sink by the leader node. All these issues would result in network partitioning and decreased network lifetime. Therefore, a lot of modifications have been proposed in the literature that aims at removing all the above mentioned issues of PEGASIS and minimize the distance between the nodes of the chain. To decrease the distance they divide the network in small parts and form a PEGASIS chain in each of these parts as in [3]–[14]. In these approaches there is a trade off between number of such parts and the area of each part which leads to a trade

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Variance on Outlier Factor

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Abstract— **Outliers are deviant cases. Their detection is important as they can provide valuable information. Detection of these deviant cases is called Outlier Mining. Outlier mining is an active area of research. Many methods for outlier detection are available. LOF is one of them and is an efficient and tested density based outliers mining method. LOF stands for Local Outlier Factor and is a quantification of outlying-ness of an object in a given database. By observation, we can conclude that LOF can also be treated as a variable of a dataset. Therefore many of the statistical concepts can be applied on LOF. If we apply variance on LOF by the name of VLOF, values will be more indicative of outlierness and better results for outlier detection are possible. In this paper, we applied variance on LOF and found results better.**

Keywords— Variance, Spread, Outlierness, Ird, k-distance, VLOF.

I. Introduction

Outlier detection is actually finding of an anomaly. It is an active research area of data mining [3] and is concerned with detecting, abnormal cases existing in the database. Outliers are important because "One person's noise could be another person's signal" [8]. Outlier detection has many applications in areas where illegal or abnormal behavior is possible. Illegal or abnormal behaviors include frauds like insurance fraud and network intrusion.

Approximately all data in a dataset follow certain model but there may exist some exceptional cases and these exceptional cases may not follow the model. Such exceptional cases are called the outlier. Hawkins in his famous book "Identification of Outliers" writes:- "an outlier is an observation that deviates so much from other observations as to arouse suspicion that it was generated by a different mechanism" [1]. This definition pictures Outlier as a deviant case.

The world is very complex. There are many situations in the real world scenario where deviant cases are more important in comparison to ordinary (normal) cases. For example - video surveillance, intrusion detection, public safety, telecom, public health, and credit card frauds, loan approval, crimes in E-commerce etc [8][3][9].

Many outlier detection techniques exist in literature and LOF (Local outlier Factor) technique is really efficient one. In this work, we will apply variance on LOF.

Present work contains 5 sections. Section II is concerned with the understanding of LOF. Section III provides some intuition on variance. In section IV there is an application of variance on LOF. Results are discussed in section V. Section VI concludes the paper.

II. Local Outlier Factor[4] : Basic Concept

The concept of Local Outlier factor (LOF) [4] was first introduced in paper "LOF: Identifying density-based local outliers" published in ACMSIGMOD-2000. LOF quantifies how much an object is lying away from other objects in any given dataset. Terms related with LOF are defined below. Detail discussion regarding LOF can be found in the base paper [4]. All definitions described below assume k as a use supplied value. This value is a natural number and used with MinPts interchangeably. D is the dataset. What is MinPts will be explained later.

Definition I: k-distance of an object p: - Let the distance between object p and an object o is distance (p, o), where $o \in D$ then k-distance of an object p is a distance(p, o) that satisfies the following conditions:

(i) There are at least k objects in a given dataset whose distance from p is less than or equal to distance (p, o). And

(ii) At most (k - 1) objects of the given dataset have distance less than distance (p, o).

k-distance of an object p is represented here as k-distance (p).

Definition II: k-distance neighborhood of an object p: - k-distance neighborhood of object p includes each and every object whose distance from p is less than or equal to k-distance(p).

k-distance neighborhood of object p is represented in this paper as $N_{k\text{-distance}(p)}(p)$

Definition 3: reachability distance of p with respect to o can be defined as

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Automatic Human Age Estimation System using fusion of Local and Global Features

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***Abstract*— Human beings can easily estimate the person's age from a facial image but this ability is not promising in machines. To address this problem, we propose a novel scheme of age estimation using fusion of local and global features. Local feature, Gabor filter is applied after detecting four parts (Forehead, left cheek, right cheek and mouth) around face and eye regions. Global feature, Histogram of Oriented Gradients (HOG) is applied on cropped face. Experimental results show that combination of local and global features outperforms many previous approaches.**

Keywords- *Local feature, global feature, Gabor filter, HOG, facial expression*

I. INTRODUCTION & RELATED WORK

Age estimation can be defined as predicting the age or age group of a person based on his or her biometric features, precisely on the basis of facial image. Human age estimation from face image has become a prominent topic in computer vision. In the recent time, the interest in this topic has drastically increased because of many practical applications in the field of security control, law enforcement and human computer interactions [1].

Variety of information can be extracted from just by looking the image of a face such as identity, expression, age, gender and ethnicity. Age estimation is very challenging task due to human face characteristics like wrinkles, skin aging (texture change), muscles dropping, dark spots and craniofacial growth (shape change) are changed with time. These signs of age progression displayed on face are out of control and depend person to person. Various factors such as lighting effects, expression or pose of a facial image can be adjusted during image acquisition process but face aging is an inevitable natural process [1]. Aging signs depend not only on internal factors but also on many external factors such as health, degree of stress, life style and weather condition. Estimation of age in presence of different expression on face like happy, sad, neutral, angry surprised make automatic recognition system also more difficult. Gender also plays a vital role in estimating age because they have different discriminative features for e.g. female may have different hair styles, makeup, ornaments and cosmetics which create the negative impact on automatic age estimating system.

There are various techniques available in the literature which can be used for identification of human's age. In the earlier work, Lou et al. [2] proposed a method for expression invariant age estimation. They build a graphical model to learn relationship between expression and age and proposed four potentials for the comparability of age, expression and latent layer. Three datasets FACES, Lifespan and NEMO were used for evaluate the performance of method. Fard et al. [3] proposed a method for age group estimation based on fuzzy inference system. The algorithm consists of three steps: preprocessing, feature extraction and classification. In the preprocessing, a face is detected using neural network and used horizontal and vertical projection to find the eye's position. They have extracted two features: histogram of oriented gradient (HOG) and local binary pattern (LBP) for skin texture and wrinkle feature analysis. Neural network is used to classify the image group. The dataset used for experimental results is PAL dataset and reported 88.01% accuracy. This method does not consider the full range of age for estimation from 18-93 available in dataset into account and it works on only 4 age group 0-18, 19-35, 36-59 and 60-94. Nguyen et al. [4] proposed a method for human age estimation using facial image. Adaboost method is used to detect face and eye regions. Muti-scale local binary pattern (MLBP) is used to extract the texture features from the face image. Finally the age is estimated using support vector regression (SVR). In order to evaluate, PAL dataset was used and reported 6.58 years mean absolute error (MAE). Li et al. [5] proposed a discriminative model for age invariant face recognition. They represented face by two local descriptor scale invariant feature transform (SIFT) and MLBP. LDA based classifiers were constructed and then combined to estimate the age via fusion rule. Experimental results have been performed on two publically available dataset MORPH and FG-NET. Guo et al. [6] proposed a method for age estimation using bio-inspired features. Face image goes though S_1 layer and C_1 layer. S_1 layer is related to visual cortex and here Gabor function is utilized. C_1 layer generate cortical complex cells. PCA based method used for dimensionality reduction. Finally regression and classification used for the age estimation. Accuracy of method was tested using 4 fold cross validation on YGA dataset and leave-one-person- out (LIPO) test scheme is used on FG-NET dataset. Babu et al. [7] proposed a method for age group classification using rank based edge texture unit (RETU). Robinson compass masks method is used to detect edges in face image. They apply the four masks on 3*3 sub image and find the edge values. Texture unit represent the local texture edge information, then rank is assigned to edge matrix. The co-occurrence matrix is derived from the RETU matrix and rule based classifier is used to determine the age group.

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Classification of Spam Email Using Intelligent Water Drops Algorithm with Naïve Bayes Classifier

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Abstract

The paper proposes an emerging evolutionary and swarm-based intelligent water drops algorithm for email spam classification. The proposed algorithm is used along with the machine learning classification technique known as naïve Bayes classifier. The intelligent water drops algorithm is used for feature subset construction, and naïve Bayes classifier is applied over the subset to classify the email as spam or not spam. The result of the hybrid method is compared with other evolutionary algorithm used with machine learning classifiers. The proposed algorithm outperforms the other hybrid algorithms.

Keywords

Intelligent water drops Naïve Bayes classifier Email spam classification

References

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A Comparison of Visual Attention Models for the Salient Text Content Detection in Natural Scene

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Abstract— **Visual saliency approaches have been acquainted to recognize the most noticeable object in the scene that are going to pull in human attention. These methodologies have been adequately utilized for the prominent region detection. The text or character detection as a salient region in image remains a challenging research problem. Intrinsically about the image, a text in the scene conveys vital information. This paper evaluates six state-of-art models of visual attention in context to scene content (i.e. text or characters). Saliency map generated by these models of visual saliency have been intended for facilitating salient text detection in a natural scene by highlighting text and concealing non-text regions.**

Keywords— visual attention model; saliency map; text detection

I. INTRODUCTION

A standout amongst the most difficult issues in Computer Vision field is that the detection of content (i.e. text or characters) in a scene having an assortment of various colour shading, textual style, size and orientation. Recognition of scene content may be a complex issue for Computer, yet people appear to distinguish content with no issues. The human visual system has the ability to easily visualize diverse assortments of data and centered about the captivating target, e.g. car number plate, road sign board, advertisement hoarding in the natural scene. Visual Saliency model primarily works on identification of attention points that a people would focus on at the initial glance. Visual saliency normally alludes to a property of a "point" in a picture (scene), which makes it liable to be focused. Most models for visual saliency are propelled by human vision and have a tendency to replicate the dynamic alterations of cortical connectivity for scene recognition.

In the recent years, a number of methodologies have been proposed for identifying salient or fascinating objects in the scene. These models of visual saliency can be extensively characterized into a) top-down b) bottom-up and c) hybrid model. These model elaborate various studies on identifying region-of-interest, the majority of these methodologies mean to spawn the saliency map and then segment the whole salient region from the image. Visual saliency model having "top-down" approach uses the methodology of finding a category specific objects which are known and learned a priori. These models are task oriented. Furthermore, humans search an object for some context in a scene. Visual saliency model having "bottom-up" approach [1], [2], [3], [4], [5] uses method that finds any object of interest based on visual stimuli, without any prior knowledge about its category. Visual saliency model having "hybrid" approach combines the methodologies of both the "bottom-up" approach and "top-down" approach.

The evaluations of six diverse models of visual attention have been accomplished for detection of content (i.e. text or characters) in common scenes. The significant addition of this assessment of various state-of-art visual attention models in context to the content (i.e text or characters) and finding out the outperformer model, that can do well in text saliency [6], [7] i.e. identification of text in the natural scene.

II. VISUAL ATTENTION MODELS

A. Itti's Model

The visual attention model proposed by Itti et al. [1] is having "bottom up" approach. This model is basically inspired by neurology and find salient image region using feature integration theory. The methodology used in this model is to segment a given scene image into different channels specifically Color (C), Orientation (O) and Intensity (I). A dyadic Gaussian pyramid is utilized for filtering and images are sub-sampled into 8 octaves, having scale different scales (scale 0 to scale 8).

"Center-surround" operations are utilized for evaluating the feature vectors, a distinction between center and surround scale implements the feature vector. The scale $k \in \{2, 3, 4\}$ used for center pixel and the scale $s = k + \mu$, with $\mu \in \{3, 4\}$ used for the surround pixel [1]. This model evaluated various channels of an image. Intensity channel uses the contrast. The color map with the specialized paired colors is generated by the color channel. Gobor filter at the orientations of 0, 45, 90 and 135 degrees used by the orientation channel and evaluate the reaction of these filters on image intensity. This model generates 42 feature maps: 6 for intensity, 12 for color and 24 for orientation. All these feature maps computed using different methods are having different dynamic ranges. Computing the final saliency map cannot be possible by simply merging the feature maps since it would suppress the scrawny

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Text indpendent speaker recognition using wavelet cepstral coefficient and butter worth filter

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Abstract

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SciVal Topics

Metrics

Abstract

In this paper an effective and vigorous method for text independent speaker identification is proposed to extract speech features. The objective of feature extraction is to extract features from speech and captures the unique characteristics of a individual speaker . The proposed method can be used in noisy environment with high degree of accuracy. The proposed method is based on the wavelet transform and the input speech signal is decomposed into various frequency channels. The purpose of Wavelet transform is to find the frequency spectrum while wavelet cepstral coefficient is used to capture the characteristic of the signal. It is more suitable than Fourier transform because it is restricted in both time and frequency whereas fourier transform is only restricted in frequency. The proposed method is capable to reduce the noise as well as also improves recognition effectively. Fuzzy rules are used for decision making. The proposed method is very useful in the field of forensic also. The performance of WCC is about 22% higher than mel-frequency cepstral coefficients. © 2017 IEEE.

Opinion Mining considering Roman Words using Jaccard Similarity Algorithm based on Clustering

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***Abstract*—Today's E-commerce is totally based upon the opinions of the customers. There are lots of opinions on the internet about any product. Now a day's people are using roman words to express their reviews. The main aim of this paper is to find the polarity of any item. In this paper firstly Roman opinion words are converted into corresponding English opinion words then applied Jaccard Similarity algorithm based on clustering for obtaining the polarity of the item. This paper approaches to the conclusion of the overall polarity of the item efficiently.**

***Keywords*—Jaccard Similarity, Roman words, Opinion mining.**

I. INTRODUCTION

In the present era maximum market is based upon E-Commerce. It also facilitates people to express their experience and give their opinion or feedback through reviews. It helps both the E-Commerce sites to enhance their customer's satisfaction level and the customers for their shopping. These reviews can be classified into positive and negative opinions[1]. There are number of products of same usability and features. Hence the opinion helps in finding out the most efficient product and support in decision making.

Opinion mining sometimes known as sentiment analysis[2], opinion extraction, opinion mining[3], emotion analysis, sentiment mining, subjectivity analysis, affect analysis, review mining, etc. Opinion mining is the process to analyze the overall opinion, sentiment or attitude of the item that decides the its polarity[4]. Polarity summarizes the overall negative or positive sentiment of the product. Sentiment classifications can be performed at three levels: Document Level Classification, Sentence Level Classification and Aspect Level Classification[5]. In document level classification, complete document is considered as a single text file that contains opinion about single object only. Complete document give either positive opinion or negative but if the document contains the detail about more than one product then it is not efficient. In sentence level sentiment analysis, the polarity of the product is obtained from a sentence only. It is more fine methodology as compared to document level classification. It includes two task i.e. subjectivity classification & sentiment classification. Subjectivity classification do not disclose any polarity, it gives only the fact about the product. But in sentiment classification, the sentence is classified under positive, negative or neutral polarity. Aspect level classification is also known as feature level classification. It is most fined methodology as compared to other.

Now a days many people are using roman words to express their reviews about any product. These roman words play a pivotal role in determining the overall sentiment. Hence these words are required to be converted in its equivalent English opinion words. So that it can be included in opinion mining.

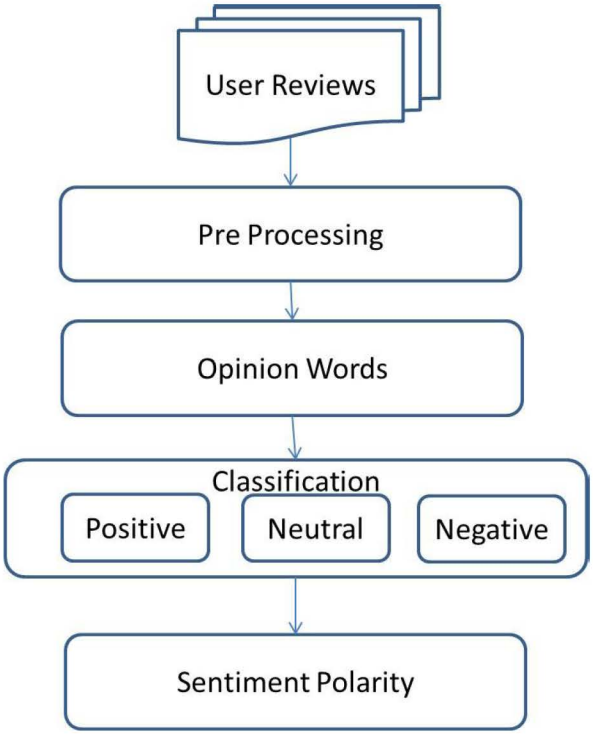

Fig. 1. General Sentiment Classification Model

The aim of this paper is to calculate the polarity of the review using Jaccard clustering algorithm. In the polarity finding procedure we consider both English as well as roman opinions. The rest of the paper is organized as follows. In section 2 discussion of related work in sentiment mining is presented. In section 3, proposed word discussed and calculated the polarity of English and Roman words using Jaccard clustering algorithm. In section 4, evaluated proposed model using corpus and find its polarity and we conclude in section 5 with future work and challenges encountered during the execution of proposed model.

II. RELATED WORKS

There are different attitudes, experiences and sentiments of different people for the same product and hence these are

Human-fall Detection from an Indoor Video Surveillance

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Abstract— **In this paper, we present a human fall detection method from visual surveillance. In first step, background subtraction is performed using Improved GMM to find the foreground objects. In second step, contour based human template matching is applied to categorize the human or non-human object. It helps to detect fall incident by providing sudden change in generated score after matching. Height-width ratio is computed in third step to decide whether the human shape is changed or not. In fourth step, distance between top and mid centre of rectangle covering human is computed, if it is less than a certain threshold, then human fall is confirmed. Finally, if inactive pose of human is continued till 100 consecutive frames, then an alarm is generated to alert the people at home to provide treatment on time. Experiments have been performed on 21 video sequences having different usual and unusual fall incidents. Experimental results show that proposed system works well efficiently and effectively in real-time for recognizing human fall.**

Keywords— Human Fall, foreground object, height-width ratio, contour.

I. Introduction and Related Work

Human Fall Detection from Visual Surveillance is an active research area of the image processing and computer vision. It plays a significant role to protect the elder people having age more than 70 years or children from the injury caused by fall incident; also avoids the death of human beings due to the head injury just happened due to an accidental fall at home. In recent days, there are lots of sensor based devices such as accelerometer, manual help button available to wear on hand. But, sometimes elder people forget to wear such devices or fail to press the help button becoming unconscious after a sudden fall. The recent advancements in the field of computer vision have brought an innovative solution to overcome such drawbacks. Now, visual surveillance provides the more information related to the human activity such as fall incidents.

There are several semi-automated video surveillance is being used to monitor the elder people or children at home to recognize the fall incidents so that a proper treatment can be provided on time but continuous watch on video captured by semi-automated video surveillance is a complex task. Therefore, an intelligent video surveillance for human fall detection is required that can recognize the fall incidents immediately and alert it to the member present at home through the message or alarm to take care of elder people or children.

Several researchers have developed human shape analysis [1],[2],[3],[4],[5] human posture analysis [6],[7],[8],[9], [10],[11],[12],[13] and human motion analysis [14],[15] based techniques to recognize fall incidents. Chua et al. [1] presented a method based on line drawing between three centroids of upper body, middle body and lower body of human being and analyze the orientation and distances in between the two lines for shape analysis to decide the fall incident. This approach achieved accuracy 90.5% with false alarm rate of 6.7%. Liu et al. [2] utilized bounding box method for human shape analysis based on the features such as human aspect ratio, effective area ratio and center variation rate. This approach worked for indoor video in which human is far 5 to 10 meters from the camera. In [3], Auvinet et al. proposed vertical volume distribution ratio to find the 3-D volume of the person for human shape analysis from multiple camera views with low frame rate. In [4]-[5], ellipse around the human has been drawn to analyze the temporal change of head position [4] and shape deformation features [5].

Many researchers have tried to draw an ellipse around silhouette for the posture analysis to recognize the fall incident [6]-[8]. Thome et al. [6] used lengthened and standing postures with layered HMM to find the fall incidents. This approach detects 82% falls correctly with 18% false negative rate. Khan et al. [9] proposed an approach for posture analysis to recognize fall based on binary silhouette in which Kernel Discriminant Analysis on R-transform features, k-means clustering algorithm and HMM have been utilized. Bounding box method has been utilized for the posture estimation analysis in [10]-[13]. Nasution et al. [10] proposed a novel method to detect falls in which adaptive background subtraction approach has been used. In this, adaptive characteristics are removed to prevent the inclusion of static human as background. Vertical and horizontal histograms of foreground objects and angle between last standing postures with current foreground bounding box are used as feature set. Extracted features are passed to the k-NN classifier and falling speed infer the real falling incidents. K-NN classifier with multiple posture templates yields recognition rate about 90%. Liu et al. [11] proposed a falling detection system in which statistical scheme and vertical projection histograms of the silhouette image are used to reduce the effect of upper limb activities of human body. The k-NN has been used to classify the postures using the difference and height-width ratio of silhouette's bounding box. This approach yields the fall detection and lying down event detection rate 84.44%.

Energy-efficient Approach towards Video-based Sensor Networks (Wireless) beneath Barrier Coverage

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***Abstract*—The Modern pace in hardware technology such as the accessibility of small-scale array sensors, low cost CMOS cameras and microphones has prompted the evolution in the arena of communication (wireless) amidst the network of sensor is equipped with multimedia devices such as Micro Electro-Mechanical Systems (MEMS), To capture the limitations pertaining to sensor nodes (video-based) as well as sensor networks (wireless), a video stream (which supports it) is difficult to be effected keeping the contemporary sensor network protocols into consideration. The present paper exhibits a comprehensive architecture pertaining to video transmission in connection with Wireless Multimedia Sensor Network (WMSN) called Energy-efficient and Video transmission Architecture. The inclination towards usage of video-based Wireless Sensor Networks (WSN) applications has showed significant gains. Video WSN behaves quite differently from the traditional sensor networks in the sense that it involves a sensing model (directional in nature), an in-node processing which is complex and transfer of large amount of data, thus resulting in frequencies which are high clock and transmission time (radio) which is significant in nature. To ensure reliability of applications, energy consumption reduction is a prime requirement. In this paper, we have come up with a novel energy conservation technique which hinges on Barrier Coverage Preservation rather than Blanket Coverage.**

Keywords*—Wireless Sensor Network, Multimedia Delivery, Wireless Multimedia Sensor Network, video Surveillance

I. INTRODUCTION

Rapid enhancements and developments in technology pertaining to CMOS, microphone and camera have led to them becoming an indispensable portion of wireless sensor node. [1, 2] WMSN relates to intelligent equipment which is exhibits wireless network trait and facilitates video-retrieval facility and streams of audio, scalar data and still images. Additionally, WMSN: storing, sensing, processing, fusing and communicating data of multimedia nature from varied sensor-based equipment becomes possible and that too in real-time. Diverse applications of WMSN over and above traditional WSNs have led to the emergence and realization of it. [1, 2, 3] Such disparate areas as control and enforcement, intelligent homes, gauging of environment, health services, avoiding traffic, control on industrial processing and surveillance of multimedia nature are some of the crucial applications of WMSN. It has a variety of applications including the areas in Digital image processing, communication, networking and much more. The most important applications areas include multimedia surveillance, traffic avoidance, enforcement and control, environment monitoring, advance healthcare systems, industrial process control etc [11]. High volume of data affects the network lifetime [12, 13, 14]. For monitoring remote geographical areas, wireless video sensor networks are likely to be deployed. In order to make sure that such an applicability is achieved, numerous aspects of the existing networks, as diverse as the one based on energy efficiency to the one dealing with mobile communications and sensor deployment, have been catered to in a good number of research works [2]. The WMSN will be generating huge data in several applications. In WMSNs have drawn the attention of all due to its wide variety of applications and its ability to provide an enlarged, enhanced and multi-resolution view of the area of interest but at the cost of degradation in the network lifetime and multimedia content quality. The multimedia data generated by the multimedia sensor nodes is significantly larger than scalar data and managing a large amount of data in resource constraint environment is very challenging. The forces that are driving it and the benefits that are motivating it are increasing day by day. As we are in the era of communication and more energy is consumed by sensor as compared to processing the data. The number of connected devices on the WMSN network will be huge. Multimedia sensors data needs to be collected as frequently as necessary [4]. This give rise to the need of effective and energy-aware sensor-networks which may or may not be connected to each other.

WMSNs require more of resources in contrast to WSNs. These resources can be in the form of data rate, memory, processing capability, battery power, etc. Obsolete data should be characterized by coding techniques which are efficient. This becomes apparent owing to the extreme volume pertaining to multimedia traffic. Higher bandwidth becomes essential for multimedia data streaming even after using source coding. Novel hardware architecture needs to be developed for this purpose along with new transmission methods which are efficient. QoS (Quality of Service) requirements could be guaranteed in WMSN provided

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An optimized palm print recognition approach using Gabor filter

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Abstract

Author keywords

Indexed keywords

SciVal Topics

Abstract

Identity verification of a person always considered a wide research area. In past, Identity of a person verified by traditional token-based or knowledge-based system but in recent year's bio-metrics traits like face, finger, iris, palm print etc. become a key technology for identity verification. Palm print is also the one bio-metric trait that can be used for the efficient identification. Palm print contains many unique features like principal lines, points, ridges, textures etc. that can differentiate two person. Because palm is a large area of hand, there is a common problem of palm displacement over scanner that results in increase in false rejection rate. This paper proposed a method which first generates ROI of captured palm image then median filtering is applied to remove noise and increasing edge sharpness. Histogram equalization applied after that for contrast stretching for low resolution images. Enhanced image is then divided in sixteen equal part, texture feature is extracted from each part of image separately using different orientations of Gabor filter . The generated feature vectors of all sixteen images are then normalized to a single feature vector using n bin histogram process. This increase acceptance rate in case if palm is placed over scanner in slightly different angles because working on small areas of palm helps to extract detail features. This paper used SVM for classification of generated feature vector and Experiment performed on polyU palm print database [1]. © 2017 IEEE.

Author keywords

Biometrics; Gabor Filter ; Palm Print

Summary generation using geo-coordinates and temporal data in microblogging

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Computed tomography brain images semantic segmentation

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GLA University, India

Abstract

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SciVal Topics

Abstract

In this paper we appliianced an approach for segmenting brain tumour regions in a computed tomography images by proposing a multi-level fuzzy technique with quantization and minimum computed Euclidean distance applied to morphologically divided skull part. Since the edges identified with closed contours and further improved by adding minimum Euclidean distance, that is why the numerous results that are analyzed are very assuring and algorithm poses following advantages like less cost, global analysis of image , reduced time, more specificity and positive predictive value.

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Use of reference model for formal specification of NFR

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Abstract

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Abstract

Requirement Engineering plays a very significant role in order to encode domain knowledge (customers) and implementation strategies (developers). Further, for the development of quality software, it is indeed necessary to specify both functional and non-functional requirement for the proposed software especially for those who program it. Hence, it is must to model the non-functional properties of the system. However, focus of modeling requirements is limited to the functional requirements only. Hence, this paper addresses the issue of specifying Non Functional Requirements (NFR) by integrating the NFR with Reference Model on the basis of soft nature of NFRs. Result analysis validates the claim that the proposal presented in this paper is compared well with various established measures. For validation purpose the sensitivity analysis is also carried out. © 2016 IEEE.

Author keywords

Formal method; Non Functional Requirements; Reference model

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A QoS based methodology for multiple fault handling in SOA

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Abstract

Author keywords

Indexed keywords

Abstract

The services oriented architecture along with web services came out with the base for a new revolution in the field of system management tools and distributed application. Both service-oriented architecture (SOA) along with Web services for software interoperability as a middleware shows a significant role. With such deployment of quality of services (QoS) constraints such as reliability, services cost, availability, response time, throughput, reputation etc. To overcome the multiple faulty services configuration the proposed method came into existence. Proposed model focuses on reconfiguration of the multiple faults in the faulty region with corresponding distinct QoS values, the computational efficiency of the search complexity algorithm and finding the optimal path using proposed algorithm from source to destination. It may degrade the overhead time, space complexity of the whole system and disruption in services delivery. Instead of regenerate the whole composition of the web service. © 2016 IEEE.

Author keywords

Directed acyclic graph (DAG); multiple faults; Quality of service (QoS); service-oriented architecture (SOA); web services

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Exploring Enterprise Service Bus in the Service-Oriented Architecture Paradigm Pages 14 - 25 14 February 2017

Featured analysis of enterprise service bus

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Abstract

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Abstract

These days' incorporation and interoperability studies and research have gotten to be interesting issues in business field, giving advances which empower Enterprise Application Integration (EAI). In this sense, Enterprise Service Bus (ESB) items have picked up a critical unmistakable quality as the components for supporting EAI. As a result, a few ESB items from both open source and commercial have risen. Because of the significance of utilizing open source solutions for a few areas, for example, research and business field learns about some open ESB items ought to be finished. Additionally, in these studies the reconciliation of existing services and procedures ought to be concentrated on. The point of this chapter is to assess probably the most essential open ESBs by demonstrating the primary elements and the execution contrasts between them concerning the joining of existing services and procedures in each of the ESBs analysed. © 2017, IGI Global. All rights reserved.

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Content aware image size reduction using low energy maps for reduced distortion

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Abstract
Author keywords
Indexed keywords
SciVal Topics
Metrics

Abstract

On different devices images are often viewed with different resolutions which require image resizing. Resizing images often affects the quality of the images. To better resize images to different resolutions content aware image resizing should be done so that important features are preserved. Seam carving is one such content aware image resizing technique. In this work seam carving is used to downsize an image . This is achieved by carving out an optimal seam (either vertical or horizontal), which contains less information. Each seam removes a pixel from every row (or column) to reduce the height (or width) of the image . To prevent distortion resulting from uniform seam carving, we propose an algorithm that uses a new energy gradient function. In this method minimum of three neighboring pixels is calculated in both energy map and cumulative map and these values are added to find the value of pixel for the new cost matrix. © Springer Science+Business Media Singapore 2017.

Author keywords

Empirical Role of Gamification In IoT Provinces

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Abstract

Gamification and IoT (Internet of Things) are the most emerging trends in computer science domain in these days. Gamification is a rising drift which can be applied in various fields such as education, business, health-care, service, organizational management etc. IoT simply refers to the scenarios where network connectivity and computing potential extends to the various devices, objects, sensory units and along with these our day to day appliances which are being allowed to generate, automate, exchange and consume data without or less human interference. This paper reviews several empirical studies to examine the status of current research in Gamification. Along with that the possibilities of empirical role of Gamification in various existing IoT based applications.

Keywords: Gamification, IoT, automation.

Introduction

The time has been over when playing games & keeping games in mind most of the time, spoil the productivity. In this era of hyper technology playing games & developing games for any application or even services may solve many of our problems more joyfully. Now-a-days, applying games [16] to any service is called Gamification.

It has been observed that most of the people even from computer science background haven't gone through the word, "Gamification". It is more surprising that even though they probably involve themselves in it every day's life. In fact, Gamification is the process in which we can add some sort of games or even game-like elements to any particular task. The main objective behind adding games is to encourage participation in a very user friendly fashion.

On the other hand, one more concept is emerging day by day in our daily life as IoT. The Internet of Things (IoT) is a set-up in which machines, objects or even humans are provided with unique ability to automatically transfer data over a network. This transformation of data doesn't require any human-to-human or human-to-computer interaction to fulfill its goals.

Our paper firstly discussed the concepts of Gamification & IoT. After that we highlighted the need & widely acceptance of Gamification & later on how Gamification can be empirically applied in various IoT provinces.

What is Gamification?

Gamification is the use [12], [14] of building logics and applying game mechanics in non-game contexts to connect end users just to fulfill their automated tasks. In fact, Gamification is not a new term in computer science domain. To apply an interactive approach towards assigned tasks having joyful experience includes the process of Gamification.

Movie Review Rating Based on Sentiments Analysis

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ABSTRACT:

Movie reviews are an important way to gauge the performance of a movie. While providing a numerical or star rating to a movie tells us about the success or failure of a movie quantitatively, a collection of movie reviews is what gives us a deeper qualitative insight on different aspects of the movie. A textual movie review tells us about the strong and weak points of the movie and deeper analysis of a movie review can tell us if the movie in general meets the expectations of the reviewer.

In this paper we aim to use Sentiment Analysis on a set of movie reviews given by reviewers and try to understand their overall reaction to the movie was i.e. if they liked the movie or they dislike it. The aim is to utilize the relationships of the words in the review to predict the overall polarity of the review. Here we propose an online system that automatically allows users to post reviews and stores them to rate movies based on user sentiments. The system now analyses this data to check for user sentiments associated with each comment.

Our system consists of a sentiment library designed for English sentiment analysis. The system will analyze the data to check for user sentiments associated with each comments. The system also gather all comments for a particular movie and then calculates an average ranking to score it. This score is generated for every movie in the system. The system also displays top rating movies as per analysis and user can provide feedback regarding the website and also he can subscribe to our newsletter. This provides an automated movie rating system based on sentiment analysis.

Keywords: Information Retrieval, Sentiments Analysis, IMDb

INTRODUCTION

Sentiment Analysis is a major subject in machine learning which aims to extract subjective information from the textual reviews. The field of sentiment of analysis is closely tied to natural language processing and text mining. It can be used to determine the attitude of the reviewer with respect to various topics or the overall polarity of review. Using sentiment analysis, we can find the state of mind of the reviewer while providing the review and understand if the person was "happy", "sad" and "angry".

Sentiment Analysis typically occurs in two or three stages:

1. The input text is split into sections, such as sentences, and each section tested to see if it contains any sentiment: if it is subjective or objective.

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Diabetic Retinopathy Screening Using Retinal Blood Vessel and Lesions Segmentation

A Comparative Study

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***Abstract*—Diabetes is a disease that reduces the human body's ability to store and regulate sugar. This disease develops due to excessive intake of food with higher sugar, excessive work pressure or unbalanced routines lacking in proper diet. Diabetes once developed is then harder to overcome and thus effects the human body functioning leading to failure of many human body parts. One of the major problem associated with the diabetes is vision loss, technically called Diabetic Retinopathy (DR). Analyzing retinal images via automation is evolving and proving its importance in screening of early detection of diabetic retinopathy. The early detection of DR is helpful in overcoming the disease preventing blindness. Many researches have been carried out in the past years for the development of automated tools that could help simplify screening of effected images and reduce evaluation time in detection of disease.This work is aimed at studying the algorithms for detection as well as classification of diabetic retinopathy and presenting a brief summary of selective relevant work amongst the methods being proposed in last 5 years till date. A comparative study of latest techniques that provides the best results for the screening of diabetic retinopathy through the analysis and segmentationof lesions is presented.**

Keywords—Diabetic Retinopathy, Retinal Blood Vessel Segmentation, Eye Bleeding, Retinal lesions, Vision Loss

I. INTRODUCTION

An eye disease that is caused due to the unbalanced sugar level in person affected with diabetes is called Diabetic Retinopathy. In this disease, blood vessels of retina loses their architecture and even get ruptured due to higher glucose level in blood. This may lead to leakage of blood and other fluids from veins into eye. It can also cause swelling in retinal region called macula, and thus giving rise to the condition called Diabetic Macular Edema (DME). In most advanced state of Diabetic Retinopathy, blood vessels start to form on retinal surface and keeps increasing if not treated at time. This results in formation of spots and thus blurring in the vision [1] further resulting into blindness. In order to prevent vision loss, regular screening of eyes of diabetic patients is must because of the reason that diabetic retinopathy does not show up any discrepancy in the vision until the time it grows up severely and is at its last stage where ophthalmologists are helpless in curing it. So, treatment of diabetic retinopathycan only be done if its monitoring is done on time and symptoms are detected at earlier stages.

Screening process of diabetic retinopathy involves acquisition of eye fundus images, these images are examined by ophthalmologists to check for the lesions that indicate diabetic retinopathy. Lesions show up the signs of exudates (EXs), hemorrhages (HEMs), cotton wool spots (CWSs) and micro aneurysms (MAs). This examination can either be carried out manually or via automated methods. When done manually, it consumes lot of time and is prone to errors but automated methods are capable of carrying out large database analysis within seconds, thus reducing workload and cost involved in DR grading.

Diabetic retinopathy is classified on the basis of its nature to proliferate. If it is non-proliferative in nature, it can be classified as under:

Non-proliferative diabetic retinopathy (NPDR): It is primary stage of diabetic retinopathy at which retinal blood vessels starts weakening. It is progressive in nature and develop through following stages:

1. No apparent retinopathy: No sign of change of eye fundus is seen.
2. Mild NPDR: Retina's smaller blood vessels swell and balloon structures are formed that may burst and leak fluid in retina. These small structures are MAs.
3. Moderate NPDR: This stage is marked by the presence of MAs, intra-retinal HEMs or venous beading which are not much severe but result intoblood vessels that nourish retina suffer swelling, losing strength for blood transportation and a change in appearance of retina.
4. Severe NPDR: The fourth stage under which retinal areas that require blood do not receive blood due to blockage of blood vessels. This causes deficiency of blood to required areas and passes signal to retina for blood resulting into growth of new blood vessels.

Proliferative diabetic retinopathy (PDR). It is last stage of diabetic retinopathy that result into vision loss and complete blindness. In this, blood vessels grow at inner part of retina

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PERFORMANCE ANALYSIS OF IMAGE TRANSMISSION THROUGH RAYLEIGH CHANNEL

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***Abstract*—The transmission of image at high data rate required a broad bandwidth mobile environment which has narrow band and hostile characteristics. Orthogonal Frequency Division Multiplexing (OFDM) technique is the solution of broadband requirement for a wireless channel. This technology is being used in Long Term Evolution (LTE) and Worldwide Interoperability of Microwave Access (Wi-MAX) standards of 4th generation wireless communication. Bit Error Rate (BER), channel coherence bandwidth and rating of transmitted power are the key parameters to analyze the system. A tradeoff is made in these parameters to ensure perceptual quality of transmitted image over Rayleigh channel. In this paper, performance of Rayleigh channel and constant envelope modulation techniques are analyzed on the basis of perceptual quality at rated Signal to Noise Ratio (SNR).**

keywords- Bit error rate; Constant envelope; Orthogonal frequency division multiplexing; Rayleigh channel.

I. INTRODUCTION

Channel is an abstract model that describes how a received data is associated with the transmitted data. Wireless channel have a relatively small bandwidth and analyzed with model of Rayleigh fading channel. Bit Error Probability (BEP) performance of Rayleigh fading channel degrades in comparison to the Additive White Gaussian Noise (AWGN) channel. BEP decreases linearly with the average SNR in Rayleigh fading channel and exponentially in Gaussian channel [1]. Diversity, spread spectrum, and OFDM are the three techniques to overcome fading. The BEP of Rayleigh fading derived as;

$$P_b^{Rayleigh} = P_b \int_0^{\infty} P_b(\gamma_b|r) P_r(r) dr \qquad (1)$$

$P_r(r)$ is the Probability Distribution Function (PDF) of Rayleigh faded received signal. The received signal power envelope $=r/\sigma^2 e^{-r2/2\sigma 2}, 0 \leq r \leq \infty$ - received power envelope or the amplitude of received power, r = $(x_I^2+x_Q^2)^{1/2}$, x_I and x_Q are in-phase and quadrature phase components of received power, the mean of r is E[r]=$\sigma\sqrt{\pi/2}$, the root mean squared (RMS) value of the distribution is E[r^2] =$\sqrt{2}\sigma$, σ the standard deviation. The PDF has its maximum at r = σ , with its mean value at r = $\sigma\sqrt{\pi/2}$ and has a variance of 0.429 σ^2 [1]. Fading is the variations in the amplitude of received signal due to multipath propagation caused by three major mechanisms: reflection, diffraction, and scattering [2].

OFDM reduces the problem of fading due to multipath propagation and design for complicated equalizer [3], [4]. The transmitter Power Amplifier (PA) caused to nonlinear distortion due to high Peak power to Average Power Ratio PAPR in OFDM [5]. A problem of PAPR is reduced to 0 dB level by using continuous phase modulation. An amplified constant envelope modulated signal maximizes power amplifier efficiency at minimal of input back off power (IBO). [7]-[11].

II. MODULATION TECHNIQUES

A. Orthogonal Frequency Division Multiplexing

In this technique the incoming symbol stream splits into multiple parallel bit streams at reduced bit rate, modulates them using an M-ary modulation scheme, and then transmits each of them on a separate subcarrier with adding certain number of cyclic prefix bits. The amplitude spectrum of each modulated subcarrier using Phase Shift Keying (PSK) or Quadrature Amplitude Modulation (QAM) has a sink shape. In the amplitude spectrum of OFDM, at the peak of each subcarrier, the spectral response of all other subcarriers is null. This improves spectral efficiency. The selective use of narrowband flat-fading sub-channels can effectively resist frequency selective fading. OFDM spectrum is shown in fig.1.

$\Delta f = \frac{B}{N}$ Subcarrier spacing, B denotes the channel bandwidth and N number of subcarriers, f_0 is fundamental frequency and i^{th} subcarrier frequency component = $\pm N_i \times f_0$.

B. Code Division Multiple Access

A spread spectrum modulation technology is the Code Division Multiple Access (CDMA) in which different codes are allocated to all users to use a common radio channel. Different frequency bands can occupy same frequency and time irrespective of Frequency Division for Multiple Access (FDMA) and Time Division for Multiple Access (TDMA), separated by their specific codes. In Direct Sequence CDMA (DS-CDMA) system, at the base station (BS), the baseband

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Enhanced Discrete Cosine Transformation feature based iris recognition using various scanning techniques

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***Abstract*—Distinctive and irreversible features of the iris make its most secure and trustworthy biometric modality for person identification. This paper presents the comparison of various scanning techniques for feature extraction in iris recognition. Iris localization and segmentation was performed using Circular Haugh Transformation, which estimates the parameters of iris using edge map. Normalization on the segmented iris was performed using Rubber sheet model, to convert the circular iris in-to a rectangle of fix dimension. Thereafter Discrete Cosine Transformation coefficients were extracted from the normalized iris using different scanning techniques. The scanning techniques used are Zigzag, Raster, and Saw-tooth. Experimental results show the promising performance of Raster Type-II scanning technique with 100 coefficients. The database used for the observations is CASIA iris database version-IV. The analysis and experimental results show that proposed scheme can be used in iris recognition systems for better performance.**

Keywords- iris recognition, feature extraction, discrete cosine transform, scanning techniques

I. INTRODUCTION

Iris recognition is known as the most accurate and secure identification system in biometrics security. Despite of the application areas like security and identification, iris recognition technique is also extensive research area for application models[1],[2]. The uniqueness of iris is said to be one of about 10^{31} persons and even for one person,left and right iris differs[3]. Normally iris recognition system consists of following sub-stages: Image acquisition[4], image quality assessment and enhancement[5], [6]iris localization or segmentation[2], [7]–[9], Normalization[3], [8], extraction of significant features and classification or matching[10]. Daugman [8]introduced Integro-differential operator for iris localization that searches a circular path to detect the iris boundary into the image of eye. Sankowski*et al*[2] presented a novel algorithm for segmentation of iris from image of eye taken in visible and near infrared lights. Wildes [11] suggested an automatic segmentation algorithm based on Circular Hough Transform (CHT) to calculate center and radius of iris. A wide number of iris segmentation approaches proposed thereafter, those improvised the basic concept of Hough transform[2], [12].Yuniol*et al* [13]presented a keypoints-based robust algorithm for real time iris recognition applications. He *at el*[14]presented a pulling and pushing elastic model for segmentation the iris from the eye image in visible light.

Features extraction is the most important part in the iris recognition. Number of techniques have already been introduced for the significant feature extraction. Likewise, De Martin-Roche *et al*[15]suggested a technique to represent the features by fine-to coarse approximations and extract features on the basis of discrete dyadic wavelet transformation. Panganiban *et al*[16] proposed wavelet based feature extraction algorithm for iris recognition system in near infrared (NIR) environment. Kekre*et al*[17] made a comparative study of performance of Discrete Cosine Transform (DCT) wavelet and Haar wavelet for person identification using iris. Authors proposed a varying matrix size selection method to use only upper-left coefficients and discard the remaining coefficients of DCT as shown in Figure 1, because DCT concentrates the energy towards left top corner of the image. Abhiram*et al*[18]formulate a combination of DCT based features and enhanced edge detection techniques for iris recognition. Authors have also expounded circular sector and triangular shaped DCT feature extraction techniques. He *et al*[19]extract local texture features of the iris by utilizing K-means clustering algorithm. De Mira *et al*[20]came up with morphological operators to extract stable local patterns. Khan *et al*[21] suggested a method to recognize individual's identity by using unique iris features that are extracted using 1-D Gabor filter. Chen *et al*[22] used three sub-feature selection strategies named as, Orientation Probability Distribution Function (OPDF), Magnitude Probability Distribution Function (MPDF) and compounded strategy to optimized features in iris recognition system. Authors also suggested a novel method based on weighted sub-region matching fusion to make technique more effective for recognition.

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Image Transmission through Wireless Channel: A Review

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***Abstract*—Developing an efficient wireless communication system for image and video signals other than voice signal is the need for a mobile radio link. Image transmission through a wireless channel requires an image to be compatible with the channel characteristics such as bandwidth. The image and video signals occupies a large space in storage device and takes long time to transmit over a wireless channel. Compression techniques are used to reduce the redundant data from an acquired image and make it compatible with channel bandwidth. In this paper various compression techniques and communication models are analyzed. Various noises introduced during image acquisition and in channel. These noises are required to be reduced during image formatting and de-formatting process at transmitter and receiver respectively.**

Keywords—Acquisition; Channels; Compression; Filters; Noises

I. INTRODUCTION

In order to transmit an image through a wireless channel various characteristics such as reduced propagation time, less power consumption and higher bit-rate with an efficient bandwidth are required for a better image transmission. The bandwidth restriction of wireless channel demands to reduce the data size of transmitted image. Reduction of image data size is termed as image compression, therefore image to be represented in compact format. Pre-processing methods are implemented to improve image quality before compress the data effectively. Pre-processing methods include image enhancement, segmentation and representation.[11] A wireless communication system is described in Fig. 1.

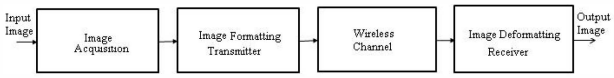

Fig. 1: Image Wireless Communication Model

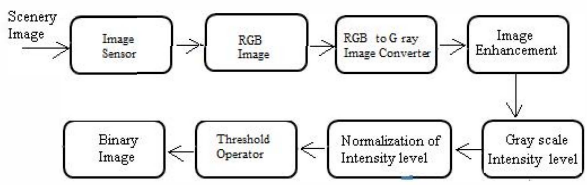

Fig. 2: Block Diagram of Image Pre-processing

The wireless communication system mainly consists of a transmitter, wireless channel and a receiver. Preprocessing and formatting of image being carried out at transmitter to make it suitable to transmit on a channel. The preprocessing implemented on image to enhance image quality by using contrast limited adaptive histogram equalization (CLAHE), and convert it in digital image signals as described in Fig. 2.

Compression system having encoder at transmitter to compress the image data and conversely decoder is used to de-compress the data at receiver as shown in Fig. 3. Mapper transformed f(x, y) into a format which has reduced spatial and temporal redundancy. The entire process is termed as formatting of image. Quantizer reduces large set of input values to a smaller set size. Quantizer operation involves rounding and truncation of mapper output to obtain pre-established fidelity criterion. The symbol coder generates a code to represent the quantizer output by a fixed or variable length codeword. An inverse operation of mapper and symbol coder is performed at receiver to decompress the data.[9]

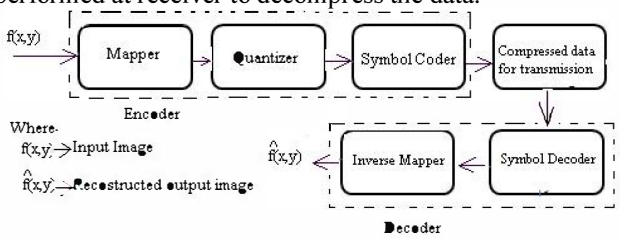

Fig. 3: Block Diagram of Compression System

Wireless channel is random in nature and having multiple reflectors in environment which results in to fading. Multiple reflections create multiple paths for a signal to travel a signal from transmitter to receiver termed as multipath propagation. Multipath propagation results a high fluctuations in phase and amplitude of the signal. Rayleigh fading channel model is specialized for stochastic fading there is an absence of line-of-sight propagated signal. Deformating and decompression implemented on the received image from wireless channel at the receiver to retrieve transmitted image and make it suitable for the display system.

II. LITERATURE SURVEY

A. *Image Compression & Pre-processing Module*

M.A. Ansari & R.S. Anand[1] worked in the field of medical image compression. To transmit a medical image through a wireless channel requires compression of

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Design, Fabrication and Evaluation of Low Density, Broadband Microwave Absorbing Composite for X & Ku Band

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Microwave absorbing [illegible] microwave absorbers [6-7] have also been proposed for importance in solving the increasing menace of electromagnetic interference problems, caused due to the proliferation of electronic devices & systems. They have potential applications in the stealth technology for radar cross section reduction.

In this paper, a radar absorber structural (RAS) composite has been proposed for frequency region 8.2-18 GHz. Proposed RAS composite is based on sandwich structure where indigenously developed syntactic foam has been used as core material. RAS is designed with impedance gradation for attenuation of microwave energy and shows better than 10 dB reflection loss in X (8.2-12.4 GHz) & Ku (12.4-18 GHz) band frequency region. The measurement results of fabricated RAS composite are in good concurrence to the simulated results. The proposed RAS is compact with less weight penalty, environmental resistance, and good mechanical strength.

Keywords: Microwave Absorbers, Sandwiched RAS, Syntactic Foam, Carbon Fibers, Free Space

I. INTRODUCTION

As the technology in the field of radar and other microwave engineering related fields are evolving, it has created electromagnetic interference related issues for devices, appliances being used in day to day life. Electromagnetic interference is a measure concern for the engineers and developers working in the aerospace and defence sectors.

Several papers have been proposed to overcome these problems [1-3]. Various types of ferrite absorbers [4-5] have been presented in the literature, however, these methods continue to rely on a very high weight % of the magnetic materials resulting in the form high density and weight penalty which is not desirable in the case of airborne applications. The limitations of these absorbers are that they have narrow absorption bandwidth. Few non-magnetic material based broadband, but it suffers either due reflection loss less bandwidth below 10 dB and, increased thickness, which limits its use for air borne applications especially in case of aircraft skin and fuselage.

Similarly the pyramidal shape of absorbers, also suffers from the drawback e.g., bulky in nature, and thicker etc., although the absorber can absorb the incident electromagnetic wave over a wider range. The design and fabrication of broadband microwave absorber have the challenges for absorption bandwidth and thickness.

In this proposed paper, design and fabrication of broadband microwave absorbers based on dielectric materials, e.g. carbon fibers and carbon black have been presented. To reduce the density, sandwich configuration has been used for proposed absorber configuration whereas indigenously developed syntactic foam based on micro glass balloon and carbon fiber has been used as core material of sandwich RAS. Low density (0.15 gcc) of syntactic foam core helps in overall reduction in density and weight penalty, whereas attenuation of incident wave by impedance graded different layers and syntactic foam core of sandwich RAS resulted in better than 10 dB reflection loss in X & Ku band at comparably low thickness.

The genetic algorithm tool has been used for the weight percentage optimization for various filler materials of the proposed absorber design for the X and Ku band frequency region. Free space measurement set up has been used for characterization of constituent parameters such as permittivity and loss tangent of fabricated absorber. The low density and lesser thickness of the proposed absorber makes it a potential candidate for the for the radar cross section (RCS) reduction.

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Diode based Multi Mode MTCMOS 8T Adder for Wake up Noise Minimization in 90nm CMOS Technology

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***Abstract*—**Conventional MTCMOS technique is an efficient method for minimizing leakage current in sleep mode but it gives rise to a new problem i.e. wake up noise during active mode transition which gives the wrong output as well as reduces the lifetime of circuits. Wake up noise produce during OFF mode to ON mode transition which is an important challenge for MTCMOS circuits. Here a diode based multi mode 16 bit 8T full adder design is proposed for reducing this wake up noise and leakage current . In proposed technique we use a additional body biased based high V_{th} parallel pMOS for reduction of peak amplitude of wake up noise during active mode transition will also provide a way to control the leakage current in sleep mode due to stacking effect. The MTCMOS 16 bit 8T full adder design reduces the peak amplitude of wake up noise efficiently by 97.17% and reduce leakage current by 84.74% as compare to tri-mode MTCMOS technique and 16.81% reduced as compare to Dual switch MTCMOS technique
To evaluate the significance of the proposed technique, the simulation has been performed for 16-bit 8T full adder circuit using tanner EDA with 90nm standard CMOS technology.

Keywords: MTCMOS , wake up noise, Leakage current.

I. Introduction

Multi threshold CMOS is a strategy to diminish the leakage current. The connection between power supply and ground can be removed by utilizing the high V_{th} sleep transistors in MTCMOS circuit[4]. During mode transition in MTCMOS circuit sudden current flow through sleep transistors and large distortion occur at power line and ground line. This distortion is known as wake up noise[5]-[6]. In MTCMOS circuits, the wakeup noise is a significant concern. some MTCMOS techniques like Tri-mode technique and Dual switch technique exist to maintain leakage and wake up noise in circuits .[7]-[10]
A large voltage fluctuations occur on both the ground line and power line when MTCMOS circuit change the state from the sleep mode to the active mode and it happens because of high current flow through the standby transistors. The wake up noise is an important reliability issue in MTCMOS integrated circuits with shrinking noise margins .

A new design is presented for reducing wakeup noise using by adding additional mode between sleep and active mode and reducing power consumption in standby mode as compare to tri-mode MTCMOS technique and dual switch MTCMOS technique.

In this paper, section II describes the various previous techniques with leakage reduction. Section III describes analysis of proposed design. Section IV describe the methodology of reducing leakage and wake up noise. Section V represents the simulation result and comparison of peak of wake up noise. Section VI conclude this paper.

II Previously Published Techniques

Leakage current and wake up noise is a most critical issue in VLSI industry. So, here we discuss earlier published techniques in terms of wake up noise and leakage reduction minimization.

A. Tri-mode MTCMOS Technique

In tri-mode MTCMOS technique, at the footer of the low V_{th} logic block the high V_{th} PMOS and NMOS transistor are connected in parallel . This technique works in three modes of operation so it is known as tri-mode technique which is shown in figure1.

In this technique, NMOS and PMOS diminish the leakage current during sleep mode and voltage at the virtual line which is preserved up to V_{dd} (supply voltage). The NMOS is switch off and PMOS is switch ON during the transition mode from sleep to active. The park mode situation is occurs in this condition. The NMOS transistor is turned ON at the footer during the condition in which virtual line is discharge till the V_{tp} and finally virtual line is discharge till Vgnd. For controlling the footer sleep transistors this technique is used where no additional circuitry is required .Wake up noise, temperature and size of the transistors is the trade off in this technique [8]

Synthesis and Simulation of efficient CAM

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Abstract— **In this work, we designed a Content Addressable Memory (CAM) in terms of Energy and power efficient using LVMOS family of IO standard on 28nm Field Programmable Gate Array (FPGA). These different IO Standards are compared with each other in terms of various power i.e. Clock power, Logic power, Signal power, IOs, Leakage power and Total power consumption to find the most power efficient one. We have analyzed our Memory at different frequencies of 1 GHz, 2 GHz, 3 GHz & 4 GHz. In this work, there is 44.46% power saving when LVCMOS_15 IO standard is used in place of LVCMOS_12 at 4 GHz operating Frequency. And there is 64.01% power saving when LVCMOS_18 is used in place of LVCMOS_12 at 1 GHz of operating frequency. For designing Content Addressable Memory, this work is done with make use of Xilinx ISE 14.4 simulator with Artix-7 FPGA.**

Keywords— LVCMOS,High speed, Content Addressable Memory, FPGA..

I. INTRODUCTION

In today's scenario the technology is evolving day by day, before 20 decade ago in computer system the memory was in range of few Mega bit. But as the features and application of computer system increases the amount of required memory in increasing, with increasing the overall amount of memory also there is reduction in size of system that is possible by reducing the size of component used in computer system. As now there is trend of low power VLSI, so the size of transistor is decreasing day by day, by scaling the size of transistor, there are various advantages such that reduction in overall size of device, amount of required voltage to run the device in also scales, amount of power dissipation decreases etc. In computer, laptop with increasing the size of memory, user wants to access data quickly, i.e. possible by using special kind of memory that helps to increase the access time i.e. Random Access Memory. RAM can be of 2 types i.e. SRAM and DRAM. SRAM is basically made-up with the help of Flip-flops. In computer System SRAM is use with Cache Memory i.e. L1, L2 Cache Memory. While DRAM is made-up with the help of Capacitor, where information is stored in form of charge. There is another memory i.e. used in computer system, Content Addressable Memory or CAM. The goal behind designing CAM is basically to make likely for user to find any data by simply finding (searching) data by the content. In content addressable memory user gives the content (data) i.e. to be searched. CAM searches whole memory for finding the data in memory. After searching it shows the result as presence of data at list of addresses. Apart from other memories CAM is fastest in data searching application. CAM is basically a application specific memory, it allows user to search data in single clock cycle. CAM is mainly used for data searching in memory. As CAM searches the presence of data, its circuitry is large and complex as compared with any other memory. In computer systems there are basically two types of CAM, Ternary Content Addressable Memory and Binary Content Addressable Memory. Binary Content Addressable Memory uses searching of data words containing 0s and 1s. whereas Ternary Content Addressable Memory make use of another state i.e 'Don't Care' or 'X'. This makes searching process more effective as compared to Binary CAM. Let Binary CAM have a stored word "1001" which will match to only "1001" but in case of ternary CAM stored word is "X01X" it will match any of these words "1011", "1010", "0011", "0010". Hence ternary CAM increases our option for search by making it more flexible. But it also increases the cost of CAM. Content addressable memory is also known as associative array, associative memory or associative storage.

II. FPGA

FPGA stands for "Field Programming Gate Array". It is basically Integrated Circuit which is configurable i.e. programmable. The term "Field Programmable", Field means – Programming in the fields that means device function can be modified, configure, can be program in the Lab or at site where the device is installed. FPGA is an easy realization platform or logic network. The basic architecture of FPGA given below in figure 2.

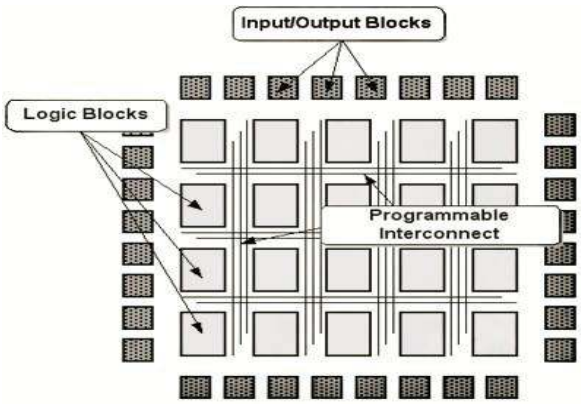

Figure 1 Basic Architecture of FPGA

Design of 4-bit LFSR on FPGA

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***Abstract*- LFSR is installed at transmitter side in CDMA system to generate pseudorandom sequence. In this work n=4 bit LFSR is synthesized and simulated on Artix -7 FPGA board by using different Input-Output Standard techniques. For designing 4-bit LFSR, LVCMOS_18, HSTL_I_18, HSTL_II_18, SSTL_I_18 and SSTL_II_18 IO Standards are used and amount of power requirement is calculated on CMDA Uplink and Downlink average operating frequencies and find LVCMOS_18 is most power efficient IO Standard among these other IO Standards.**

Keywords—FPGA, I/O standards,DFT, BIST buffer, LFSR, Artix-7, HSTL, low power, memory.

I. INTRODUCTION

Selecting the more power efficient family among the various different families plays key role to develop a most efficient circuit. These various families are having different feature sizes (channel size of transistor). In order to get the better performance in device and also lower cost and area, manufacturer scale the geometry of IC. During scaling manufacturer, must remember one thing with each reduction parameters of IC. Under the shadow of the electronics industries day by day as the semiconductor technology is booming. LFSR is used in various applications, when there is a need for long random binary sequences with a high degree of randomness with complexity and balance of zeros and ones. It is used in various applications such as digital communications, Monte Carlo statistical techniques, correlation guidance systems, CDMA, Wireless communication, Satellite Communication, Error Control Coding, Cryptography and range radar pulse patterns [5]. In military application to transmit information with high security it is used. LFSRs are also used in DFT and BIST. LFSRs are used to carry out response compression in Built in Self-Test, while for the DFT, it is a source of pseudorandom binary sequences.Now currently new device in low power VLSI is FinFet which is double gate MOSFET with 18nm feature size. In designing any circuit, the main factors are operating voltage, frequency and temperature etc. the operating voltage and frequency range depend upon that for what kind of application circuit will be used.

II. PREVIOUS RESEARCH WORK

LFSR is designed using gated-clock technique in order to reduce power consumption, depending upon technological nature of design. Here 0.35x10^-6 m digitally standard cell is used. At n=3, Pt=2.58x10^-6 W, n=5, Pt=3.81x10^-6 W and various result calculated with Vdd=3.3v and fclk=1MHZ [4].

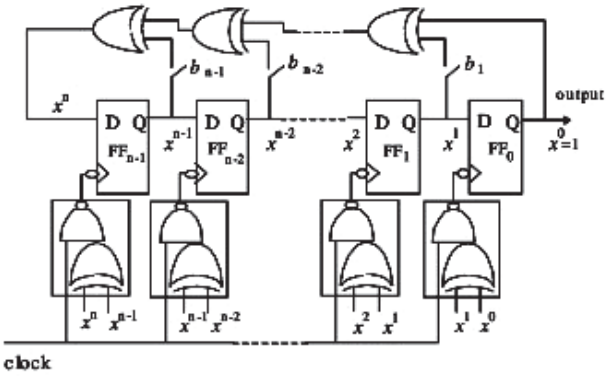

Figure 1 Gated-clock -bit LFSR [4]

Parallel Architecture of LFSR is implemented used in BCH, CRC Error Control Codes Encoder, reduces area-time product by 59% as compared to traditional XOR feedback based LFSR [10].

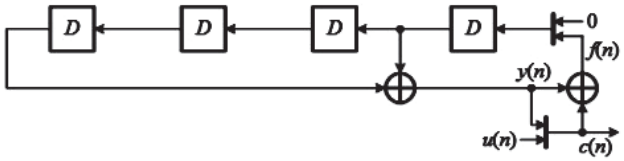

Figure 2 LFSR for Generator Polynomial [10]

Random bit stream is generated by using Non-Linear Feedback Shift Register in cryptography area [5].

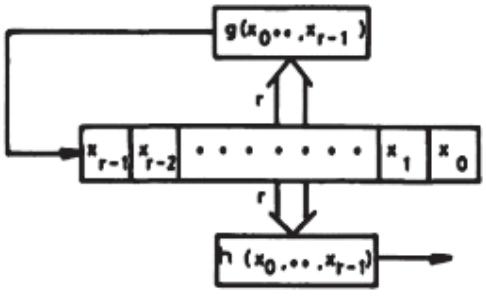

Figure 3 Non-LFSR with nonlinear feedforward logic [5]

In order to fulfill user's need of fast operation, different LFSR is designed with mathematical proof how to convert LFSR

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Design of Low Power SRAM on Artix-7 FPGA

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***Abstract*—SRAM is associated with cache memory inside computer system, it increases overall speed of the system. In this work 64kb SRAM is synthesized and simulated on Artix-7 FPGA board by using different Input-Output Standard techniques. For designing SRAM, HSTL_I, HSTL_I_18, HSTL_II and HSTL_II_18 IO Standards are used and power dissipation is calculated on various range of operating frequencies and find HSTL_I is most power efficient IO Standard among these other IO Standards. at 1GHz, 2GHz and 3GHz operating frequency if HSTL_I is used in place of HSTL_II_18, 26.38%, 17.18% and 11.12% power can be saved.**

Keywords: FPGA, I/O Standards, Buffer, SRAM, Artix-7, HSTL, Low Power, Memory

I. INTRODUCTION

Selecting the more power efficient family among the various different families plays key role to develop a most efficient circuit. These various families are having different feature sizes (channel size of transistor). In order to get the better performance in device and also lower cost and area, manufacturer scale the geometry of IC. During scaling manufacturer must remember one thing with each reduction parameters of IC. Under the shadow of the electronics industries day by day as the semiconductor technology is booming RAM is a very essential part of any computer system. RAM is basically directly accessed by the Central Processing Unit. It is used for both read and write operation quickly. SRAM is basically collection of flip-flops which contains less memory cells, takes less access time. DRAM is basically a collection of capacitors, contains large memory cells, take more time to access as compared with Static-RAM. Compared with a conventional SRAM of 6T cell, the most widely used DRAM cell is 3T DRAM Cell. Another DRAM cell is B3T DRAM Cell, based on CMOS technology. It has smaller leakage current and also small leakage power. But is suffers from noise. Earlier, Initially BJT was used to design/ fabricate integrated circuits, but due to high packaging density of MOSFET, now mosfets are using for fabricating integrated circuits. Now currently new device in low power VLSI is FinFet which is double gate MOSFET with 18nm feature size. In designing any circuit, the main factors are operating voltage, frequency and temperature etc. the operating voltage and frequency range depend upon that for what kind of application circuit will be used.

II. CLASSIFICATION OF MEMORY

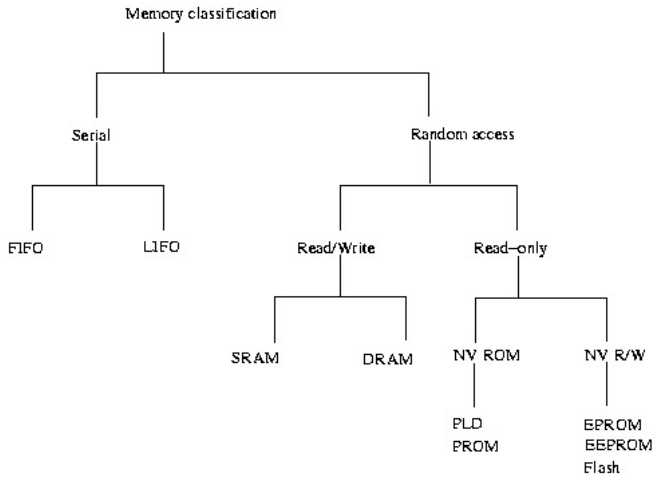

Fig. 1: Classification of Memory

Figure 1 shows the classification of Memory. Semiconductor memories are basically classified based their functionality. Based on data access mechanism memories are broadly classified into two categories, Serial and Random access memory. Serial memories are basically FIFO and LIFO, FIFO is First in First Out, means in this kind of memory whatever data will be stored first, that data will be read firstly. LIFO is Last in First Out, means whatever data will be written at last that will be read firstly. Under the Random access kind of memory depending upon their nature of read/write data in or out to memory, memories are again divided into 2 categories, Read/Write (RAM) and Read only(ROM). RAM is of two types SRAM and DRAM.

III. MEMORY ORGANIZATION

The idea behind designing memory is, first choose the number of input bits and total size of memory. Figure 2 shows the basic diagram of memory organization. In which word 0, word 1,--, word N-1 are the memory elements i.e. registers and

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Comparative Analysis of Convolutional Codes based on ML Decoding

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***Abstract*—Viterbi algorithm is based on Maximum Likelihood Decoding Method. It finds a path from 2^k total path through trellis that maximizes the path conditional probability. During decoding it compares the metric of all partial path entering each state. this paper involves brief information about Convolutional code in terms of strategies of encoding and decoding of convolutional codes and also, Recursive Systematic Convolutional Encoder is designed with BPSK Modulation and decoding is done by use of ML Decoding Method, compares the BER vs SNR performance at different code rates and find that as SNR increases the BER improves and also as number of bits are increases the performance of communication system also improves. At 3 db SNR the BER is 10^-2, when the number of bits are 2048 and 4096 at 4db SNR the BER is close to 10^-3.**

Keywords: Convolutional Code, LTE, ML Decoding, MAP Decoding, Burst Error, HSDPA, Interleaver

I. INTRODUCTION

Error control coding is basically to add parity bits with the source encoded message bit, then send on channel to the receiver, it enhances the performance of communication, improves SNR and BER. In 1948, in paper "A mathematical theory of Communication" Shanon [3] introduces the concept of channel capacity, and his theorem proved that there exists channel coding scheme that can achieve very low probability of error as long as the transmission rate is close to channel capacity. Error control coding is coding of channel. It involves encoding of message bits and decoding of message bits corresponds to encoded data. The transmission path may be guided or unguided, AWGN channel [5] is basically adds the noise with encoded data, AWGN noise is additive in nature, while in case of Wireless channel, due to multipath propagation there exists scattering components such as tree, buildings, moving objects etc. so there is fading due to fading there exists interference, which may constructive or destructive in nature. Due to fading there is a complex fading coefficient apart from noise, unlike AWGN noise it is multiplicative in nature. So in transmission medium bits might be corrupted, so there is probability of wrong decoding or wrong estimation of decoded message bits. to overcome this problem channel coding introduced. It may situation that channel is very noisy that can result in burst error, in this situation these codes don't perform well, to overcome this problem there is concept of concatenation of two codes with interleaver, this concatenation of code may in series or in parallel. In now a day there are various types of channel coding schemes that exists for Channel coding. Since by make use of Channel coding, it gives better performance so that, channel coding is using in various field such as Deep space communication, satellite Communication, Mobile Communication, Data Storage System, Advance 3G/4G communication such as UMTS, WiMax, OFDM, MIMO-OFDM, LTE. Advance LTE, 3GPP Standards etc. there are various popular channel coding schemes that are being used in Modern Communication Systems such as BCH Code, Reed Solomon Code, Cross-Interleaves Reed Solomon Code, Convolutional Codes, Low Density Parity Check Code, Turbo Code, Turbo product Codes, Quantum Codes etc. the initially channel coding schemes was CRC, Parity Check Code, Hamming Codes and Repetition codes etc. Turbo concatenated codes are capable of achieving close-to-Shannon capacity, have been adopted by many wireless communication standards, including HSDPA (High Speed Downlink Packet Access) and LTE (Long Term Evolution) [1]. Viterbi algorithm is introduced by Viterbi in 1967 for decoding Convolutional codes. It is based on Maximum-Likelihood Based Decision. For encoding data with convolutional code, convolutional encoder requires only a set of Shift Register (SISO) and Modulo-2 Adder. Channel encoding is totally opposite to source encoding, in source encoding the bits are removed while in channel encoding extra parity bits are added with the original message bits. parity bits are used for detection and correction of noisy data at the decoder. The performance of convolutional code depends on its weight distribution. Which is obtained by modifying the state diagram. Mathematically the Weight distribution function of Convolutional code is obtained by Mason's Gain formula. For decoding convolutional codes there is another algorithm, BCJR Algorithm i.e. based on Maximum Aposteriori

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Comparative Analysis of Propagation Models in LTE Networks with Spline Interpolation

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***Abstract*—This paper deals with the radio propagation models predominantly used for the 4th Generation (4G) of cellular networks generally known as Long Term Evolution (LTE). It is necessary to study the radio wave propagation models at the development level of any wireless communication network or system. A comparative analysis is made among various radio propagation prediction models to assess the appropriate prediction model which can be helpful for LTE networks in a particular environment. In the analysis part; the mean, standard deviation and root mean square value are computed. In the evaluation Free space model predicts the minimum path loss and SUI model predicts the more path loss for the given values of frequency, base station antenna heights, and Mobile equipment antenna heights and transmitted power. Ericsson, winner II, Cost-231 and ECC models are showing better results when compared with the practical data obtained in the NCR region Delhi (INDIA). Among these models Ericsson model is showing least RMSE and standard deviation. From the analysis carried out in this paper, it is observed that the Ericsson path loss model is the best model for NCR region Delhi (INDIA). To acquire more accurate results in the existed Ericsson model some modifications are given using statistical measures.**

Keywords: Long Term Evolution (LTE), Path Loss (PL), Fourth Generation (4G), Stanford University Interim (SUI) Model Ericsson Path Loss Model

I. INTRODUCTION

The forthcoming step towards 4th generation wireless communication services is known as Long Term Evolution (LTE) or evolved UMTS Terrestrial Radio Access Network (E-UTRAN) [8]. A simple LTE is commonly known as 4G wireless service but it is not compatible to all 4G standards. The next version to LTE is LTE Advanced which is fully compatible to all 4G wireless services and standards. The frequency band used in these two technologies is same. LTE is depended on third generation partnership project (3GPP) standards where as LTE Advanced takes much attention on the capacity and coverage according to the user requirements [10]. The speedy progress in wireless communications use amplified frequency bands, minimum sized cells, and smart antennas. Radio propagation prediction becomes more challenging because the channels used in the wireless radio communication are time varying, frequency selective and frequency dispersive [13].

The complete transformation of radio signals with respect to distance travelled from a transmitter to receiver can be described using a radio propagation model. Using these propagation models one can get the information about the total path loss allowed and maximum coverage area from a certain system [9]. Path loss plays vital role to decide the QoS for wireless communication at network planning level. Path loss causes poor signal strength at the receiver side [16], So that the receiver is not able to detect the original signal. All wireless communication operators use Key Performance Indicators to judge their network performance and they evaluate the Quality of Service (QoS) regarding end user perspective.

In this paper, a comparison is made among various proposed propagation models that would be used for the evolution of LTE or 4G wireless system. These models are empirical. The empirical models use Existing equations obtained from the results of quite a few measurement efforts. A few of the path loss models are as follows [9,14,17]:

1. Free space model
2. Cost-231 Model
3. Ericsson Model
4. Winner II Model
5. ECC-33 Model
6. SUI Model

These models are used to predict the pathloss.

II. LITERATURE REVIEW

Field Propagation models used to predict path loss during radio communication are the blend of analytical and empirical

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Improved 0.18µm CMOS Down-Conversion Mixer For UWB Systems

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***Abstract*— This paper presents the CMOS Down-Conversion Mixer for UWB systems., The circuit is simulated under 0.18µm TSMC CMOS technology. Common mode feedback is used in the circuit and buffer stage is used to provide th impedance matching. The Passive RLC matcing is used at the input ports. The simulation result shows the conversion gain 15.484dB with noise figure of 15.894dB and IIP3 value of 10.009dBm. The Power consumption the MOSFETs used in the circuit is 40mW.**

Keywords—Mixer, LNA, UWB

I. INTRODUCTION

Wireless communication has been widely used in the field of environmental monitoring, health, data transferring etc. The device used for the communication requires the low power consumption so that the device should have a long battery life[3]. CMOS technology has become widely used because of its low power consumption. The cutoff frequency has been increased because of the decrement in the gate length [2]. The low voltage of the CMOS design provides it from the fatal damage. The RF receiver requires the small signal to be processed at low voltage. RF circuit is shown in Fig 1.

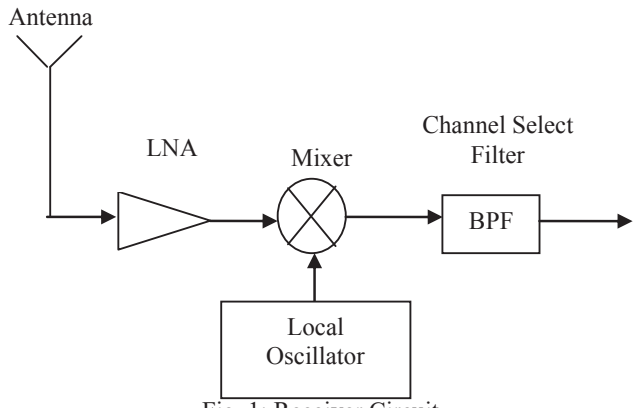

Fig. 1: Receiver Circuit

The designing of the CMOS circuit has limitations of decrement in f_T as a function of gate voltage. The low value of f_T affects the entire circuit performance such as low noise amplifier, mixer, local oscillator etc. Lower the value of fT, lower the conversion gain and higher is the noise figure [10]. The various parameters of mixer circuit such as gain, noise figure, IIIP3 and power consumption has tradeoff among them [20]. The designing of mixer circuit is typical.

UWB has the advantage of high data rate in local area network whose frequency ranges from 3.1GHz to 10.6GHz [1]. The boundation of UWB is about to limit the transmitted power to reduce the interference of frequency under licence band. Various mixer design topologies provide good gain, noise figure and better isolation between RF-IF port as well as between IF-LO port. This paper gives the CMOS down conversation mixer for UWB system with their improved parameters. The input impedance matching has been introduced to provide the better isolation.

II. MIXER TOPOLOGY

Different types of mixer topologies are used to get better linearity, conversion gain, noise figure, power consumption etc. Varios topologies such as current bleeding, source degeneration and Multi-Tanh are given with their various advantages.

Current Bleeding

The current in LO MOSFETs get decrease so the current at IF port decreases which helps in increment of the drain-source resistance. By the increment in active load the output voltage increases and hence the converson gain improves [8]. The current in amplifier increases without having more current in the switching stage which helps in reduction in the power consumption of the circuit.It also helps in the imrovement in the noise figure. The circuit using current bleeding is shown in Figure 2 [1].

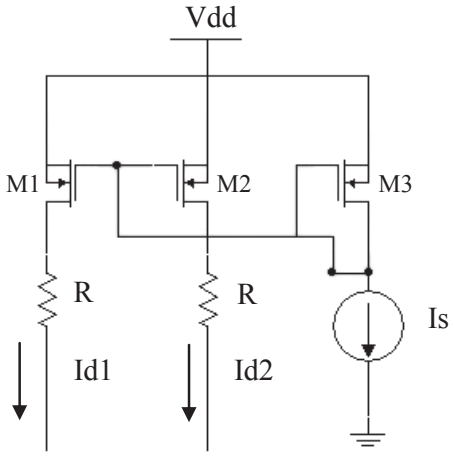

Fig. 2: Current Bleeding Circuit

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Design and Simlation of LNA Using 0.18 µm CMOS Technology for UWB Systems

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***Abstract*—This paper presents the UWB LNA using 0.18µm CMOS technology. The proposed circuit is simulated for the frequency range of 3.1GHz to 10.6GHz. By applying the resistive feedback topology, the noise figure of the circuit can be improved. The source degeneration technique helps in balancing the effect of parasitic capacitance. The proposed circuit has the cascade and cascode connections of the transistors helped in the increment of the gain. The simulation results shows that the highest gain of the circuit is 19.982dB at 8.665GHz & the gain is approximately constant throughout the frequency range. The minimum noise figure is 1.270dB at 3.1GHz and the maximum noise figure is 3.4dB at 10.6GHz.**

Keywords: LNA, UWB, Noise Figure

I. INTRODUCTION

LNA is the first block of the receiver system which is used to increase the strength of the signal and lowering the effect of noise. The output of LNA is applied to the next block called as mixer which is used to multiply two signals [5]. The performance of the LNA determines the performance of the next block in the receiver system. The parameters which are used to measure the performance of LNA are noise figure, conversion gain, S_{11}, S_{22} and linearity. Generally there is a tradeoff between these parameters. So maintaining all the parameters at the reasonable value is a very challenging task in the designing of a good LNA. The main requirements for a good LNA are low noise figure, high conversion gain, low value of S_{11} and S_{22}. The other requirement is the low power consumption of the circuit [4].

Today's demand is the high data rate and high speed. The FCC has given the licensed in the frequency range of 3.1 to 10.6 GHz for UWB system [1]. The requirement of UWB system is low signal power so that it does not affect the signals which overlaps with the frequency band of UWB. In UWB, the data can be transmitted at rate of 100Mbps and uses the bandwidth of greater than 500MHz [2].

There are various techniques for improving the performance of LNA. The shunt feedback topology helps in improving the noise figure and stability of the LNA but this technique degrades the gain [4]. The current reuse topology is used to reduce the power consumption of the circuit but it also decreases the gain [3]. Stagger technique, gm-boosting technique and peaking technique are also very helpful for the low power consumption of LNA circuits. By using the body-bias technique, the requirement of low voltage can be achieved. The gain can be increased by using the cascode topology and this also increase the bandwidth of the circuit by reducing the miller effect of C_{gd}. The cascade topology is also used to improve the gain. The impedance matching at the input is obtained by the source degeneration technique.

II. CIRCUIT DESIGN

The proposed LNA circuit is shown in *Fig. 1*. The transistor M_1 is connected in common source configuration, M_2 is connected in common gate configuration which is used to amplify the signal. M_1 & M_2 are connected in cascode connection which increases the bandwidth of the circuit. M_3 & M_4 are also connected in cascode. The transistor M_2 & M_3 are connected in cascading while M_4 is working as current source which will help in biasing the M_3 transistor.

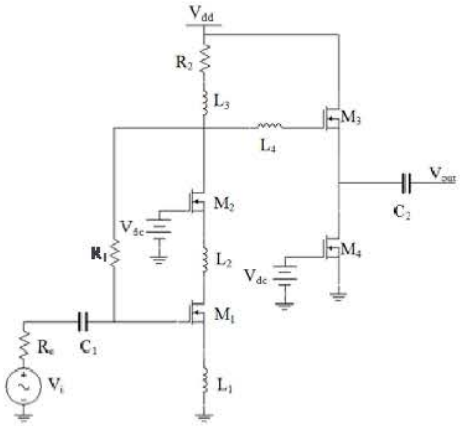

Fig. 1: The Proposed Circuit

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High Linearity and High Gain Bulk Driven Down Conversion Mixer for UWB System

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***Abstract*— A high gain and high linear CMOS down-conversion mixer with improved noise figure is presented for Ultra-wideband (UWB) technology. The proposed mixer is designed and simulated using 0.18µm CMOS technology for 3.432 GHz RF input frequency, 3.696 GHz LO frequency and 264 MHz output IF frequency using Key sight Advanced Design System (ADS) tool. The double balanced bulk driven Gilbert mixer architecture is used as a core in proposed mixer. LC Differential matching is used both at the LO switching stages and RF trans conductance stage with R-L-C load as output stage to enhance the conversion gain of the mixer. The bulk driven technique is used for the low power consumption. The proposed mixer provides IIP3 of 20dBm, maximum conversion gain of 10.060 dB, P1 dB of -20.98 dBm and double side-band noise figure (DSB NF) of 0.58 dB. The mixer operates at DC supply of 3.1V with power consumption of 2 mW.**

Keywords—CMOS, Gilbert Mixer, Differential LC Matching Network, UWB.

I. INTRODUCTION

In the today's time, the wireless receiver demands for low power, low cost and low voltage with high data rate. Output power of UWB is limited to -41.3 dBm/MHz for the frequency range of 3.1-10.6 GHz [10]. UWB technology provides high data rate with low power consumption and capable of transmitting information over high bandwidth (>500 MHz). Mixer is an important block of heterodyne receiver which down converts RF frequency to IF frequency. Mixer Performance is determined by conversion gain, noise figure and IIP3. Conversion gain determines the IF power at the output with reference to IF power at the input, P1 dB gives the idea of gain compression at higher values of RF input power, the value of IIP3 indicates rejection of 3rd order intermodulation product. There are various trade-offs in designing the mixer such as linearity, conversion gain, noise figure and supply voltage [15]. The power consumption of the mixer can be reduced by using bulk driven technique presented in this paper while maintaining reasonable gain and linearity. As of late there have been various reports of bulk driven mixer (e.g., [2]) with single ended matching and common-mode feedback (CMFB) structure. In the proposed work, the performance of the mixer is improved with the use of differential LC matching and RLC load as a output stage.

In this paper designing of proposed mixer is discussed in segment II. Results are address in section III and conclusion is given in Section IV.

II. CIRCUIT DESIGN

In designing the mixer, because of its favorable circumstances of high linearity, good isolation and reduced even order distortion, the core of mixer supported as double balanced Gilbert mixer. The fundamental structure of double balance CMOS Gilbert cell mixer can be separated in three sections as output load stage, LO stage and RF stage as appeared in Figure 1.

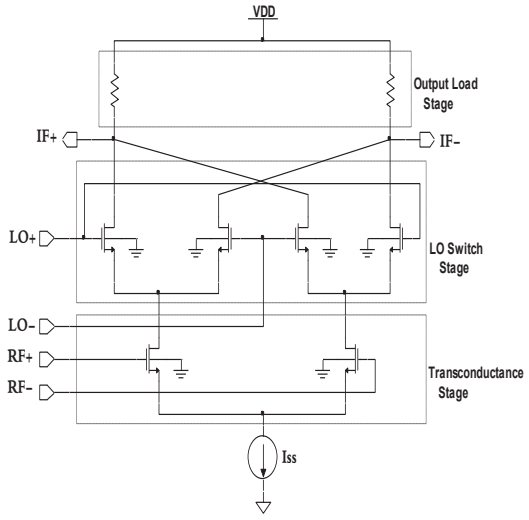

Figure 1. Conventional double balanced Gilbert mixer [12]

In gilbert mixer, RF transistors are worked in saturation region and LO transistors are worked at

A Low Power, Low Voltage UWB Low-Noise Amplifier Using Source Degeneration Technique

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***Abstract*— This paper presents a low-power (LP) and low-voltage (LV) ultra-wideband (UWB) low-noise amplifier (LNA) using source degeneration topology. A biasing metric for LV and LP is designed in deep-submicrometer CMOS technologies. Using this biasing metric with source degeneration and current reused technique LNA is analyzed for a low voltage 0.65V, low power of 0.80-mW. Measurement results show 11.942 -dB voltage gain, 03–5.5 GHz bandwidth, -<2dB NF.**

Keywords—LNA, Resistive Shunt Feedback, low power (LP) low voltage (LV), UWB.

I. INTRODUCTION

An innumerable application of wireless sensor network in the field of cell phones, health-care, environmental monitoring, agriculture, industries requires a high speed & long battery life circuit at the wireless sensing node. In recent year, shrinking of channel length in standard CMOS technology, which do not only reduce maximum voltage supply, but also reduce the conversion loss and power consumption. The shrinkage of the channel length degrades the performance in term of velocity saturation, higher output conductance, high mobility and high transit frequency (f_T).

The degradation in different parameter mention above can be traded with low power consumption with high bandwidth. These trade off first given in [1]-[3] followed by[4] in which an extended biasing metric shows the common effect of gain(g_m/g_{ds}), transit frequency(ft), efficiency(gm/id). It is suitable for designing of low power low voltage ultra-wideband low noise amplifier (LNA).

The LNA is the first active component of front end circuit at the receiver side. To design an LNA with wide band input matching, high gain, low noise figure and high linearity, a large amount of power is required therefore LNA is a most power hungry block. So it becomes a challenging research topic to design a low-power, low-voltage LNA with above specification. There are a lot of well known topologies to design an LNA [5].-[6] Fig.1 shows a distributed architecture in which external inductor (Lg) with internal parasitic capacitance (Cgs) resonate at operating frequency that provide very high bandwidth. But due to large no of transistors, it suffers with high power consumption and large chip area.

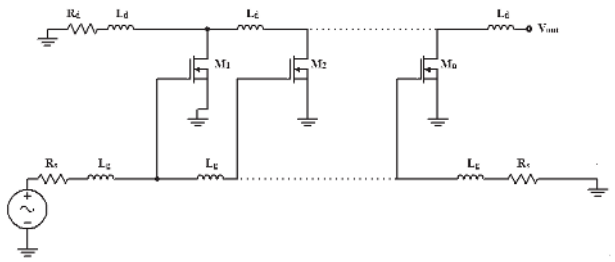

Fig. 1: Distributed Amplifier

Another approach is common gate as shown in Fig.2 in which total input impedence (Z_{in}) seen from the source terminal is equal to $1/g_m$. so a wideband input matching 50 ohm can be achieved by 20mS transconductance but it limits the noise figure and gain.[7]

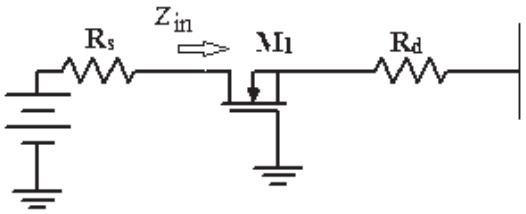

Fig. 2: Common gate Amplifier

$$\text{Minimum noise figure (NF)} = 1 + \frac{\gamma}{\alpha} \qquad (1)$$

where γ=thermal noise coefficient and $\alpha = \frac{g_m}{g_{do}}$

So noise figure still remains high because of the boundation in the constant g_m during wideband input matching.

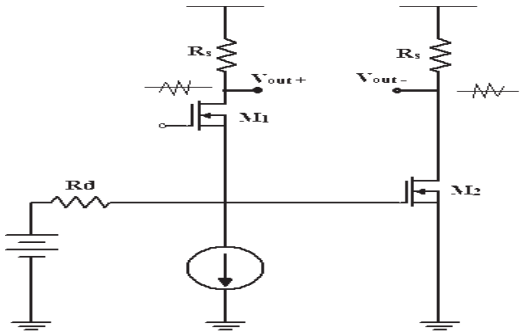

Fig 3: Noise Cancellation Structure

Implementation and Analysis of Power Reduction Techniques in Charge Transfer Sense Amplifier for Sub 90nm SRAM

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***Abstract*—**
This paper describes the implementation and analysis of different low power reduction techniques in charge transfer sense amplifier based on 90nm CMOS technology. The charge transfer sense amplifier has been characterized to find out their performance in terms of power dissipation. The Forced Stack technique shows a good improvement in leakage power dissipation of about 23.82 µW as compared to Sleepy Stack (41.313 µW), Variable Body Biasing (38.805 µW) and Footer Stack (29.947 µW) techniques. It has been also observed that the CTSA shows an overall reduction in leakage power dissipation up to 35.014 µW.

Keywords*— *Sense amplifier, leakage power dissipation, CTSA(charge transfer sense amplifier).

I. Introduction

Sense Amplifier is one of the important parts of CMOS memory as it sense or detects stored data from read selected memory and also affects both memory access time and overall memory power dissipation [1]. The conventional sense amplifiers [2] require a minimum amount of differential voltage on its bit-lines for their consistent operation. The time required to develop this differential voltage is basically depend on bit-line capacitance. This large bit-line capacitance makes memory slower which results in more power dissipation. Therefore, it is very essential for the sense amplifiers to operate fast with consuming the minimum amount of power [3]. It can be done by focus on diminishing the bit-line swing to reduce both the delay and energy involved in charging and discharging the bit-lines.
In proposed work, low power reduction techniques such as forced stack, sleepy stack, variable body biasing and footer stack technique [4] have been implemented to minimize leakage power dissipation in charge transfer sense amplifier.

II. Implementation of Low Power Reduction Techniques

Deepak et al. [6] reported total power dissipation of 2396µW in charge transfer sense amplifier. They have also reported the implementation of low power reduction techniques in charge transfer sense amplifier. J. C. Park et al. [7] reported the sleepy stack reduction in leakage power. In this work, we have employed the basic Charge Transfer Sense Amplifier (CTSA) [5] ckt as shown in Fig. 1 and implemented various low power reduction techniques [4].

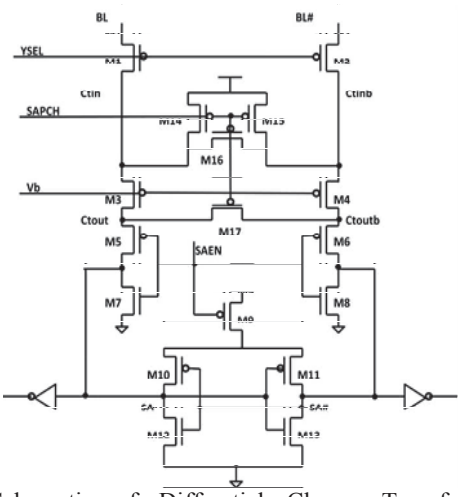

Fig.1 Schematic of Diffrential Charge Transfer Sense Amplifier (CTSA)

A. Sleep Transistor Technique:

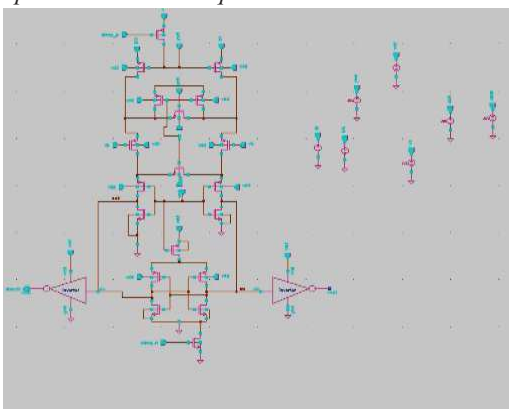

Fig. 2: Schematic of Sleep transistor technique

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Investigations of Various SRAM Cell Structures for Leakage Energy Reduction

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***Abstract*—In this Paper different SRAM (Static Random Access Memories) cells are studied and compared w.r.t. their power dissipations and current leakage. These different studied structures are also compared with a normal 6-T SRAM cell, which is simulated under 180nm technology. As per outlooks some of the studied improved structures have less power consumptions then the regular 6-T SRAM cell. The static energy drop is clear but this also displays that it didn't came down as per expectation level. The possible causes are diverse, nevertheless, it is agreed that the other factors cause increment in dynamic leakage energy, which possibly is a reason for such results. However there is some work done in such case also, that has been discussed in later half of the paper. The total reduction in dissipation for the studied techniques was found to be in the range of 35%-66% approximately.**

Keywords: CMOS, SRAM Cell, Low Power, Leakage Current, Static Power, Dynamic Power

I. INTRODUCTION

The ITRS report suggests that the gate oxide thickness for CMOS circuits is expected to be as low as 0.5nm in future technology. The gate leakage current is an important factor, as far as nanometre technology is concerned. Also it is evident that the Gate Leakage current increases exponentially not linearly as we reduce the $t_{ox.}$ The gate tunnelling current increases sharply with the change (reduction) in technology somewhere 100 times to subthreshold current.[2] Hence before reviewing the circuits which reduce the gate tunnelling current it is important to understand the factors which are behind the increment in tunnelling current. Firstly the subthreshold current because of low threshold voltage, the gate leakage due to very thin gate oxides, & tunnelling leakage due to heavily-doped profile. Now the factors that impact tunnelling current heavily are, gate to source and gate to drain overlap currents, direct tunnelling current which is also known as gate to channel current and gate to substrate current.

The techniques described and compared here use various methods for reducing these current leakage factors e.g using PMOS instead of NMOS which has lower leakage in the regime of inversion [2]. Or it can be reducing the single rail to reduce subthreshold current, which exploits the decreased drain induced barrier lowering effect [3]. Another Described way is to assign the dual threshold voltage to reduce the leakage. The method also deploys a scheme of maintaining a fixed distance of SRAM cell from sense amplifier block and decoder. This can reduce the static noise margins also without the significant change in 6-T cell structure [4]. Another improvement in this was studied when the dual t_{ox} was used with dual threshold. The method also proposes that there will be no delay or area overhead by using this technique. [5]. 8-T SRAM cell was used in one of the techniques instead of 6-T. it was observed that this topology increases cell stability but also increments the bit line Noise. In section II we have described the different techniques which are to be compared. Also in section III the various comparisons have been made w.r.t. the basic 6-T SRAM cell designed. The conclusion and discussion of future work has been explained in section IV.

II. REVIEW OF STUDIED WORK

In this section we will reconnoitre the techniques which are previously proposed for the reduction of leakage current in SRAM cell. In [2] there are two low gate leakage SRAM cell structures. The first is IWLVC (Improved Word line Voltage Control) SRAM cell. Looking at this circuit carefully, we find that, there are two transistors NC1 and NC2, which are required to provide different ground levels to the memory cell in active and idle mode. The positive voltage reduces the gate leakage but damages the read and write performance of the cell. Then a pass transistor P3 is joined with SRAM cell which completes IWLVC circuit. It is clear that this will reduce the gate voltage of N3 and N4. Hence the reduction will take place in gate tunnelling and sub threshold leakage current in idle mode. As far as working in active mode is concerned there is no change as in the working of 6-T SRAM cell as shown in figure 1[2]. However while working with idle mode gate currents of N3 and N4 are lowered. Also the power consumption by three transistors is not significant. It takes only 4% extra static power if we compare with a normal 128 SRAM cells. The second circuit is PP-SRAM (PMOS Pass Transistor SRAM) as shown in figure 2 [2] in this the P5 and P6 are deployed in place of NC1 and NC2. The P3 is removed. This reduces the gate leakage substantially. In order to decrease sub threshold leakage the PMOS with high threshold is used.

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A Comparative Study for Flow Control using SCIC and NPIC Controllers

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***Abstract*—Flow control is essentially a very important part of the process control industries. The flow control loops often employ pneumatic control valves as the final control element. These control valves suffer from various nonlinearities and stiction is most common of these. Due to stiction effect in the pneumatic control valves, the commonly used proportional-integral-derivative (PID) controller introduces limit cycles in the flow control loops, which essentially deteriorates the productivity of the industrial environment. To curb such non sinusoidal oscillations in these control loops, recently two novel controllers have been proposed namely, Stiction Combating Intelligent Controller (SCIC) and Nonlinear Proportional Integral Controller (NPIC). These two controllers have been earlier thoroughly evaluated for flow control studies and are claimed to be very efficient for curbing the limit cycle behavior in the control loops. However, a comparative study between them is missing for the same, which would fill the void existing at present. This paper addresses the same issue and a comparative study between the two controllers is performed and presented in this paper for the setpoint tracking, disturbance rejection and parametric uncertainty problems.**

Keywords—pneumatic control valve; flow control; intelligent control; stiction; limit cycle; controller tuning

I. INTRODUCTION

Flow control is of immense importance in the industrial environment. Various materials in the industries are needed to be regulated either in the form of flow or its rate. Other than this, for many other control loops, flow variable is used as a manipulating variable. Often, in such cases, the flow control loop is placed in the cascade configuration where again a flow control loop comes into existence. In view of these facts, the control of flow variable becomes a very important issue and must be handled with utmost care. For manipulating the flow variable, often a pneumatic control valve is employed which changes the effective restriction in the fluid line to change the flow rate through the control valve. Pneumatic control valve offers a crucial advantage in the form that it is inherently inert towards the inflammable fluids flowing through the fluid line and thereby mitigating the risk of any hazard to occur. However, the problem with these pneumatic control valves is that they suffer from stiction nonlinearity. This stiction nonlinearity is a significant cause of the reduction of the plant profitability and efficiency since this nonlinearity causes non-sinusoidal oscillations in the controlled variable and the in the manipulated variable also. This stiction nonlinearity can be further defined as, "*Stiction is a property of an element such that its movement in response to a varying input is preceded by a static part (deadband plus stickband) followed by a sudden abrupt jump called slip-jump. Its origin in a mechanical system is static friction which exceeds the friction during smooth movement*" [1]. Figure 1 shows the typical variation in the flow rate for a constant setpoint controlled by a linear proportional – integral (PI) controller using a sticky pneumatic control valve. Here it can be seen that the process variable, here flow rate, is oscillating about the setpoint which clearly decreases the control effectiveness in the loop.

To curb these limit cycles in the control loop originating due to stiction, many methods have been presented in the literature and most of these either use a separate compensator or element other than the controller itself for their implementation or are highly reliant on the exact measurement of the plant parameters. Armstrong-Hèlouvry et al. in year 1994, presented several compensation techniques including stiff proportional derivative (PD) control, PD with integral control with deadband, dithering and impulsive control techniques [2]. Positioners were also suggested to curb these oscillations which could maintain a specified position of the stem in the pneumatic control valve. Gerry and Ruel also suggested some methods which included use of PI controller with bandgap; using a high proportional gain controller, readjustment of the parameters of the positioner in the control valve assembly etc. [3]. Knocker method was presented by the Hägglund which added some short pulses to the controller output to mitigate the limit cycles in the control loop [4]. In year 2008, "two move approach" [5], was presented as a solution to these limit cycles, however it was highly reliant on the process parameters and also used a separate compensator for the implementation for its implementation. Another interesting approach for the stiction compensation was devised by the Cuadros *et al.* in 2012, but again the compensation scheme used a separate compensator for the stiction compensation in the control valve [6]. Besides these solutions, some other solutions for the same problems have been presented over the years such as [7], [8], and [9] etc. However, the problem with these techniques is unavoidable due to the nature of their structural implementation as mentioned earlier. In view of these problems, two novel control techniques for the alleviation of the limit cycles from the control loop, i.e. stiction

8-Bit High Speed, Power Efficient SAR ADC Designed in 90 nm CMOS Technology

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***Abstract*—In this work a high speed, power efficient successive approximation register (SAR) analog to digital converter (ADC) is designed using 90nm CMOS technology. Double tail dynamic latched comparator is used instead of conventional comparator which shows the significant reduction in power consumption and increases in the device speed. The simulation results indicate the suitability of the proposed novel structure with 3.933Watt power consumption (24.61% Power saving) and 250MHz sampling frequency for replacing the conventional SAR ADC CMOS structure.**

keywords- SAR, CMOS, ADC, Comparator ,Power dissipation.

I. Introduction

In modern mixed signal designing data converters are important building block. Data converter circuit acts as a bridge between digital domain and analog domain. As digital systems are superior to analog systems, they help in improving the performance of the modern electronic system. Real world signals are analog in nature, therefore an analog to digital converter (ADC) is required to solve this problem. Out of the various architectures present, successive approximation register (SAR) architecture is the best due to its low power requirement, medium speed, moderate resolution and low supply voltage requirement [1].This proposed architecture is completely op-amp free architecture and it mainly consist a digital circuit and double tail latched comparator. SAR ADC does not require high gain bandwidth product op-amp because op-amp consume large amount of power and suffers various short channel effect low power systems.

In SAR ADC, only comparator and digital to analog converter (DAC) needs analog design consideration and rest of all are in digital domain. The SAR ADC has good power efficiency and provides balance between speed, power and area [2]. SAR architecture majorly uses ADC architecture, it can achieve more than 150MS/s sampling frequency with 8-bit of resolution. The SAR ADC architecture is most demanding ADC in low power and high speed applications [3].

In this paper the architecture designing of SAR ADCs sub blocks have been done in various ways, which consume low power and provide good speed, that design would be considered in proposed SAR ADC in section II, section III represents simulation results of the different sub-blocks of SAR ADC and finally conclusion is written in section IV.

II. Architecture of SAR ADC

The architecture of 8-bit high speed SAR ADC is shown in figure (1), it consist a sample and hold circuit, DAC, SAR logic and comparator. The SAR ADC provides a digital code equivalent to input signal using binary search algorithm. In this system, input signal is first applied to sample and hold circuit. This sampled analog signal is input to the comparator which compares weather input signal is higher or lower than output of the DAC and provides the one digital bit to the SAR logic that provide corresponding code that feeds to the DAC input ports. The process of comparison will continue until all the bits of DAC are decided as per the operation.

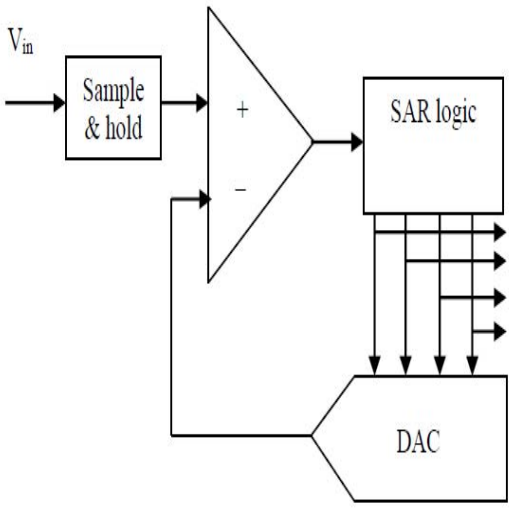

Fig. 1. Block Diagram of SAR ADC

A. Sample and Hold Circuit :

Several sample and hold circuit design are available in electronic industries, the high speed and low power sample and hold circuit shown in figure (2). It contains only a MOS as a switch which is driven by a clock signal and capacitor also known as holding capacitor. When the clock signal goes high, the switch is ON which sample the input signal and when the clock signal goes low the switch is OFF and capacitor holds the sample value and maintain constant until the next clock

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Dual Band Compact Antenna with Series of Hexagonal Cut and Coupling Structure for Isolation Enhancement

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***Abstract*— The paper presented a design of 2X1 antenna for dual band WLAN application with coupling element to improve the mutual coupling. Coupling structure is located between two patch antennas. The designed structure is consisting of a series of hexagonal cut to shrink the size of the patch antenna. A proposed coupling structure is used to improve the value isolation between two closely placed antenna elements. The 2x1 MIMO antennas for the frequency band 2.4 GHz and 5.2 GHz is presented and simulated with coupling and without coupling element. The proposed design uses a FR-4 material with the height 1.524 mm. The size of the single patch antenna is 16 X16 mm. Simulation result presented the improvement in isolation from without coupling elements to with coupling element. 15dB and 2 dB isolation improvement found with coupling element for frequency band 2.4 GHz and 5.2 GHz correspondingly.**

***Keywords*—** *MIMO; ECC; Isolation; VSWR; CST.*

I. INTRODUCTION

High data rate transfer and more bandwidth are primary issues for the present wireless communication system. All new generation system is shifting towards multiple transmitter and receiver antenna from the single antenna system. Nowadays devices are very compact so placing of multiple antennas in a small device is a challenging job. The MIMO is the techniques which not only improve the capacity of the system, but also increase the bandwidth, gain and diversity [1]. The designed system used two element antenna for producing high data rate. The main aim of any decoupling network is to produce optimum isolation characteristics for antenna array. The radiation characteristics discussed and represented for antenna array. The coupling network produced good isolation with proper impedance matching [2]. An antenna for 2.4 GHz WLAN application using meandering structure proposed using two small L type strip to overcome the problem of coupling. Optimum bandwidth and isolation achieved [3]. Orthogonal polarization is achieved for UWB application. Slot antenna presented for increased bandwidth. The isolation and impedance can be controlled by creating slots. Proposed antenna is useful for UWB, RADAR and medical imaging purposes [4].

To achieve higher bandwidth, reconfigurable antenna is proposed. The antenna is designed using FR4 substrate and performance of antenna is calculated by measuring the value of S-parameter, voltage standing wave ration, total active reflection coefficient and ECC [5]. Antenna proposed for 5 GHz frequency achieved better efficiency; greater than 60 % with the value of gain is 3dbi. The isolation of any antenna can be measured by value of envelop correlation coefficient [6]. Long term evolution antenna proposed using multiple inputs, multiple output technique. Proposed structure produced better value of isolation and ECC [7]. Printed four elements wideband antenna described for MIMO with good isolation characteristics. Capacity and radiation pattern presented and discussed for MIMO and achieved good value of ECC 0.001[8]. Three patch antennas implemented using a triangular shape structure for frequency band 2.65 GHz using MIMO technique. Shape of proposed antenna increased the diversity gain and efficiency with low value of ECC [9]. The antenna proposed for USB dongle application and a coupling structure sandwiched between antennas to improve the performance of antenna [10]. An antenna designed for Non Line of sight application to overcome the effect of fading [11]. Two element patch antenna discussed for 5.4 GHz with and without isolation element and found good isolation improvement between two elements by using diamond shape isolation structure and modified ground [12]. Two element cavity backed slot (CBS) based novel design used to improve the isolation [13]. Antenna array using multiple input multiple output presented for dual band application. By inserting a stub between two antenna elements the value of isolation and matching can be improved. The paper presented for frequency band 2.4 and 5.8 GHz [14]. Antenna implemented for wireless broadband and WiMax application which cover 2.3 GHz band. Proposed design produced Omni directional pattern [15].

Section II contains the design of two element compact antenna and simulation result. The ground structure and slotting geometry presented for compactness. The same, two element structure with coupling network and simulation result presented in section III. The result of, with coupling and without coupling element is reported in section IV. Section V include conclusion of designing of antenna structure.

II. PROPOSED DESIGN WITHOUT ISOLATION STRUCTURE

Figure 1.1 presented the design structure front view and back view. Series of hexagonal cut used to increase the compactness. With the help of ground slot frequency can be shift.

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Stabilization of Sliding Mode Controller for Uncertain Discrete-Time-Delayed Nonlinear Systems using Descriptor Approach

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Abstract: Control of nonlinear systems is vital due to wide range of their application. As it is obvious that the minimum requirement in any control system is the stability, however the proof of stability is not trivial in case of the nonlinear control systems. One of the best nonlinear control techniques is sliding mode control by applying a descriptor model transformation for bounding cross terms. Descriptor approach in sliding mode controller design for uncertain discrete time delayed nonlinear system is investigated in this paper.

Key words: Nonlinear system, sliding mode control, descriptor system approach.

I. INTRODUCTION

Time delay always reduces the stability of a system, often appears in most of the engineering systems, such as control system, aircraft stabilization, nuclear reactors, automotive systems etc. Since time delays are common source of instability, many researchers study the absolute stability of control system [1]-[2]. Depending upon the area of application, considerable attention has been given to control synthesis and stabilization of discrete time varying delayed systems [3]. Stability analysis of delay dependent systems with different control approaches have been well documented in [4]-[5] and the references therein, provide sufficient conditions for the asymptotic stability of the time delay system.

Sliding mode control (SMC) originated in Soviet Union somewhere in the late 1950's, but was not published outside the Soviet Union until the publications [6]-[7] as a variable structure control system [8]-[9]. The main advantage of SMC is the robustness to unknown disturbances [10]. Moreover the dynamics of the nonlinear system is altered according to the application of a high frequency switching control. On the sliding mode plane, the SMC has attractive features to keep systems insensitive to the parameter uncertainties and external disturbances [11].

The problem of stability analysis and controller synthesis has been extensively investigated in recent years for uncertain system with time varying delays [12]-[14]. One of the most popular methods for solving this problem is the Lyapunov based approach. However, the traditional quadratic stability analysis, especially in case of uncertainty with time varying delays, usually leads to conservative results. To overcome this drawback, Parametric Dependent Lyapunov Function (PDLFs) was proposed [15]. Generally the stability conditions were formulated based on the linear matrix inequality [LMIs], less conservative as compare to Parametric Independent Lyapunov Functions.

The LMI based approach has become a powerful tool in the analysis and designing of the uncertain system by introducing a new slack variable, a new LMI condition for stability of descrete system proposed [16]. Accordingly, because of there is a kind of decoupling between the Lyapunov and system matrices, the controller synthesis condition can easily be adapted.

Recently a new extension was proposed for stability analysis and controller synthesis by descriptor system approach, which was initially introduce by E.Fridman to study the H_∞ control of linear time delay system [17]. The two main advantages of this approach are as follows: First, can significantly reduce the conservatism by introducing some slack variables. Second, the problems related to the controller synthesis can be easily solved by applying this approach. Descriptor approach was applied to the system for stability analysis and control synthesis of linear system with time varying delays [18].

Devid G. Luenberger Provides a systematic way to generalize two important theories for descriptor system approach in 1997;

1.1 DYNAMIC EQUATIONS IN DESCRIPTOR FORM

According to this the dynamic phenomena represents a special version of complexity, where the variables describing a system at one particular time are interrelated in a different way with variables at other time [19].

$$g_0(y(0), y(1), u(0)) = 0,$$
$$g_1(y(1), y(2), u(1)) = 0, \quad (1)$$
$$\cdot$$
$$\cdot$$
$$g_{p-1}(y(p-1), y(p), u(p-1)) = 0$$

$y(k)$ = Descriptor vector for each k= 0,1,2,.....p,

$u(k)$ = Input vector for each k= 0,1,2,.....p-1,

g_k = function taking value in n-dimensional space.

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Sliding Mode Control of Uncertain Nonlinear Discrete Delayed Time System Using Chebyshev Neural Network

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Abstract This paper investigates a Chebyshev Neural Network (CNN) sliding mode controller for stabilization of time-delayed version of system with uncertainty and nonlinearity. The nonlinearity in the system is unknown but bounded and has been approximated with the help of CNN. The input delay has been balanced and further converted into regular form and the original system is converted into a delayed free version with the help of Smith Predictor. Now, the predicted states of the system and "Gao's reaching law" are used to derive the robust control law. Further, to prove the stability analysis Lyapunov–Krasovskii candidates has been chosen according to the proposed system. A numerical example is provided to illustrate the stability of the system in the presence of uncertainty, time delay and nonlinearity.

Keywords Chebyshev neural network · Sliding mode control · Smith predictor

1 Introduction

The real-time dynamical systems are not easy to deal within the presence of uncertainties, nonlinearity, disturbances and time delay. So, the dynamics of the system has been affected by the uncertainties, nonlinearity and disturbances that should be taken into account in the design of the controller as it degrade the system performance and sometimes may tend the system towards instability. The uncertainties and nonlinearity have been included in the real-world control systems due to inaccuracy in modelling, errors in measurement and some unavoidable external conditions. Another real-time problem that should also be taken into account is time delay which can be frequently found in real physical systems such as biological systems, aircrafts, rolling mills and economic systems and the main cause of time

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Dynamic Evolution Control Strategies for Fuel Cell System

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Abstract—**The electric vehicle offering the better performance as compared to an internal combustion engine. In this context, electric vehicle powered by the fuel cell is an interesting solution because of their higher efficiency and clean source of energy. Fuel cell is providing the continuous power to the load, so it is necessary to provide the control strategies for fuel cell system. This paper presents two control techniques for fuel cell. First control technique is used for controlling the fuel (H_2 and O_2) for controlling the fuel cell power. Second control technique is used to maintain the constant output voltage of the boost converter. The control technique have designed and implemented in MATLAB/Simulink. The performance of control technique is tested through simulation. Simulation results shows that the proposed technique are suitable for performance of fuel cell**

Keywords—Boost Converter; Dynamic Evolution Controller; Fuel Cell; PI controller

I. INTRODUCTION

The fuel such as petrol, diesel and gasoline are very much essential for the IC engine. But with the use of these fuel pollution and green house gases are produced, which is very dangerous to human life. So "Electric Vehicle" is the another aspect to overcome these challenges. The electric vehicle is the vehicle in which one or more than one source is present [1, 2].

Fuel cell is the clean source of energy because of its high promising performance and it does not produce any harmful gases. Fuel cell has been used as a main source of energy, which can supply the continuous power to the load. The devices which convert chemical energy to electrical energy through a chemical reaction is called as "Fuel Cell" and the byproduct formed are heat and water if the hydrogen and oxygen is used as a reactant. There is no combustion in this process so no harmful gases are produced. A fuel cell produces electricity on change in demand continuously as long as the fuel and oxidants are supplied [3, 4].

Fuel cell component includes anode, cathode, electrolyte and catalyst layer. The stack of fuel cell is connected in series and parallel to produce the desired voltage and current. The anode and cathode contain a porous gas diffusion layer, usually made of high conduction material such as graphite. The catalyst used in the fuel cell are nickel for high temperature fuel cell and platinum for low temperature fuel cell to increase the rate of chemical reaction[5 , 6].

There are many types of fuel cell such as direct methanol fuel cell (DMFC), Alkaline Electrolyte Fuel Cell (AEFC), Phosphoric Acid Fuel Cell (PAFC), Molten Carbonate Fuel Cell (MCFC), Solid Oxide Fuel Cell (SOFC) and Proton Exchange Membrane Fuel Cell (PEMFC). In which the fuel cell with most effective conversion of energy is PEMFC because of higher efficiency, operating temperature is low (50°C-100°C) and no emission of harmful gases so it is eco- friendly with nature [7–9].

Fuel cell is providing the continuous power to the load, so it is necessary to provide the control strategies for fuel cell. In this paper two control techniques are used. First control technique is used for controlling the flow rate of fuel in fuel cell, which is done by the use of a PI controller. Second control techniques are used for controlling the output power of the fuel cell, which is done by the use of dynamic evolution controller.

II. POWER MANAGEMENT SYSTEM

The vehicle comprises of fuel cell have higher efficiency and low emission of harmful gases as compared to internal combustion engine. Generally fuel cell is using hydrogen and air as an input, which will help to reduce the use of non renewable energy sources. The Boost converter is connected in between fuel cell and DC bus. The Fuel cell takes hydrogen from anode and oxygen from cathode, but with the change in load demand the fuel input to the fuel cell has to be controlled. So providing the control strategies at the input is very much essential for the fuel cell. The controlling of fuel involves the controlling of hydrogen and oxygen with the help of PI controller. Figure.1shows the complete diagram of fuel cell with boost converter and dynamic evolution controller

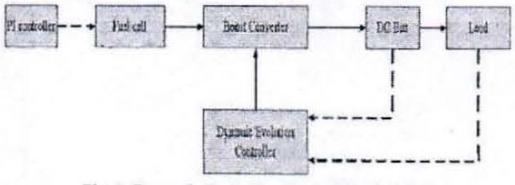

Fig. 1: Dynamic Evolution Control for Fuel Cell

The controlling strategy is implemented in Matlab/simulink 2013a. In which the reference value of 89 is taken which is compare by the fuel cell output current,

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Sliding Mode Control Strategies for Fuel Cell System

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Abstract—**The electric vehicle offering the better performance as compared to an internal combustion engine. In this context, electric vehicle powered by the fuel cell is an interesting solution because of their higher efficiency and clean source of energy. Fuel cell is providing continuous power to the load, so it is necessary to providing control strategies to fuel cell. This paper presents control strategies for fuel cell. The PI controller controls the fuel of fuel (H2 and O2) for constant power operation of fuel cell. The output voltage of boost converter is controlled with the help of sliding mode controller. The controller was designed and implemented in MATLAB/Simulink. The performance of control technique is tested through simulation. Simulation results show that the proposed technique is suitable for performance of fuel cell.**

Keywords—Boost Converter; Fuel Cell; Sliding Mode Controller

I. INTRODUCTION

The fuel such as petrol, diesel and gasoline are very much essential for the IC engine. But with the use of these fuels pollution and greenhouse gases are produced, which is very dangerous to human life. So "Electric Vehicle" is another aspect to overcome these challenges. The electric vehicle is the vehicle in which one or more than one source are present[1,2].

Fuel cell is the clean source of energy because of its high promising performance and it does not produce any harmful gases. Fuel cell is used as a main source of energy, which is supplying the continuous power to the load. The devices which convert chemical energy into electrical energy is known as "Fuel Cell" and the byproduct formed are heat and water if the hydrogen and oxygen is used as a reactant. There is no combustion in this process so no harmful gases are produced. A fuel cell produces electricity on continuously change in load demand as the fuel and oxidants are constant.[3 , 4].

Fuel cell component includes anode, cathode, electrolyte and catalyst layer. The stack of fuel cell is connected in series and parallel to produce the desired voltage and current. The anode and cathode. The anode and cathode contain a porous gas diffusion layer, usually made of high conduction material such as graphite. The catalyst used in the fuel cell are nickel for high temperature fuel cell and platinum for low temperature fuel cell to increase the rate of chemical reaction[5 , 6].

There are six types of fuel cell such as direct methanol fuel cell (DMFC), Alkaline Electrolyte Fuel Cell (AEFC), Phosphoric Acid Fuel Cell (PAFC), Molten Carbonate Fuel Cell (MCFC), Solid Oxide Fuel Cell (SOFC) and Proton Exchange Membrane Fuel Cell (PEMFC). In which the fuel cell with most effective conversion of energy is PEMFC because of higher efficiency, operating temperature is low (50°C-100°C) and no emission of harmful gases so it is eco- friendly with nature[7 , 8].

The boost converter is connected in between fuel cell and dc bus. The step up converter or boost converter is used where the output voltage is greater than input voltage. Many control strategies are applied to the boost converter to achieve the smooth output voltage. Usually the boost converter is nonlinear and time varying, so linear control techniques are not best option for boost converter. In order to design the linear control technique using classical approach, a small signal model which is derived by linearization around a precise operating point from state space average model. The controller based on these techniques are simple to implement, however due to variation in system parameter, it is difficult to account because of dependence of small signal model parameter on converter operating point[9 - 12].

A control technique for boost converter is designed in such a way that it works proportionally as the load changes, maintain stability during transient and provide faster response. Since switching converter constitutes a case of variable structure systems, then the possible option for controlling this kind of circuit is the use of sliding mode control technique. Due to having certain demerit associated with other type of controller, the sliding mode controller overcome and improves the deficiency associated with other controller based on small signal model. In order to obtain the desired response, the sliding mode control technique change the structure of the controller in response to the changing state of the system. This is realizes by the use of high speed switching control forcing the trajectory of the system to move to and stay in the predetermined surface which is called sliding surface. The mode of the control system in the sliding surface is called as sliding mode. In sliding mode a system response remain insensitive to the parameters and disturbances.

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An Enhancement in Electrical Efficiency of Photovoltaic Module

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Abstract— **Energy is considered as a prime agent in the generation of wealth and a significant factor in the economic development. The development scale of any country is measured by few parameters among which per capita energy consumption holds the most significant. With the depletion of nonrenewable energy resources and growing environmental concerns, it is expected that solar energy i.e. a renewable energy source is going to play a very significant role in the future. Over the last three decades, a significant research on photovoltaic (PV) solar cells and modules has been carried out. Today, the electricity conversion efficiency of a silicon solar module available under standard test condition (I(t)=1000 W/m^2& T_a = 25 ^{0}C) for commercial application is about 12 %. More than 75% of the incoming solar energy is either reflected or converted into heat energy. The abundant solar energy obtained from solar radiation can be utilized in the form of either thermal energy or electrical energy (DC) using photovoltaic (PV) modules. The efficiency of the PV system is more sensitive to the operating temperature. The higher the operating temperature, lower is the electrical efficiency and vice-versa. The operating temperature of PV systems can be lowered by withdrawing/utilizing the thermal energy associated with it. The thermal energy associated with the PV module can be carried away by flowing air below it. This type of system is known as hybrid photovoltaic thermal (PVT) system. The hybrid PVT system allows the enhancement of the electrical performance of PV by removing thermal energy and subsequently decreasing the operating temperature.**

Standalone Photo voltaic (SPV) systems has less electrical efficiency hence long payback period is observed. The parameter performance ratio is usually employed for performance of SPV systems. This paper illustrates that both types of energy are generated and by utilizing both types of energy, payback period can be reduced hence performance is improved. SPV system is mounted on roof of administrative building of University. It has been observed improvement in average electrical efficiency is 7.02%.

Keywords—PV module, energy ,performance, Rooftop.

I INTRODUCTION

The consumption of energy is increasing day by day due to high demand . India's energy consumption has almost doubled since 2000 and the potential for further rapid growth is enormous.75% demand of Indian energy is met by fossil fuels the energy sector for 1.3 billion people is expanding quickly. Indians use solid biomass for cooking.

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The backbone of Indian power sector is coal, which contributes in maximum power generation. India has huge potential for renewable energy, aiming high in this area with a target to reach 175 GW installed renewable capacity by 2022.Solar energy is the key to support the government's expansion plan [1] . Figure 1 shows state wise target of harnessing electrical energy from solar energy and Figure 2 shows year wise target to achieve electrical enegry form PV. Indian government has year wise and state wise target to 100 GW from solar, out of which 40 GW form building integrated photovoltaic systems by 2022. [2].

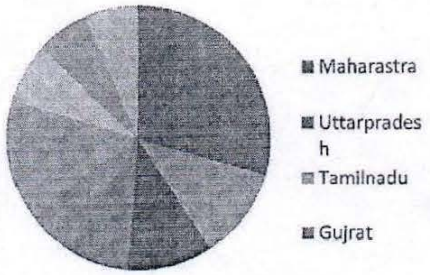

Fig.1: state wise target

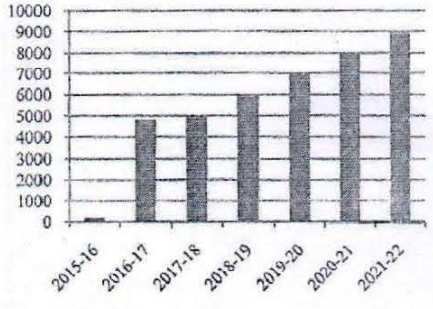

Fig. 2: Year wise targets (MW)

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Dynamic Performance of Cascade Multilevel Inverter based STATCOM

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Abstract—**Cascade multilevel inverter is the best suitable topology among the other multilevel inverter topologies in STATCOM application due to its distinguished featuring like modularity in structure and feasibility in control design in terms of less switching losses and better ac output waveform quality. DC voltage balancing and reactive power compensation at the point of common coupling are the challenging issues which may enhance the system superiority. In this paper special attention is dedicated to increase the reliability of the system by presenting the general control design for the system by which dc link voltage balancing and reactive power compensation can be carried out by using the nine-level cascade multilevel inverter as STATCOM. Computer based simulation result has been carried out to verify the superiority of the system at different load conditions and faulty condition.**

Keywords—Cascade Multilevel Inverter (CMI); Line to Ground (LG) Fault; Point of Common Coupling (PCC)

I. INTRODUCTION

The converter based FACTS controllers are used to provide continuous and precise power control which provide terminal voltage regulation, control of reactive power flow in overhead lines and helps in power system stability improvement [1]. STATCOM is a very effective FACTS device to maintain good voltage regulation and to update the transient stability by exchanging the reactive power between STATCOM and the power network [2].

Mostly, Cascade multilevel converter is used as a STATCOM because it gets appreciation over the other multilevel topologies like diode clamped and flying capacitor due to less number of circuit components used within it and it has a advantage of its modularity, availability, overall efficiency and high output waveform quality [3]-[4]. The greater switching repetition with flexibility in terms of trade off among harmonic performance, switching losses and voltage balancing make it possible by maximize the number of level of the output waveform. Cascade multilevel inverter has many advantages over the other multilevel inverter topologies in terms of switching losses, less component requirement and less control complexity. The voltage unbalance condition that could appear on the dc side of different H bridge which can be avoided by active power balancing absorbed by each H bridge to make it equal to the power losses of each H bridge [5]. To compensate the reactive power, its reference value is determined with regard to the grid voltage. However the value of active power that has to be flowed to the STATCOM is calculated from the difference between the dc-link voltages and the reference voltage.

To improve the dynamic performance of system, appropriate controller design and selection of modulation strategy have an important role which may balance the dc link voltage and track the reactive power in a required manner. Figure 1 shows the configuration of three phase cascade multilevel inverter based STATCOM system.

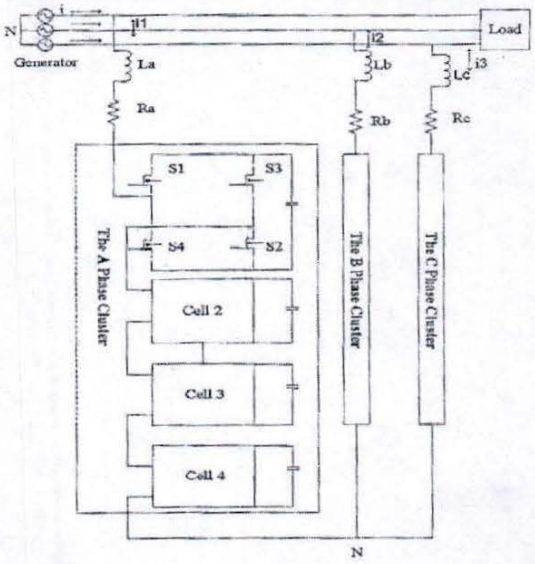

Fig. 1: Configuration of CHB Based STATCOM

II. DC VOLTAGE BALANCING

To increase the feasibility and modularity of the system, cascade multilevel inverter with separated dc capacitor are used in STATCOM application but the dc voltage unbalancing condition occurs due to the internal losses associated with CMI. To avoid nonessential condition like over voltage at any particular link, non uniform voltage stress across semiconductor switches and poor waveform quality, dc voltage balancing is necessary. This dc voltage balancing can be achieved by creating a

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Boost Control for PV Applications using Impedance Source Inverter

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***Abstract*—This paper is composed of study of operation of Impedance Source Inverter (ZSI) and its steady state analysis under different operating conditions. Output voltage of ZSI depends on shoot-through control method applied to generate pulses provided to semiconductor switches. Among different methods, simple boost control technique, being most uncomplicated is implemented here. As dc-input from solar panel is not constant, voltage boosting and operation of converter as ZSI is needed only if the input from panel is low else it will perform normal PWM inverter action. Thus, constant AC-supply can be maintained by switching between shoot-through and non-shoot through modes. A virtual model of simple boost control ZSI is built using MATLAB/SIMULINK and results are analyzed for both conditions.**

***Keywords*—Impedance Source Inverter(ZSI),shoot-through, boost control, PV module.**

I. INTRODUCTION

The ascendance of PV among renewable energy technologies is because of its features- noiseless, non-toxic emission, simpler operation and maintenance as compared with other technologies. The utilization of renewable energy for different applications like ventilation, heating and HVAC has activated due to rise in demand of electricity peak load. India's location between tropic of cancer and equator allows India to have huge solar potential with annual temperature ranging from 25-27.5 degree Celsius [1]. Increasing prosperity and growing rate of urbanization has resulted in increased energy demand that prompted the country's efforts in adopting renewable energy power generation.

A grid connected inverter along with PV module forms an AC module. PV systems are advantageous because of modularity feature and this allows to increase installed power easily. And by implementing MPPT to each PV module, problems due to partial shading and panel

TABLE I CONTRIBUTION OF RENEWABLE ENERGY IN TOTAL INSTALLED CAPACITY

Year	Contribution of renewable energy in total IC
2002	0.34GW(2% out of 17GW)
2014	31.7GW(12.5% out of 250GW)
2016	44.812GW(14.7% out of 304.76GW)
2022(estimated)	175GW

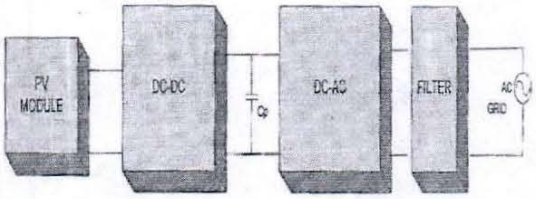

Figure 1. Duo step arrangement

Figure 2. Single step arrangement

mismatching can be reduced. Efficient and reliable operation throughout the lifetime is the major need within the AC module [4]. There are many different arrangements for AC module that have been presented in [5], [6]. Low output voltage of PV module is needed to be boosted so as to interface with grid. Transformer use is widespread for this purpose. But transformer-less topologies are preferred in terms of high efficiency, light weight and less cost when compared to isolated inverters [7]. In duo step arrangement, first the low output of PV module is increased by a boosting circuit then the boosted output is inverted to AC for three phase load. But this arrangement was bulky and requires too many semiconductor switches that are prone to add harmonics in output. Then, the concept of replacing the boost converter by a simple two-port impedance network was introduced [8].

II. IMPEDANCE SOURCE INVERTER

In duo step arrangement, boosting and inversion were in two separate steps but Z-source inverter performs both of these functions simultaneously in single step. Thus ZSI excludes the limitations of conventional duo step topology. Due to the problems in VSI and CSI like output voltage limited to a range, necessity of dead time and overlap time between gating on of switches to prevent short-circuit of devices and open-circuit of inductor [9]. To nullify these problems ZSI are employed. It has both buck and boost potentiality without any presence of transformer.

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Direct and Quadrature Axis Voltage and Current Control of a Three Phase Grid Connected PV System with Adaptive Fuzzy Logic MPPT Controller

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Abstract—**For improving dynamic response of grid connected photovoltaic systems voltage source inverter are operating in inner voltage and current control loop. This paper presents, a control technique for three phase grid connected photovoltaic system. Two stage power conditioning units has been used for system interfacing. First stage comprises of DC/DC converter and DC/AC conversion is done by voltage source inverter in second stage. Adaptive Fuzzy Logic Controller (AFLC) maximum power point tracking (MPPT) is proposed to achieve maximum power point operation. Using direct and quadrature axis voltage and current control voltage source inverter provides ac voltage by DC/DC boost converter output and total harmonic distortion (THD) is controlled as per IEEE Standard 929-2000. Finally, MATLAB/Simulation is carried out to confirm system operation and results.**

Keywords: Photovoltaic Systems (PVS), Utility Grid (UG), Point of Common Coupling (PCC), Voltage Source Inverter (VSI), Adaptive Fuzzy Logic Control (AFLC), Membership Function (MF), Direct Axis (d), Quadrature Axis (q), Total Harmonic Distortion (THD)

I. Introduction

In current scenario, the research and development work is in the area of solar irradiance have made PVS popular and a feasible alternative resource and having effective solution regarding the environmental problems. Grid connected PVS gained more attention and popularity as the demand of electricity in day to day life is increasing rapidly due to modern civilization.

There are two topology which are widely used to interface PVS to grid; single stage and two stage PVS. In single stage PVS the grid tied inverter is required to control its parameters like output current, output voltage etc. and harmonics mitigation is done by using shunt active filters. Although, single stage remains cheaper but its computational complicity gets increases [1],[5].

A two stage PVS, having separate stages for controlling dc/dc converter by using MPPT algorithm and grid connected inverter by controlled pulses. This topology has less computational complicity. AFLC technique easily handles non linarites and is robust in variable environmental condition. Three phase three leg twelve pulse inverter is used in addition with RLC filter and its switching is control by controlling direct axis and quadrature axis voltage and current using discrete PI controller for maintaining synchronization with grid [2],[3].

The paper is categorized into following sections; Section II presents the system details (DC/DC boost converter, Adaptive Fuzzy Logic Control for maximum power point tracking and Voltage Source Inverter control). Model simulation and results are discussed in Section III and final conclusion has been made in Section V.

II. System Details

The grid connected PVS schematic diagram is shown in fig.1. The overall system comprises of 1.2KW PVS, DC/DC boost converter, three level three phase and twelve pulse voltage source inverter, RLC filter, PV interfaced transformer and utility grid. The advantage of PV interfaced transformer can be summarised as [2]:

- Matches voltage output of inverter with grid by providing suitable taps.
- Injection of DC current into the grid is prevented by using suitable galvanic isolation between grid and PVS, and
- Harmonics of inverter injected currents are filtered.

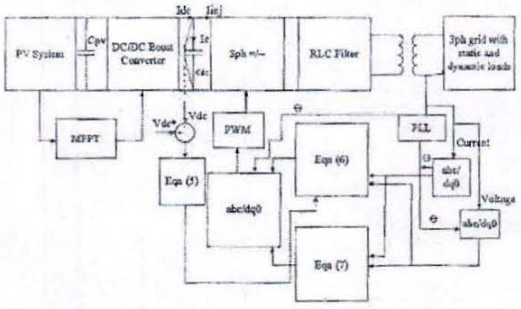

Fig. 1: The Schematic Diagram of GC PVS with Control Blocks

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An Adaptive Fuzzy Tuned PID Controller For The Pitch Control Of Wind Turbine In The Turbulent Winds

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Abstract **Adjusting the pitch angle of the blades provides an effective means of regulation or limiting turbine performance in strong wind speeds, In case of above rated wind speed, large scale wind generators with variable pitch control usually uses PID control to maintain its output power constant. However, as the velocity of the wind varies randomly on a daily and hourly basis, the simple PID controller can hardly achieve satisfactory performance, as at high speed, the relationship between pitch angle and wind speed is nonlinear. This research work presents an adaptive F-PID controller for the control of generated power from a variable pitch variable speed wind turbine. Controller performance is evaluated on the MATLAB/SIMULINK platform and compared with the performance of a PID controller. In this study a wind profile is developed by an autoregressive moving average (ARMA) model and the results are validated to show that proposed F-PID controller can effectively regulate the output power of wind turbine in the turbulent wind speeds.**

Keywords- Fuzzy Logic Controller, Adaptive control, Wind turbine Control, F-PID controller, Pitch controller, WECS.

I. INTRODUCTION

Constantly rising need of energy cannot be fulfilled by the limited available fossil fuel resources moreover the environmental issues forced us to think beyond the conventional energy resources. Wind energy is the most mature technology in the field of renewable energy technologies and is easily available to all. Biggest market share in the wind turbine technology is of variable speed adjustable-pitch wind turbines, instead of constant speed fixed- pitch turbines and to extract the optimum power from these turbines one has to use a sophisticated controller Majority of wind turbines currently available in the market are Pitch control enabled. In comparison to a fixed pitch turbine, pitch controlled systems of same rated power have lower turbine speed with regulated power at the generator. Variable speed mode requires a control technique to adjust the angular position of the rotor blades installed on turbine wheel so that by adjusting the aerodynamic characteristics of the wind turbines, the applied force and torque on the wind blades can be modified to extract the optimum power [6].

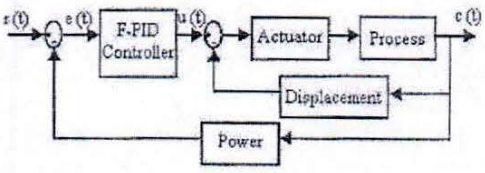
Researcher all around the globe had contributed a lot of work in this field and proposed some of the methods like: sliding mode fuzzy controller [1], Fuzzy controllers [2], single neuron controllers [3], MRAC controllers [4] and so on these approaches shows good performances in their prototypes but only few are used in servo pitch control applications. In this paper a self learning Fuzzy plus PID controller is proposed whose PID parameters are attuned online.

Moreover the wind velocity profile is not a constant one, it varies in considerable amount and has a stochastic nature, In such a situation, for the stable operation of wind turbine and to reduce wear and tear losses it requires a robust pitch control system which can extract the power from wind at wind speeds less than the rated wind speed following the MPPT mode. For the wind speed above the rated speed, it can adjust the pitch angle position of turbine blades to shed off the extra stress on the turbine structure changes to improve the flexibility of drive system.

II. CONTROLLER DESIGN

A. *PID Controller Design*

Three Term or PID (Proportional plus Integral plus Derivative) controller are commercially successful and are widely used as controllers of first choice in industries. PID control structure is simple and robust structure which can be employed even in complex systems.



Current Scenario of Electricity Sector in India and Restructuring

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***Abstract*— As per the experience of restructuring trend in many places of the world, the reform and restructuring process in Indian electricity sector is going on since 1992. To facilitate competition wherever feasible, efforts are being made. This paper presents current scenario of electricity sector in India and emphasizes the recent strategies and policies made by Government of India towards restructuring. With varying degree of success, various states of India have implemented several key elements of the reform program. The model for UPPCL restructuring is proposed. This model can be adopted at national level with suitable modifications, if needed.**

***Index Terms*— Electricity Act 2003, Deregulation, Distribution, Generation, Open Access, Power Sector Reforms, Regulatory Commission, Restructuring, Transmission.**

NOMENCLATURE

ABT	Availability Based Tariff
AT&C	Aggregate Technical and Commercial
BEE	Bureau of Energy Efficiency
CAGR	Compound Annual Growth Rate
CEA	Central Electricity Authority
CERC	Central Electricity Regulatory Commission
CPGs	Captive Power Generations
CTU	Central Transmission Utility
DDG	Decentralized Distributed Generation
Discos	Distribution Companies
DSM	Demand Side Management
ENMRS	Expected Nodal Must Run Share
Gencos	Generation Companies
GoI	Government of India
HHI	Herfindahl-Hirschman Index
IEA	International Energy Agency
IPPs	Independent Power Producers
ISO	Independent System Operator
LI	Lerner Index
LTOA	Long Term Open Access
MoP	Ministry of Power
MRR	Must Run Ratio
MRS	Must Run Share
MTOA	Medium Term Open Access
NEEPCO	North Eastern Electric Power Corporation
NETA	New Electricity Trading Arrangement
NHPC	National Hydroelectric Power Corporation
NMRS	Nodal Must Run Share
NTPC	National Thermal Power Corporation
OA	Open Access
PFC	Power Finance Corporation
PGCIL	Power Grid Corporation of India Limited
PMUs	Phasor Measurement Units
POSOCO	Power System Operation Corporation Limited
PSUs	Public Sector Undertakings
PX	Power Exchange
RE	Renewable Energy
REBs	Regional Electricity Boards
REMC	Renewable Energy Management Centre's
RLDC	Regional Load Dispatch Centre
SC	Scheduling Coordinator
SEBs	State Electricity Boards
SERCs	State Electricity Regulatory Commissions
SLDC	State Load Dispatch Centre
STOA	Short Term Open Access
STU	State Transmission Utilities
Transco	Transmission Company
T&D	Transmission and Distribution
TSO	Transmission System Operator
UI	Unscheduled Interchange
WAMS	Wide Area Measurement System

I. INTRODUCTION

Electricity has become a part of our existence. Moreover, development and economic growth of the country significantly depends on availability of electric energy at economical prices. It is a real time commodity being produced and consumed instantly. Due to increasing demand of electricity, power situation in India is not up to the mark yet. There is a shortage of electricity. In India, the electricity sector is mainly governed by the MoP. Electricity sector has three major pillars (generation, transmission, and distribution). The generation is mainly divided into three sectors like central, state, and private sector. Central sector or PSUs involved in the generation of electricity include NHPC, NTPC, and NPCIL. Various state level corporations (earlier name SEBs) are also involved in the generation and intra-state distribution of electricity. Other than PSUs and state level corporations, private sector enterprises also play a major role in generation,

A Comparative Analysis of Transient Accomplishment of STF and PI Speed Controlled CSI Fed IM Drive

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Abstract— **With the advent of recent power semiconductor devices and various intelligent control algorithms, induction motor (IM) can proficiently be used for high performance variable speed drive application. The objective of this paper is to investigate the transient performance of self-tuned fuzzy (STF) and compare results with PI controlled current source inverter (CSI) fed IM drive. A self-tuned fuzzy-like FLC (STFFLC) is proposed here for the tuning of output normalization factor. STFFLC has two fuzzy controllers; one is used for system performance control and the other for output gain control of the first FLC. The transient performances of the CSI fed IM drive are investigated for different operating speed and load torque conditions using STFLC and PI in speed loop and PI controller in current loop by simulating the system with MATLAB coding.**

Keywords— Proportional Integral, STF, Artificial Intelligent (AI), Current Source Inverter (CSI), Pulse Width Modulation (PWM).

I. INTRODUCTION

The CSI-fed IM drive is used in many industrial applications [1]. To control the speed of IM motor, Drives use mostly a voltage-source inverter (VSI). In terms of energy storage task which is more constructive and profitable in capacitors in comparison with inductors. The employment of VSI's may outcome in decreased drive durability due to the high dv/dt output voltage of PWM inverter. A viable solution for this obstacle is the adoption of PWM –CSI. The CSI method bids various natural advantages for example- short circuit protection, low dv/dt output voltage etc. [2-3].Till now different control strategies are employed to control the speed of IM. For high-power applications, a various level of CSI is proposed [4], in which the excellent phase angles are scrutinized for the reduction of various inverter current total harmonic distortions (THD). Power factor settlement scheme based on motor flux modification for a PWM CSR–CSI-fed high-power motor-drive system has been scheduled in [5]. For a large-power CSI-fed IM drive, a dc-link current denigration design is proposed in [6], which can adequately reduce the drive current rating and depreciate the losses on the semiconductor apparatus and the drive's dc contact. A unique VSI and CSI fed IM drive is drafted in [7], which can be applied for different kind of load like pump load, fan load, compressor load etc. Space-vector PWM CSI fed IM drive scheme is proposed in [8]. A novel hysteresis band current control CSI-fed induction motor drive is designed in [9], which offers the advantages of an ordinary hysteresis band current control. A new unique CSI provided IM drive is proposed [10], which practices two exact multilevel inverters as an active filters, one at the input terminal and another at the motor terminals, with dc bus as common in them.

In this paper transient performance comparison of STF and PI controlled CSI fed IM drive is done. A STFFLC is proposed here for the tuning of output normalization factor. STFFLC has two fuzzy controllers; one is used for system performance control and the other for output gain control of the first FLC. The transient performances of the CSI fed IM drive are investigated for different operating speed and load torque conditions using STFLC and two PI regulators, one is used in speed loop and other in current loop.

II. SELF-TUNED FUZZY SPEED CONTROLLER

To ensure the acceptable control fulfillment over a broad range of load gesture regardless of incorrect operating knowledge or plant changing behavior, adaptability is mandatory for FLC.

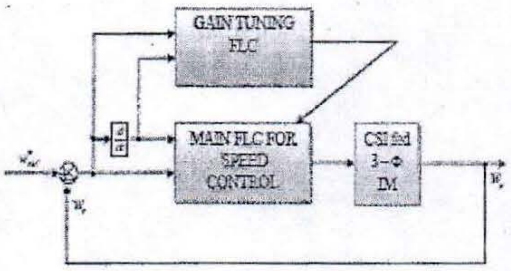

Fig.1 Self-tuned fuzzy logic speed controller of three-phase CSI fed IM

of

Microgrid: A Conceptual Solution for Rural Electrification and its Control Aspects by Varying Inverter Output Impedance

Apoorva Saxena, Durg Singh Chauhan, Shakti Singh Soni

Abstract— **This paper explores the various changes that has occurred in traditional electricity grid that has led to the emergence of Microgrids as a possible solution for rural electrification. It has been observed that inverters forms the basic building blocks of these Microgrids and variation in the output impedance of these inverters through virtual droop control can be used to control the inverter output voltage as well as it helps to improve the voltage quality by reducing the Total Harmonic Distortion(THD).**

Keywords- Electricity market, Hierarchical control, C inverters, Total Harmonic Distortion (THD), resonance

I. Introduction

The advent of technology and electricity market based on the principles of economies of scale, cost plus pricing, monopoly franchise lead to the centralized one way power flow in the electricity grid. The electrification of remote areas was done through extension of the existing grid. But post 1970, with increased focus on environment and sustainable development, the electricity market has undergone a paradigm shift. Renewable integration, two way power flow, competitive pricing has shifted the focus towards a smart distribution network.

The Rural electricity supply in India is suffering both in terms of availability for measured number of hours & penetration level. More than 25% of their rural households yet to have an access to electricity [1].A major bottleneck in the development of the power sector is the poor financial state of the State electricity boards (SEBs), which can be attributed to the lack of adequate revenues, state subsidies for supply to the rural subscribers & high T&D losses to the tune of over 25 %.

Due to high T&D losses and low collection efficiency state utilities have very little incentive to provide electricity to rural areas, which in turn further add to already poor financial status of utilities giving rise to a 'vicious cycle'.

In this paper the concept of Microgrids has been explored as a possible solution for rural electrification and some of the challenges in its implementation are discussed. This paper is organized as follows: Section II outlines the major changes that have happened in traditional grid that supports the concept Microgrids as a possible solution for rural electrification. Section III explains the concepts of microgrids and main drivers for this technological evolution along with the hierarchical control required for its implementation. Section IV discusses the inverters as basic building blocks of these Microgrids and various operational constraints in the operation of these inverters. Section V consists of conclusion.

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II. Major Changes in Traditional Grid

Post 1870, the evolution of traditional electricity grid was based on the concept of Economies of scale which literally means the larger production directly implies cheaper rates. In late 1800's big business houses realized the good business prospects in electric generation and distribution area. So concept of Monopoly franchise with virtually no competition came into existence. The cost plus pricing model in which a small profit was added by the utility in addition to actual cost was practiced as shown in Fig 1

Fig. 1. Cost plus pricing model

Post 1970 due to labour laws, land acquisition for centralized power plant, rise in inflation etc Economies of scale concept started to be less relevant. With restructuring and deregulation of electric energy sector and competitive bidding of power blocks, monopoly franchise also started to wither away. Increased focus on reduction of carbon emissions and sustainable development has changed the way energy is generated and distributed around the world.

These concepts are summarized in Fig 2, which clearly indicates that the electricity energy market scenario has undergone considerable change and so the conventional approach of fossil fuel based centralized generation and grid extension to remote rural areas may not be the way forward. These factors have led to the evolution of traditional grid by employing innovative products and services with intelligent monitoring & control. Microgrids essentially form the basic building block of these smart distribution networks.

Model Adaptive Reference Control Based Boost Converter For Electric Vehicle

Shakti Singh Soni, Om Prakash Jaga, Apoorva Saxena

Abstract— **Gasoline and diesel fuel based automobiles emits greenhouse gases and air pollutant which are responsible for global warming. Efficiency of these automobiles is not desirable or low. This petroleum product are going to be finished within next few decades The problem associated with gasoline and diesel fuel based automobiles can be overcome by replacing it with electric vehicle. An electric vehicle uses fuel cell as primary source of energy. The voltage level of the fuel cell is low which is responsible for high current causes more losses and efficiency of the electric vehicle is decreased. During transient condition likes light, high and normal load condition, the dc bus voltage changes with respect to time. For this application there is requirement of high power dc-dc boost converter, which step-up fuel cell output voltage as per as vehicle requirements. This paper presents modal adaptive reference controller based boost converter and PI controller for controlling the fuel of fuel cell for an electric vehicle. The proposed controller is designed to maintain or regulate constant 100V at dc bus or load side during steady state and transient condition. The proposed controller design operates in stable region during transient conditions. The designed PI controller able to control the fuel (H_2 and O_2) of fuel cell during load demands. The testing of the designed controller is verified by simulating whole system in MATLAB/Simulink 2013a.**

Index Terms— fuel cell, boost converter, pi controller, model adaptive reference control design(MRAC).

I. INTRODUCTION

Internal combustion engine uses petroleum product like petrol and diesel for its rotation system which produces greenhouse gasses as well as high emission resulting in global warming. Electric vehicle is a vehicle that uses electrical energy for rotation system. Use of electrical energy makes automobile industry pollution free.

Electric vehicle uses energy source such as battery, ultra-capacitor, Fuel cell (FC) for propulsion system. FC is unable to respond alone in sudden change in load that is why an ultra-capacitor is required for propulsion system during transient condition. Ultra-capacitor also charges during regenerative braking of motor. As FC is conventionally used as primary source of energy for hybrid electric vehicle so it is required to handle FC power for electric vehicle [1]-[3]. FC is a pollution free source of electrical energy as it never produces any harmful gases. Normally application of FC in electric vehicle as primary source, which can supply uninterrupted power to propulsion system. FC will FC is a pollution free source of electrical energy as it never produces any harmful gases. Normally application of FC in electric vehicle as primary source, which can supply uninterrupted power to propulsion system.

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FC will continuously provide energy on change in demand continuously until the fuel and oxidants are provided [4]-[9].As fuel cell is primary energy source; so it have to provide regular power to propulsion system that is why it is necessary to regulate the output voltage of FC. As voltage profile of FC is low, so a boost converter is interfaced with the FC and dc bus. A control technique is designed for boost converter to maintain or regulate dc bus voltage in proportion to load change. This paper introduces a model adaptive reference control design for boost converter which maintain constant voltage at dc bus during transient condition or during load variation. The stability of the closed loop system is always guaranteed.

II. ELECTRIC POWER MANAGEMENT SYSTEM

The hybrid electric vehicle consists of FC having efficient and less emission of dangerous gasses comparatively to different supply of oil energy. Generally hydrogen and air are used as fuel for FC; it will help to decrease the utilization of typical (non-renewable) source of energy. A boost converter is interfaced with FC and dc bus. Controlling of input fuel for FC is required as load changes [10]-[11]. Input of FC is controlled with the help of a PI controller as shown in Fig.1.

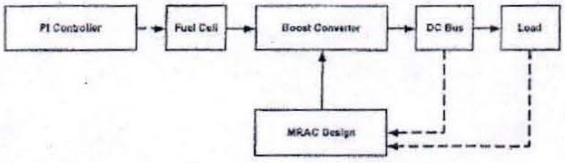

Fig. 1. Power management for fuel cell.

The control technique is simulated in MATLAB/Simulink 2013a.The desired value of the fuel cell current is regulating the input of the fuel cell (hydrogen and air) with the help of PI controller. This PI controller control the amount of hydrogen and air accordingly desired fuel cell current. The model reference adaptive control design controls the output voltage of the boost converter at dc bus (100 V) during transient condition or variation in load demand.

III. MODELING OF BOOST CONVERTER

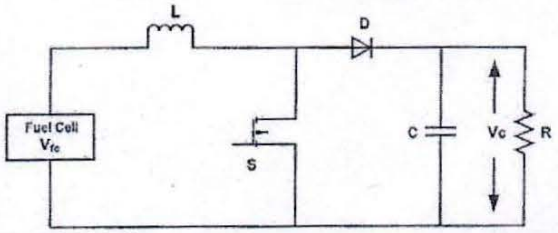

Fig. 2. Model of boost converter.

The typical diagram of boost converter is shown in figure 3, converter uses a diode, an inductor and an IGBT switch (S)

Comparative Study of Dynamic Evolution and Sliding Mode Controller for Fuel Cell System

Om Prakash Jaga, Shakti Singh Soni, Ashish Kumar Shakya

Abstract—**Nowadays, fuel cell is the primary source of energy because of its better performance and clean source of energy in electric vehicle. It is mandatory to operate FC (fuel cell) at constant power and step up the FC output voltage through boost converter. These requirements can be done by different type of controller, but such type (Dynamic evolution, Lyapunov, adaptive cruise, model predictive controller etc) of controller having their advantages and disadvantages. This paper presents a comprehensive state-of-the-art of control strategies such as dynamic evolution controller (DEC) and sliding mode controller (SMC) for fuel cell (FC) system on the basis of stack efficiency and time response of FC parameters like FC output voltage, FC output current etc. This paper also presents a complete modeling of boost converter with FC along with DEC and SMC. These two control strategies have been designed and simulated in Matlab/simulink 2013a.**

Index Terms—Boost converter, FC, PI controller, SMC, DEC.

I. INTRODUCTION

Petroleum product like petrol and diesel are used as fuel in IC engine for its rotation system which produces greenhouse gasses as well as high emission resulting in global warming. Electric vehicle is a vehicle that uses electrical energy for rotation system. Use of electrical energy makes automobile industry pollution free.

Electric vehicle uses energy source such as battery, ultra-capacitor, FC for propulsion system. FC is unable to respond alone in sudden change in load that is why an ultra-capacitor is required for propulsion system during transient condition. Ultra-capacitor also charges during regenerative braking of motor. As FC is conventionally used as primary source of energy for hybrid electric vehicle so it is required to handle FC management for electric vehicle [1]-[3].

FC is a pollution free source of electrical energy as it never produces any harmful gases. Normally application of FC in electric vehicle as primary source, which can supply uninterrupted power to propulsion system. FC will continuously provide energy on change in demand continuously until the fuel and oxidants are provided [4].

(PAFC), solid oxide FC (SOFC) and Proton Exchange Membrane FC (PEMFC). Out of all these FC PEMFC is best and effective FC for conversion of energy in electric vehicle. PEMFC's has better efficiency, low operating temperature(50°-100°) and it never produces any dangerous gasses so it is eco-friendly in nature. PEMFC never offer fast

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PEMFC's has better efficiency, low operating temperature(50°-100°) and it never produces any dangerous gasses so it is eco-friendly in nature. PEMFC never offer fast response due to slow electrodynamics and chemical reaction in it, therefore it cannot reply to unforeseen modification in load [4]-[6]. Another disadvantage is Starvation development. Lack of Fuel or oxygen cell can cause voltage drop during unforeseen energy demand. [7]-[9].

FC consisting of anode, cathode, electrolyte, and catalyst layer. For desire voltage and current FC stack connected in series and parallel. The anode and cathode having a porous gas diffusion layer. Graphite is used for anode and cathode because of its high conductivity property. Nickel and platinum are used as catalysts for used high temperature FC and platinum for low temperature FC respectively to accelerate the rate of chemical reaction[5], [6]

As FC provides continuous power to the load. So that a controller is required for FC management. Inputs for FC are controlled with the help of PI controller, which is common for both the controller used. The controlling output power of FC is done with the help of two control strategies- dynamic evolution and sliding mode controller. In this paper the comparative study of two control strategies are discussed.

II. POWER MANAGEMENT SYSTEM

The hybrid electric vehicle consists of FC having efficient and less emission of dangerous gasses comparatively to different source of oil energy. Generally hydrogen and air are used as fuel for FC; it will help to decrease the utilization of typical (non-renewable) source of energy. A boost converter is interfaced with FC and dc bus. Input control management for FC is extremely required as load changes [10]-[11]. Input of FC is controlled with the help of a PI controller and controlling of dc bus voltage is done with the help of DEC and SMC.

Control technique is simulated in MATLAB/Simulink 2013a. The desire value of input current is 133.33A from fuel cell. This reference value of fuel cell current is compared by the actual value of fuel cell current; resulting an error signal which is given to PI controller. The steady state error is minimized by with the help of PI controller by automatic tuning in MATLAB/Simulink 2013a. The Typical block diagram of FC system is shown in Fig. 1.

Power Quality Aspects of Three Phase Induction Generator in Single Phase Operation

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Abstract— **In this paper work, design and analysis of a STATCOM has been carried out to achieve current and voltage balancing in a three-phase induction generator in a single-phase operation feeding single-phase diode rectifier load. The modeling of the overall system is done in Simulink and performance of the overall system is studied. In this paper, a three-phase self-excited induction generator in single-phase operation by employing Fukami's configuration is modeled using MATLAB/Simulink to feed single-phase diode rectifier load. The final results show that SEIG terminal voltage is maintained constant for both nonlinear balanced and unbalanced loads and no more harmonics using STATCOM-based voltage regulator.**

Index Terms— **Capacitor Bank, Diode Rectifier, MATLAB/SIMULINK, Power Quality, STATCOM, Self excited Induction Generator.**

I. Introduction

The concept of self-excitation of induction machine emerged for the first time in 1935, when Basset and Potter reported that the induction machine can be operated as an induction generator in isolated mode by using external capacitor [4]. Voltage buildup in an induction generator is very much similar to that of a dc generator. The magnetization curve of the induction generator can be obtained by running the machine as a motor at no load and measuring the armature current as a function of terminal voltage [1-3]. This paper deals with the performance analysis of a static compensator (STATCOM)-based voltage regulator for self-excited induction generators (SEIGs) supplying nonlinear loads [13].

In general, a number of loads are nonlinear in nature, that's why they create harmonics in the generating systems. The SEIG's performance is very much affected by these harmonics. In this paper, A three-phase self-excited induction generator in single-phase operation by employing Fukami's configuration is modeled using MATLAB/Simulink to feed single-phase diode rectifier load. The SEIG has more advantages as compared to the conventional synchronous generator as like simplicity, maintenance free, absence of dc, brushless, etc.,

A three-phase induction generator can be used in a single-phase operation to feed single-phase loads. Four connections are possible [13-15]:

I. Steinmetz connection
II. Smith connection
III.C-2C Connection
IV.Fukami connection

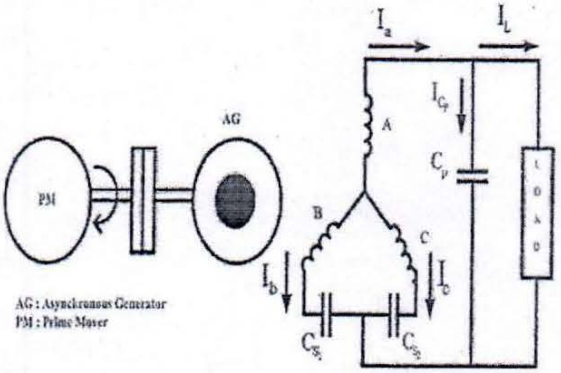

Fig.1 Fukami's configuration

Figure 1 show the configuration which is used in three-phase self-excited induction generator in single-phase operation.

II. Power Quality

The term Power quality means the extent of variation of the voltage, current and frequency on the power system. The variation of voltage and current are in the form of magnitude or waveform shape/distortion [16].

In IEEE Std. 1100-1999, "Power Quality" is defined as "The concept of powering and grounding electronic equipment in a manner that is suitable to the operation of that equipment and compatible with the premise wiring system and other connected equipment".

Power Quality Problems [15-16]:

1. Disturbance
   a) Voltage sag
   b) Voltage interruption
   c) Voltage swells
   d) Transient
   e) Voltage notch
2. Imbalance
3. Distortion
4. Voltage fluctuation
5. Voltage flickering

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The Smith Predictor based Internal Model Controller for Flow Control in a Blending Process

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Abstract-. **Flow control in blending process is a well-known control problem which was solved earlier by different approaches. In our research article, the model of this process is used to derive analytical expressions for PID controller based on Internal Model Controller structure. This concept utilizes an equivalence with the standard Smith Predictor based on desired closed loop transfer function for set-point changes. For clear insight of the proposed technique, we firstly try to establish control parameters for a general first order plus time delay and third order plus time delay models. Simulation for the process system shows better step response in terms of rise time, setting time than those obtained by the Smith Predictor.**

Keywords—**Dead-time systems, Smith predictors, Internal Model Control, Process control, PID controller.**

I. INTRODUCTION

Pure time delay" or "transport lag" is a property of a physical system whereby changes occurring at one point in a system are reproduced at another point after a finite interval of time. The presence of time delays in a system limits the performance of a conventional feedback control system. From a frequency response perspective, a time delay adds phase lag to the feedback loop, which adversely affects closed-loop stability.

In order to improve the performance of system containing time delays, special control strategies have been developed that provide effective time-delay compensation.

Methods for the compensation of time delayed processes may be broadly divided into proportional integral derivative (PID) based controllers, in which the controller parameters are adapted to the controller structure, and structurally optimized controllers, in which the controller structure and parameters are adapted optimally to the structure and parameters of the process model.

II. CONCEPTUAL SMITH PREDICTOR DESIGN

The Smith Predictor technique is the best known strategy (Smith, 1957).Smith [5] suggested time delay compensation scheme for single input/single output systems, now referred to as Smith predictor. Smith predictor is a simple and powerful control technique for processes with time delay.

Various investigators [6, 10, and 12] have found that the performance of a controller incorporating the Smith Predictor for set-point changes is better than a conventional PI controller based on an integral-squared-error criterion.

A block diagram of the Smith Predictor controller structure is shown in Fig.1.

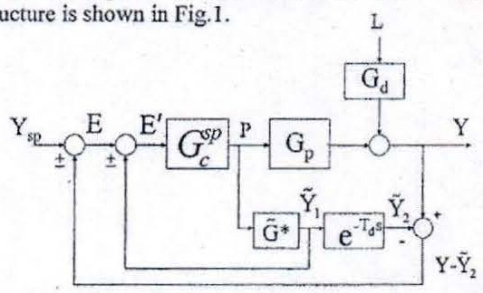

Fig: 1. Smith Predictor Structure

Here, G_c^{sp} is the primary controller (as needed in Smith Predictor).

Plant : $$G^*(s).e^{-\theta s} = G(s) \quad (1)$$

Process model : $$\tilde{G}^*(s).e^{-\tilde{\theta} s} = \tilde{G}(s) \quad (2)$$

where $G^*(s)$ is minimum-phase part of process dynamics including measurement and actuation and θ is pure time-

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An Empirical Investigation of Small Manufacturers for Operational Reliability

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Abstract: *Reliability of a supply chain depends on the reliability of its various components. To be responsive and cost effective. It is very essential to estimate the reliability of the whole chain as well as the individual player. This is very essential to conduct suitable reliability tests and modify them as per the dynamic environment. For this work a statistical tests are conducted with the help of data collection for various elements. On the basis of that the overall reliability is also estimated. Then various suggestions based on investigation are proposed to improve the reliability and acceptability of the small suppliers in supply chain.*

Keywords: *Reliability, Uncertainty, Risk Assessment, Supply Chain Management*

1. INTRODUCTION

Supply chain management Is the key of thought in today's story with basic purpose to integrate all elements of supply chain to improve the supply chain value increase. Supply chain is play important role globally and stimulates the dangerous opportunities in India also. The global manufacture are reduce the cost and increased their quality continuously. Therefore the cut throat competition they are India. Large scale of manufacturers are taking full advantages in India. The changing global story but despite many policy measures for the part of decades, the significant not shown by small scale units. Its improvement to share the global market with large manufactures. This department is very small, and technologically back ward. In which, some of the large problems faced by the factor are access to timely and adequate credit, technological obsolescence, infrastructural. Large scale manufacturers having a cyclonic market. And multiplicity of rules and regulations. Because Condition of this situation the sector of Indian manufacturing could not melt the global expectation and absent the opportunities which really knocking our doors. The small scale industries having special things is that, it highly fragmented and having a pyramidal structure. It means that establishment size is minimize number of unit goes up. The maximum competition occurs by this structure at small and mini sectors. This competition minimum the profit margins, which makes the worst condition. The player of Indian or global in small scale units is supply uncertainty compels the company to keep the high volume of safety inventories. It is very hardly accepted by any big player. In supply chain manufacturing, the small suppliers are considered as the uncertainty generators. Reason is that competency removed from the supply chain. The support of government is proper for small scale industries but it is not enough. In this area, the medium and large manufactures and academia should study for resolve their problems. We can say that this sector can also become an effective and skillful player of supply chain and exploits the advantages of globalization and liberalization.

On the basis of study conducted for a small scale manufacturing unit manufactures auto parts of this paper. This paper is situating at Mathura. In which, the study one of supply uncertainty and analyzed as a supplier selection metrics and over all supply chain performance.

Benski and Cabau [1] emphasis to use the field data to estimate the Reliability and analyze the supply chain performance through it as it gives more realistic results.

1.1. Initial Investigations

The unit basically manufactures various small auto parts for bigger suppliers situated at Noida. From last four years this unit has been facing a tremendous problems related to the quality of products, scheduling, lead time, frequent failures and breakdowns. Because of the above mention reasons and increasing competition this unit lost almost all of its orders and out of the market.

Following points are come out after the initial phase of discussions with the proprietor and senior persons of the unit.

- Initially the unit was doing well with expertise in machining products.
- Later on situation become tough because of increasing competition.
- Company could not manage to manufacture and deliver the products timely.
- Quality and costing were also vulnerable issues.

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5-S Implementation to Reduce the Lead Time via Applying Time and Motion Technique for Identification of Wastes: A Case Study of Small Scale Pipe Industry

Shashank Srivastava, Manoj kumar Agarwal

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Abstract: *A Company is like a living organism. A worldwide increase in demand for products has caused sales to increase tremendously in the peak season. The increased workload at the plant has resulted in longer lead-times The manufacturer is inefficient because it has poor product flow due to operations being departmentalized. The increase in lead-times could cause a loss in the market share to its competitors. The manufacturer must reduce its lead-times in order to remain competitive and continue its growth by providing quality products in a timely manner.The objective of this paper is to develop a plan for eliminating the wastes and consequently reducing lead-times by implementing 5-S in HDPE section of pipe industry. A time and motion study has been done pin point areas that have potential for improvement. 5-S will then be implemented to reduce lead-times and increase throughput.*

Keywords: *5-S, HDPE.*

1. INTRODUCTION

Now days when there is cut and throat competition in the market, it is very difficult for an organization to sustain. Customer requirements changes rapidly, fluctuations in the requirements of the product in market come out to be challenging task for the manufacturer point of view. Therefore, the manufacturer has to respond quickly and accurately as per the market demand to fulfil the customer need. So the organization should focus on all issues during the product development activity, starting from identification of customer needs to last activity that is delivery of the product to the end user. This objective can only be completed when every employee should do their own work with 100 % efficiency. Also the workers should complete all the process in such a manner that will be effective. Various techniques have been applied up to till date to achieve this objective. Some of them are like 5S, Kanban, Just in Time concept that will not increases the productivity but also improve the customer relationship. This paper shows the application of 5S concept which is originally a Japanese concept but now a day's applied worldwide all the industry.

5-S Concept

The 5-S is a philosophy, which focuses on effective workplace organization and standardized work procedures. It is based on five Japanese words that begin with S.

The 5-S philosophy originated in the post World War II era (probably in the mid 1950s) in Japan. At that time, Japanese manufacturing companies were forced to produce with a very few resources, so they developed a shop floor method to make every scrap count while wasting nothing. Originally there were only four activities in the Japanese system, each beginning with the letter S. They were -

SEIRI - Sorting

SEITON - Setting in order, straightening, simplifying

SEISO - Sweeping, Shining, Systematic Cleaning

SEIKETSU - Standardizing

Later, a fifth activity was added, called SHITSUKE (sustaining), which completed the five S elements known as 5-S.Today, the 5-S system retains its fundamental power to change the workplace & involve everyone in the improvement process. It is a system, to reduce waste and optimize productivity through maintaining an orderly Workplace to achieve more consistent operational results. It may be applied to any workplace for a short period of time due to its simple nature.

The brief description of 5-S is as follows:

TABLE 1.1: 5-S Meaning & Objective

The 'S'	5-S Element	What is Involved?	Objective
1-S	SEIRI	Separate necessary items from unnecessary	Proper utilization of space

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Implementation Investigation of Factors for Enhancement in Productivity with Economic Conclusions

Sunil Kumar, Toshit Jain, Manish Rawat

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Abstract: *Productivity is of concern rather an extremely important concern for any manufacturing industry. Several ways of improving productivity are suggested in this paper. Paper explains various productivity parameters which improved in various sections of Industry under consideration. Areas of weak productivity identified which indulges heavy set up or operational cost identified and this paper suggests alternate ways of doing the same process which resulted in cost saving. Cost saving directly means increase in profit. This paper gives the details of all such processes which reflect in cost saving of company undertaken as case study.*

Keywords: *Productivity, Energy saving, Machining, Machine Shop, Cost Saving*

1. INTRODUCTION

Productivity usually defined as a ratio between output and input. It is a fundamental concept considering this efficient and effective use of resources. Dealing with continuous competition, company not only needs to produce quality products but excellence production systems and management also plays an important roles. . The aim of study is to improve the productivity in manufacturing industry. The objective is to identify the defect of the company and create a better solution to improve performance. Various industrial engineering technique and tools is implementing in this study in order to investigate and solve the problem that occurs in the production.

1.1. Objectives of selecting parameters

1) Implementation of tools from industrial engineering in manufacturing industry.

2) Identification of defects in high frequency at workstations

3) Introduction of latest methods in same manufacturing firm.

4) Improvement of productivity in firm.

2. LITERATURE SURVEY

Piotr Tomaszews et al., 2006 identified and analyze the impact comparative productivity of given two projects. One represented an initial development stage while the other represents a subsequent and thus more matured development stage. Henri Juslen et al., 2007 examined whether or not a controllable task-lighting system that allowed people to select high lighting levels will enhance productivity under real working conditions. Hannu Rantanen, 2001 found that internal obstacles form the only category of obstacles which is clearly under the control of the firm. **Carrino et al., 2007** studies the characteristic complications of GMAW processes, owing above to the large count of main variable values and to their inter-dependency, proposed all possible results by designing a fuzzy-logic-based scheme, where elements were dogged by preparing an artificial neural network (ANN).

Dimitrov et al. focus is put on the effectual utilization of 5-axis machining with the high-end CAD/CAM-systems for their tenacity of productivity and quality up gradation. The analysis of several case studies like their comparison between 3-axis machining and 5-axis cutting as a substitute possibility has been proposed.

Weston paper accounts on progresses that assurance such a step change, primarily in auto, aero and construction equipment industries with roll out to other subdivisions. It labels how integrated people, product, process and plant (ip4) virtual environments and innovative forms.

2.1Company Analysis

As per the consolidated - Audited financial statement in the fiscal year of 2012, total overall operating revenue in the firm increased by 10.8%, from Indian Rupees 2, 739.07 tens of millions to Indian Rupees 3, 039.68 tens of millions. So that the operating results increases from Indian Rupees 166.4 tens of millions to Indian Rupees 194.11 tens of millions which got at 16.65% change in overall. Returns on its equity (Net income/Total equity) move up to 14.25% to 14.72%, the Return On Asset (Net income / Total Asset) moved from 3.64% to 4.07% and the Net Margin in Profit

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Tensile Behavior of Hybrid Polymer Nano-composite Reinforced by Al_2O_3 Rod and Spherical Shape Nano Particles

Pankaj Sonia, Kamal Shrama

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GLA University, Mathura, Uttar Pradesh, India

Abstract: *Particulate composite reinforced with Nanofillers are getting increased attention because of their improved tensile and elastic properties. In this work alumina (Al2O3), with rod and sphere shape Nanofillers are used in the fabrication of hybrid epoxy composites. Probe sonicator has also been used for the proper mixing of Nanofillers in the vicinity of epoxy matrix, finally for making the hybrid composites. The dimensions of the Nanorods and spherical particles are 15-30nm diameter & 50nm in length and diameter 20-50nm respectively. Three different types of samples with weight fraction of 0.5%, 1% and 1.5% of Nanofillers are prepared by in-situ polymerization technique. The ASTM standard D638 is followed in the preparation of the samples. A series of unidirectional tensile tests has been performed on the fabricated samples. Best result has been obtained with 1.0 wt. % hybrid composites as compared to the composite without Nanofillers. This may be attributed to the good dispersion of Nanofillers in epoxy matrix. Tensile strength was found to be improved by 9% for 1.0 wt. % sample as compare to 0.5 and 1.5 wt. % hybrid composites. A decline in the properties was also noticed at higher wt. % i.e.1.5 hybrid composites. This may be due to the agglomerations of the filler particles as they have been used in different l/d ratios. Further Morphology of fracture surfaces has also been detected through optical microscopy at 1000X scale. More roughness of fracture surface indicates more energy absorbed during fracture. This experimental work provides the better insight to the researchers working for the materials to be developed for special coatings.*

Keywords: *Hybrid Polymer Nanocomposite, tensile behavior, in-situ polymerization, Alumina Nanoparticles*

1. INTRODUCTION

The development in the industrialized processes and material science has led to development of new composite materials, one such material is reinforcement based polymer composite. Polymeric composite materials are widely used in applications as the following: weight sensitive, high specific strength, stiffness, high wear resistance, excellent corrosion & chemical resistance, high dimensional stability. [Khashaba, 2006]. Highly brittle characteristics of epoxy in term of resistance against cracks initiation and propagation are drawback [Shukla and Parmeswaram, 2007]. Tensile strength enhancement with MWCNT reinforced in epoxy [Zhou et al., 2007]. Increment of 34% in fracture toughness was observed for alumina nano rods at 1.5 wt% over that of neat epoxy and alumina nano rods of higher aspect ratio on the same weight fraction fracture toughness was enhanced 56 % for nanocomposites [Shukla et al., 2013]. Tensile strength of hybrid is high compare to aramid composite and plane composite of 1% nanoparticle alumina [Charvani et al., 2015]. Failure strain and Tensile strength increased 31% &20% at 0.5% &1% wt% of alumina nano rod elastic modulus increase with increase in wt% of nano rod, max 14% at 1% wt% of nano rod [verma et al., 2014]. Moderate increase in the elastic modulus and tensile strength of epoxy-clay nanocomposites at very low volume fraction of clay [Daniel, 2003]. However at higher volume fraction (10%) the elastic modulus increased by 90% whereas the tensile strength decreased by 44%. Fracture toughness increased 57% and showed not suitable improvement in tensile strength and modulus [8]. Improvement in Alumina and its alloys property, SiC with Al_2O_3 reinforced and also mechanical property tensile strength, hardness, density and wear resistance increased [NarayanaMurty, 2003]. Present work is concentrated on hybrid reinforced effect of Al_2O_3 nanoparticles of different size and shape taken are, i) spherical shape ii) rod shape, investigation of tensile behavior was done with the help UTM of nano plug n play servo control. Fractured surface behavior analyzed by optical microscope.The appropriate dispersion of nano-fillers provides more filler surface area accessible for linking with polymer chain, but also restricts the aggregation of filler and the resultant stress concentrator, harmful to the mechanical behavior of composites. However, some challenges, such the fraction of Al_2O_3 in composites, size of Al_2O_3 NPs as well as the viscosity of the matrix have to be overcome to achieve uniform dispersion of the Al_2O_3 NPs in NCs[Kango et al., 2013].

2. MATERIALS AND PROCESSING

Al_2O_3 nanoparticles both type were provided by Sigma Aldrich India. Rod shape particle has 5-10nm diameter &

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Optimisation of Machining Parameters using TOPSIS-Based Taguchi Approach for Turning of AISI D2 Steel

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Abstract: *The present study highlights in order to examine the different turning parameters such as spindle speed (N), feed rate (f) and depth of cut (d) on different performance measures during dry turning of AISI D2 Steel using PVD coated carbide tool. Experiments has been conducted according to L9 orthogonal array in order to assess the turning performance characteristics such as material removal rate (MRR) and surface roughness (Ra). Attempt was further made to convert the multi responses into equivalent single response i.e. TOPSIS. In this study, Decision-Makers' (DMs') subjective opinion (in regards of response weight) expressed in linguistic terminology has been transformed into appropriate fuzzy numbers. Fuzzy representation of multiple-judgments have been aggregated and finally defuzzified to obtain crisp weight. Response data thus obtained from machining experiments along with crisp weight of the responses have been utilized in TOPSIS. Finally Taguchi has been implemented in order to determine the optimal parametric combination.*

Keywords: *TOPSIS-based Taguchi approach; AISI D2 steel*

1. INTRODUCTION

Nowadays, hard turning technology has made tremendous growth and advances in manufacturing industries in order to manufacture of many high precision, high hardness components. AISI D2 steel have been commonly applied in the long run tooling applications, where wear resistance is important, such as blanking or forming dies and thread rolling dies. Hence, it became essential to understand the machinability aspects of these materials.

Kishawy and Elbestawi examined the effect of machining parameters such as cutting speed, feed rate and depth of cut in turning of AISI D2 steel using PCBN tools. They concluded that cutting speeds above 350 m/min, the surface roughness increased with increase in tool wear and this was attributed to material side flow. Konig et al. 1984 noticed that application of PCBN tools in machining of hardened steels improves tool life values as compared to ceramic tools. Aouici et al. (2014) applied RSM and desirability function approach in order to evaluate the optimal process parameter in the turning of AISI D3 steel. Ferreira et al. 2016 done the experimental investigation on the turning of AISI H13 steel with ceramic tools: conventional and wiper. It has been observed that wiper tool reduces the flank wear.

In this paper, TOPSIS coupled with Taguchi philosophy Hwang and Yoon 1981, Lan 2009 has been proposed for optimizing multiple performance characteristics such as material removal rate and surface roughness.

2. MATERIAL EXPERIMENTATION

The study analyzed the effect of machining variables such as spindle speed, feed rate and depth of cut in turning of AISI D2 steel. The machining variables are varied into three different levels which is shown in Table I.

TABLE 1: Domain of Experiment

Sl. No.	Process parameters	Level (1)	Level (2)	Level (3)
1	Spindle Speed (N)	420	605	787
2	Feed Rate (f)	0.05	0.06	0.07
3	Depth of Cut (d)	2	2.5	3

A series of experiments have been carried out on manually operated lathe (Specification of lathe)) in order to obtain the experimental data. So, proper design of experiments has been essential for experimentation. Therefore, Taguchi has been implemented in order to decide the number of experiments. Here, L9 orthogonal (Table II) array has been selected for conduction of experiments. Cemented carbide too has been used for turning operation. Material removal rate and surface roughness have been evaluated as the machining evaluation characteristics. Following is the equation that has been used to determine the material removal rate.

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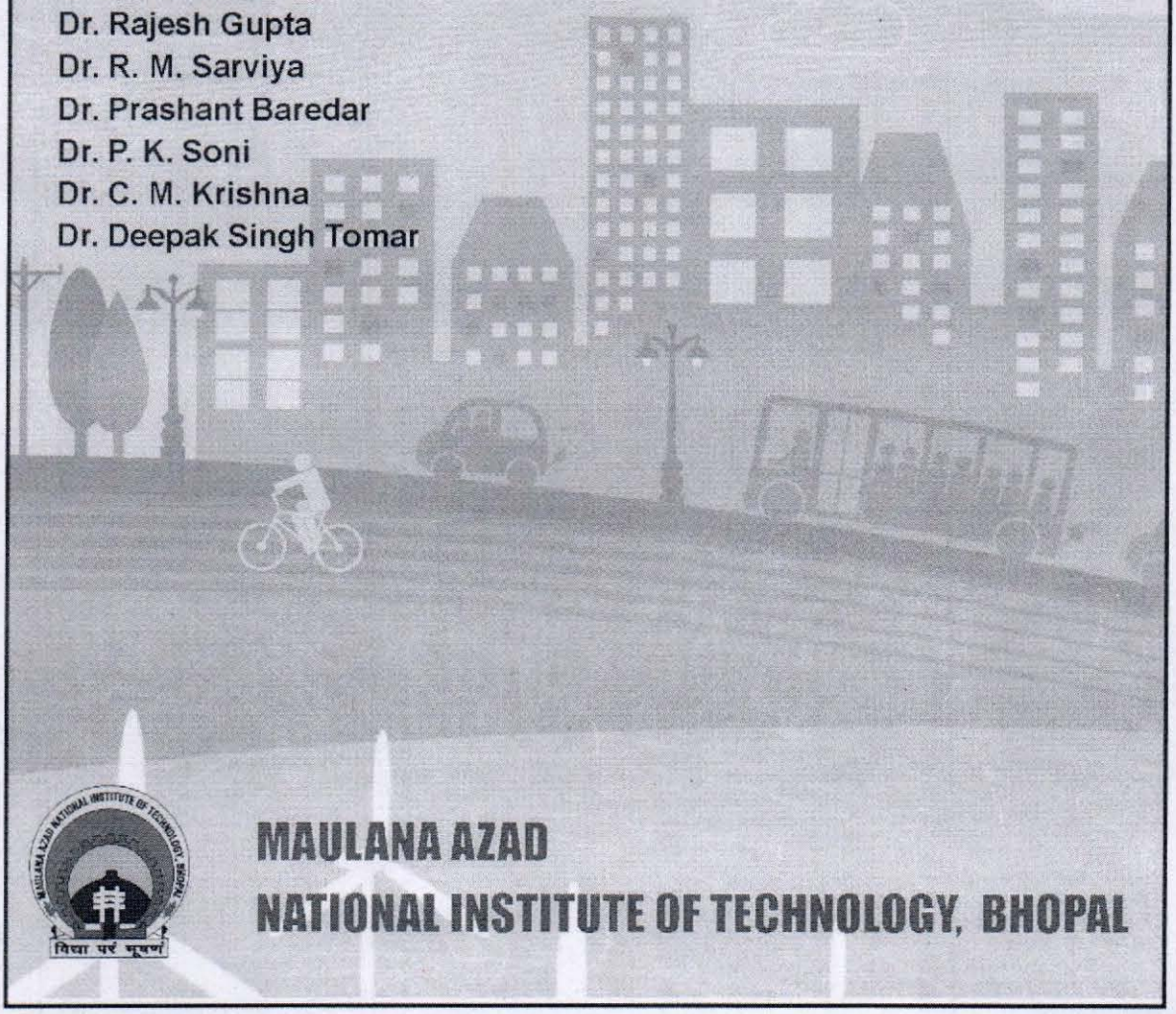

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OVERVIEW OF NON- CONVENTIONAL ENERGY AND CURRENT STATUS OF INDIA IN RENEWABLE ENERGY

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1. ABSTRACT

In this paper a study has been presented regarding various non-conventional energy sources along with their current status in India and ranking of India in world for these sources. Also the various methods are explained by which these renewable sources are derived from their natural source and can be utilized in more effective way. As India is on path of fast economic development along with speedy overall growth. This development requires a large amount of energy which is not fulfilled by present rate of energy production. As the future of country depends on various factors amongst which energy plays a vital role. These energy sources may be natural or harnessed by alternative fuels. The climate change in country caused due to conventional methods of manufacturing energy by burning fossil fuels is a major problem as pollution caused by waste residues obtained from different power plant endangered the mankind and other species. As 59.50% of energy generation is done by harnessing coal in the country which increases the rate of respiratory problems and share of solar, wind and biomass energy are 3.80%, 8.90% and 2.50% respectively in total energy generation. So in order to obtain a clean and safer source of energy one must switch to renewable energy sources. They not only provide us clean energy but they are also inexhaustible and easily available. Some of non-conventional sources include wind energy, hydro energy, solar energy, tidal energy, biomass energy, etc. Since the conventional energy sources are based on fossil fuels which have finite reserves and would deplete in future, thus in order to save them for future generation one must limit the use of these conventional sources and must increase the consumption of non-conventional energy sources. So by adopting different ways of utilizing the non-conventional energy one can increase the share of renewable energy in total energy generation and can overcome the health hazards caused due to uncontrolled burning of fossil fuels. It not only provides clean energy but also reduce the medical expenses of country.

Keywords: Renewable energy; Non-conventional energy; current status; solar; wind; hydro; tidal; biomass

& INTRODUCTION

Amongst the fastest developing economy in the world, India is the third largest producer and fourth largest consumer of electricity. During year 2015-2016 India produce only 96% of its installed capacity of power sources, which shows that the plants are unable to work with its full efficiency. The per capita electricity consumption is 1074.65 Kwh which is very low as compared to other countries in the world. In order to fulfill electricity demand in the country, the government of India launched a scheme called "POWER FOR ALL" under which adequate electricity is made available to all people in country by year 2019.

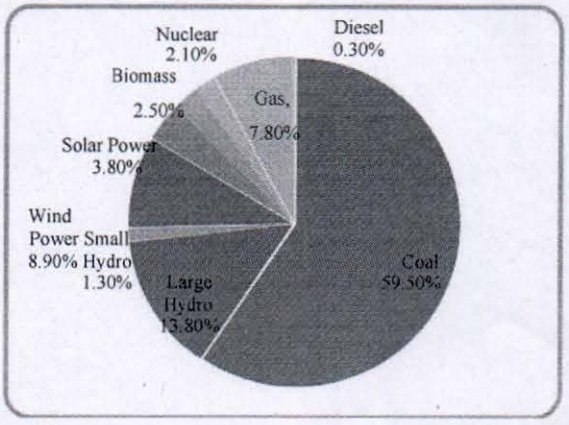

Fig.1 Type wise break up of total installed utility power generation capacity (31 march 2017)

As the transmission and distribution losses during year 2014-2015 war noted as 22.77%, also the green house gases (GHG) emission from electricity generation in 2014 was noted as 2019.67 Mt.co_2, so in order to save mankind once we should adopt non-conventional and renewable sources of energy. It not only saves environment but the energy is made available to all remote areas. As the national

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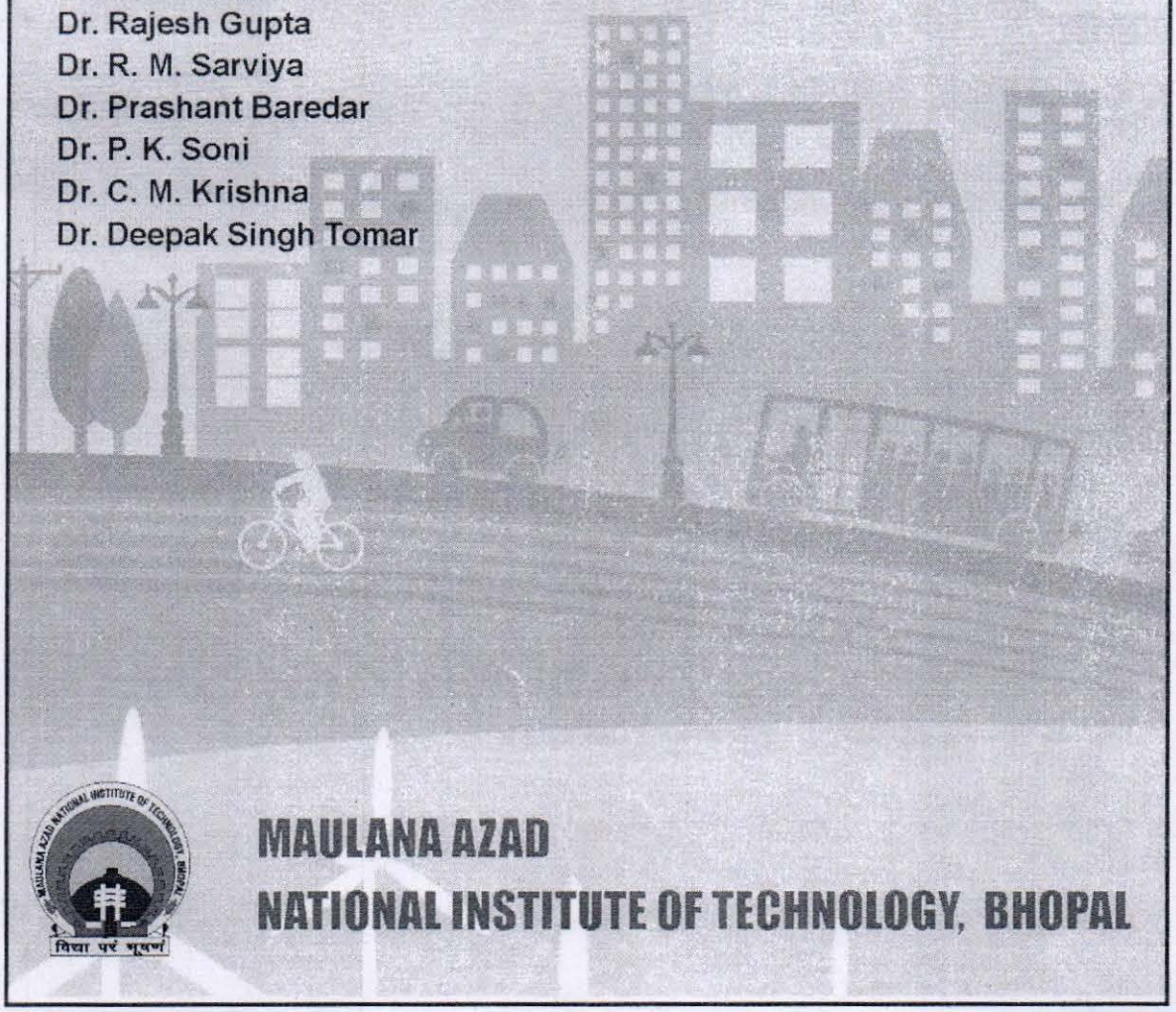

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TECHNOLOGICAL EVALUATION OF ENHANCING THERMAL ENERGY STORAGE IN BUILDINGS USING PCM

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Abstract- ***Building sector is one of the largest primary energy consumer in modern society of which a major portion of energy is utilized for space heating and cooling. The building envelop determines the energy required to heat and cool a building, hence it must be optimized to keep heating and cooling load to a minimum. Latent heat thermal energy storage by using PCM, because of high energy storage capacity, can be a potential technique to reduce energy demand for space heating and cooling purposes. Incorporating suitable PCM into the building material will increase the thermal mass of the buildings which helps in reducing energy demand for space heating and cooling. Therefore, this article shows various methods which can be used to increase the thermal mass of the building by incorporating PCM directly into the constructional material. The article also shows various properties that make PCM suitable for direct use in building materials.***

Keywords—Energy; PCM; Building

I. INTRODUCTION

The demand for energy in India is rapidly increasing with increasing human population, urbanization and modernization. There is a very causal relation between urbanization and energy need [1]. Over 80% of the global carbon emissions are generated by urban centers and consumes more than $1/3^{rd}$ of the total global fossil fuel production [2]. As per International Energy Agency, report 2013, the building sector is the largest energy consuming sector. Globally, it accounts for over $1/3^{rd}$ of the total final energy consumption and is also equally responsible for carbon-dioxide (CO_2) emissions [3].

Figure 1 shows the share of the final end use of energy globally. Currently, space heating and cooling along with water heating accounts for more than 60% of the total final energy consumption in the building sector. Therefore, they represent the largest opportunity to reduce consumption of energy in the building sector. In recent years, the research on developing systems and methods to ensure energy efficiency in buildings has been drastically increased. Energy efficient buildings will ensure a peak power reduction for space heating and cooling, shifting of peak heating and cooling loads to the non-peak hours or low tariff hours, helps in creating an envelope for normal indoor temperature and, efficient utilization of passive heating and cooling loads.

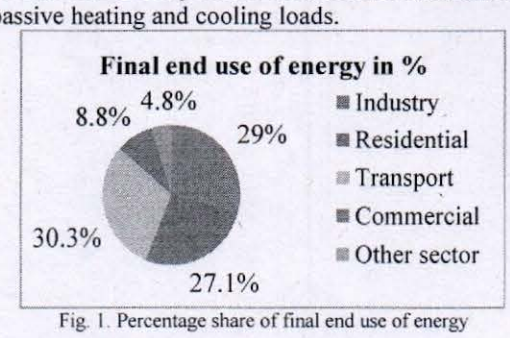

Fig. 1. Percentage share of final end use of energy

Thermal Energy Storage (TES) can be a potential technique in order to reduce the energy consumption of the building sectors [4,5]. Among all the available options of TES, the method which uses Phase Change Material (PCM) integrated into building materials has gained much attention because of higher energy storage capacity over a period of time at a certain temperature [6, 7, 8].

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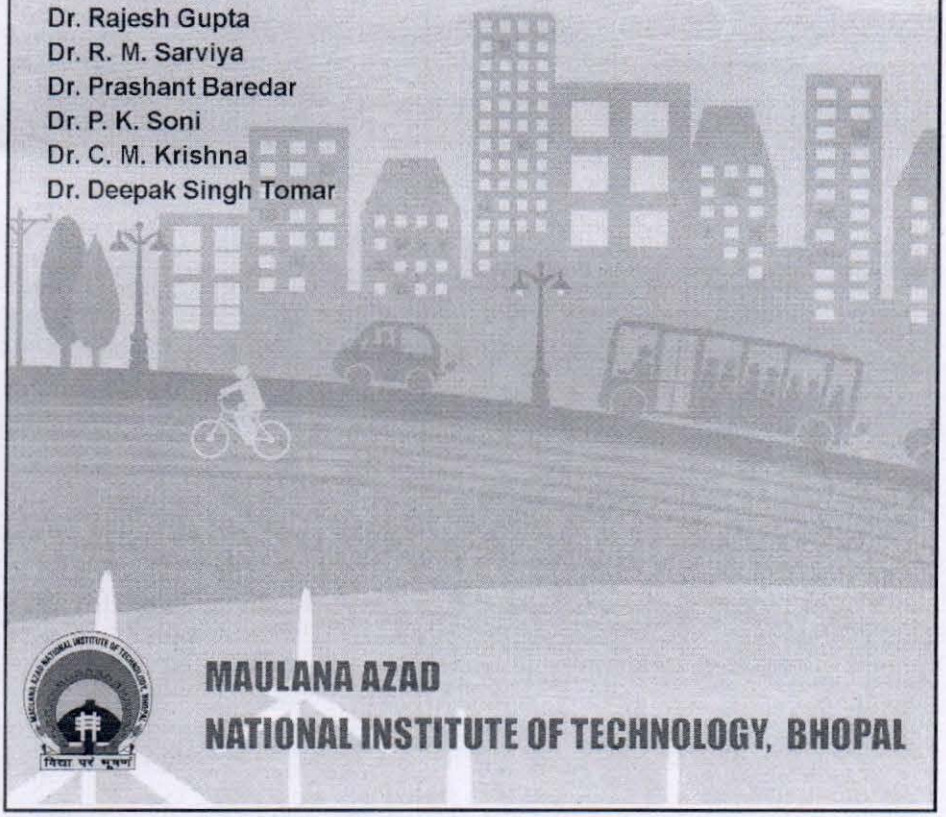

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Charging and Discharging of Shell and Spiral tube LHSS using Paraffin wax as a PCM

Mehtab Alam, Toshit Jain

Abstract—**Thermal energy storage (TES) system using phase change material (PCM) is an interesting area because of its large storage capacity. In this experimental investigation, a horizontal shell and spiral tube heat exchanger using Paraffin wax as a phase change material is used. The melting point ranges of the paraffin wax are 53°C to 57°C considered for calculating thermal characteristics. Due to high specific heat, less cost and easy available water are used as a heat transfer fluid (HTF) in the latent heat storage system (LHSS) and the thermal behavior of PCM during a phase changing process is analyzed. A series of experiments are carried out to study the effects of different inlet temperature at a fixed mass flow rate. The Thermocouple of K-type has been placed for calculating the temperature variation inside the cylinder. This paper also examined the temperature variation inside the cylinder along with radial direction. Natural convection and conduction came into consideration while the melting of PCM and solidification process respectively. Results of mass flow rate of HTF at 0.3 LPM are shown over the inlet temperature at 70°C, 75°C and 80°C. Time of charging and discharging was calculated in this process. Investigated charging, discharging and overall efficiency are calculated 61%, 55% and 36.37% respectively. The maximum useful energy which can be extracted from the system, called exergy and the exergy efficiency of the system is found 13.37%.**

Keywords—**TES, PCM, HTF, LHSS**

IX. INTRODUCTION

Resources provided on the Earth are getting depleted hence, the fossil fuel are being expensive for domestic as well as for the research use. The by-products which are left over after burning are harmful to the environment. The by-products are in the form of gases such as sulphur dioxide (SO_2), Nitrogen oxide (NO_X), Carbon dioxide (CO_2) which is responsible for the sudden climate changes. Moreover, the ashes left after burning affects the surface of the earth in an adverse manner as it does not decompose. Combustion of fossil fuel leads to harmful greenhouse gases like carbon monoxide, carbon dioxide which causes incurable diseases like cancer, and asthma which is a great cause of concern. Shortage of fossil fuels and increasing consciousness towards the human health has made researchers contemplate about the alternatives of fossils. To minimize the above effects and to continue the work smoothly, there is a need to switch to another resource which is affordable and can be used freely. From last few years trends are showing that use of alternative source of energy has been increasing slowly in Figure 1.

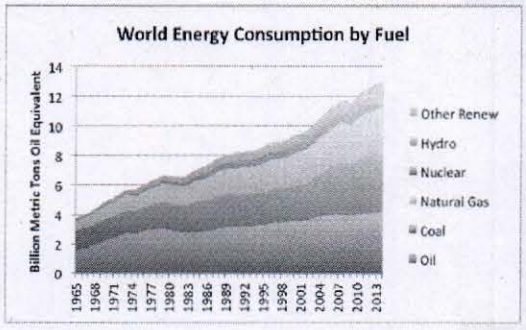

Fig. 1: Development of renewable energy

Above figure represents the energy consumption of fuels measured per year. The graph clearly shows that oil, coal and natural gas have remained to be a primary source of energy since 1965. Their usage has been very high. Use of nuclear and hydropower also had significant growth with time but its consumption is very less in comparison to oil, coal and natural gas. Other renewable sources of energy like solar energy started to proliferate in 2007 and are continually growing with time to become a better alternative for energy generation. There are two ways to get rid of this problem to some extent. One is to use the resources very carefully. Another one is to utilize the available energy sources like renewable energy. Among the various source of renewable energy available, solar energy is present in abundance and is considered innumerable. The solar energy available in a year exceeds the possible

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Design Modification for Anti-Choking Mechanism in Thresher Machine

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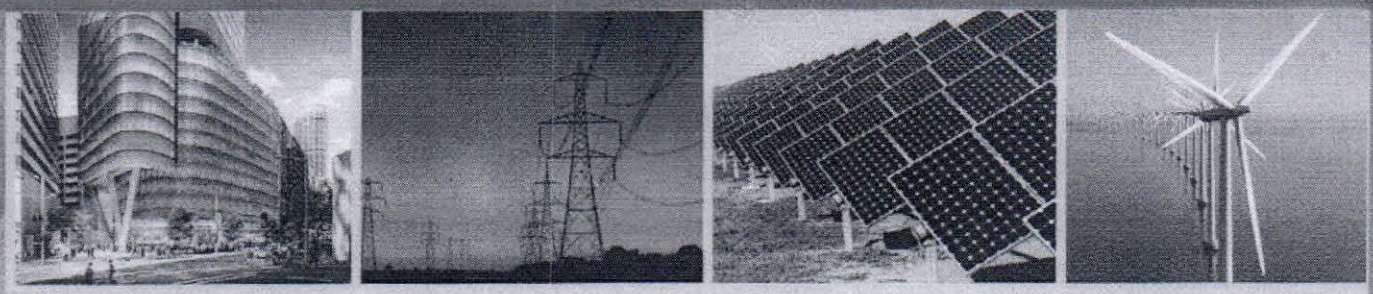
Abstract

This paper suggests a modified thresher machine design for minimizing the problem of choking in the concave. As surveyed in the district of Dantaramgarh, Rajasthan, the major hitch faced by the farmers in employing Multi-crop thresher machine is the choking of straw and chaff in concave clearance as the speed of feed is increased. As the feed is increased the chaff aggregate increases considerably and is forced down the clearance and chokes it subsequently.

To resolve the issue a design was suggested that entailed a concave frame to hold the concave instead of being an integral part of mainframe of machine. The mechanism introduced to move the concave frame was termed as Anti-choking mechanism.

Keywords: Anti Choking, Offset Slider Crank, Multi-crop Thresher, Concave Frame, Concave



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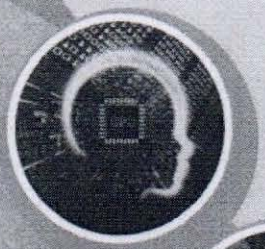

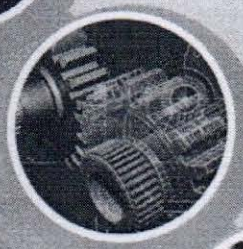

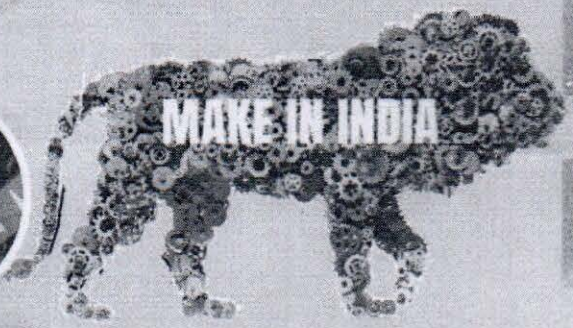

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Effects of Divergent Nozzle on Pulse Detonation Engine Performance

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Abstract—Pulse Detonation Engine (PDE), a propulsion system, includes detonation of fuel to produce thrust more efficiently than current engine systems by enlargement of its mechanical simplicity and thermodynamic efficiency. The concept of PDE is old but has a great impact on efficiency of propulsion engines. At present due to the behavior of unsteadiness this type of engine's design optimizations are not completed and this leads one to improvise nozzle geometry with the nozzle implementation via qualitative numerical predictions. This paper summarizes the computational behavior of Pulse Detonation Engine attached with the divergent nozzle, with the working medium of kerosene and oxygen mixture. Two different tubes are studied for four separate angles. In addition, the effects of a transient detonation process and performance of the engine is computationally predicted using a two dimensional grid in a viscous domain and evaluated from subsonic to supersonic operation. Grid independence study is performed to eliminate/reduce the influence of the number of grids/grid size on the computational results. Pressure variation with the several time intervals are pictured for all test cases. Obtain result of this computational investigation provides that as the nozzle length is increased the responsible impulse is also increased. Overall, to find the quality amount of thrust, high divergence angle at the end of the tube are favored.

Keywords: PDE, Detonation Engine, Divergent-Nozzle, Numerical Prediction, Grid Independence Study

I. Introduction

PDE is an efficient and improved unsteady propulsion technology that uses a repetitive cycle to produce effective thrust. 1990 was the time when researcher took this concept again into consideration and started improving its controlling parameters and responding devices. Researcher found much noticeable improvement in thermal efficiency, specific impulse and mechanical simplicity for this system as camper to other air breathing system.

The major development was observed in the papers of Hoffmann, where both liquid and gaseous hydrocarbons are employed and concept of intermittent detonation was successfully discovered. But later on some unsuccessful attempts were also observed to attain optimum cycle frequency [3]. This leads Nicholls and all in 1957 to explore again the concept of detonation waves for propulsion applications. Nicholls and all studied a simple detonation tube open at the other end, which utilizes fuel and oxidizer at the other end and examined specific impulse of 2100 seconds for hydrogen and air mixtures at attainable frequency of 25 Hz but the attempt of initiation form the open end were not successful [3].

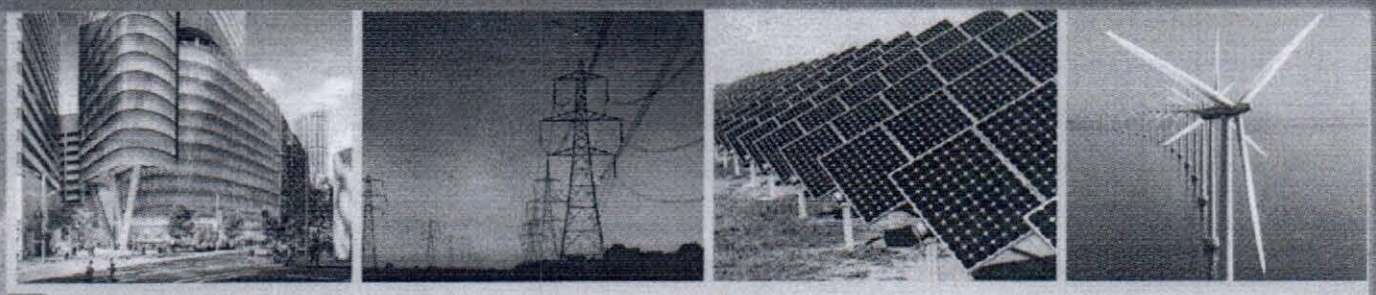
Helman and all did successful attempts to achieve the initiation of detonation inside the detonator tube of small diameter with the mixture of oxygen and ethylene. This repetitive fuel injection resulted in intermittent detonation at frequency of 25Hz. Later on numerical simulation were also carried out to check the performance of PDE system by M. Arian and A. M. Tahsini [1]. Their study was done for the 50 cm long main tube attached to a 43 cm long diverging nozzle, quality issues likes mixing, ignition and transition from deflagration to detonation was ignored under this study. But overall performance gave the specific impulse of approx 6500 seconds at the 667 Hz of operating frequency. Cambier and Tegner [1] computationally investigated the five different shapes of nozzle and their results provide that the presence of nozzle can improve noticeable parameter in the performance of a PDE [1]. Eidelman and Yang adds another conclusion in study by converging and diverging nozzle by re-examining and comparing all the relevant finding. Overall conclusion of these two studies was that the nozzle is truly responsible for the improvement in the efficiency of PDE's system. Another effect of nozzle was investigated by Cooper and Shepherd [2], where the prediction of partial filled model for detonation tube was investigated [2]. Study of convergent and divergent nozzle was experimentally investigated by Cooper and Shepherd and all finding were compared with steady state flow nozzle [2]. Points for the performance of nozzle on PDEs were considered and the whole study is focused to present the effect of divergent nozzle on the pulse detonation engine performances.

PDE allows repetitive ignition, propagation and finally transmission of detonation waves inside detonation tube. Inlet valves, detonation tube and a nozzle at the end are the basic element of our considered propulsion system.

A summary of PDE cycle's process has been clearly explained in figure 1, where part 1 to 3 shows the purging, filling and Ignition stages respectively. Part 4and 5 shows the propagation of detonation inside the complete tube and how effectively it reaches to the exit stage. Simultaneously after a certain period of time a reflection of compressive disturbance is observed, which reflects from the exit wall, and reinitiate ofthe cycle has been clearly mentioned.

II. Geometry

In any Computational analysis, the major step is to model the geometry and generate the mesh. Presented numerical work utilizes GAMBIT for creating geometry



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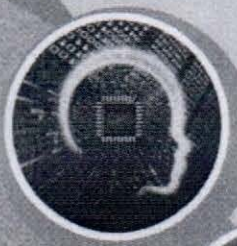

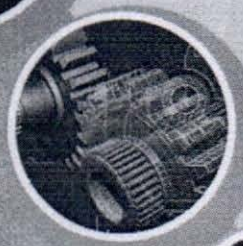

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Computational Investigation Over Helo Deck of Simplified Frigate Ship

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***Abstract*—Backward facing step (BFS) is an obstacle for the helicopters during landing and hovering over frigate ships. Over the time many researchers have seen the behavior of recirculation zone, turbulence airwake and unsteadiness over the helo deck through the method of fluid flow measurement technique and fluid flow visualization. This paper summarizes the computational result of recirculation length on and over the helo deck of a normal hangar. Recirculation length is successfully validated on the helo deck and over the deck against the experimental results. Approx 8.6% variation is found with the experimental results. Recirculation length results is also verified through grid independence check of computational model.**

Keywords: SFS, BFS, Helo, SHOL, WOD

I. Introduction

The naval ships are the vehicle which are used by many countries for various purposes such as guarding coastal lines, naval warfare, sealift providing support to the main warships. These naval ships carry heavy weapons, aircrafts, electronic systems, which controls the operation of weapons and other equipment. The simplified frigate ships (SFS) mainly depend upon their aircrafts (helicopter) for any operation. These helo (helicopters) land at the helo deck of the frigates, located at the stern (aft part) of the ship. The topside of the frigate has a hangar to store the aircraft inside it. The hangar and helo-deck configuration develops the backward facing step (BFS).

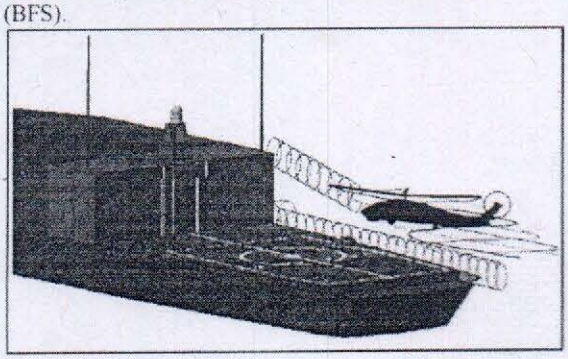


Fig. 1: Complex System of Mutually Interacting Vortices Between Helicopter Rotor and Ship Airwake

Helicopters have to keep an eye over a vast region, which requires frequent take-off and landing in all weather. The operation of helo from the naval frigate is not an easy task for pilot, as he has to keep a track on the moving surface of the ship in either direction for landing and hovering. Another hazardous problem during the operation of helo-ship is ship airwake region, which is highly unsteady, highly turbulent, unpredictable and multi directional. The vortical region gets developed at the backside of BFS resulting in recirculation zone and separation over the helo deck shown in Fig. 2. If the helicopter enters in the recirculation region it is for sure that it will meet an accident. The downwash of helicopter also influences the turbulence to the surrounding air on the deck. The helicopter rotor must be protected from this eddy region created by wind around superstructure. In past, few decades researchers have been focusing on the issue to determine the length of recirculation zone or unsteadiness, so that the helicopter can perform operations smoothly.

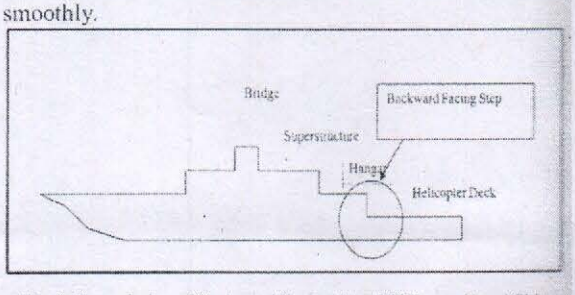
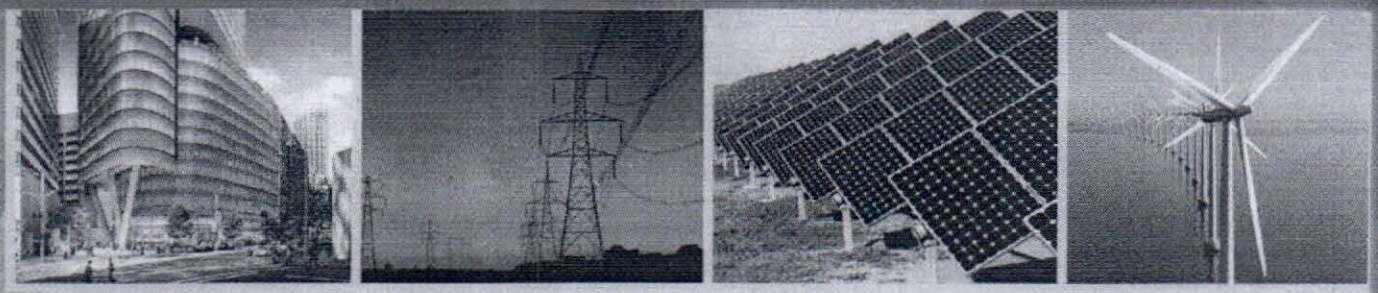


Fig. 2: Formulation of Backward Facing Step (BFS) on a Naval Ship

Several experiments and computation tests were conducted by researchers to reduce the unsteadiness and to make the helo and the pilot safe from getting in contact with the recirculation region. P G Spazzini *et al.* [1] performed numerous experiments over the BFS, varied the step height to space coordinate and observed that the primary recirculation region has more adverse effect on the flow. However, the secondary recirculation region and reattachment region do also affect the flow over helo deck and cause the unsteadiness. B F Armaly *et al.* [2] conducted an experiment to investigate the separation length variation considering Reynolds number varying from 80 to 4000 and abundantly established turbulent flow recirculation region and found that the recirculation length is not much affected by the turbulent flow, which was later validated numerically considering two-dimensional steady differential equation of mass and momentum. Daniel M Safer [3], in an experiment on a model of the naval frigate reduced the unsteadiness and recirculation region over the helo deck to 12.1% inside the wind tunnel with the help of several techniques. J Forrest et.al [4] numerically analyzed the ship airwake using Detached-Eddy Simulation. In this paper, the unsteadiness over the helo deck was examined at different wind velocities and different wind over deck



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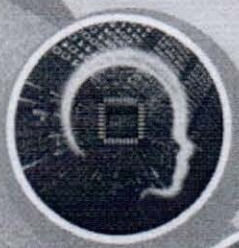

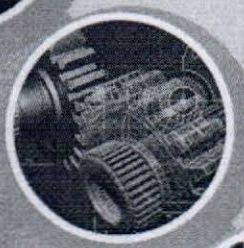

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Selection of Suitable Machining Parameter of Die Sinking Electric Discharge Machine (EDM) to Optimize Material Removal Rate (MRR) using Gray Relational Analysis (GRA) for CNT Reinforced 10-Layered Carbon Fiber Nano Composite

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[3]Professor, Dept. of Mechanical Engg., GLA University, Mathura

Abstract—**In this research work the Gray Relational Analysis (GRA) is used as the optimization technique to find out the suitable process parameter for the machining of Carbon nano tube(CNT) reinforced 10 layered carbon fiber nano composite. GRA apply the specific concept of information. GRA used to determine the suitable process parameter for die sinking Electro Discharge Machining (EDM) for machining of CNT reinforced 10 layered carbon fiber nano composite. In this experimental work four process parameters are selected named peak current(Ip), pulse on time(Ton), Duty cycle(η) and gap voltage(Vg) and the significant effect on material removal rate (MRR) has been calculated. MRR is considering as the main input variable for the basis of selection of suitable process parameter.**

Index Terms: Carbon nanotube (CNT), Die Sinking Electro Discharge Machining (EDM), Gray Relational Analysis (GRA), Material removal Rate (MRR).

I. Introduction

A. Electric Discharge Machining

EDM is a heat-electric metal elimination method in which tool profile is reproduced mirror wise into a work finished material with the shape of the electrode which defines the space in which the erosion will occur [1]. For improving effectiveness work piece and tool are submerged in dielectric fluid so that fluid can easily remove the debris particles. Electrode connected to positive terminal generally erodes at faster rates so work material is made anode and tool material is cathode. Spark is generated by a generator which is assisted with pulse in both tool and work piece which is submersed in dielectric fluid which leads to material removal by thermal erosion and vaporization [2].

When a suitable gap is maintained between work piece and tool (anode and cathode respectively) an electro static field is generated that result in emission of the electrons which discharge the dielectric fluid and breaking them into electrons with higher velocity and positive ions [3].

The latest achievement in the area of EDM have forward due to the arising function of EDM route and the difficulty being faced by the current mechanized industries, from the progress of recent metals that are hard -to-process such as tool steels, mnemonics, carbides, super alloys, hastelloy, wasp alloy, composites, ceramics, stainless steels, heat resistant steel, etc. mostly used in die and mould making factory, area of aerospace, area of aeronautics, and area of nuclear industries. EDM has through its being there felt in the new area such as sports, optical and, medical, dental and jewellery industries, surgical instruments including automotive R&D areas [4].

B. Grey Relational Analysis (GRA)

GRA invented by Deng in 1982, this optimization method work on the some specific concept of information. GRA include two extreme:-

1. At one hand no solution can be find/defined for any system with indication of no information.
2. On the other extreme a system with perfect information has a unique well defined solution.

In the mid of the process GAR provide number of range of solution among which a suitable (not best) solution exist. GRA not provide best solution but it provides a way to find out a good solution with some degree of optimization for any real world problem.

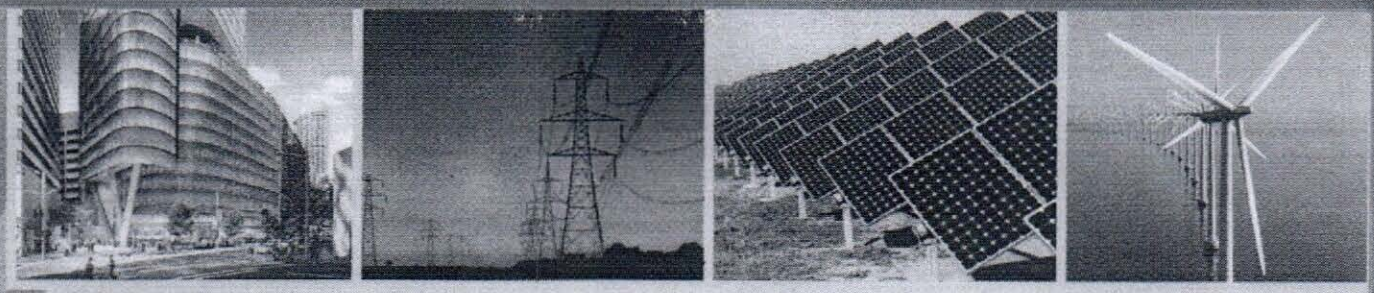
In this method a grey relational grade(GRG) is generate which is the average sum of grey relational coefficient which is defined by following relation:-

$$Y(x0*, xi*) = Yi = (1/n)\xi i(k)$$

Here, n is the number of process responses.

II. Methodology

1. Maximum and Minimum value of MRR and TWR is calculated.
2. Form normalized table of MRR and TWR.
3. Calculate deviation sequence for each response.



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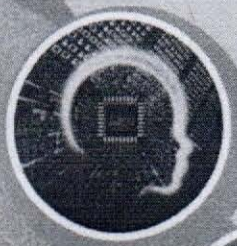

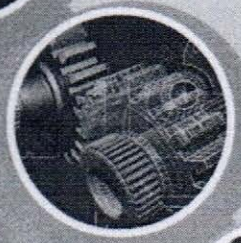

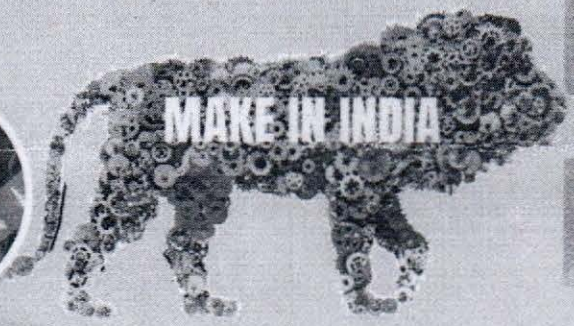

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Noise Control in Tile Cutting Machine by Taguchi

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Abstract—**There are Millions of workers across over the world suffer notably hearing loss as well as mental and health stress due to high levels of factory noise. Tile cutting noise not only affecting the operators work but also create noise pollution that affecting the environment. In this paper noise produce in tile cutting machine is optimized by adopting active and passive noise control method and taguchi as well this paper is helpful for optimizing noise without deteriorating functionality and quality.**

Keywords: *taguchi, noise, deteriorating.*

I. Introduction

Noise can be defined as unwanted sound. They may cause so many serious hazard cause and applications that reducing noise level is of great importance. Loss of hearing is only of the effect of continuous exposure to excessive noise. Noise can interfere with sleep and speech, and cause discomfort and other non-auditory effects. Moreover, high level noise and vibration lead to structural failures as well as reduction in life span in many industrial equipments. The importance of noise issue could be well understood by looking at regulations that have been passed by government to restrict noise production in society.

II. Noise Exposure Limit

The permissible exposure limits for noise are stipulated in the factories (noise) regulations. No person shall be exposed to an equivalent sound pressure level of 85 dBA over an 8 hour work day.

The permissible exposure limits for noise are given in table 1 for every 3dBA increase in sound pressure level in sound pressure level; the exposure duration is reduced by half.

Table 1: Permissible Noise Level

Sound pressure level(dBA)	Maximum duration
82	16 hrs
83	12 hrs
84	10 hrs
85	8 hrs
86	6 hrs
87	5 hrs
88	4 hrs
89	3 hrs
90	2 hrs
91	2 hrs
92	1 hrs 35mins
93	1 hrs16 mins
94	1 hrs
95	48mins
96	38mins
97	30 mins
98	24 mins
99	19 mins
100	15 mins
101	12 mins
102	9 mins
103	7.5 mins
104	6 mins
105	5 mins
106	5 mins
107	3 mins
108	2.5mins
109	2 mins
110	1 mins

III. Fundamental of Sound

Noise is unwanted sound and Sound is a form of energy which is emitted by a vibrating body and on reaching the ear causes the sensation of hearing through nerves. Sometimes sound is not audible when vibrating body is nearby. The frequency limits of audibility of sound frequency are from 20 Hz to 20,000Hz.

There are three basic elements in any noise control system

1. Sound source.
2. Distance travel by sound
3. The receiver of the sound.

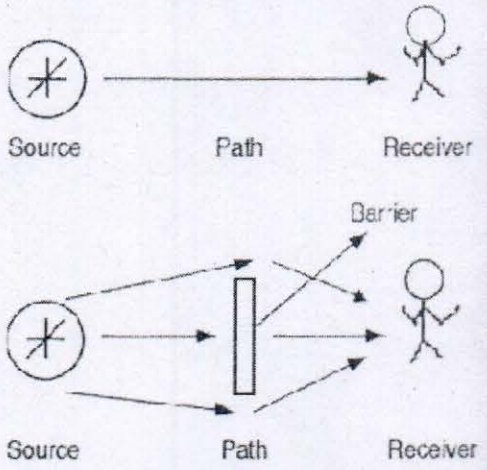
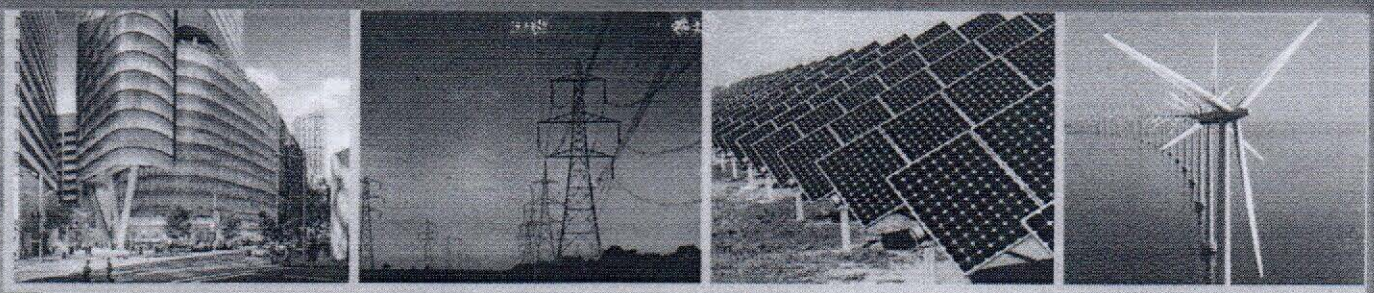
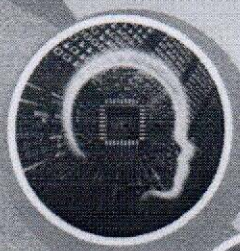
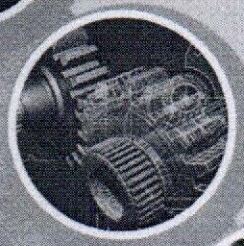


Fig. 1: Inter-Relationship Between the Elements of Noise

Noise is sometimes continuous or intermittent. Noise may be of high frequency or of low frequency which is undesired for a normal hearing. For example, the typical cry of a child produces sound, which is mostly unfavorable to normal hearing. Since it is unwanted sound, we call it noise.







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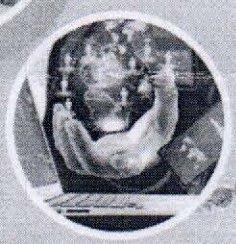

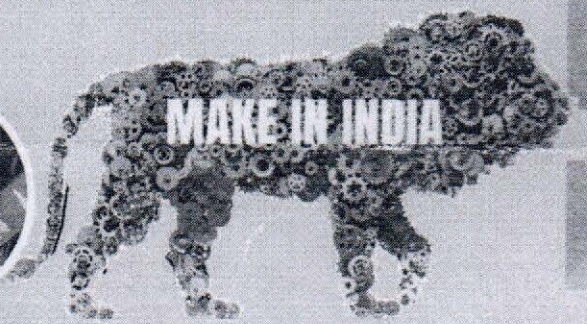

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(592)

Experimental Study of Rapidly Varied Flow in Horizontal Prismatic Channel: Relative Pre-Jump Depth

Sanjeev Kumar Gupta[1] and R.C. Mehta[2]
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Abstract—**In the present paper hydraulic jump in horizontal prismatic channel has been studied and analyzed considering the effect of both approach Froude number (Fr_1) and incoming Reynolds number (Re_1). Empirical models for relative pre jump depth considering relative specific energy before and after the jump based on experimental data using Buckingham π–theorem and regression analysis have been developed The developed empirical computational model is validated using Bhutto (1987) data.**

Keywords: Hydraulic Jump, Froude Number, Reynolds Number, Empirical Corelation

NOMENCLATURE

E_1: Specific Energy before the Jump
E_2: Specific Energy after the Jump
E_L: Energy Loss
E_{RL} Relative Energy Loss
F_{r1}: Froude number
F: Function of
G: Gravitational Acceleration
H_j: Height of the Jump
L_j: Length of the Jump
R^2: Coefficient of Determination
V1: Velocity of Flow before the Jump
V_2: Velocity of Flow after the Jump
Y_1: Depth of Flow before the Jump
Y_2: Depth of Flow after the Jump

I. INTRODUCTION

Hydraulic jump is a phenomenon caused by change in stream regime from super critical flow to sub critical flow with considerable energy dissipation and rise in depth of flow. At the place where hydraulic jump occur rollers of turbulent water form which causes dissipation of energy. Hydraulic jump primarily serve as energy dissipater to dissipate excess energy of flowing water downstream of hydraulic structure such as spillway, sluice gates, etc. This excess energy, if left unchecked, will have adverse effect on the banks and the beds. A review of literature shown that earlier researcher studied the hydraulic jump characteristics only in terms of approach Froude number. In the present paper hydraulic jump in horizontal channel has been studied and analyzed considering the effect of both approach Froude number and incoming Reynolds number. Empirical models for relative pre jump depth considering relative specific energy before and after the jump based on experimental data using Buckingham π–theorem and regression analysis have been developed. The developed empirical computational model is validated using Bhutto (1987) data.

II. EXPERIMENTAL SET-UP AND METHODOLOGY

A. Experimental Set-up

The experiment was carried out in Hydraulic Laboratory of Applied Mechanics Department of Motilal Nehru National Institute of Technology Allahabad. The general layout of experimental setup is shown in fig (1). The setup consist of (1) an over head supply tank (2) feeder pipe with regulating valve (3) inlet tank (4) stilling basin (5) test section (6) sharp edged vertical regulating gates (7) point gauges with slider (8) discharge tank with rectangular weir.

B. Experimental Procedure

Experiments on free hydraulic jump are carried out in a rectangular horizontal prismatic channel. A series of runs at different values of discharge were experimented and hydraulic jump was formed by operating the tail gate and sluice gate. For each run initial depth, sequent depth and length of hydraulic jump were measured. The above steps were performed sequentially at different valve opening. The discharge in the channel is measured with the help of sharp crested rectangular weir. The initial depth, sequent depth and height of water flowing over the crest of weir are measured with the help of point gauge.

III. DIMENSIONAL ANALYSIS

Based on the phenomenon of hydraulic jump, the important parameters affecting the hydraulic jump phenomenon and energy dissipation downstream of hydraulic structures are Y_1, Y_2, V_1, V_2, L_j, H_j, E_1, E_2, E_L, E_{RL}, ρ, g, μ, ε and η which can be explored as:

$$f(Y_1, Y_2, V_1, V_2, L_j, H_j, E_1, E_2, E_L, E_{RL}, \rho, g, \mu, \varepsilon, \eta)=0$$

With the help of Buckingham's π-theorem and taking Y_1, g and ρ as repeating variables, the following dimensionless groups are developed

Charging and Discharging of Shell and Spiral tube LHSS using Paraffin wax as a PCM

Mehtab Alam, Toshit Jain

***Abstract*—Thermal energy storage (TES) system using phase change material (PCM) is an interesting area because of its large storage capacity. In this experimental investigation, a horizontal shell and spiral tube heat exchanger using Paraffin wax as a phase change material is used. The melting point ranges of the paraffin wax are 53^0C to 57^0C considered for calculating thermal characteristics. Due to high specific heat, less cost and easy available water are used as a heat transfer fluid (HTF) in the latent heat storage system (LHSS) and the thermal behavior of PCM during a phase changing process is analyzed. A series of experiments are carried out to study the effects of different inlet temperature at a fixed mass flow rate. The Thermocouple of K-type has been placed for calculating the temperature variation inside the cylinder. This paper also examined the temperature variation inside the cylinder along with radial direction. Natural convection and conduction came into consideration while the melting of PCM and solidification process respectively. Results of mass flow rate of HTF at 0.3 LPM are shown over the inlet temperature at 70^0C, 75^0C and 80^0C. Time of charging and discharging was calculated in this process. Investigated charging, discharging and overall efficiency are calculated 61%, 55% and 36.37% respectively. The maximum useful energy which can be extracted from the system, called exergy and the exergy efficiency of the system is found 13.37%.**

***Keywords*—TES, PCM, HTF, LHSS**

IX. INTRODUCTION

Resources provided on the Earth are getting depleted hence, the fossil fuel are being expensive for domestic as well as for the research use. The by-products which are left over after burning are harmful to the environment. The by-products are in the form of gases such as sulphur dioxide (SO_2), Nitrogen oxide (NO_X), Carbon dioxide (CO_2) which is responsible for the sudden climate changes. Moreover, the ashes left after burning affects the surface of the earth in an adverse manner as it does not decompose. Combustion of fossil fuel leads to harmful greenhouse gases like carbon monoxide, carbon dioxide which causes incurable diseases like cancer, and asthma which is a great cause of concern. Shortage of fossil fuels and increasing consciousness towards the human health has made researchers contemplate about the alternatives of fossils. To minimize the above effects and to continue the work smoothly, there is a need to switch to another resource which is affordable and can be used freely. From last few years trends are showing that use of alternative source of energy has been increasing slowly in Figure 1.

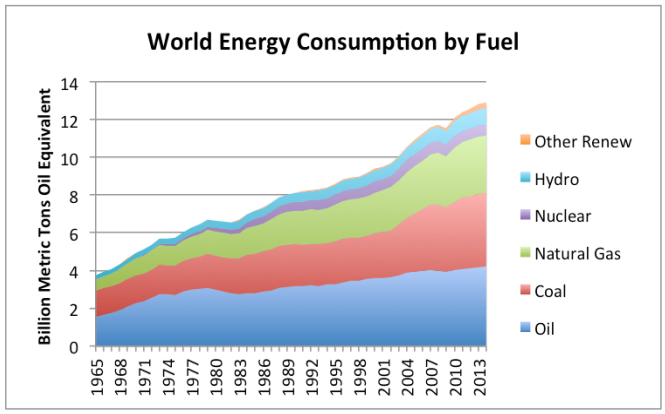

Fig. 1: Development of renewable energy

Above figure represents the energy consumption of fuels measured per year. The graph clearly shows that oil, coal and natural gas have remained to be a primary source of energy since 1965. Their usage has been very high. Use of nuclear and hydropower also had significant growth with time but its consumption is very less in comparison to oil, coal and natural gas. Other renewable sources of energy like solar energy started to proliferate in 2007 and are continually growing with time to become a better alternative for energy generation. There are two ways to get rid of this problem to some extent. One is to use the resources very carefully. Another one is to utilize the available energy sources like renewable energy. Among the various source of renewable energy available, solar energy is present in abundance and is considered innumerable. The solar energy available in a year exceeds the possible fossil fuel reserves in India. It has various advantages over fossil fuels. It has no energy input cost, unlike coal and gas. It has no transportation cost input. Various materials are being discovered for the thermal energy storage in various sectors like domestic, industrial, transportation etc. Thermal energy storage is the process of storing excess solar energy during peak hour time (day) and using it later. Thermal energy is used for both short-term storage (when energy is stored for few hours) as well as long-term storage (energy stored for months or more). LHTE can be done using various phase change material (PCM) which are broadly classified as solid-solid, solid-liquid, solid-gas, and liquid-gas. Generally, solid-liquid phase change materials preferred over solid-

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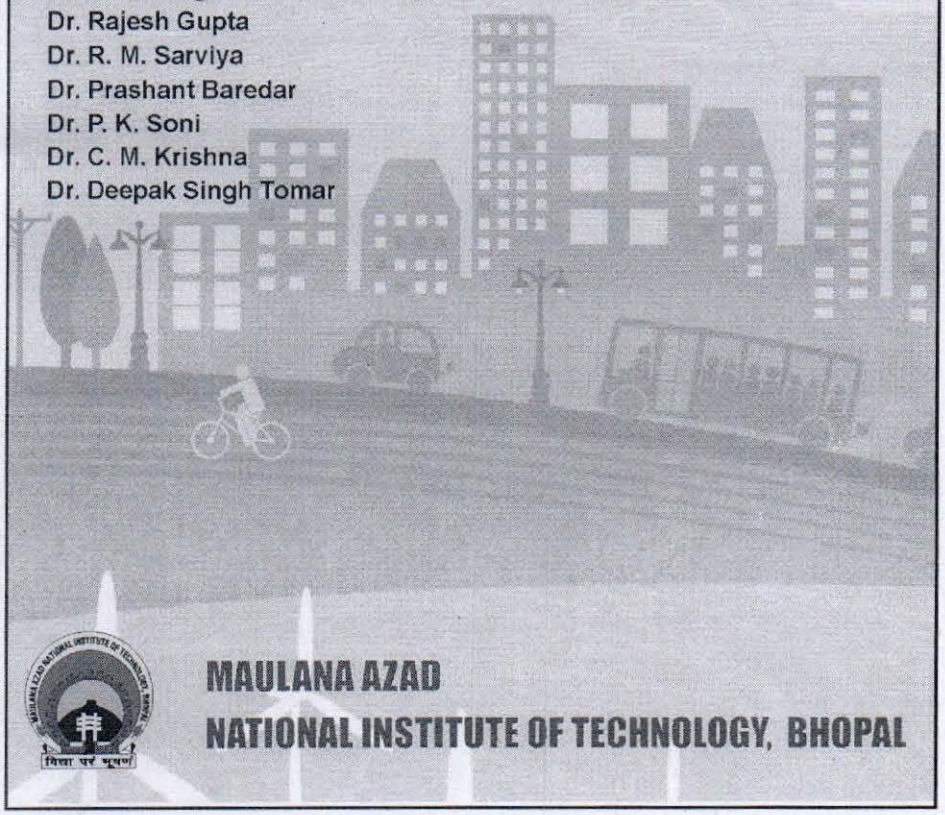

MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY, BHOPAL

Smart Technologies for Green and Sustainable Future (STGSF-2017)
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Numerical study in Channel Angular Pressing of friction with strain energy on Aluminum Alloy

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GLA University, Mathura

Abstract

Equal channel angular pressing (ECAP) is a method used to impose strain energy in material which helps to increase the mechanical properties of a material. It is generally used to refine grain size of the material by passing sample through equal channel. In this study, analysis on frictional effect in equal channel angular pressing using aluminum 1100 has been done by using finite element (FEM) software DEFORM-3D version 10.1. Dies with different channel angle were designed with the help CATIA. This study shows the effect of friction with different die channel angle and changes incurs with change in energy. It has been found that with the increase in friction, reduction in corner gap is found (dead zone), which may cause material damage and improve strain distribution homogeneity. The result obtained with FEM simulation are compared to those obtained theoretically, thus it is found that the current study is in good agreement to the theoretically result.

Keywords

Die channel angle, Equal channel angular pressing, Finite element analysis, Friction, Strain

Nomenclature

$\&_y$ Yield stress (N/mm^2)
& $_0$ Friction stress (N/mm^2)
10. Constant of yielding
d Grain size of material (m))
ε_N Equivalent strain (mm/mm)
9. Shear strain (mm/mm)
5. Number of passes
Φ Die channel angle (^{0})
Ψ Curve angle (^{0})

Introduction

Ultrafine grained (UFG) materials can be obtained by equal channel angular pressing (ECAP). Many Severe plastic deformation (SPD) techniques have been developed to produce bulk ultra-fine grain material. Equal channel angular pressing is widely used method among the several severe plastic deformation (SPD) for obtaining bulk, defect free material. Ultra-fine grains have increased their strength at a lower temperature scale and rapid formability at some elevated temperature therefore seeking an important industrial prospect. According to the Hall-Patch equation [1] grain size of the material is related to the strength of the material which is given by equation (1):

$$\sigma_y = \sigma_0 + kd^{-1/2} \quad (1)$$

Equal-channel angular pressing (ECAP) developed by Segal [2] and Valiev [3] to produce huge ultra-fine grain materials hence improve mechanical properties of the material. Process of ECAP can be seen in figure (1), which shows, a billet is being passed through two equal channel made in die by pressing the billet by a punch. In this process plastic strain is imposed by simple shear at the intersection of the channels. The main advantage which makes this process

attractive is that strain can be imposed in this process without any reduction in the cross sectional area of work-piece and it is a relatively simple procedure that is easily performed on a wide range of materials. Lubrication is used in process to reduce friction between the channel wall and work-piece. In this process it is the shear deformation occurs in the material at the

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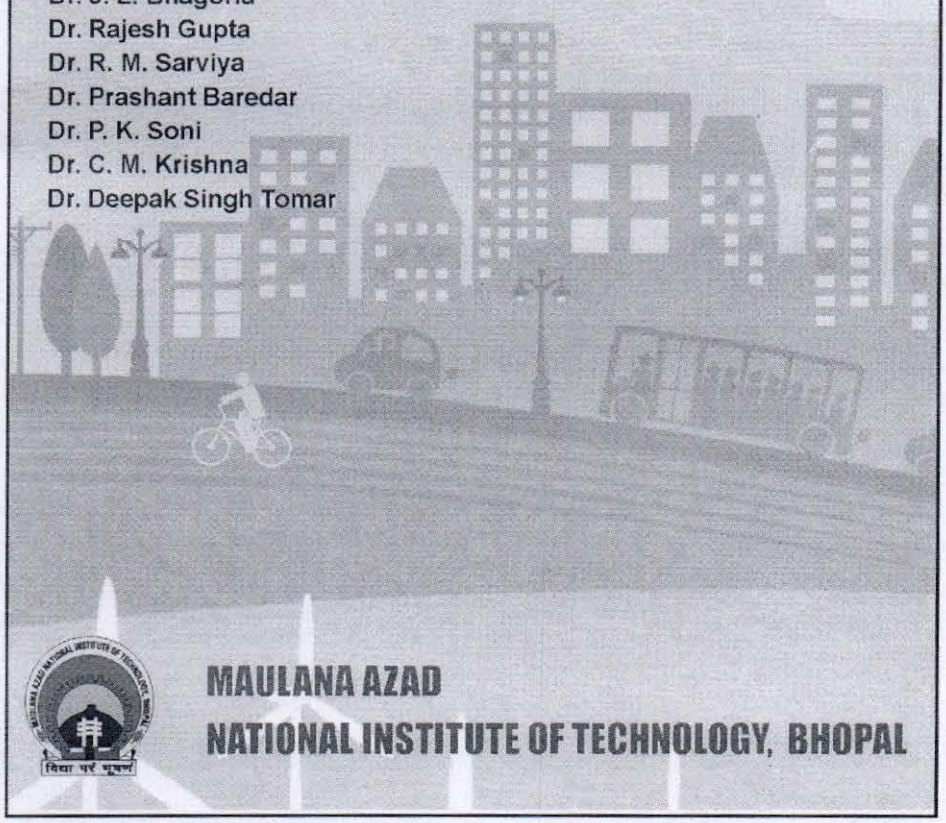

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Smart Technologies for Green and Sustainable Future (STGSF-2017)
Maulana Azad National Institute of Technology, Bhopal (M.P.)

Energy Saving by Productivity Improvement using Alternate Manufacturing Techniques

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[1,2,3] *Department of Mechanical Engineering, GLA University, Mathura*

Abstract: Productivity is of concern rather an extremely important concern for any manufacturing industry. Several ways of improving productivity are suggested in this paper. Paper explains various productivity parameters which improved in various sections of Industry under consideration. Areas of weak productivity identified and suggestions given are applied to that area and results obtained. Considerable savings in time taken for new suggested process and hence energy saving in form of reduction of wastage of electrical energy is thus obtained as a result. As energy is of at most importance for Mixed Economy like India's. So this paper gives satisfactory result in terms of electrical energy saving which further saves capital input given to Machines in form of electrical energy.

Keywords: *Productivity, Energy saving, Machining, Machine Shop*

1.Introduction:

Productivity usually defined as a ratio between output and input. It is a fundamental concept considering this efficient and effective use of resources. Dealing with continuous competition, company not only needs to produce quality products but excellence production systems and management also plays an important roles. . The aim of study is to improve the productivity in manufacturing industry. The objective is to identify the defect of the company and create a better solution to improve performance. Various industrial engineering technique and tools is implementing in this study in order to investigate and solve the problem that occurs in the production.

It is the reduction in the wastage of resources and concerned with optimal utilization of inputs and that input may be man, material, machine, time; for the production of goods and services. OEEC i.e. Organization of European Economic Community defines productivity as the ratio between the productions of given commodity measured by volume and one or more of the corresponding input factors also measured by output. EPA i.e. European Productivity agency defines productivity in a different way as "productivity is an attitude of mind. It is mentality of progress, of the constant improvement of that which exists. It is certainty of being able to do better than yesterday and continuously.

1.1.Objectives of selecting parameters

1) To implement tools from industrial engineering in manufacturing industry.
2) To identify the defects of high frequency at workstations
3) To introduce latest methods in same manufacturing firm.

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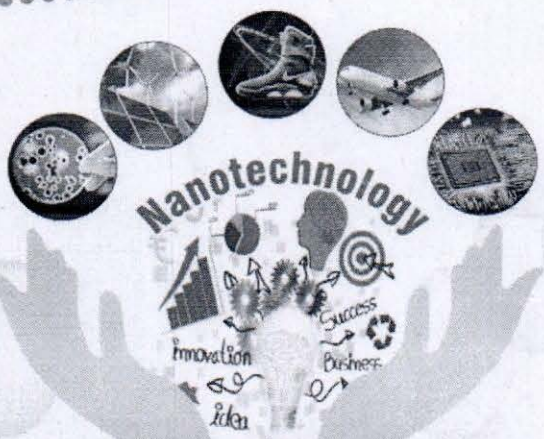

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Application of Nanofluid in Thermal Energy Storage System: A Review

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ABSTRACT

Traditionally, energy was stored as a sensible heat that has a problem of large volume for storing heat, to eliminate this issue latent heat energy storage system (LHTESS) was introduced. Latent Heat thermal energy storage using phase changing materials (PCM) is a very popular source to fulfil the gap between demand and supply of energy. Storage system using PCM has also a problem of thermo-physical properties such as low thermal conductivity. PCM using nanofluid is the best way to diminish the problem of intermittent energy in cold region where the demand of thermal heat is more than the supply. Nanofluid is a nano-sized particle which is mixed with the base fluid to enhance the thermo-physical properties of base fluid. In thermal energy storage system researchers are now focusing on the usage of nanofluid because it increases the heat transfer rate with little pressure drop acting as a single-phase fluid. In this article, many scholar papers are reviewed based on the thermal properties such as thermal conductivity, viscosity, specific heat, and density of nanofluid. This paper also reviews the variation of thermal properties with inlet temperature and concentration of nanoparticles examined in previous researches. The recent scope on the study of nanofluid is in method of preparation, ways to enhance the stabilization of nanofluid in many fields such as energy, mechanical and biomedical fields. After exploring the effect of nanofluid in TES system through scholar papers, in future the further investigation will be done by using nanofluid like TiO_2, CeO_2, and Al_2O_3 etc as a heat transfer fluid (HTF).

Keywords: PCM; HTF; LHTESS.

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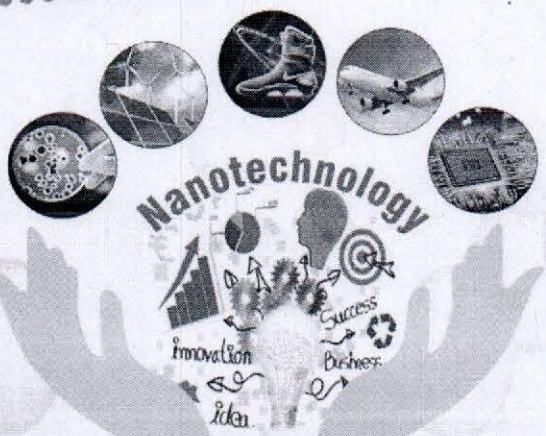

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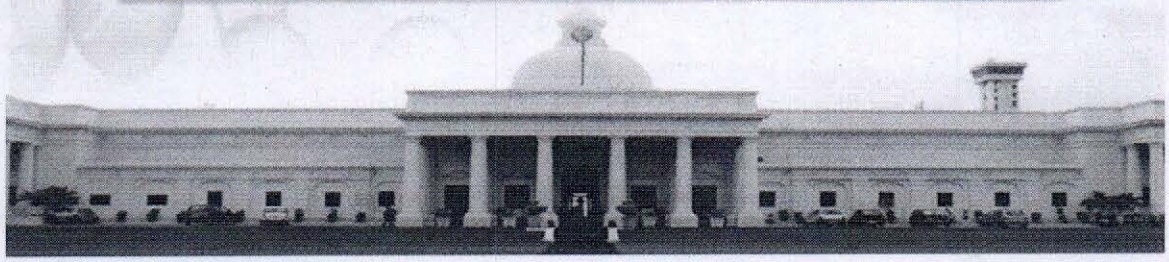

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Recent Developments in Thermal Conductivity of Normal Nanofluids and Hybrid Nanofluids: A Review

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ABSTRACT

In the last two decades, a new engineering fluid called Nanofluid has been considered as the promising option in the various heat transfers application since pioneering researchers discovered enhanced heat transfer characteristics of these fluids. Nanofluids are colloidal suspension of nanoparticles in common heat transfer base fluids such as deionized water (DW), ethylene glycol (EG), engine oil (EO), kerosene, EG/DW mixed. Hybrid nanofluids are suspension of two or more types of nanoparticles into base fluid. This review is an attempt to summarize the recent research in enhancement of thermal conductivity of various normal nanofluids and hybrid nanofluids with all of their significant features and findings. The present study demonstrates the influence of different factors such as nanoparticle size, concentration of nanoparticles in base fluids, surfactant, the temperature and type of base fluids. In literature many experimental investigation reported anomalous enhancement in the thermal conductivity with increase in nanoparticles volume concentration and temperature.

Keywords: Nanofluids; Nanoparticles material; Thermal conductivity; Hybrid nanofluids.

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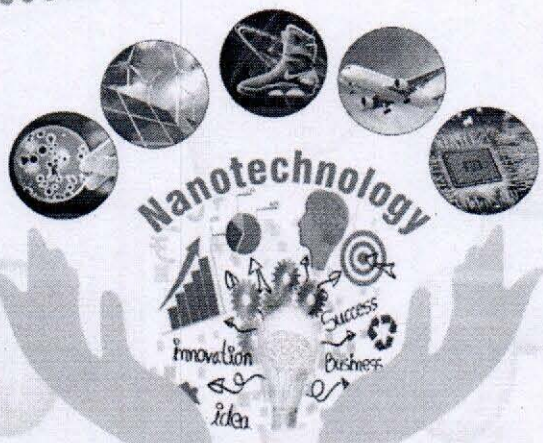

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A Review of Thermo-physical Properties of Nanofluids

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ABSTRACT

Nanofluids are the new class of thermo-fluidics and also an emerging area for research. Due to their superior thermos-physical properties, researchers were attracted towards their application in different thermal devices. Although, the effect of nanofluid applications on thermal performance of thermal devices is still controversial. Researchers claimed that the positive impact of the nanofluid application on thermal performance is due to their enhanced thermal properties like thermal conductivity, specific heat and viscosity etc. The goal of this review is to provide an overview of thermos-physical properties of nanofluids. Authors also enlist the different parameters responsible for the change in thermos-physical properties of nanofluids. All parameters have individual or combined effects on thermos-physical properties of nanofluids. Authors have drawn the attention of research community to explore the dependency of all parameters on each other.

Keywords: Nanofluid; Thermal conductivity; Specific heat; Viscosity.

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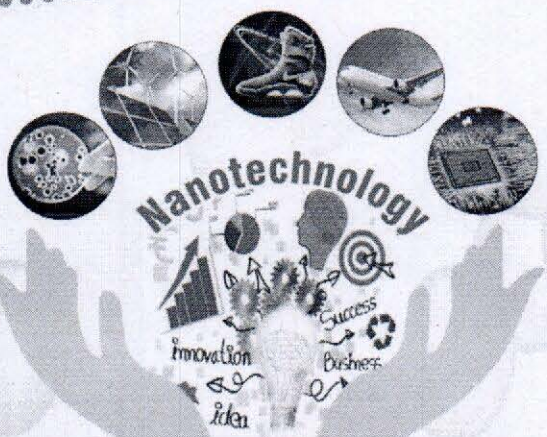

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Effects of TiO_2 /H_2O Nano fluid Application on Thermal Performance of Mesh Wick Heat Pipe

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ABSTRACT

In the age of technological advancement, continuous improvement is required in every walk of life. In electronic equipment, due to miniaturization and densification of electronic circuits, more heat flux is generated. High heat flux may affect the performance and operating life of the equipment. Heat pipes are the most effective solution to dissipate that high heat flux to the surroundings. There are different operating parameters, having effects on the thermal performance of the heat pipe like power input, inclination angle, type and volume of working fluid etc. In the present paper, TiO_2/H_2O nanofluid has been used as working fluid in the heat pipe. The effects of TiO_2/H_2O nanofluid application in heat pipe for a wide range of power input (50-150 watts), and inclination angles (0°, 15°, 30°, 45°, 60°,75° & 90° with the horizontal) has been analysed. The purpose of the investigation is to highlight the enhancement in thermal performance of heat pipe using nanofluid as compared to water. Authors have drawn the attention of research community to identify the dominating parameters and explore the interaction effects among all parameters responsible for the thermal performance of heat pipe.

Keywords: Heat pipe; Thermal resistance; Thermal efficiency.

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HWWE-250

Digital Human Modeling using CATIA-V5 for the Analysis & Ergonomic Improvements in Design of Wearable Load Assisting Device for Porters

Harish Kumar Sharma[1], Amit Kumar Sharma[2], Aditya Singh[3] and Piyush Singhal[4]
[1,2,3,4]*GLA University, Mathura, India*
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This study proposes a wearable load assist device for load carrying for porters at Indian railway station using computer aided Ergonomics and digital human models. The task performed by the porter is the lifting and carrying the luggage of passengers using manual process. In order to lift the luggage the porter has to bend his neck and trunk which can be responsible for the development of various work related musculoskeletal disorders (WMSD). The purpose of this evaluation was the development of a load carrying structure for luggage carrying and to distinguish potential outline issues that could bring about musculoskeletal damage in a real workplace. CATIA computerized human modeling software was utilized for ergonomic investigation to assess the potential damage danger, considering contrast among utilizing and not utilizing the assist device. The results suggest that using the assist device decreased injury risk potentially and increase the load carrying capacity. The solution seems, by all accounts, to be appropriate for helping porters and diminishing potential dangers related with their task at the working environment.

Keywords: Digital Human Modelling, CATIA, Ergonomics

HWWE-254

A Study on Ergonomic Design and Drafting of Furniture in Higher Classes in India

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The comfort experienced by the students in classrooms is primarily related to the proper design of furniture and its effect on biomechanics of human body. Studies have shown that learning ability of the students greatly enhanced under a comfortable environmental

Outline

Abstract
Keywords
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materialstoday: PROCEEDINGS
Volume 4, Issue 9, 2017, Pages 9423-9428

Evaluation of Elastic moduli for different Patterns of Stone-Thrower-Wales Defect in Carbon Nanotubes/epoxy Composites

Amit Kumar, Pradeep K Singh, Kamal Sharma, Vijay K Dwivedi

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https://doi.org/10.1016/j.matpr.2017.06.197

Abstract

A pristine Carbon nanotube (CNTs) possesses exceptional mechanical properties. However, the performance of CNTs get affected from defects such as vacancies, Stone-Thrower-Wales (S-T-W), hybridization and doping which can appear during production. The study conducted here is based on molecular dynamics (MD) simulations performed on S-T-W defected single-walled carbon nanotubes (SWCNTs) and their corresponding epoxy composites. A (6, 6) armchair SWCNT has been used in this study with the defect ratio (DR) varies from 1 to 5.0% for S-T-W defects. S-T-W defects in two (type-I and type-II) different forms has also been modeled and simulated for their various mechanical properties. Results have also been obtained for S-T-W defective SWCNT/epoxy composites. A continuous degradation of elastic

Outline

Abstract
Keywords
References

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Volume 4, Issue 2, Part A, 2017, Pages 4013-4021

Mechanical characterization of vacancy defective single-walled carbon nanotube/epoxy composites

Amit Kumar, Kamal Sharma, Pradeep K Singh, Vijay K Dwivedi

Show more

https://doi.org/10.1016/j.matpr.2017.02.303

Abstract

A pristine Carbon nanotube (CNTs) possesses outstanding mechanical properties. However, the performance of CNTs get affected from defects such as vacancies, Stone-Wales (S-W), hybridization and doping which can appear during production.The study conducted here is based on molecular dynamics (MD) simulations performed on vacancy defected single-walled carbon nanotubes (SWCNTs) and their corresponding epoxy composites. A (6, 6) armchair SWCNT has been used in this study with the defect ratio (DR) varies from 1 to 5.0%. Three different vacancies pattern such as symmetric, asymmetric and mixed in SWCNTs are modeled and simulated for obtaining the mechanical properties. Results have also been obtained for defective SWCNT/epoxy composites. Results show that a gradual degradation of Young's

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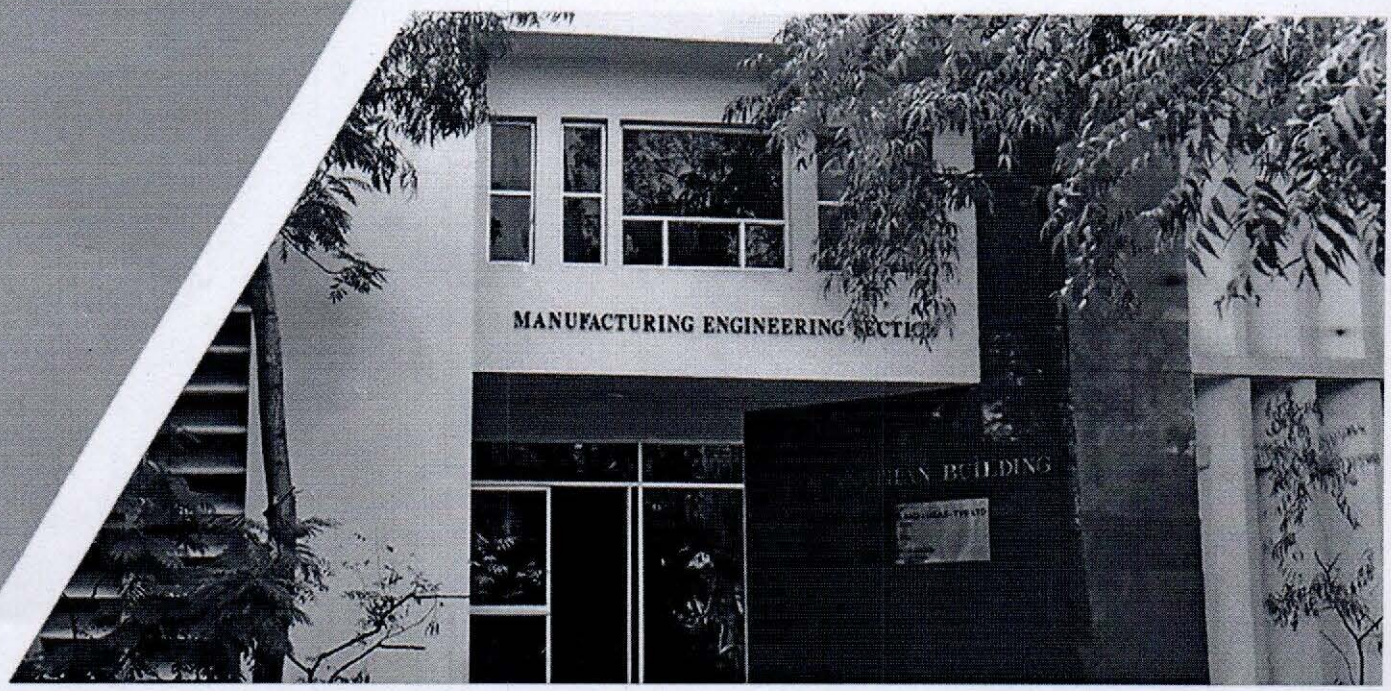

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603

Study of Mechanical Characteristics of Sintered Preforms at Varying Strain Rates During Slow Speed Forming Process.

Atul Pandey[1], Ashish Sharma[1], Dr. Piyush Singhal[2], Dr. R.K. Ranjan[3]

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Abstract

The paper presents an investigation into the deformation characteristics of sintered metal powder perform at different ram velocity during slow speed forging under both end lubricated. The preforms were prepared and forged at different ram velocities. Relation between various parameters involved in forging are observed and critically explained.

KEY WORDS: Composite preform; Strain rate; Interfacial friction law; Forgeability.

1.Introduction

Jha and Kumar (1988) investigated the influence of powder particle sizes, compacting pressures, sintering temperatures, and forging parameters on relative density of the preform along with the deformation characteristics and fracture mechanisms during the cold forging of sintered iron powder preform under axis-symmetric conditions.

Ranjan and Kumar (2004) had also used an upper bound approach to determine the die pressure in closed die forging of hexagonal preform and found the die pressure was minimum for certain dimensional ratios of the preform. Sumathi and Selvakumar (2015) have investigated the workability of sintered copper-silicon carbide preforms during cold axial upsetting. They showed that strength property is very high at 5 % of SiC with copper and the initiation of crack appeared at a low axial strain with higher value of SiC addition. Authors have not yet come across the investigations in which the effect of strain rate (based on ram velocity) on the composite preform has been taken into consideration, as the strain rate is one of the most important parameter in forging process.

The present paper reports on an investigation of relation between various parameters involved in the cold forging of aluminum-copper composite cylindrical preforms at different ram velocities. The theoretical results have been presented graphically. The effect of ram velocities on deformation behavior has been observed and discussed.

2. Basic Experiments and Deformation Pattern

The cylindrical preforms were fabricated from aluminum-copper powders, mixed in different proportions on weight percentage basis: 100:00, 95:05, 90:10, and 70:30 UTM at a compaction pressure of 300-400 MPa using a circular die-set of 20 mm diameter.

These preforms had relative density of 0.9 (approximately) and aspect ratio 1.0. The percent height reduction, average contact diameter, percent increase in diameters at top, bulged portion and bottom, and compressed volume, changed relative density of the preforms were calculated.

The cold upset forging of the sintered porous aluminium specimen was conducted at room temperature on 400 kN computerized UTM at strain rate of 1.5 mm/ min and for two different frictional end-conditions. For each case, five specimens were stressed to different deformation stages. After each deformation, the following parameters of the compressed porous metallic specimen were measured:

1. Height (h_f)
2. Contact diameters (D_{C1} and D_{C2}) D_{C1}= Top diameter, D_{C2}= bottom diameter.
   finally the contact diameter of the porous metallic specimen is calculated by
   $D_C = [D_{C1}+D_{C2}]/2$.
3. Bulge diameter (D_b) of the barrel.
4. D_t and d_t are the maximum and minimum diameters of the truncated cone part.
5. Height of the barrel (h_b).
6. Height of the truncated cone part (h_t).
7. The radius of the barrel (R).

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PAPER ID: 25NCICEC075

An Experimental Investigation on Waste Plastic Fuel towards the solution of Crude oil Crisis

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Abstract: In this era, a remarkable growth in the use of plastic-based material has been observed. The plastic-based material is widely used for various parameters such as food, beverage container, household appliances, and various automobile parts. The reason for such a variant use of plastic is its light weight, flexibility, durability, corrosive resistance and formality. In this study waste plastic is used as raw material and a diesel equivalent fuel is produced as an output product. During this investigation, a tilting furnace, mild steel container (airtight), two condensers (heat exchanger), two oil collectors, rubber ducts, thermocouple and argon gas cylinder is used. Water at 280C (room temperature) is used as the coolant in the first condenser and temperature of the water being supplied to the second heat exchanger is 100C. Results have shown that the synthesized fuel was very much similar to the diesel fuel characteristics. Through various test runs the optimum condition for maximum yield percentage is found. Furthermore, if one can produce it on a large scale then the synthesized fuel will cost considerably less than that of other fuels.

Keywords: Diesel Fuel, Waste Plastic, Tilting Furnace, Rubber Duct, Thermocouple

PAPER ID: 25NCICEC077

Comparison of Performance Characteristic of a Single Cylinder Four Stroke Diesel Engine using Diesel and Kerosene–Diesel Blend

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[1]*Department of Mechanical Engineering, GLA University, Mathura, U.P.*
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Abstract: The importance of diesel engine for human application is growing day by day. The parameters that are used to operate engine also play a vital role; the diesel fuel that is used to operate the engine also plays a significant part. The fast depletion of fossil fuels and increase in price of petrol products revived interest among researcher to find out suitable blend. In this experimental investigation, the evaluation of characteristics of blending kerosene with diesel fuel on the performance characteristics of Kirloskar made four stroke single cylinders engine is done. Studied performance parameters are: specific fuel consumption, exhaust temperature, enthalpy change, mechanical efficiency and brake thermal efficiency. Results of this investigation show that the mechanical efficiency and brake thermal efficiency increases as the concentration of kerosene increases. Graphs in between exhaust temperature with load, provides that the temperature of exhaust gas increases as the load increases. Furthermore, as the concentration of kerosene increase in kerosene diesel blend the specific fuel consumption decrease.

Keywords: Kerosene Blend, Specific Fuel Consumption (SFC), Brake Thermal Efficiency (BTE), Diesel Engine

TEST Engineering & Management

Comparison of Performance Characteristic of a Diesel Engine Using Diesel and Kerosene – Diesel Blend

Nitin Kukreja, Sanjeev Kumar Gupta

Abstract

The significance of diesel engine for human application is growing day by day. The parameters that are used to operate engine also play a vital role. The fast reduction of fuels and growth in price of petrol or diesel products revived interest among researcher to find out suitable blend. In this experimental investigation, the evaluation of properties of blended kerosene with diesel fuel on the performance characteristics of Kirloskar made four stroke single cylinders engine is done. Studied performance parameters are: specific fuel consumption, exhaust temperature, enthalpy change, mechanical efficiency and brake thermal efficiency. Results of this investigation show that the mechanical efficiency and brake thermal efficiency increases as the concentration of kerosene increases. Graphs in between exhaust temperature with load provide that as the load increases the temperature of exhaust gas also get increased. Furthermore, as the concentration of kerosene increase in kerosene diesel blend the specific fuel consumption decrease.

Keywords: *Kerosene Blend, SFC, BTE, Diesel Engine.*

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Section

Articles

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Flow characteristics over helo deck of a simplified frigate ship (SFS) model

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Abstract

In modern era many difficulties have come into consideration due to backward facing step (BFS) of SFS. Over the time many researchers have seen the behavior of recirculation zone and unsteadiness over the helo deck through the method of flow visualization and fluid flow measurement. In this paper we have summarized experimental and computational investigation, to find out two undesirable factors Viz., the length of recirculation zone and unsteadiness over the helo deck of a scaled down model of SFS, also results are successfully validated. Furthermore, to modify the length of recirculation zone, six different flow control techniques have effectively implemented.

1. Introduction

Naval Ships are allocated with the role of search, medical evacuation, rescue and vigilance, but they are deeply dependent on helicopter (helo). Helo deck is normally positioned at the rearmost part of the vessel and hangar is placed immediately at its front. This zone is created due to the sharp edges of the hangar and step height at BFS. Shape of hangar and helo deck, results in reverse flow zone, separated shear layer with unsteady flow in terms of shedding vortex. Therefore, if helo will enter in this zone then the collision of the rotor blade with the vortices may lead to the complete damage of the helo as well as of the pilot. A vast number of literature study shows that there is a lot of difficulties in chasing of the naval ship and to overcome the same concept of helo (helicopter) came into picture.

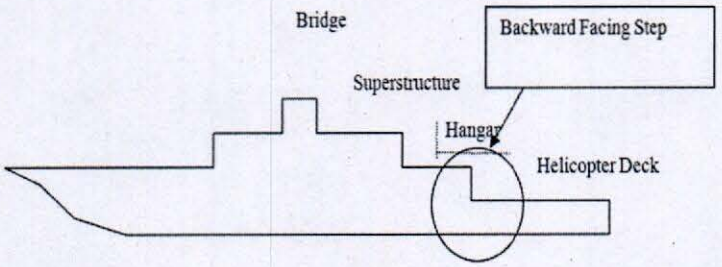

Figure 1: Formulation of Backward Facing Step (BFS) on a Naval Ship

After this recirculation zone, picture of reattachment zone comes, where helo can land or take off easily. Difficulties like unsteadiness and prediction of recirculation and reattachment zone is discussed in this study. Nowadays various experimental and computational tests are conducting to measure the Dynamic Interface (DI) and Ship helicopter operating limit (SHOL). SHOL is also one of the launch and recovery process for testing of ship/helo. P G Spazzini et al. [1] discussed the flow behavior over the two dimensional (2D) BFS, conducted numerous experimental over the BFS by varying step height to space coordinate ($0.27 \leq X/H \leq 8.2$) and Reynolds number in the range of 3500 to 16000 on different four Reynolds number. B F Armaly et al. [2] experimentally investigated separation length variation with Reynolds number in between 70 to 8000 and analyzed under fully developed turbulent flow recirculation length is unaffected with Reynolds number and validated numerical results by 2-D steady differential equation of mass and momentum with experimental results up to Reynolds number 400.

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Computational Investigation of Rayleigh–Bénard Convection in viscoplastic fluid

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Abstract

Convection due to non-uniform heating is the extensive nature of fluid motion in the space and this kind of occurrences has been witnessed in many engineering operation. This entire study delivers the numerical investigation of the Rayleigh–Bénard Convection in a viscoplastic fluid where three different concentration of a viscoplastic fluid is being utilized. During the computational procedure the fluid is homogeneously heated from below and cooled from the top inside a rectangular meshed domain. This causes a density stratification to occur along with the vertical direction which beyond a critical temperature gradient may trigger a convective instability. Moreover, precise grid independence test is being conducted for three different concentrations and at the end results are being validated through the existing experimental work.

1. Introduction

Rayleigh–Bénard Convection is a type of natural convection, occurring in a plane horizontal layer of fluid heated from below and cooled from top. In this convection fluid develops a regular pattern of convection and results into a consistent and steady fluid motion in the form of rolls or hexagons [1]. Temperature difference in between the plates will lead to show the beginning of a structure thermal conductivity variation [2]. Once conduction is established, the microscopic random movement spontaneously becomes ordered on a macroscopic level, forming Bénard convection cells [2].

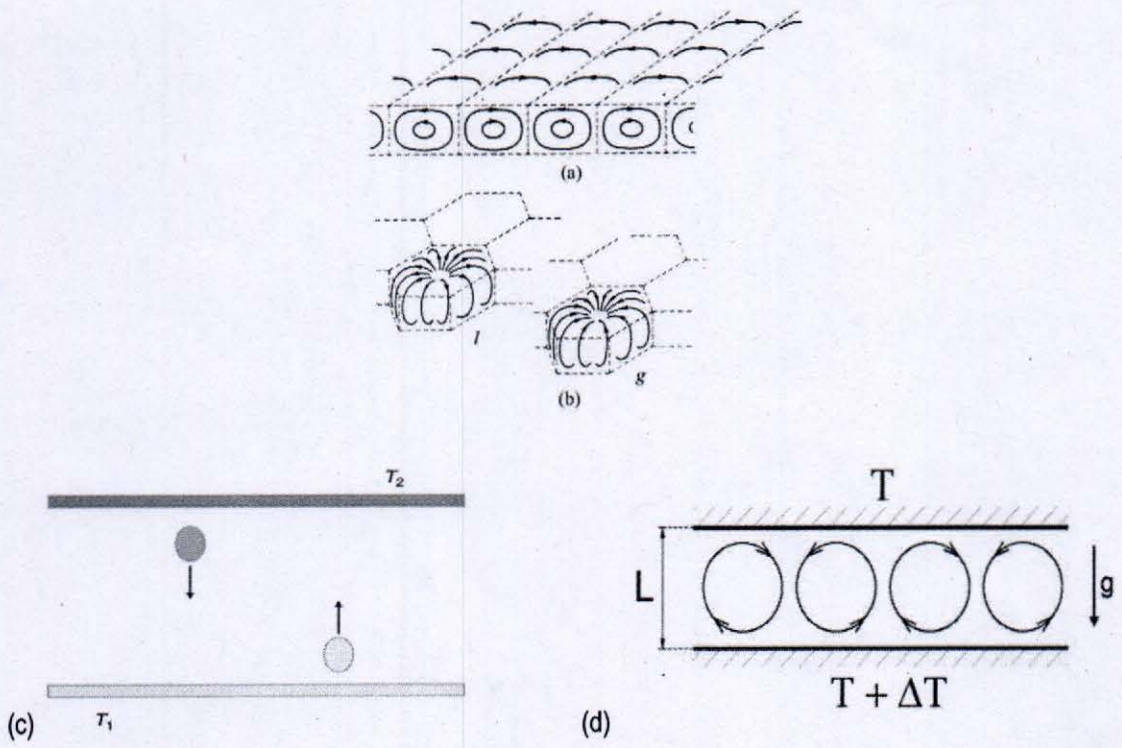

Figure 1: (a) Circular (b) Hexagonal pattern inside the horizontal layered fluid [1], (c) Schematic moment of two practical due to gravitational and buoyancy effect (d) Formulation of regular circular pattern inside the horizontal layered tube

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5th International Conference on Materials Processing and Characterization

Stress Analysis for an infinite plate with circular holes

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Abstract

Isotropic plate with central circular hole under different loading, have found widespread applications in various fields of engineering such as aerospace, marine, automobile and mechanical. For design of plates with holes accurate knowledge of deflection, stresses and stress concentration are required. Stress concentration arises from any abrupt change in geometry of plate under loading. As a result, stress distribution is not uniform throughout the cross section. Failures such as fatigue cracking and plastic deformation frequently occur at points of stress concentration. Hence, it is very important in any engineering structures to know about the stress concentration in plates with holes. In the present study stress concentration in an infinite isotropic plate around circular hole subjected to transverse, longitudinal and biaxial loading is calculated using analytical approach. For calculating stress concentration around two holes complex variable and bipolar coordinate method are used. The results obtained from this approach shows good agreement with result given in literatures.

Selection and peer-review under responsibility of Conference Committee Members of 5th International Conference of Materials Processing and Characterization (ICMPC 2016).

Keywords: biaxial loads, fatigue cracking, complex variable and bipolar coordinate.

1. Introduction:

Krisch and Muskhelishvili [1] were first to solve the problem of infinite plate with single circular hole, subjected to uniaxial stress at infinity. The elasto-static problem in two dimensions can be reduced to obtaining two stress functions. Krisch has solved the problem using Airy's stress function. Airy's stress function is used by him in finding out the stresses in polar co-ordinates. Maximum stress concentration is observed at the points on the boundary of the hole lying perpendicular to the loading axis. All results in the field of anisotropic plates which were of practical and theoretical interest were attempted by Lekhnitskii [2].

Ukadgaonker and Awasare by using Muskhelishvili's complex variable approach developed a method for analyzing infinite isotropic homogeneous plates containing elliptical [3], circular [4], triangular [5] and rectangular

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Characterization of Nanofluids as an advanced heat transporting medium for Energy Systems.

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Abstract

Nanofluids are exciting new materials came into existence due to innovative idea put forth and research performed by Choi. In fact nanofluids are colloidal suspension of nanoparticles in base fluids. Lot of research has been done and going on since its inception in early 1990s.Advanced heat transporting medium is requirement of modern technologies and efficient devices. In order to increase efficiency of heat absorbing and transporting devices, efficient working fluid can drastically change the economic and manufacturing scenario. In absorption of solar energy, performance of nanofluids as reported by researcher is very promising. Since performance of nanofluids as heat transporting medium depends on various parameters such as thermal conductivity, density, viscosity, convectional heat transfer coefficient In characterization of nanofluids for experimental work authors have experimentally analyzed that how thermophysical parameters of SiO_2 /water nanofluid vary with respect to base fluid with temperature and volume concentration and particle size.

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*Keywords:*Nanofluid, TEM, XRD, Zeta Potential.

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2nd International Conference on Emerging Materials: Characterization and Application

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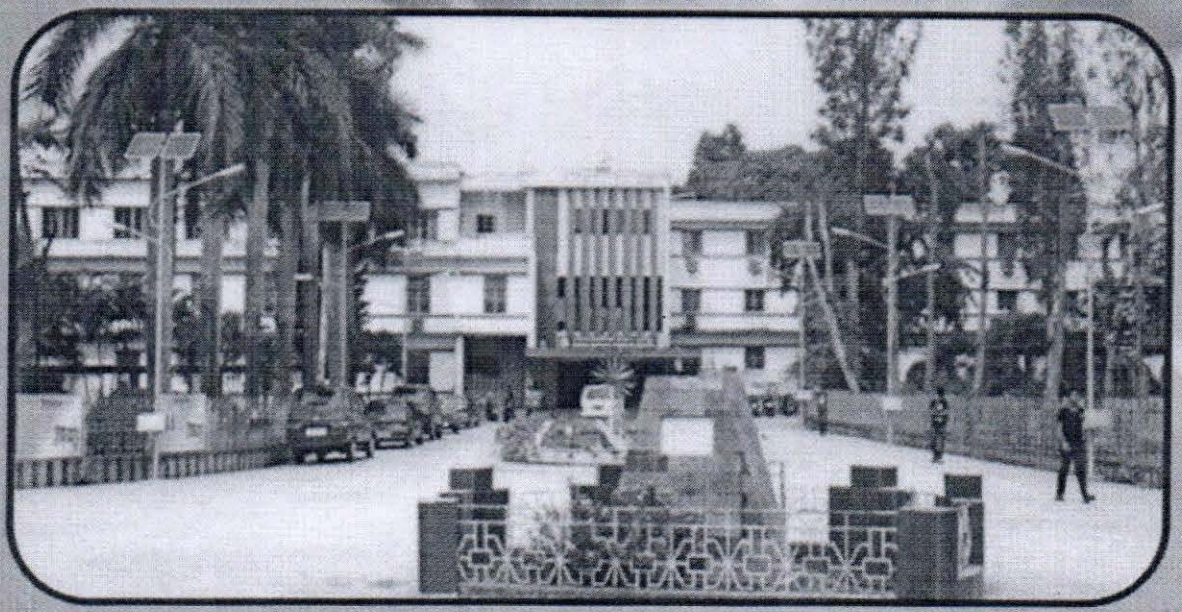

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IMPROVED MECHANICAL PROPERTIES OF GRAPHENE OXIDE REINFORCED CROSS-LINKED EPOXY NANOCOMPOSITES: A MOLECULAR DYNAMICS APPROACH

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Keywords: Graphene oxide; Mechanical properties; Epoxy nanocomposite; Molecular dynamics simulations.

ABSTRACT

Molecular Dynamics (MD) simulations were carried out to investigate the effects of graphene oxide (GO) on the mechanical properties of cross-linked epoxy composites which were built using Diglycidyl Ether of Bisphenol A (DGEBA), an epoxy resin cross-linked with Triethylenetetramine (TETA). Different models of epoxy nanocomposites were modeled with different weight percent (wt.%) of GO ranging from 0.1 to 0.7. The simulation results indicated that reinforcement of small amount of GO (0.5 wt.%) into epoxy matrix significantly improve the elastic modulus property of epoxy nanocomposites than that of pure epoxy. At 0.5 wt.% of GO reinforced composite, it was estimated that maximum value elastic modulus increased by 32%. Whereas at 0.1 wt.% of GO reinforced composite, maximum value tensile strength increased by 2.0%. The MD simulation results show reasonable agreement with the available experimental results.

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Investigation of Optimum Process Parameter for Minimum Tool Wear in EDM Process

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Abstract - The objective of this paper is to determine the optimal combination of the process parameters on the electro-discharge machining (EDM) machine while machining 48 layered carbon–fiber composites with the copper-cadmium tool. The parameters considered are gap voltage, peak current, duty cycle and pulse-on-time &; whereas the response is tool wear rate (TWR). The optimal combination of the parameters are determined through experiments planned, conducted and analyzed using the Taguchi method followed by regression analysis. In this method we have taken four process parameters and taken three levels of each parameters and uses standard L_9 orthogonal array to find out optimal combination of machining parameter for minimum tool wear rate. A relationship among selected process parameters is developed with the help of MINITAB 15software.

Keywords: Peak current, Gap voltage, Pulse-on-time, Duty cycle, TWR, Taguchi Method, MINITAB

1. INTRODUCTION

EDM has achieved a status of being nearly indispensable in the industry because of its ability to machine any electrically conductive material irrespective of its mechanical strength.EDM is a spark erosion process involves submerging two conductive materials, the cutting tool, which is the electrode or spark, and the work piece, a hard metal which needs to be precisely bored or shaped, in an non-conductive liquid (a dielectric). The material removal in EDM mainly occurs due to formation of shock waves as the plasma channel collapse owing to discontinuation of applied potential difference. Material is removed from the work piece through localized melting and vaporization of material.EDM is commonly used in mould and die making industry and in manufacturing automotive, aerospace and surgical components. Since there is no mechanical contact between the tool and the work piece, thin and fragile components can be machined without the risk of damage. Because of the nature of EDM process, optimization of the process parameters is required, in order to achieve the desirable performance specification.

In machinability studies investigations, statistical design of experiment is used quite extensively. Statistical design of experiment refers to the process of analyzing appropriate data by statistical methods to get valid and objective conclusions. Taguchi's parameter design is totally based on statistical design of experiments. It offers a simple and systematic approach to optimize design for performance, quality and cost. Some of the previous works that used the Taguchi method as tool for design of experiment in various areas including turning, drilling, grinding are listed in refs [1-7].

2. DESIGN OF EXPERIMENT

Design of experiment methods are used in robust design for obtaining product and process conditions, which are very less sensitive to the various cause of variation to produce high quality products with low development and manufacturing cost [11]. There are many techniques used in Design of Experiments namely Taguchi method, Factorial design method, Response surface method, Fitting regression models.

2.1 Taguchi Method

Taguchi Method developed by Genichi Taguchi [8] to improve the quality of manufactured goods. Taguchi defines the quality of a product, in terms of the loss imparted by the product due to deviation of the product's functional characteristic from its desired value, called losses due to functional variation. The uncontrollable factors which cause the functional characteristics of a product to deviate from their target values are called noise factors, which can be classified as external factors such as temperatures and human factors, etc. The Taguchi's parameter design is used to

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March 31st & April 1st, 2017

Selection of Optimum Honing Parameters for Surface Roughness Using Design of Experiment

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Dept. of Mechanical Engg. GLA University, Mathura (U.P.)

Mr. Kuwar Mausam
Professor Dept. of Mechanical Engg. GLA University, Mathura (U.P.)

Abstract - **Surface roughness and cross hatch angle are among the most critical quality measures in cylinder liner honing process. In this study Taguchi techniques a powerful tool to design of experiment for quality, is used to find the optimal honing parameters in a vertical honing process of a engine cylinder liner. The L_{27} orthogonal array, signal-to-noise ratio and analysis of variance are employed to study the performance characteristics surface roughness. The three honing process parameters namely, honing pressure, stroke speed and rotational speed, are optimized with consideration of surface roughness. The optimum machining parameters are determined by using statistical software MINITAB-15. Finally, confirmation test were performed to make a comparison between the result predicted and experimental value. The experimental results obtained confirm the adequacy and effectiveness of this approach.**

Keywords: Honing, Taguchi method, signal-to-noise ratio, analysis of variance

1. INTRODUCTION

Honing could be considered an unfairly neglected material-removal technology, when you considered its importance in allowing millions of automobile engines to run clearly, quietly and efficiently. Honing is a low-velocity abrasive finishing process used to both remove the final amount of metal to get a cylinder bore to within the required size limits, and to provide adequate surface roughness to resist wear and to store and retain lubricates during high temperatures, in addition to linear hardness, geometric dimensioning and tolerances to ensure other proper functions. Honing has been and remains to be in the foreseeable future the only process available that could provide both the required surface roughness and the cross-hatching lay directions for cylinder liners. The surface roughness of cylinder liner is generally controlled by honing parameters honing pressure, rotational speed and stroke speed.

In machinability studies investigations, statistical design of experiment is used quite extensively. Statistical design of experiment refers to the process of analyzing appropriate data by statistical methods to get valid and objective conclusions. Taguchi's parameter design is totally based on statistical design of experiments. It offers a simple and systematic approach to optimize design for performance, quality and cost. Some of the previous works that used the Taguchi method as tool for design of experiment in various areas including turning, drilling, grinding are listed in refs [1-6].

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Taguchi orthogonal array (OA) offers the way of conducting the minimum number of experiments that gives the full information of all the factors that affect the response parameters [10]. According to the Taguchi design concept, the selection of OA depends on the

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Solar Energy In India: Key For Sustainable Development

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Abstract- **The demand for power is increasing continuously due to modernization, urbanization and economic growth. In order to mitigate this rising demand India have to explore its solar resources, which are available in unlimited quantity. This will not only help in fulfilling the power supply demand, but also put India on the path of sustainable development. To put a step forward in the same direction the government has launched Jawaharlal Nehru National Solar Mission in order to explore and effectively use the solar energy available at the doorstep of the Indian subcontinent. This paper shows an overall solar profile of the Indian subcontinent by analyzing the availability of solar power, growth of the solar PV market and motivational factors that help in expanding the solar power profile of India. This article also discusses various government initiatives to revamp the condition of solar power. The author also shows the current situation of solar power and future of solar power in India.**

Keywords— Solar; Power; Energy; India

I. INTRODUCTION

Global final energy consumption has increased by about 1.5% annually in recent years, because of the increase in population, driven primarily by rising demand in developing countries like India, China and Brazil [1]. One estimate suggests that the world population is expected to double by the middle of this century [2]. Most of the population increase will take place in developing countries like India, Brazil and China. Fossil fuels are the primary sources of energy worldwide and accounts over 79% of the world total energy consumption [3]. This leads to the depletion of fossil market and increase in Green House Gasses (GHG) at a very dominant rate. Thus very soon countries, which have scarce of fossil fuel deposit, have to search some alternate fuels for sustainable development. Same is the case of the Indian subcontinent. The demand for energy in India is rapidly increasing with increasing human population, urbanization and modernization. Being a developing nation and ranked 2nd in terms of population, India's power appetite is increasing at an alarming rate. Today, India heavily relies on fossil fuel to meet its energy requirements. In India the generation capacity of fossil fuel based power plants has been doubled in the past ten years and it is around 27122 MW at present [4]. Around 69.5% of the total power is generated by fossil fuel based thermal power plants [4]. Such higher dependency on thermal generation sources poses a serious threat to energy security in terms of fuel availability, long-run economic viability and environmental sustainability. In India electricity generated by burning fossil fuels contributes 37.8% of the total greenhouse gasses released in the atmosphere [5]. Burning of fossil fuels increases carbon-dioxide emission which is a major contributor to the climate change crises today [6]. Climate change is recognized both as a threat and a challenge. The impact of human activities on climate and climate systems is unequivocal. According to world health organization, India already has 13 of the 20 most polluted cities of the world. For India to sustain strong economic growth, a significant growth in its electricity consumption is inevitable, which also does not create any harmful effect to the environment. Renewable energy sources have the capability to solve the problem of sustainable development associated with fossil fuel based power plants as these energy sources are unlimited, ecofriendly and provides energy with negligible emissions of air pollutant and greenhouse gases [7]. Wind energy, Geothermal energy and Ocean energy are limited to specific sites, but India's potential of solar energy is unlimited. More than 75% of the land mass of India lies between the tropic of cancer and equator hence it receives about 5000 trillion kilowatt hours (KWh) of theoretically calculated solar energy per year [8]. Instead of being a paradise country for solar energy, the contribution of solar power is only 2.5% of the total installed capacity of power stations which accounts only 7.8 GW of totalled installed capacity. Whereas, countries like Germany and Japan have a total installed capacity of more than 40 GW and 34 GW respectively. Germany alone have installed more than 2% of the total worldwide PV installation in 2015 [9]. However, in India the installed capacity of fossil fuel based power plants has increased from 1362 MW in 1947 to 27122 MW in 2015, but still, in 2015 there is a peak power deficit of 2.6%. This peak power deficit will rise to 5.6 % in 2022 as demand rises due to economic growth and increase in population [10]. To maintain a sustainable growth

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Progress in Application of Nanofluids in heat pipe - A Review

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Abstract - **Heat pipe is the most popular member of the heat exchanger family. It is known for its unique kind of working in various domains and walks of life. Nanofluids are the new generation of fluids, used in various fields. So it's time to witness the latest revolution, the Smart Nanofluid technology applied in heat pipe. The present review article attempts to peep into some of the important published articles that deal with the function and performance of heat pipes using nanofluids. Authors summarized the effect of different parameters such as particle size, concentration of nanoparticles in base fluid, with different operating condition of heat pipe. The effect of heating power, volume filling ratio (%), inclination angle, coolant flow rate has also been discussed. The paper also focuses the enhancement in thermal efficiency of heat pipes using nanofluids as working fluid.**

Keywords: Heat Pipe, Thermal performance, thermal conductivity, thermal efficiency;

1. INTRODUCTION

In the world of technological advancement, the performance of various applications are improving continuously, due to which different equipment are becoming more effective and smaller in size. Heat energy may be either input or output of any system, so heat transfer rate plays a key role in effective operation of that system. Therefore the requirement of more efficient working fluid also increases. In last two decades significant work has been done to apply nanotechnology in heat transfer applications. Nanofluids are the new advancement in thermo-fluidics, obtained by stirring nano particles in conventional fluids[1]. Researchers have taken nanoparticles of different metals, metal oxides, carbides, nitrides and different types of carbon with different base fluids such as water, ethylene glycol (EG) and engine oils. Under specific conditions nanofluids exhibit superior thermo physical properties which result in improved efficacy of the thermal application.

In the last few years many researchers proposed mechanisms of enhancement in heat transfer through nanofluid like effect of Interface, Brownian motion, Ballistic transport of energy carriers and thermophoresis. Chandrasekar et al. [2] reviewed the mechanisms which were responsible for enhancement in thermal conductivity(TC) of nanofluids. Researchers discussed various mathematical models to identify different factors and their limitations. Mursheed et al. [3] concluded that nanoparticles shape, size and volume fraction were the main parameters to decide the TC of nanofluids. Saidur et al. [4] summarized the applications and challenges of nanofluids.

In present paper authors have made an attempt to summarize the research outputs of different researchers, worked on application of nanofluids on TPHP. It also highlights the reasons which are responsible for the change in TP and points out the problems occurred while using nanofluid as working fluid in HP.

2. APPLICATION OF NANOFLUIDS IN HEAT PIPE

2.1 Experimental Investigation

HPs are very compact in size, simple and effective in operation, so they are very popular among all members of heat exchanger family used in different thermal engineering applications. They are used in different size and shapes depending upon the application. Most popular categories are Cylindrical, Flat, Pulsating, Oscillating, Closed loop, Thermosyphon etc. Applications of nanofluids make a tremendous enhancement in its thermal performance.

Hung et al. [5] examined the thermal performance of heat pipe(TPHP) using nanofluid as working fluid. Experimental study has been done on cylindrical heat pipe (CHP). The effect of different input parameters like the nano fluid charging% (20%, 40%, 60%, and

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Experimental investigation of thermal efficiency of thermosyphon heat pipe

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ABSTRACT

Heat pipe is used to increase the heat transfer rate for a given temperature difference. In compact and high heat flux generating systems heat pipe facilitates, higher heat transfer rate leads to the effective operation of the system. Thermosyphon heat pipe is a specific type of heat exchanger, known as gravity assisted heat pipe. Thermal efficiency of thermosyphon depends on the various operating parameters like power input, inclination angle, working fluid, vacuum pressure etc. In present paper authors find out the maximum thermal efficiency for various level of operating parameters. Design of experiments using Taguchi approach is used for finding the most suitable parametric combination for maximum thermal efficiency of heat pipe.

Keywords: Thermosyphon, Thermal efficiency, Taguchi method;

1.Introduction

In present scenario, heat pipes are widely used in different thermal devices due to its high heat transfer capability and compact size.
Thermosyphon heat pipe is a device, used to transfer the heat from one place to another place. It is a hollow, closed, evacuated pipe, containing a working fluid. Heat pipe is divided into three section evaporator, adiabatic, and condenser. Heat is absorbed by working fluid in evaporator section and converted into vapor phase, which travels towards the condenser section due to pressure difference and rejected heat to the cooling media through the condenser section and converted into its liquid phase. Therefore heat is transferred from evaporator section to condenser section. The heat transfer rate depends upon thermo physical properties of wall and working fluid, orientation of heat pipe etc. Thermal efficiency of heat pipe is the ratio of, heat transferred to the coolant to the input supplied heat.

$$\eta = \frac{MC(T2-T1)}{VI} \quad \text{Equation (1)}$$

Where η = Thermal efficiency of heat pipe
M = mass flow rate (kg/sec) of coolant
C = specific heat of coolant
T_2=Temperature of coolant at outlet section
T_1= Temperature of coolant at inlet section
VI = Inlet power supply
In present study authors made an attempt to find the most suitable combination of operating parameters leading to maximum thermal efficiency, using Taguchi methodology.

2.Method and Materials

The experimental set up of thermosyphon heat pipe is shown in fig.2. The main components are copper heat pipe, circumferential heater, constant cooling bath, thermocouples, data logger,stand etc.

The outset of the problem formulation is shown in Fig.1. Design parameters remain unchanged. Operating parameters like input power, charging volume % (i.e. % of evaporator volume filled by working fluid), angle of inclination and vacuum pressure varies.

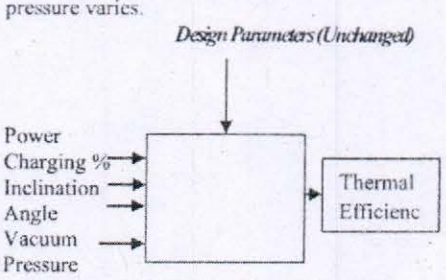

Fig.1: Various parameters.

All the operating parameters contribute in the thermal efficiency of heat pipe. In present study four factors (Fig.1.) have been considered for the optimization of thermal efficiency. Design of experiments using Taguchi approach is used for the parametric optimization of heat pipe.

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CFD Analysis of Heat Transfer in a Square Duct

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Abstract— **This paper deals with the investigation of flow in a square duct. The computational study of this problem has been carried out in the CFD laboratory of Mechanical Engineering department, GLA University, Mathura on commercial finite volume package ANSYS FLUENT-15.0. The objective is set in obtaining the outlet temperature of fluid flowing through a square duct and the calculation of convective heat transfer coefficient during the flow. The reason behind using the square duct is that it provides the more area for the heat transfer and also increases the fluid flow turbulence near the wall. The results are presented in the form of Nusselt number as the function of Reynolds number and Prandtl number.**

Keywords- forced convection, convective heat transfer coefficient, ANSYS, Nusselt number, Reynolds number, Prandtl number

I. INTRODUCTION

Today for the movement of air in air-conditioning, heating and ventilating and for exhaust system the duct systems are used. When there is pressure difference across the buildings is relatively low the noncircular pipes are usually installed for the heating and cooling effect throughout the system. The duct systems have lower manufacturing and installation costs and the available space is limited for ductwork. Square or rectangular duct is ideal for in-wall applications requiring a lower profile than any other type of duct. Square duct still holds the title of King for low-pressure systems [1]. The square shape is standard shape for duct heaters used for the industrial purpose. The mechanism involved in cooling or heating through the ducts is known as internal forced convection. Forced turbulent heat convection in a square or rectangular duct is one of the fundamental problems in the thermal science and fluid mechanics area. Over the years, significant advances have been made in the application of air cooling techniques to manage increased heat fluxes. Air cooling continues to be the most widely used method of cooling electronic components because this method is easy to incorporate and is cheaply available. Nowadays in advanced gas turbine the maximum inlet temperature in the turbine may reach up to 1500°C, this high temperature within the turbine might exceed melting point of the metal of turbine blades or can cause the thermal stresses, so this high temperature is reduced using square or rectangular type of duct so that the blades can withstand this temperature [2].

Many researchers have done a different type of analysis on the rectangular duct, square duct as well as on the circular duct in order to find out the heat transfer coefficient and friction coefficient and also other parameters. Suhas V. Patil and P. V.Vijay Babu (2011) worked on the review of previous years on heat transfer augmentation in a circular tube and square duct fitted with swirl flow Generators [3]. Sandeep Kumar Karole and Ishwar Singh (2015) computed the heat transfer coefficients and friction factors for turbulent flow through rectangular ducts with reverse pentagonal shape at same height, reverse pentagonal shape at uniformly varying height, triangular shape at same height and triangular shape at uniformly varying height also he presented the measurements of both heat transfer and pressure loss in channels with different rib shapes using Fluent-14.5 [4]. Ravi Teja, Pathan F Z, Mandar Vahadne (2015) optimized the heat transfer through rectangular duct by using the laminar and κ-ε model and predicted the behaviour of flow and heat transfer with measured flow field data in a stationary duct which sheds light on the detailed physics encountered in the fully developed flow region [5].

II. GOVERNING EQUATIONS

The governing equations considered for the analysis of heat transfer in a square duct are as follows:

A. Continuity Equation

$$\frac{\partial \rho}{\partial t} + \frac{\partial (\rho u)}{\partial x} + \frac{\partial (\rho v)}{\partial y} = 0$$

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Effect of Temperature and Strain Rate of Glass Wool Composite Material with Mechanical Behaviour

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ABSTRACT

The glass wool fiber is high thermal insulating properties for many different types of small pockets like as air in between the glass. The natural material like as glass wool has the eligibility to absorb the large amount of the water then after increased the relative humidity in the environment. During the glass wool has increased the performance of the products under the different conditions for lifetime. The glass wool fiber is very good conditions under the temperature range of about 60°C. The glass wool composite sheets were fabricated under the continuous extrusion process. The increase of mechanical property like as stiffness and strength of the epoxy matrices can be modifying the molecular structure due to increase the crosslink density. The response of the material and structural is varying under the impact loading conditions. The glass wool is used to the reinforcement materials like as mainly due to applied to insulation and heat. The mechanical property of the wool is increased such as the tensile modulus and strength. In the particular process, the ability of moisture transport properties in wool's is good for other materials. The wool has the ability to liberate the heat from the wetted out of desirable premium fiber.

Keywords: *Glass Wool Fiber, Fabrication Process, Tensile Test, Flexural Test, Impact Test*

1. INTRODUCTION

The glass wool has been used as an insulating material using a binder as well as texture from fibers of wool. The glass wool has been a complicated form of bio composite materials. The properties of glass wool fibers are renewable, high toughness, low density, lightweight, good thermal insulating material, low cost, high specific modulus etc. The glass wool has been potentially used to replace as a composites materials from the traditional reinforcement materials. Then it is required to increase the high strength to the weight ratio and further more to the reduction of the weight of fibers. The natural fiber was performed to improvement of the mechanical properties like as tensile strength, impact strength, flexural modulus, etc. The advantages of natural fibers in the form of composites due to increased the performance and having economical and good for an environmental process. The glass fiber reinforced materials are very superior properties. The glass wool is used as a different fields like as engineering applications, sports goods, defense, aerospace, etc. The glass wool fibers are easily elongation and complicated in the water which it may be guided to a poor quality of the wet lead mat. The glass wool material has the ability to absorb the large amount of water then the most important process of the glass wool is to increase the relative humidity of the environment. In the composite materials, the glass wool fiber is used as reinforced materials for a polymer. The unreinforced matrix is weaker than the composite materials. The determining properties of the composites materials plays the volume fraction is generally for the single influencing properties of the materials. In the composite materials, there are different types of dynamic loading process for strain rates, to need for the special testing machines. The S-N curves, during the testing time the temperature of the test specimens is always rise and due to loss the stiffness of the specimens.

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Direct Evaporative Air Cooling: A Review

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ABSTRACT

Air Conditioning is the science of controlling primarily three parameters of human comfort, temperature, relative humidity and air quality. Air conditioners, dehumidifiers and evaporative coolers serve the purpose. However, air conditioners are termed expensive and coolers prove ineffective in humid conditions. Air cooler is coupled with a dehumidifier to achieve dual objective i.e., dehumidification and sensible cooling. Evaporative cooling systems require considerable electric energy and a significant constant clean water supply during operation. Evaporative cooling equipment's work well in the hot and arid southern regions, which constitute practically the two third of the country. They have no impact whatsoever on the environment. This paper presents a study on a direct evaporative air cooling (DEAC).

Keywords: *Evaporative Cooling, Dew Point Temperature, Dry Bulb Temperature, Dehumidification, Sensible Cooling, Relative Humidity, Human Comfort, Air Conditioning, Air Cooling*

1. INTRODUCTION

India is a tropical country in which most of the regions experience very low temperatures during the winter and very high temperatures during the summer seasons. That is, the temperature range between summer and winter seasons is very large. Hence, it is not a very pleasant experience and highly uncomfortable. Though cheaper methods of heating are available during the winter season but methods of cooling down the hot temperatures during the summer do not have wide variety.

Air conditioners have high initial and running costs so cannot be afforded by all the people in a developing country even like India. Air coolers are relatively cheap, but provide unsatisfactory results; there is a need for developing a cheaper room cooling system. Conventional air conditioning contributes most of CFCs into the atmosphere only and only if there is a leakage in the copper tubes of air conditioner, otherwise there is no harm in any sense. An alternative type of cooling, which does not expel CFCs is highly desirable as one important step in the correction of this problem. So, this is why evaporative cooling is environmental friendly because it is a passive cooling method (Passive cooling is a building design approach that focuses on heat gain control and heat dissipation in a building in order to improve the indoor thermal comfort with low or nil energy consumption) that does not expel CFCs. It is 100% fresh air cooling which even helps to clean the air it cools. With the help of Evaporative Technology swamp coolers provide cooling at cheaper than central air or larger air conditioners [1].

A Regenerative type evaporative cooler cools air using a heat exchanger in addition to the direct evaporative method of cooling. It is observed that the overall efficiency of the system and the COP increase by about 20-25% than the normal air cooler system but the initial and maintenance costs of the system are increased due to the addition of a heat exchanger and a pump. The size of the system also increases due to the addition of more components [2].

A multi-utility desert cooler is one in which water cooling as well as cold storage systems are attached in addition to the air cooling system. The average effectiveness was found to be 65.42% and a temperature range of 22-27°C was achieved. It can be used only in areas with high temperature and low relative humidity hence reducing its scope [3, 4].

2. DIRECT EVAPORATIVE AIR COOLER

Single stage or direct evaporative coolers are the most common and are categorized by pad type, "Fiber" pads or "Sheet" pads [5].

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Comparative Study of Mechanical Properties for TIG and FSW Welding Processes

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ABSTRACT

Welding technique is one of the widely used permanent fastener method, and there are different types of welding used which are used for different welding applications. In this project, an experimental analysis has been carried out on hardness, microstructure and tensile properties for AA6061 alloy with two different welding processes namely, a solid state welding known as (FSW) friction stir welding and other a tungsten inert gas welding (TIG) conventional welding. For the welding process, a 4mm thick plate of aluminium alloy AA6061 has been selected for FSW and TIG welding techniques. AA4043 grade aluminium alloy is used as a filler material for the tungsten inert welding process. This study indicated as that FSW joints were having better mechanical properties than TIG welding process.

Keywords: *Friction Stir Welding (FSW), Tungstun Inert Gas Welding (TIG)*

1. INTRODUCTION

Friction stir welding (FSW), a solid-state joining process developed and invented at the Welding Institute (TWI) in 1991[1], and it is used as a welding technique for high strength alloys that were complicated to join with conventional techniques. The FSW process was initially developed for aluminium alloy, but FSW is suitable for joining different types of material. In Conventional fusion welding of aluminium alloys there were a lot of defects, such as porosity etc. developed as a result of entrapped gas. Wherein with FSW process the interface of a non consumable tool rotating and traversing along the joint line creates a welded joint through deformation and consequent heat dissipation. This investigation had compared the influence of fusion welding technique TIG with a solid state friction stir welding (FSW) on both microstructure and mechanical properties of an AA6061 alloy.

2. LITERATURE REVIEW

The effect of FSW parameters on temperature was examined by Muhsin *et al.* [2].They conclude maximum temperature is a function of tool rotation rate while the rate of heating was a function of traverse speed Munoz et al. [3] investigated the microstructure and mechanical properties of friction stir welded and TIG welded Al-Mg-Sc alloy and reported that the yield strength FSW welded joint is decreased 20 % compared to base metal. Apart from this, there have been lot of efforts to understand the effect of process parameters on material flow behavior, microstructure formation and mechanical properties of friction stir welded joints. Finding the most effective parameters on properties of friction stir welds as well as realizing their influence on the weld properties has been major topics for researchers [4].

Extensive literature of friction stir welding of Al alloys does indicate that there are few areas particularly on the relationship between welding parameters and change in the mechanical properties of weldment. This paper focuses on finding the optimal speed (rpm) and feed rate (mm/s) with respect to mechanical properties such as hardness number and tensile strength.

3. MATERIAL

A Rolled 4 mm thick plates of aluminum alloy (AA) 6061 were machined to the required dimensions (150 mm x 60 mm) and for the TIG welding process aluminium alloy 4043 (AlSi5) is used as a filler material.

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Uncertainty in Supply Chain Management using Artificial Neural Network

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ABSTRACT

The evolution in the agriculture sector and the new challenges arises are, managing agriculture supply chain uncertainty has become an attractive topic for the researchers and practitioners. Data collection and analysis are now an important part of research which has to be carried out on different field such as economics, politics, technology, manufacturing, medicine and so on. It is well known that market price forecasting has been a difficult problem for a long time because of too many factors which cannot be accurately predicted. Conventionally, analysis has been often employed in modelling of price forecasts. In recent years a new technique of artificial neural networks ANN has been proposed as an efficient tool for modelling and forecasting. ANN model has been developed for price forecasting of wheat in this study. The data used include daily wholesale price, weekly wholesale price and monthly wholesale price collected between 2011 and 2016. The results showed that ANN model evidently outperformed the time series model in forecasting the price before one day or one week. A good correlation between the modelled and the real prices was observed from the ANN model.

Keywords: *Supply Chain Management, Uncertainty, Neural Network*

1. INTRODUCTION

Supply chain uncertainty is an issue with which every manager wrestles as driving from the increasing complexity of global supply chain networks, which include delivery delays and quality problems [1, 2]. It has been discussed that such uncertainties, which are complex in nature and network are a major problem and important to understand to overcome uncertainty. However, in intervening years there has been a lot of research is done in specific sources of supply chain uncertainty, which are relevant to manufacturing processes, supply side processes, demand side issues (probably end customer requirement) and there are many other sources of uncertainty which have received insufficient attention. Uncertainty leads to propagating up and down the supply chain and this affects supply chain performance. [3] Identifies three distinct sources of uncertainty in the supply chain which are supply uncertainty, process uncertainty, and the last one demand uncertainty. Uncertainty arises from volatile demand or inaccurate forecast. The management of agriculture production is both qualitative and quantitative and it envisages with weather conditions, interregional disparities in climate, quality of soil, seasonal factors over time capital availability and other factors. On the other hand, the agriculture market is particularly volatile, heterogeneous and highly sensitive to financial fluctuations and economics [4]. Stemming from the previous research background agri-management uncertainty occurs from growers to consumers, including the main operations: (a) location and production: (b) storage and processing: (c) distribution and consumption [5].

In order to understand and research "supply chain uncertainty", it is necessary to first know "supply chain network" and define it. The process of planning, implementing, controlling the cost-effective flow and storage of raw materials, in-process inventory, finished goods, and related information flow from point of origin to the point of consumption for the purpose of conforming to customer requirements is known as supply chain management/ network.

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Structure and Properties of Spider Silk as a Super Material

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ABSTRACT

Spider silk is one of the smart biomaterial amongst various materials. It possesses dynamic properties which sometimes leads it as super material. The extraction process, structure, mechanical and thermal properties of spider silk had remained mystery for a long time. Dragline silk produced by spider offers superior properties than many of natural and synthetic fibres. Structural similarity and comparable properties of dragline to those high performance fibres like Kevlar makes it more attractive for the application where high performance in terms of physical properties is demanded. In this paper authors reveal the properties of spider silk as tensile strength as 2.9Gpa and thermal stability up to 230°c respectively which makes it as super material. In this paper the method of extraction of spider silk is also discussed.

Keywords: *Bio Material, Smart Material, Spider Silk, Properties*

1. INTRODUCTION

Spider silk is a filamentous natural protein fibre produced by spider. It consists of long chain of repeated protein sequences, which are stored in the silk gland in a highly concentrated form. The peerless properties of the spider silk are due to the protein sequence. The silk gland contains a high concentration of salt, which prevent the formation of thread inside the duct. It's only when the protein molecules move into the spinning chamber just before being used that they start to orient into the long chains recognisable as spider silk..A spider can produce up to seven different types of silk depending upon the type of use (Figs. 1 & 2). Each type of silk has different type of amino acid composition which may vary according to the function of use. Different glands are used for the secretion of specific type of silk. The factors that affect variation in silk structure and properties include body dimensions, body weight, rate and direction of reeling, spinning direction habitat and feed of spider. Webs lost its stickiness after about a day due to factors such as dust accumulation and exposure to air In order to save energy the spider eats its own web before making a new one so the protein used for the silk thread is recycled. A spider weighing about 70 mg uses only 180 micrograms of protein to produce a web with a catching area of 50 to 100 cm^2. This is achieved because the web is build of fibres that are only few microns or so in diameter.

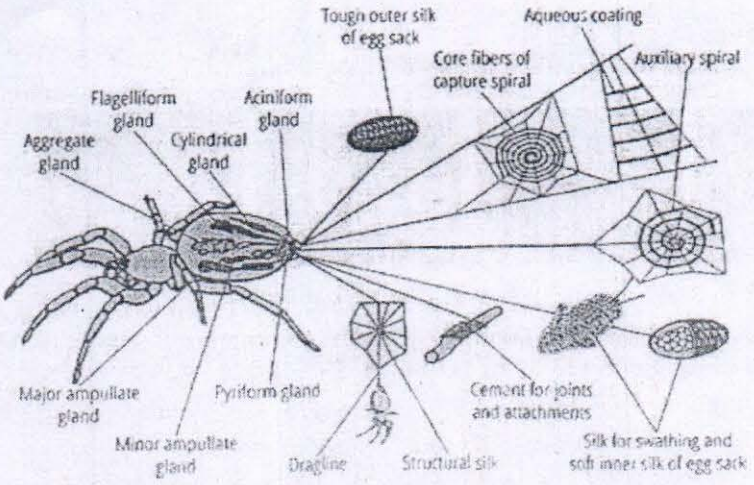

Figure 1. Spider with Different Silk Glands

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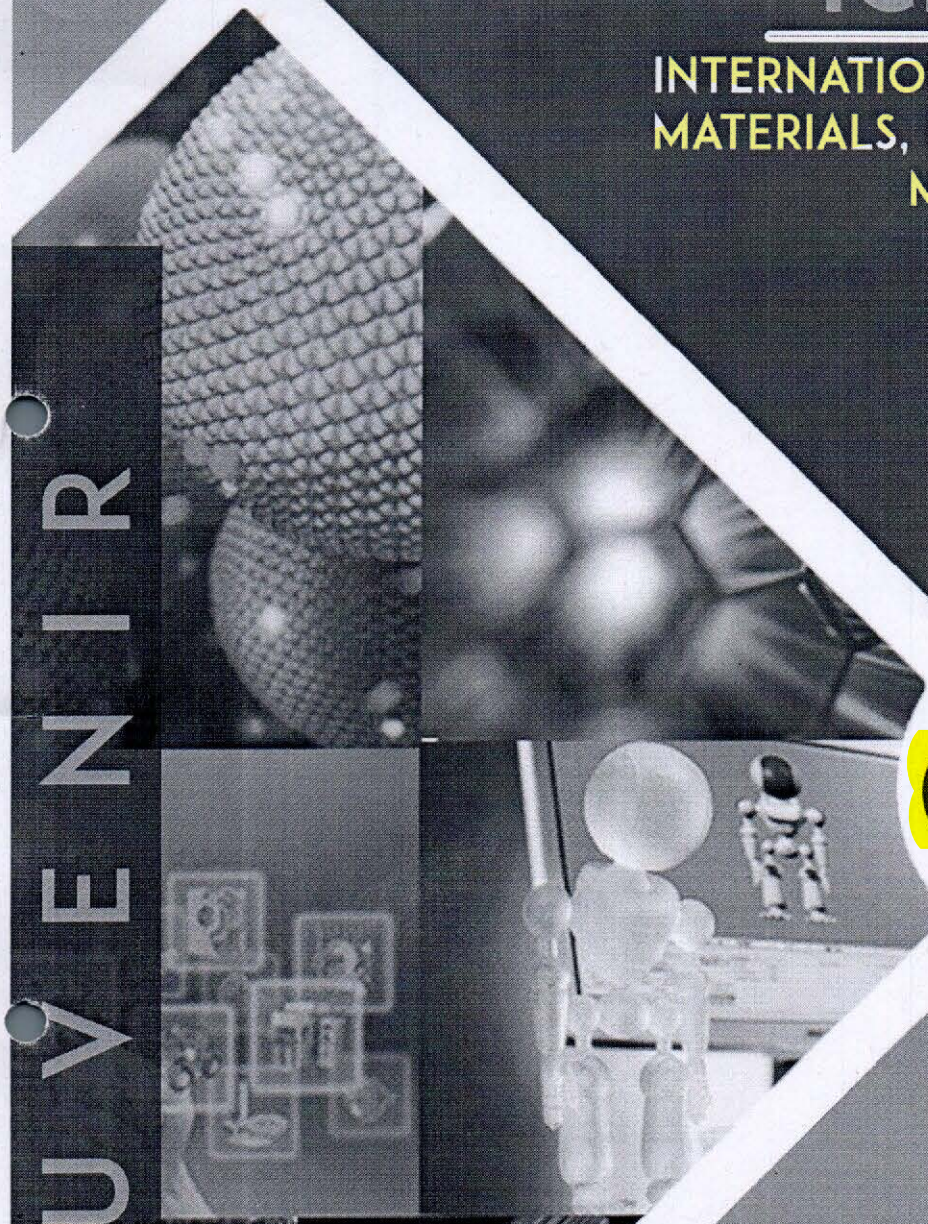

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MPF516 - Formability and Force Analysis of Steel Foils in Single Point Micro-Incremental Forming (SPMIF)

Thirumalai Muthusamy, A.K.Jeevanantham, Ravuri Kishore and A.Rajeshkanan

Single point incremental sheet forming (SPIF) is one of the latest near-net shape manufacturing technologies in which sheet metals are subjected to a step by step plastic local-deformation to form the final geometry. In this regard, many researchers have made an attempt to increase the flexibility and accuracy of the process by deforming the sheet at micro scales under the name 'Single Point Micro Incremental Forming (SPMIF)'. In this paper, it is attempted to investigate the forming limits and forming forces in micro-features formed by SPMIF on stainless steel foils of 0.04 mm thick. A 3-axis CNC vertical milling machine was used to deform the foils with the hemispherical end tool tip diameters of 200 μm and 300 μm. The effect of rotational speed on the forming forces and forming limits of stainless steel foils has also been reported. Taguchi's L18orthogonal array was used to analyze the effect of spindle speed, tool tip diameter and incremental step-down. It was found that forming forces decreases with the increase in spindle speed and the process was feasible enough to produce pyramids in micro-scale with higher forming limits than conventional forming.

MPM489 - Optimisation of Machining Parameters using Grey Relation Analysis integrated with Harmony Search for Turning of AISI D2 Steel

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Soni Kumari, Anshuman Kumar, Rajiv Kumar Yadav, K. Vivekananda

The objective of this study is to investigate the effects of different turning parameters like spindle speed (N), feed rate (f) and depth of cut (d) on different output performance parameters measures during dry turning of AISI D2 Steel using PVD coated carbide tool. An experiment has been conducted according to L9 orthogonal array in order to evaluate the turning performance characteristics like material removal rate (MRR) and surface roughness (Ra). An Effort was put to convert the multi responses into equivalent single response i.e. overall grey relation grade by using grey relational analysis. The present study also developed a mathematical model for overall grey relation grade in terms of the machining parameters. Here, improved version of the latest evolutionary algorithm such as harmony search (HS) has been implemented in order to evaluate the optimal machining condition. The results are also compared to genetic algorithm to validate the efficiency of aforesaid approach.

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Biodiesel Production from Waste Cooking Oil Using Ultrasonic Cavitation and Its Characterization

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ABSTRACT

In the age of modernization, the demand of energy is increasing day by day. Petro based fuel is the main source of energy. Petroleum reserves are very limite alternative fuel like biodiesel, has great prospects to be explored. Biodiesel is consid as best substitute of diesel fuel.In present research article waste cooking oil is used feedstock for the production of biodiesel. Ultrasonic Cavitation technique is use biodiesel production. Parametric optimization of biodiesel production using Ta method has been done. Characterization of biodiesel shows that biodiesel can be a alternative of petroleum-based fuel.

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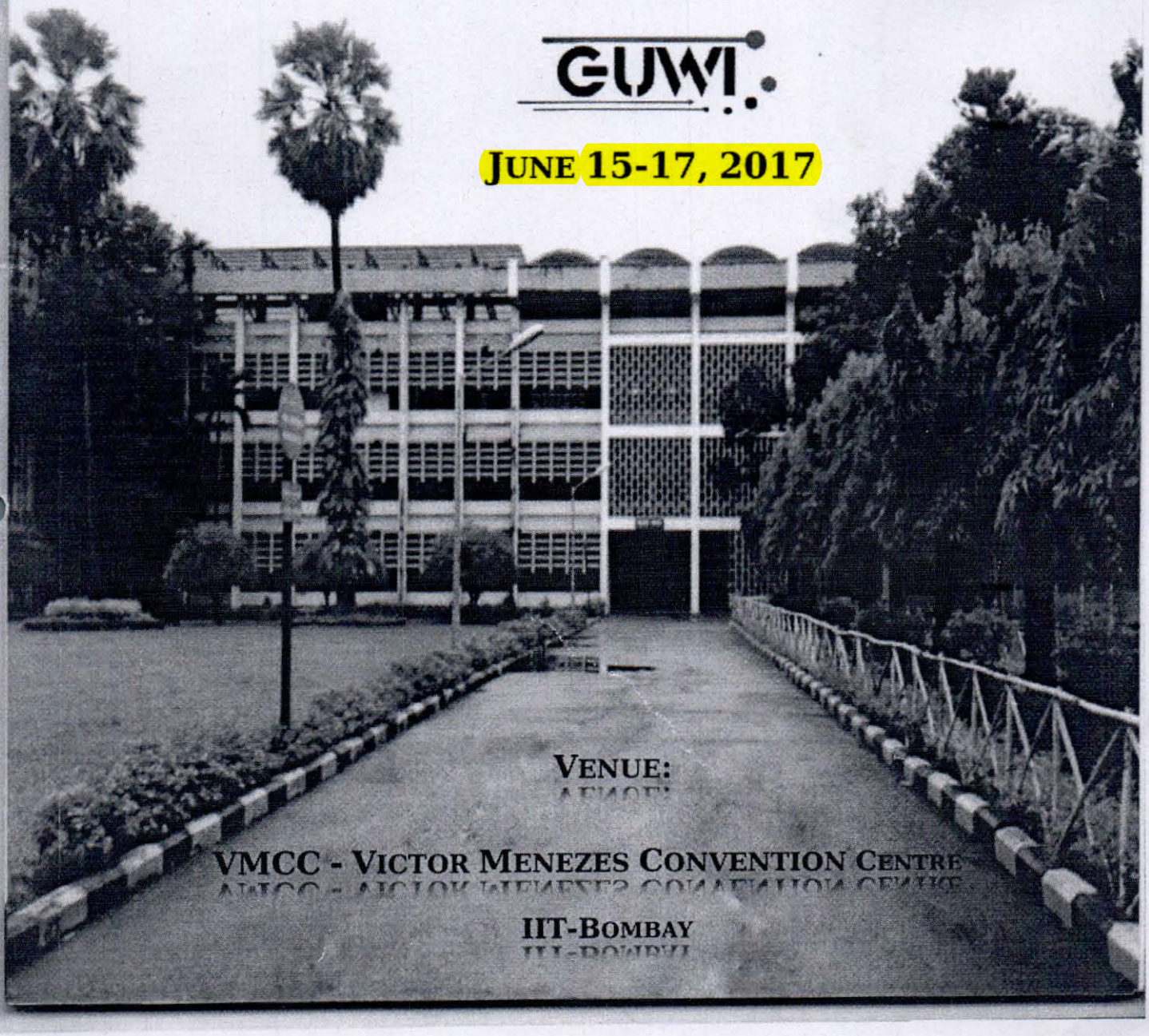

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strains generated during casting in a CSP, the steel becomes extremely susceptible to transverse corner cracks.

Whereas Nb and V is added to increased strength through grain refinement and precipitation strengthening through TMCP rolling. However, the microstructure and mechanical properties are greatly affected by the process parameters, such as reduction ratio, rolling temperature, cooling rate and the coiling temperature

This present paper discuss about

(i) Optimization of process parameters of B microalloyed steel to avoid transverse corner crack. Various process parameters such as B/N ratio, Mn/S ratio and Al-N factor were optimized through statistical analysis of actual plant data. This were validated through hot ductility studies using Gleeble thermo mechanical simulator.

(ii) Influence of cooling rate and CT on strengthening mechanism of Nb+V microalloyed steel owing to phase transformation through hot rolling simulation using Gleeble. The steel was deformed in the austenitic range followed by controlled quenching to simulate rolling and run out table cooling conditions. Cooling rate was varied from 100 to 150 °C/sec, while coiling temperatures were varied between 475 to 625 °C, with 25 °C step. It has been found that higher cooling rate coupled with lower coiling temperature is expected to give sufficiently higher mechanical properties.

Keywords: Microalloying, CSP, Transverse Corner Crack, ROT

ANALYSIS OF CONSTITUTIVE EQUATION USING FEM SIMULATION OF Zr-1Nb ALLOY

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The understanding of hot deformation parameters of as cast Zr-1Nb alloy is required for industrial application during hot working process. Therefore, hot compression test is done in all three different phases (i.e. single α–phase, single β–phase and in two phase α+β) of Zr-1Nb alloy for a range of strain rates. Stress-strain data of hot compression test was corrected for adiabatic temperature rise (ATR) at strain rate 1 s^{-1} and above. Various constitutive equations were

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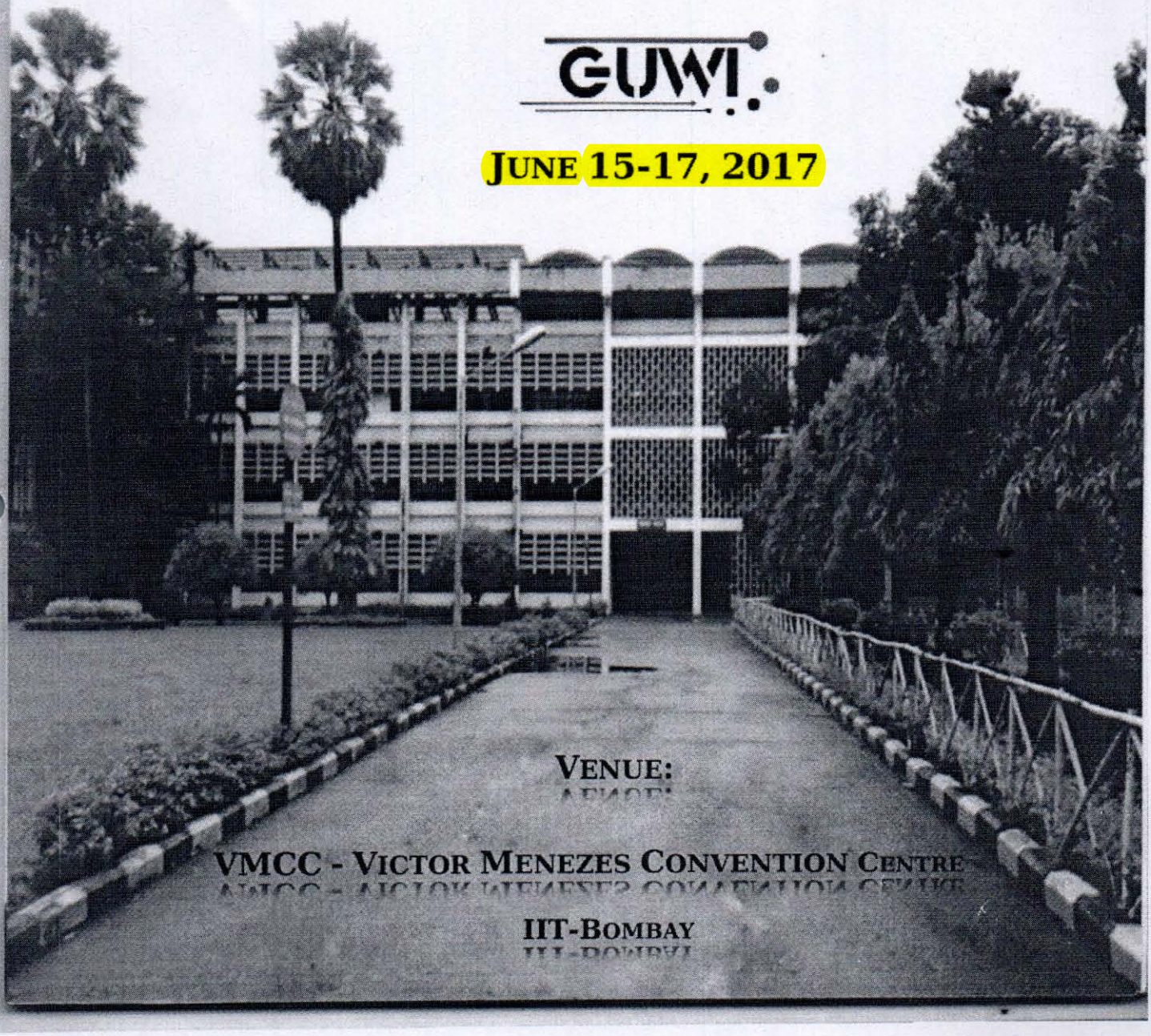

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High Temperature Tensile Properties of Superalloys used in Liquid Rocket Engines under Rapid Heating Conditions

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Modern high-speed aerospace vehicles often operate under extreme conditions, which subject various parts of the structure to high strain rate loading under rapid heating environments with temperatures approaching the melting points of the materials involved. High temperature properties of materials are generally evaluated by high temperature tensile tests, which is highly standardized and widely accepted. However, the heating rates and strain rates in conventional laboratory tensile tests, which are intended to evaluate the high temperature tensile properties of the materials usually are very low compared to those actually encountered in high-speed aerospace vehicles. The heating rates in conventional elevated-temperature tensile stress-strain tests are of the order of 0.4K per second to 0.5K per second, whereas the aerodynamic heating rates in satellite launch vehicles/re-entry vehicles usually exceed 50K per second. Therefore, for the optimum design of re-entry vehicles and liquid propulsion engines of launch vehicles, it is necessary to obtain the properties of structural materials under actual operating conditions. In this context, a very important beginning has been made with two super alloys used in launch vehicle applications, to experimentally determine the high temperature tensile properties under rapid heating conditions to a specified temperature followed by loading at a constant rate to failure at that temperature. The testing temperatures ranged from 1000K to 1400K (727-1127°C) with heating rates ranging from 50K per second to 100K per second. All the tests were carried out in normal atmosphere. These investigations have clearly indicated that the reduction in strength at high temperatures depends upon the heating rate (or heating time) and can be considerably lower for rapid-heating conditions. It is observed that under rapid heating conditions, the safety margins available for materials used in high temperature structures are considerably higher than the assessment based on conventional high temperature tensile tests, for short term applications.

Hot deformation studies of Zr alloys to understand deformation behavior in two-phase region

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[d]Department of Mechanical Engineering, Institute of Engineering and Technology, GLA Uinversity, Mathura-281406, Uttar Pradesh, India

Primary thermo-mechanical processing of Zr alloys is usually performed in two-phase region. Hot deformation studies covering low temperature phase, two-phase region and high temperature phase

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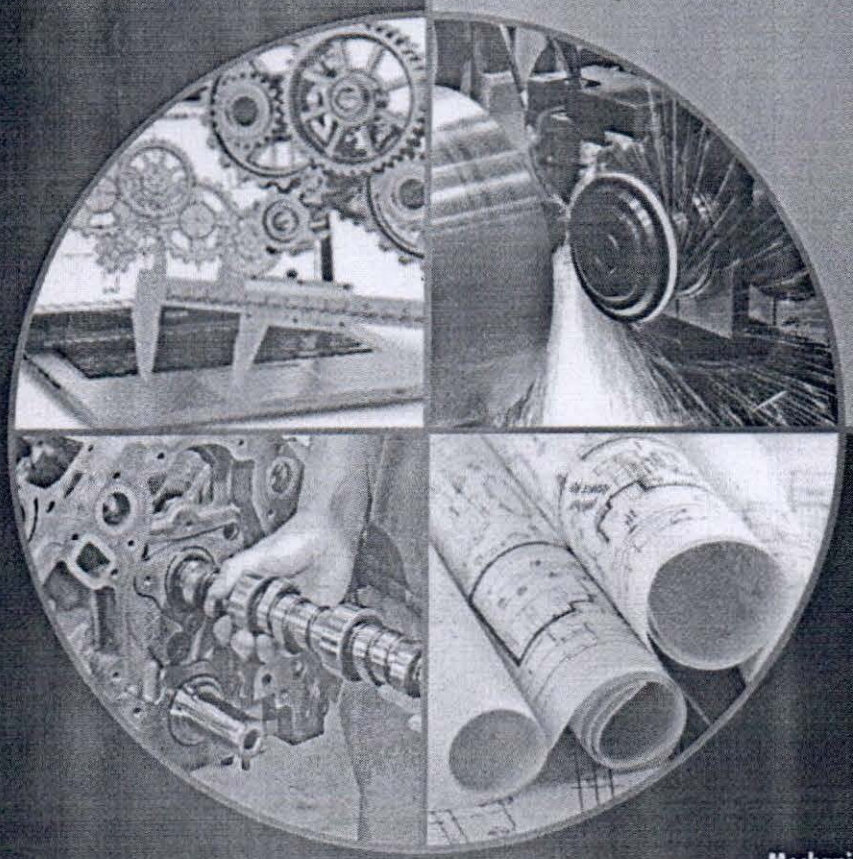

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Implementation Analysis of Parameters for Improvement in Productivity with Monetary Outcomes

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***Abstract*—Productivity is of concern rather an extremely important concern for any manufacturing industry. Several ways of improving productivity are suggested in this paper. Paper explains various productivity parameters which improved in various sections of Industry under consideration. Areas of weak productivity identified which indulges heavy set up or operational cost identified and this paper suggests alternate ways of doing the same process which resulted in cost saving. Cost saving directly means increase in profit. This paper gives the details of all such processes which reflect in cost saving of company undertaken as case study.**

Keywords: Productivity, Energy saving, Machining, Machine Shop, Cost Saving

I. Introduction

Productivity usually defined as a ratio between output and input. It is a fundamental concept considering this efficient and effective use of resources. Dealing with continuous competition, company not only needs to produce quality products but excellence production systems and management also plays an important roles. The aim of study is to improve the productivity in manufacturing industry. The objective is to identify the defect of the company and create a better solution to improve performance. Various industrial engineering technique and tools is implementing in this study in order to investigate and solve the problem that occurs in the production.

A. *Objectives of Selecting Parameters*

1. Implementation of tools from industrial engineering in manufacturing industry.
2. Identification of defects in high frequency at workstations
3. Introduction of latest methods in same manufacturing firm.
4. Improvement of productivity in firm.

II. Literature Survey

PiotrTomaszews et al. [1] identified and analyze the impact comparative productivity of given two projects. One represented an initial development stage while the other represents a subsequent and thus more matured development stage. **Henri Juslen et al. [2]** examined whether or not a controllable task-lighting system that allowed people to select high lighting levels will enhance productivity under real working conditions. **HannuRantanen[3]** found that internal obstacles form the only category of obstacles which is clearly under the control of the firm. **Carrino et al.[4]** studies the characteristic complications of GMAW processes, owing above to the large count of main variable values and to their inter-dependency, proposed all possible results by designing a fuzzy-logic-based scheme, where elements were dogged by preparing an artificial neural network (ANN).

Dimitrov et al. [12] focus is put on the effectual utilization of 5-axis machining with the high-end CAD/CAM-systems for their tenacity of productivity and quality upgradation. The analysis of several case studies like their comparison between 3-axis machining and 5-axis cutting as an substitute possibility has been proposed. **Weston [18]** paper accounts on progresses that assurance such a step change, primarily in auto, aero and construction equipment industries with roll out to other subdivisions. It labels how integrated people, product, process and plant (ip4) virtual environments and innovative forms.

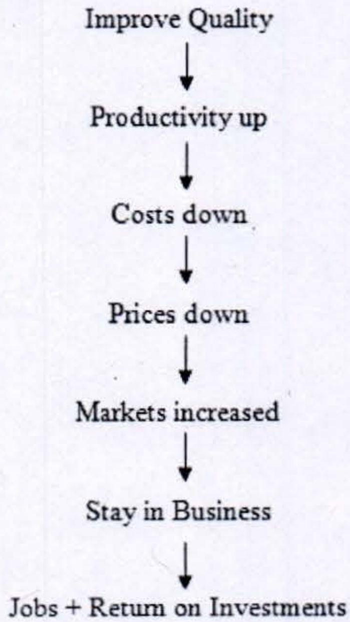

Fig. 1: Company Process Layout

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Assessment of the Effect of Triangular Velocity Profile Over an Elliptical Cylinder

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[1,2,3]Department of Mechanical Engineering, GLA University, Mathura

***Abstract*—Complex turbulent flows at high Reynolds number (Re = 0.5 ×10^6, 1 ×10^6, 2×10^6 and 3.6×10^6) over a 2D streamlined or elliptical shaped cylinder, is investigated by using two dimensional URANS equations with a standard k-ε turbulence model. The present study focuses on the investigation of the effect of triangular velocity profiles on the various flow characteristics along the periphery of a cylinder having various axis ratios (0.8, 0.6, and 0.4). Drag force over a circular cylinder is higher than elliptical cylinder. Coefficient of drag can be reduced by reducing the axis ratio with any type of velocity profile. A reduction of 35 to 40 percent in drag coefficient is observed with a streamlined cylinder having an axis ratio of 0.8 as compared to a cylinder having axis ratio equal to one. The back pressure recovery is observed for an elliptical cylinder with decreasing axis ratio.**

Keywords: Elliptical Cylinder, Axis Ratio, Cross Flow, URANS, Turbulent Flow

I. Introduction

The uniform and symmetric flow parameters are mostly used for the numerical study on unsteady flow around a circular cylinder. However, in many engineering applications, flow takes place over the real bodies like aircraft wings, turbine blades, submarines and missiles, which cannot be modeled with the uniform flow around a circular shaped cylinder. In such conditions, aspect ratio can influence the drag force, its coefficient and mean pressure coefficient. Furthermore, the predictions of turbulent cross-flow of other velocity profile attract interest due to its importance in the engineering application. However, in many engineering problems, a streamlined or cylindrical object is immersed in a flow condition other than uniform, which can affect the separation angle, back pressure and the aerodynamic forces working on it. It is necessary to understand the variations in aerodynamic forces on an elliptical in such type of complex flow. A typical example is flow over turbine blades in running conditions.

A few numerical studies reported in the open literature for the flows over elliptic cylinders. Yoshihiro mochimaru [5] examines the influence of axis ratio and Reynolds number on the drag force and streamline of the flow for the uniform flow condition at high Reynolds number up to 10^5. Zhihua Li *et al.*[4] used kω-SST turbulence model to evaluate the effect of aspect ratio on drag force at Reynolds number up to 10^4. Catalano *et al.* [3] used three dimensional large eddy simulation with wall modeling as well as URANS with standard k- ε model, for $5\times10^5 < Re < 4\times10^6$. Muk chen ong *et al.* [2] performed their studies for $1\times10^6 < Re < 3.6\times10^6$ using a standard K-ε model.

The purpose of this study is to examine the outcome of change in velocity profiles and axis ratio for the same mass flow rate in the domain on the pressure coefficient and coefficient of drag over a streamlined cylinder by using a standard k-ε turbulence model, in the high Reynolds number flow regimes.

II. Mathematical Formulation

The Reynolds-average equations for mass and momentum conservation are given by

$$\frac{\partial u_i}{\partial x_i} = 0$$

$$\frac{\partial u_i}{\partial t} + u_j \frac{\partial u_i}{\partial x_j} = -\frac{1}{\rho}\left(\frac{\partial p}{\partial x_i}\right) + \nu \frac{\partial^2 u_i}{\partial x_j^2} - \frac{\partial \overline{u_i' u_j'}}{\partial x_j}$$

Where i, j =1, 2. Here u_1 and u_2 are the mean velocity component in the horizontal and vertical direction denoted by x_1 and x_2 respectively; Pressure and density is denoted by P and ρ respectively.

The relation to estimate the component of Reynolds stress, $\overline{u_i' u_j'}$, is given in terms of a turbulent viscosity ν_T and the mean velocity gradients by using the approximation equation of Boussinesq,

$$-\overline{u_i' u_j'} = \nu_T\left(\frac{\partial u_i}{\partial x_j} + \frac{\partial u_j}{\partial x_i}\right) - \frac{2}{3}k\delta_{ij}$$

Where k denotes the turbulent kinetic energy and δ_{ij} denotes kronecker delta function.

A high Reynolds number k–ε turbulence model with standard wall function is used for the present numerical investigation.

The k and ε equations are given by:

$$\frac{\partial k}{\partial t} + u_j \frac{\partial k}{\partial x_j} = \frac{\partial}{\partial x_j}\left(\frac{\nu_T}{\sigma_k}\frac{\partial k}{\partial x_j}\right) + \nu_T\left(\frac{\partial u_i}{\partial x_j} + \frac{\partial u_j}{\partial x_i}\right)\frac{\partial u_i}{\partial x_j} - \varepsilon$$

$$\frac{\partial \varepsilon}{\partial t} + u_j \frac{\partial \varepsilon}{\partial x_j} = \frac{\partial}{\partial x_j}\left(\frac{\nu_T}{\sigma_\varepsilon}\frac{\partial \varepsilon}{\partial x_j}\right) + C_1\frac{\varepsilon}{k}\nu_T\left(\frac{\partial u_i}{\partial x_j} + \frac{\partial u_j}{\partial x_i}\right)\frac{\partial u_i}{\partial x_j} - C_2\frac{\varepsilon^2}{k}$$

Where $\nu_T = C_\mu(k^2/\varepsilon)$.

Standard model constants have the following value: (σ_k= 1.0, σ_ε= 1.3, C_1 =1.44, C_2=1.92, C_μ= 0.09).

III. Procedure for Numerical Solution and Computational Domain

Commercial CFD code, FLUENT is used to carried out URANS simulations. It is based on a 2^nd order finite volume discretization and the SIMPLE algorithm for

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Robot Path Optimization in Cellular Manufacturing Environment

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***Abstract*—In an industry, how efficiently and effectively the robot works in an immediate industrial environment primarily depends on how well it is organized for that job. In Industry, "Time is money", hence in this paper, we worked on path optimization of robots for spot welding and spray painting or swing machine kind of work environment. We initially developed programs in "C" language and then incorporated them into the RAPL-II language. We developed the program for an optimum solution, not an exact solution. After getting the result from the "C" language program, the final sequence robot path is incorporated into the RAPL-II language, which led us to the completion of our work.**

Keywords: Optimization, cellular manufacturing, RAPL-II language.

I. Introduction

Today's market requirements can only be met through radical advancement of enterprises using highly productive manufacturing environment like cellular manufacturing.

In present scenario robot based technologies play an increasingly important part in the conversion to more advance manufacturing practices. Industrial robots can serve as building blocks of versatile work cells which in turn, can form manufacturing systems more flexible and can lead towards more optimized transfer lines. Whenever a manually operated scenario in a shop floor is converted into robotically operated environment it becomes necessary to find out the optimized travelling path of robot from source location to destination location as robot wants to minimize its cost in time or in energy while achieving its goal.

Devendra P. Garg and Clayton D. Poppe [1] were actively involved in this research area. They have chosen most critical, crisp and fuzzified environment for robot path optimization problem. Their solution methodology was based upon a combined approach of Hopfield Neural Network and genetic algorithm. As this approach was based on genetic algorithm so for each new generation cycle of main genetic algorithm, the Genomes and chromosomes of the algorithm are modified. And one has to launch new generation Hopfield neural network path planner regularly. Correctness of proposed techniques was demonstrated in simulation results.

Martin Talbot [2] worked for finding better algorithm for shortest path computation for autonomous mobile robots (AMR). Integer programming for dynamic formulation of complex motion planning problems were considered in his approach.

Rishi T. Khar and Ernest L. Hall [3] have adopted the basic problem of robot path optimization applied to the context of Navigation Challenge where sequencing of points and a path in space that robot has to adopt, in order to complete the objective is of prime importance. They have given a mathematical programming based model for a Bearcat Robot which makes it enable to travel autonomously with the help of differential GPS, from a starting point to several target destinations in the least possible time. They have designed the model in such a way that during the travel, robot was able to recognize and avoid the obstacles and different hurdles present in the way through target coordinates showing in the map.

David L. Vilarino and Csaba Rekeczky [4] solved the shortest path problem with pixel level snakes (PLS) an application of the CNN-Based active contour technique.CNN is a dynamic non linear system with the local connectivity of cells. Firstly, the multiple processing steps with pixel level snakes algorithm implemented on CNN and further extended to find out the approximate shortest path length of robot.

In this work, we have suggested a new algorithm to find out optimum solution for single robotic arm path traversing in single cellular manufacturing environment. This Algorithm can also be applied easily and efficiently for multi robots in multi- cellular environment. This can be achieved by repeating the algorithm for each robot in each cell and RAPL II program can be framed for each robot to work within its respective cell environment.

II. Cellular Manufacturing

Cellular/Flow Manufacturing is the linking of manual and machine operations into the most efficient combination of resources to maximize value-added content while minimizing waste. The most efficient combination implies the concept of process balancing. When processes are balanced, the product flows continuously, parts movement is minimized, wait time between operations is reduced, inventory is reduced and productivity increases. The cellular approach is to organize the entire manufacturing process for particular or similar products into one group of team members and machines known as "cell". A work cell is a work unit larger than a individual

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Optimizing Machining Parameters of EN 31 Steel Using Electric Discharge Machining

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***Abstract*—Electric discharge Machining (EDM) is a well-established machining option for manufacturing geometrically complex forms or hard material parts which are extremely difficult to machine by conventional processes. The non-contacting machining technique has been continuously evolving from a die and sinking tool process to a micro-scale application machining alternative attracting a significant amount of research interests. The present study undertaken machining performance & optimizing machining parameters of EN 31 steel using Electric Discharge machining based on Taguchi method by varying various electrical parameters so as to obtain an optimum value for response parameters which are MRR, TWR & OC.**

Keywords: Die-sinking EDM, Material Removal Rate, Tool Wear Rate, Overcut, Taguchi Design of Experiment, S/N Ratio

I. Introduction

English physicist Joseph Priestley studied in 1770 for erosive effect of electrical discharges. Dr. B.R. Lazarenko and Dr. N.I. Lazarenk invented this Process who were Russian scientists, in the year of 1943. They are initially used spark machining process, which was named after the completion of sparks (electrical discharges) that was placed between two electrical conductors which was immersed in a dielectric fluid. Electric Discharge Machining can be taken as a series of crash and re-establishment of the liquid dielectric in the middle of the electrodes. With the help of EDM we can slice complicated contour orcavities in pre-hardened steel without the need for heat treatment to become softer and re-harden them.

Electric discharge machining (EDM), sometimes conversationally also referred to as spark machining, spark degradation, flaming, die sinking or wire wearing away, is a manufacturing process whereby a desired form is obtain using electrical discharge (sparks).

With growing requirement for novel hard, elevated strength, hardness, toughness & temperature challenging materials in engineering, the expansion & request of EDM has become more and more important. EDM has been old effectively in machining hard, high power & temperature challenging materials. Material is unconcerned by rapid & recurring spark discharges crosswise the gap between the electrode & work piece. Therefore the qualities of EDM technique turn out to be more obvious when machining materials like EN 31tool steel which have a high hardness worth.

II. Experimental Setup

A. Set up for Die–Sinking EDM

This is the experimental setup of EDM drilling machine on which this whole experiment was performed.

Some features are:

1. Servo controlled tool holder
2. Side flushing system for Dielectric (EDM oil,2-5 CST)
3. Control panel
4. Both automatic & semiautomatic handling can be done
5. Rectangular working area with Work clamping device.
6. Rotary impulse generator type electrical circuit

Fig. 1: Image of Used Experimental Setup

B. Workpiece and Tool Material

1. Work piece Material - EN 31 TOOL STEEL.
2. Chemical Composition – C 1.07%, Mn 0.58%, Si 0.32%, P 0.04%, S 0.03%, Cr 1.12%, Fe 96.84%
3. Shape -Rectangular Cuboid
4. Dimensions - 32mm×32mm×8mm
5. Properties-Hardened to obtain Vickers Hardness-315, Low Thermal Conductivity,
6. Tool Material - Copper Electrode

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FE Analysis of a Connecting Rod of a LCV using CAE Tools

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***Abstract*—The connecting rod in an automobile engine is a very critical component and a high volume production mechanical element. In this paper, the Finite Element Analysis of connecting rod is presented and is validated with experimental results available. The CAD model of CONNECTING ROD has been generated in CATIA, the pre-processing has been done in hypermesh and the solver used is radioss linear. The displacement and stress contours have been plotted and patterns are studied. It has been observed that stress and displacements have been found within safe limits and structure could withstand the given load.**

I. INTRODUCTION

The purpose of connecting rod is to convert the transverse movement to rotating movement. Connecting rodis a component of the reciprocating engine, which is exposed to lots of repetitive and varying loadings. It has to be sufficiently durable to remain stiffwhen subjected to loading. As connecting rod is subjected to accelerations which in result inertia forces, so it has to be designed to be light as inertia forces are directly proportional to mass of a moving component. High reliability is expected of a connecting rod as it being a critical and main component of a reciprocating engine. It is subjected to axial tensile and compressive forces, bending loads which are produced due to pulling and thrust on the piston produces bending stresses.

Pravardhan S. Shenoy presented the FE analysis procedure for Connecting Rod Optimization for Weight and Cost Reduction. An optimization analysis was done on a connecting rod manufactured by the process of forging. The main purpose of the study was to reduces production cost and to reduces the weight of connecting rod. The two main criteria's i.e. weight and production cost were considered separately. Manufacturing cost was reduced significantly as the forged components require less machining. Reduction in weight was accomplished by means of an iterative process. In this work optimization of weight is done for a repeated tensile load dynamic in nature and compressive load static in nature as the two limiting loads. Restraints of fatigue load, static load, buckling strength and ease in manufacturing were also considered. The fatigue strength was the most important aspect in the optimization of the connecting rod. An estimation of savings in production cost is also done. The outcomes of presented work is an optimized connecting rod which is 10% light in weight and is having 25% less cost then the existing connecting rod.

Sonsino *et al.* analysed the loading experienced by connecting rods. Connecting rods are submitted to mass and gas forces. The superposition of these two forces produces the axial force, which acts on the connecting rod.

Webster *et al.* worked on the load distribution on the connecting rod in touch with the connecting pin. With the help of experiments he gave the load distribution on the contact surfaces in tension and compression. In compression case the crank end and piston ends were following distribution of cosine type while in case of tensile loading both ends were found to follow sinusoidal type of distribution on the contact surface between connecting rod and connecting pins. Load distribution for each case is shown in Figs. 1 and 2.

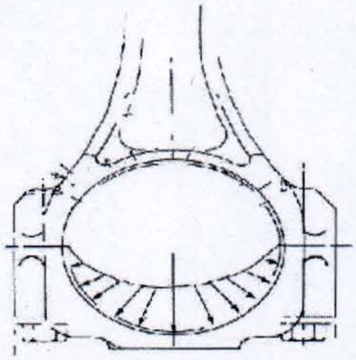

Fig. 1: Tension Loading Distribution on the Contact Surface of the Connecting Rod

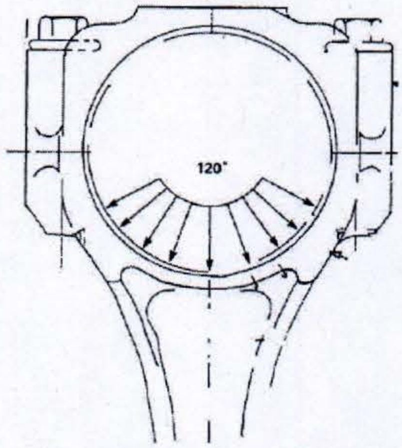

Fig. 2: Compressive Loading Distribution on the Contact Surface of the Connecting Rod

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Numerically Camparing Simple and Shchelkin Spirals Type of Tubes of a Pulse Detonation Engine

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***Abstract*—Pulse Detonation Engine (PDE) is the extension of Pulse jet engines. PDE consists of pre–detonation tube, combustion chamber and converging/diverging nozzle. In this type of engine detonation of fuel is followed by a high pressure wave of a burnt mixture to produce thrust efficiently than present engine systems. This can only be achieved through improvement of its mechanical simplicity and thermodynamic efficiency. This paper comprises numerical investigation of two different type of pre–detonation tubes. Mixture of hydrogen and oxygen gas is considered for this study. Two dimensional modeling and meshing of two different types of tubes gives a clear picture of transient detonation process. Exclusives grid independence study is performed to reduce the computational time. Pressure wave generation in both type of viscous domain (i.e. simple and shchelkin spiral) is computationally validated with experimental literature. Attained results of this computational investigation provide that the length and shape of pre detonator tube is a responsible factor to increase the impulse. Overall, to find the quality amount of thrust, shchelkin spiral types of tube are favored.**

Keywords: PDE, Pulse Jet Engine, Grid Independence, Shchelkin Spiral

I. INTRODUCTION

Pulse Detonation Engine is a kind of engine that contains extended tubes and these extended tube will occupies oxidizer and fuel mixture [1].

Pressure; by combustion process is relatively high and will generate a huge quantity of thrust. After accomplishment, all the specific properties viz. pressure, velocity and temperature will be calculated. Lastly same cycle will reappeared continuously. Pulse jet engines works on deflagration, whereas pulse detonation engine works on detonation [1].

Analysis over pulse detonation engine can only be carried out until one has an appropriate acceptance of detonation process. To explain detonation wave coupling between strong shock wave and heat release region is considered. Heat release will happen behind the shock and there combustion is highly condensed [2].

Energy release will leads to form a supersonic shock wave and resulting ignition will formulate combustion wave inside whole tube; this phenomena is recognize as "detonation".

Plenty of research examples are set through this kind of work. It has been found that first pulse detonation engine of single tube type was made-up in Japan. This single tube type PDE was capable of sliding on rails. Moreover, that experimental investigation was conducted over sliding test system, which has a frequency of 6.67Hz with 13 cylinders. The fundamental considerations of obtained systems have being studied extensively and considered for many decades [2].

Another Pulse detonation (liquid based) was designed in Russia. Many laboratories like DSO national laboratory – Singapore, started a new development in PDE; currently used in flight testing. [3] During the investigation of Lee, an exclusive study of parametric on blockage ratio has been showing vast results on spacing in between the obstacles and its length.[2] This experimental investigation was conducted with ethylene-air mixture, which has an effective blockage ratio between 0.3 and 0.6. [2]

Many research applications are answerable to a statement that this propulsion system has theoretical benefit over deflagrated combustion [1].

Open combustion chamber, without any moving part is utilized for compression work. Frequency range of these engines seems in dozen hertz [1] where entire process will occur in pulsed mode only [1]. Development of detonation is necessarily initiated at each time step and resulting thrust will be reformed for each new time step.

The functioning of Pulse detonation engines can be enlightened with the help of Humphery cycle and operation of gas turbine can be described by Brayton Cycle [3].

The Fig. 1 precisely illustrates that for the case of Humphery cycle area coming under PV-curve is extra. This makes PDE more resourceful and effective as parallel to gas turbine; the front zone is minor and will reduce total amount of drag up to large extent [3].

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Identification of Most Important and Easy to Implement Key Components of Vendor Managed Inventory (VMI) in Automobile Industry

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***Abstract*—As per the current trend, market needs variation in goods, which leads to generates dissimilarity in demand. This demand creates many managerial complexity like forecasting, planning etc. To reduce the jeopardy due to ambiguity in demand, from basic raw resources to finished product delivery to clients, the entire practice should go through some new techniques and radical changes. Companies should essentially focus on taking competitive lead by efficiently handling their supply chains. This study tries to find some key components of Vendor Managed Inventory (VMI) which are vital to vendor as well as customer for automobile industry. This paper reveals the comparative difficulties and importance in the introduction of VMI components in the automobile sector.**

I. VMI: An Introduction

VMI abbreviated as Vendor Managed Inventory, is a streamlined approach to inventory management and order fulfillment. It encompasses association of providers and their buyers (e.g., supplier, dealer, or users) that alters the conventional procedure of placing order.

Vendor Managed Inventory aims both suppliers and their customers by aligning business objectives and streamline chain operations. Increased information flow results in the direct outcome in the form of business value: Upgraded Inventory Turns, Enhanced Service, and Improved Sales.

The below mentioned steps briefly describe the VMI process:

- Data communication
- Calculation
- Monitoring and
- Reporting.

The recommended replenishment order is created by VMI software after analyzing the data. Recommendations are generally based on algorithms using factors for example predictions, occurrence of sale, and enhanced sales.

On ideal front, these processes encompasses the following:

Fixed interval review and estimation of time of placing of order and quantities associated with it, on the basis of movement data and unique information like promotions etc.

The recommended orders, any exemptions are thoroughly review by supplier's planner prior to the approval of appropriate orders.

After which VMI system directs:

Supplier with a purchase order.

Customer with a purchase order.

Following below mentioned objectives must be fulfil for trading partners to begin with VMI:

Inventory turns

Cost of transaction

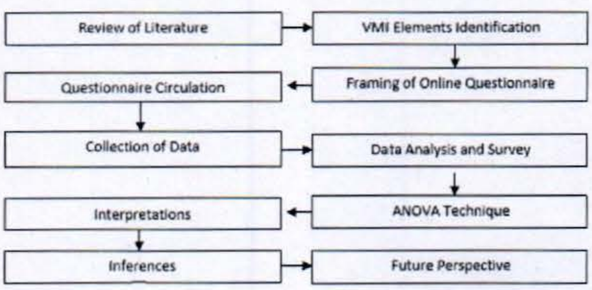
The definite measured activity against the above described goal is strictly monitored by the system. To maintain the transparency in the process the information is reported to the supplier as well as the customer. On demand, information should be accessible to both supplier as well as customer. In the case, when measurements get disturb for example do not follow an acceptable range or difficulty in the fact comes, then VMI system should provide an immunity signal to both customer and supplier.

II. Methodology

A. *Introduction*

Few factors are highlighted in the study that are related to VMI system:

1. Elements that are needed for VMI
2. Elements that are challenging to implement but important.
3. Elements that can be executed easily.
4. Elements that are more advantageous in Industries.



Research Methodology

Fig. 1

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Numerical Investigation on Biplane Structure at Different Mach Numbers

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***Abstract*—Themotivation of this paper lies in the optimization of aerodynamic shape of the biplane geometry to get a significant reduction in wave drag. The Spalart–Allmaras model is used as the viscous model in calculating the biplane structure. The optimized model certainly reduces the wave drag and the effect of flow-hysteresis and the shockwave formation is diminished to a favorable limit.**

Keywords:* *Spalart–Allmaras, optimization, biplane, shockwave.

I. INTRODUCTION

Through the ages of transportation there are drastic developments in the field of aircraft efficiency and performance.[1] Air transport is known as the fastest means of transportation and optimisation is always been the area of focus since its birth. [1]The occurrence of sonic booms limits the speed of the aircraft and the shockwaves generated at supersonic speeds results in unstable operation. [2]This study aims to realise a low-drag wing design that can improve the aerodynamic performance of the aircraft and is based on Busemann biplane concept. Computational Fluid Analysis of the flow suggests that the distribution of total lift into two separate wings can reduce the wave drag which is proportional to the square of the lift produced.[2] This concept optimises the design and increase the aerodynamic performance of the existing system.[3]

A biplane is a two wing fixed one above the other. The main advantage of this geometry is that it reduces the drag in comparison to the normal wing to provide a high lift.[4]

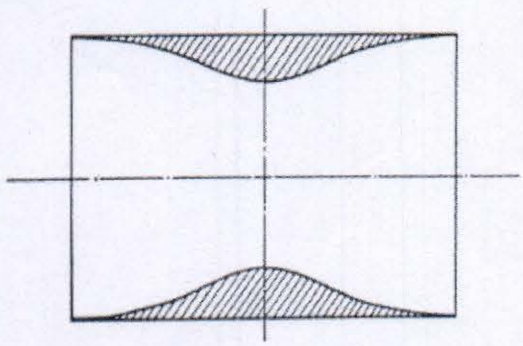

Fig. 1: Biplane of Zero Drag and Noise [1]

Bussemann biplane is an example of wave-drag reduction methods between two wings.[5]

Bussemann biplane model inspired the creation of many models with other multiple elements leading to wave interactions in favorable condition and the reduction in wave drag.[6]Choked flow is formed when fluid flow through a restricted area whose rates reach maximum when the velocity reaches sonic at some point along the flow path.[7] In addition to the cutting edge supersonic transport plane, there are mainly two noteworthy difficulties which must be determined.

- The fuel productivity must be altogether enhanced
- The Sonic boom to the ground must be significantly reduced.

Bussemann Biplane is renowned for utilizing favourable shockwaves collaboration to accomplish the nearly shockwave free supersonic flight at a particular Mach number.[9]

The drag because of thickness can be significantly lessened by presenting the biplane setup. Adolf Busemann proposed a biplane idea by just partitioning a diamond airfoil into two segments and putting the triangular surfaces confronting each other. [8]

A. *Shape of Bussemann Biplane*

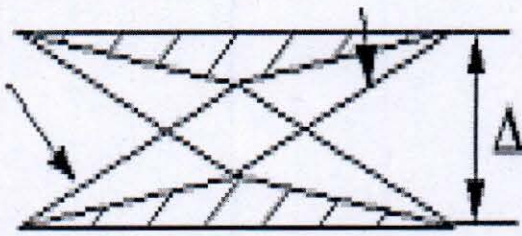

Fig. 2: Busemann Biplane [1]

The biplane model can likewise essentially lessen the wave drag because of the airfoil thickness. Inside a supersonic meager close estimation, Busemann demonstrated that the wave drag of a zero-lifter Diamond can totally be eliminated by just parting the two components and those components are parallel to each other.

The solid stun wave produced at the main edge will precisely propagates to the inward corner and it will be crossed out by the development wave by then. At the outline condition, hypothetically the stun waves can be totally dropped out with the goal that zero wave drag occurs.

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Experimental and Numerical Investigation Over Helo Deck of a Simplified Frigate Ship (SFS)

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***Abstract*—Landing of a helicopter on a helo deck is a difficult task due to its backward facing step (BFS). Many researchers have found the problems of BFS like turbulent airwake, unsteadiness, and severe velocity gradient and recirculation zone. This paper summarizes the experimental and computational results of two undesirable parameters, i.e. unsteadiness and recirculation length on and over the helo deck through the method of flow visualization (tuft technique) and fluid flow measurement (five hole probe) of a normal hangar. Results of scale down model (1:100) of SFS are successfully validated in both experimental and computational investigations. Entire findings were also verified through grid independence check of computational model. Furthermore, to reduce the length of recirculation zone, six different flow control techniques have effectively implemented.**

Keywords: Helo, Helodeck, BFS, SFS, SHOL

I. INTRODUCTION

The naval ships are fundamentally designed for the purpose of war as well as various other operations like inspections, combat and destroy the submarines, wars medical evacuation, vertical replenishment at sea and many other special tasks. Simplified frigate ship (SFS) is among one of those warship whose mission execution is mainly dependent on helo (helicopter). Helo deck is landing area for the helicopter (generally rearmost part) and hangar is used for helicopter stowage. This configuration of helo deck and hangar results in formulating of backward facing step (BFS).

Existing literature shows the difficulties in chasing of the naval ship and to overcome the same concept of helocame into the picture. In naval ships, there is a region behind the Backward Facing Step (BFS), where we encounter the unsteady flow of air, recirculation zone and large velocity gradient. This zone is created due to the disturbance of airwake at the sharp edges of the hangar. The flow of air in this region is highly turbulent and unsteady as shown in Fig. 1. Thus, if helos will enter into this zone, the collision of the rotor blade with the vortices may lead to the complete damage of the helo as well as of the pilot.

Consequently, it is very important to determine the length upto which the flow of air is unsteady.

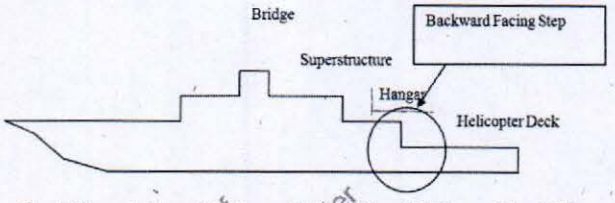

Fig. 1: Formulation of Backward Facing Step (BFS) on a Naval Ship

P.G. Spazzini *et al* [1] discussed the various flow regimes in a two dimensional (2D) BFS. There, the flow is largely dominated by a primary recirculation region surrounded by a shear layer. Moreover, a secondary recirculation zone and a reattachment region are also observed. Due to these regions unsteadiness over the BFS is experienced.

B.F. Armaly *et al* [2] experimentally investigated separation length variation. This test was conducted between the range of 70 to 8000 Reynolds number (Re), and analyzed under fully developed turbulent flow recirculation. Results have shown that the recirculation length is unaffected under the situation of fully developed turbulent flow and the results were validated by numerical study of 2D steady differential equation of mass and momentum.

Hunt *et al* [3] discussed the flow over a cube and analyzed the complex flow field like separation cavity, horse shoe vortices and reattachment length.

J. Forrest *et al* [4] analyzed numerically ship airwake using Detached-Eddy Simulation. This study captured the unsteadiness over helo deck at different wind-over-deck angles and velocity profile over helo deck at different plane. Furthermore, author has also added ship helicopter operating limits (SHOL) for Lynx and frigate ship.

S. Shukla *et al* [5] modified the shape of hangar by taking curve at side corner and investigated shed vortices. He also found the flow separation zone and discussed unsteadiness factors that increase during the landing; this happens due to the airwake and helo downwash.

Daniel M. Shafer [6] developed the idea to reduce undesirable parameters through Move/Deflect Airwake or Condition/filter airwake technique. This study was conducted over a scaled down model at different wind-over-deck angles and found that the porous surface of helo deck is and effective technique to reduce the undesirable parameters.

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Redundancy Resolution of Serial Link Manipulators in Joint Space: A Numerical Approach using Inverse Kinematics

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***Abstract*—The automatic control of robot manipulators encounters a central problem of the inverse kinematics of serial manipulators. A numerical method to determining solutions of the inverse kinematics problem for redundant manipulators is presented to procure the smoothest algorithm, which is vigorous iterative method. After primary objective of reachability of end-effectors to the target point is achieved, aim is set to resolve the redundant degrees of freedom of redundant manipulator. This method is computationally effective since it converges to the feasible solution with any initial guess value, and it deals tactfully with the singular configurations of the manipulator. Also, this method is numerically stable and can be efficiently applied to any number of DOF serial manipulators. A planar 3R-DOF serial link redundant manipulator is considered as exemplar problem for solving.**

Keywords: Inverse Kinematics, Redundancy Resolution, Redundant Manipulator

I. Introduction

Redundant manipulators have more kinematic DOFs than those are required to span a task space, producing an under-constrained problem. In the case of two-dimensional planar manipulation with both position and orientation targets, this means that a manipulator has four or more degrees of freedom, allowing a large number of manipulator joint-space solutions for a given task space position and orientation. The redundant manipulators have to face lack of solution uniqueness.

II. Literature Review

Since the beginning of robots, Inverse kinematics algorithms are an issue of major concern. To overcome this issue, analytical methods were most popular methods. Often, a unique solution does not always exist, and then it becomes necessary to find an alternate solution. The most extensively used methods are the numerical ones, however there are several methods available based on learning, neural networks [1], interval methods [2], or based on distances [3]. On control-based methods, the first approaches were developed in the 60s-70s, when Whitney [4] used the pseudo-inverse of a matrix for solving the problem. However other methods like Jacobian transpose, relatively faster, were also used. Earlier in 1980s, with the developing computational capabilities of computers, Baillieul [5] presented an extended Jacobian, which was computationally more typical, with second-order derivatives which was further developed in 1995 [6]. Also in the 80s, the manipulability index was introduced by Yoshikawa [7], an optimizing parameter for a redundant robot. Some techniques of avoiding discontinuities on the singularities by damping/filtering the Jacobian Matrix, are discussed in [8] and [9]. Many ways of improving the performance of these algorithms have been proposed. Siciliano and Slotine presented in 1991 a way to prioritize various tasks [10], and analyzed [8] the damping of the Jacobian to avoid the discontinuity of the pseudo-inverse operator for the rank deficient Jacobian matrix with its alternatives [11].

III. Methodology Inverse Kinematics

A. Transformation Between Two Adjacent Frames

In this convention, each homogeneous transformation ${}^{i-1}T_i$ (homogeneous transformation of frame {i} with respect to frame {i-1}) is given by the product of four basic transformation matrices:

$$ {}^{i-1}T_i(q_i) = \mathrm{Rot}(\theta_i, Z_{i-1}) \cdot \mathrm{Trans}(d_i, Z_{i-1}) \cdot \mathrm{Trans}(a_i, X_i) \cdot \mathrm{Rot}(\alpha_i, X_i) $$

$$ = \begin{bmatrix} \cos\theta_i & \sin\theta_i \cos\alpha_i & -\sin\theta_i \sin\alpha_i & a_i \cos\theta_i \\ \sin\theta_i & \cos\theta_i \cos\alpha_i & -\cos\theta_i \sin\alpha_i & a_i \sin\theta_i \\ 0 & \sin\alpha_i & \cos\alpha_i & d_i \\ 0 & 0 & 0 & 1 \end{bmatrix} $$

IV. Numerical Solution of the Inverse Kinematic Problem

The project work is completely based on numerical computation methods in MATLAB. In most practical situations manipulators are redundant. In such cases closed form solution is not possible. Therefore, the methods are iterative. The most frequent method Newton-Raphson method is adopted here.

In the iterative technique, the following kinematic equation is to be solved

$x = f(q)$

where x is position of the end point of the manipulator which is a function of joint angles.

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Empirical Formulation of Jump Characteristics in Horizontal Channel

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***Abstract*—This paper deals with the experimentation and empirical formulation of hydraulic jump characteristics (specific energy) in horizontal prismatic channel. The experiment has been carried out in the hydraulic laboratory, Department of Applied Mechanics, MNNIT Allahabad. The empirical correlations are developed using Buckingham π theorem and regression analysis of experimental data. The developed empirical correlations are validated using Bhutto (1987) data.**

Keywords: Hydraulic Jump, Froude Number, Reynolds Number, Empirical Corelation

I. INTRODUCTION

Behind many types of hydraulic structures such as dams and barrages, and draft tubes of hydraulic turbines, a substantial portion of the kinetic energy in supercritical flow must be dissipated in case scour and erosion. Different methods of energy dissipation have been utilized to accomplish tranquil flow condition as the flow enters the downstream channel. The main role of every such technique is to change over however much as could reasonably be expected the active vitality of stream into turbulent vitality and eventually into the warmth vitality which is scattered into air [1]. This goal is most adequately achieved by means of a neighborhood phenomenon known as hydraulic jump which may accept a few particular structures relying upon the geometry of the channel and tail water conditions. Thus hydraulic jump is a phenomenon well known to hydraulic engineers as a useful means of dissipating excess energy and thereby prevent scour and erosion downstream of spillways, chutes, power houses and other appurtenances. It has also been used to raise the water level on the downstream to provide the requisite head for diversion into canals and rivers etc for irrigation purpose. Hydraulic jump is a one of the most frequently encountered cases of rapidly varied flow which occur when a supercritical flow changes to sub critical flow. [2].Earlier researcher has found that formation of empirical correlation for hydraulic jump characteristics is very challenging problem [3-4]. Earlier researchers have developed empirical correlation considering the effect of only approach Froude number (Fr) and based on conventional momentum approach. [5-6].

II. EXPERIMENTAL SET-UP AND METHODOLOGY

A. Experimental Set-up

The experiment was carried out in Hydraulic Laboratory of Applied Mechanics Department of Motilal Nehru National Institute of Technology Allahabad. The general layout of experimental setup is shown in fig (1). The setup consist of (1) an over head supply tank (2) feeder pipe with regulating valve (3) inlet tank (4) stilling basin (5) test section (6) sharp edged vertical regulating gates (7) point gauges with slider (8) discharge tank with rectangular weir.

B. Experimental Procedure

Experiments on free hydraulic jump are carried out in a rectangular horizontal prismatic channel. A series of runs at different values of discharge were experimented and hydraulic jump was formed by operating the tail gate and sluice gate. For each run initial depth, sequent depth and length of hydraulic jump were measured. The above steps were performed sequentially at different valve opening. The discharge in the channel is measured with the help of sharp crested rectangular weir. The initial depth, sequent depth and height of water flowing over the crest of weir are measured with the help of point gauge.

III. DIMENSIONAL ANALYSIS

Based on the phenomenon of hydraulic jump, the important parameters affecting the hydraulic jump phenomenon and energy dissipation downstream of hydraulic structures are Y_1, Y_2, V_1, V_2, L_j, H_j, E_1, E_2, E_L, E_{RL}, ρ, g, μ, ε and η which can be explored as

$$f(Y_1, Y_2, V_1, V_2, L_j, H_j, E_1, E_2, E_L, E_{RL}, \rho, g, \mu, \varepsilon, \eta)=0$$

With the help of Buckingham's π-theorem and taking Y_1, g and ρ as repeating variables, the following dimensionless groups are developed

$$f\left(\frac{Y_2}{Y_1}, \frac{H_j}{Y_1}, \frac{L_j}{Y_1}, \frac{E_L}{Y_1}, \frac{E_1}{Y_1}, \frac{E_2}{Y_1}, \frac{E_2}{E_1}, \frac{E_L}{E_1}, \frac{V_2}{V_1}, \frac{V_1^2}{gY_1}, \frac{\rho V_1 Y_1}{\mu}, \frac{\varepsilon}{Y_1}\right) = 0$$

From the dimensional analysis it is observed that all the hydraulic jump characteristics are the function of approach Froude number and incoming Reynolds number.

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A Quick Change-Over Time using SMED Techniques: Setup Reduction of Hot Rolled Slitter (HRS) and Cold Rolled Slitter (CRS) in Indian Conditions

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***Abstract*—The purpose of this paper is to show the application of Single Minute Exchange of Die in any Steel industry. This technique is used for quick changeovers between products in the slitters. By applying this technique changeover times of slitters can be reduced from hours to minutes. By reducing the changeover time, products can be produced/processed in small batches or even single units, with minimal disruption.**

In this paper, We have used the SMED technique to decrease the setup time of a Hot Rolled Slitter (HRS) and Cold Rolled Slitter (CRS) in Indian conditions.

The procedure adopted to achieve, first We have collected the time study data in the shop floor. Then we analyzed this data by considering the performance rating and giving proper allowance associated with each step/process for the HRS and CRS machine. Again We have used the basic formula of time and motion study (Standard Time = Normal Time *rating + Allownace) and obtained the standard time for each process associated with HRS and CRS. After this We have differentiated the various activity associated in CRS and HRS machine in to external and internal activities. Now We have tried to convert some of the internal activities (related to arbor setting) in to the external activities as these can be performed outside the machine. This will help us, to reduce the setup time of HRS machine to some extent. Again we have further reduce the time of internal activities by using proper arrangement for cutter and separator rings, used in cutter arbor and separator arbor.

In SMED technique, the steps involved in internal setup time will be tried to convert into external setup time. By applying the SMED ,we can reduce the set up time of slitters, and it reduce the overall production lead time that will automatically increase the customer satisfaction and faith towards organization.

Keywords: Single Minute Die of Exchange, changeovers, Hot Rolled Slitters, Cold Rolled Slitters

I. Introduction

SMED is the term used to represent the Single Minute Exchange of Die or setup time. SMED is generally interchangeable with "quick changeover". SMED/Quick changeover are the practice of reducing the setup time associated with machines.

The successful implementation of SMED/Quick changeover is the key to a competitive advantage for any manufacturer that produces, prepares, processes or packages a variety of products on a single machine, line or cell. SMED allows manufacturers to keep less inventories while supporting customer demand for products with even slight variations. SMED has a lot of hidden benefits that range from reducing WIP to faster ROI of capital equipment through better utilization. To achieve the objective of setup reduction, a systematic study has been done to establish the standard time. Time study has been done to achieve it. The processes are broken down into smaller steps. The steps are classified as internal or external. A method has been devised to convert the external activities into internal activities. In this paper an attempt is made to implement SMED in steel industry to reduce the processing time of steel strips and coils. It ultimately reduces the lead time to dispatch the product to customers within a time limit.

II. Assumptions of Time Study

A. *Allowances Sheet*

The Factors assumed in the allowances sheet are:

1. Posture of the worker during working.
2. Monotony of the work.
3. Noise
4. Temperature/Humidity
5. Ventilation

III. Setup Times

Setup time is "the time required in preparation to complete a job". In shop floor, setup time can be defined as the time difference between the productions of two consecutive goods. Setup time includes the following time consuming activities like preparation time for machine arbor setting, replacements and adjustments of any part or assembly on a machine. In a major portion of the setup time the machine is in idle condition that is called as the "Non value added time" and it is a type of waste because customer is willing to pay only for "Value added

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Numerical Study of Frictional Effect in Equal Channel Angular Pressing on Aluminum Alloy

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***Abstract*—Equal channel angular pressing (ECAP) is a method used to impose strain in material which helps to increase the mechanical properties of a material. It is generally used to refine grain size of the material by passing sample through equal channel. In this study, analysis on frictional effect in equal channel angular pressing using aluminum 1100 has been done by using finite element (FEM) software DEFORM-3D version 10.1. Dies with different channel angle were designed with the help CATIA. This study shows the effect of friction with different die channel angle. It has been found that with the increase in friction, reduction in corner gap is found (dead zone), which may cause material damage and improve strain distribution homogeneity. The result obtained with FEM simulation are compared to those obtained theoretically, thus it is found that the current study is in good agreement to the theoretically result.**

Keywords: Die Channel Angle, Equal Channel Angular Pressing, Finite Element Analysis, Friction, Strain

NOMENCLATURE

σ_y Yield stress (N/mm^2)
σ_0 Friction stress (N/mm^2)
k Constant of yielding
d Grain size of material (m))
ε_N Equivalent strain (mm/mm)
γ Shear strain (mm/mm)
N Number of passes
Φ Die channel angle (°)
Ψ Curve angle (°)

I. INTRODUCTION

Ultrafine grained (UFG) materials can be obtained by equal channel angular pressing (ECAP). Many Severe plastic deformation (SPD) techniques have been developed to produce bulk ultra-fine grain material. Equal channel angular pressing is widely used method among the several severe plastic deformation (SPD) for obtaining bulk, defect free material. Ultra-fine grains have increased their strength at a lower temperature scale and rapid formability at some elevated temperature therefore seeking an important industrial prospect. According to the Hall-Patch equation [1] grain size of the material is related to the strength of the material which is given by equation (1):

$$\sigma_y = \sigma_0 + kd^{-1/2} \quad (1)$$

Equal-channel angular pressing (ECAP) developed by Segal [2] and Valiev [3] to produce huge ultra-fine grain materials hence improve mechanical properties of the material. Process of ECAP can be seen in Fig. (1), which shows, a billet is being passed through two equal channel made in die by pressing the billet by a punch. In this process plastic strain is imposed by simple shear at the intersection of the channels. The main advantage which makes this process attractive is that strain can be imposed in this process without any reduction in the cross sectional area of work-piece and it is a relatively simple procedure that is easily performed on a wide range of materials. Lubrication is used in process to reduce friction between the channel wall and work-piece. In this process it is the shear deformation occurs in the material at the intersection of two channels meet an angle 'Φ', to impose plastic strain in the work-piece. Friction is one the factor which affects the strain homogeneity occurs in the material. The speed and temperature are other factors which also affect the process of ECAP. In ECAP the work-piece is passed through channel by three routes differ by rotation of work-piece.

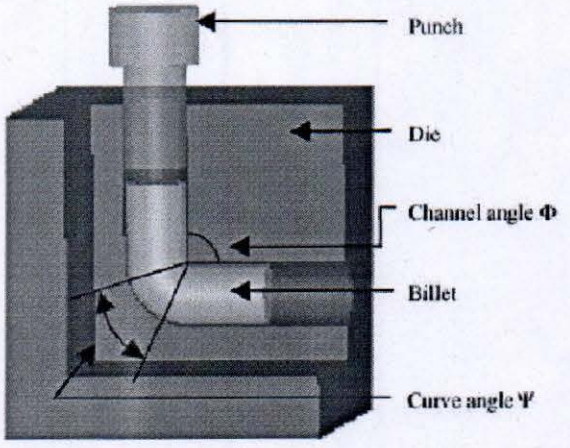

Fig. 1: Schematic Diagram of an ECAP Die Showing the Channel Angle Φ and the Curve Angle Ψ

Many studies report says that the magnitude of strain imposed in the work-piece while crossing the two channels is determine by the die channel angle 'Φ' and curve angle 'Ψ'. The relationship which is given by equation (2) [4] is:

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Optimization of Noise Control in Tile Cutting Machine

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***Abstract*—There are Millions of workers all over the world suffer significant hearing loss as well as mental and health stress due to high levels of factory noise. Tile cutting noise not only affecting the operators work but also create noise pollution that affecting the environment. In this dissertation noise in tile cutting machine is optimized by adopting active and passive noise control method. This dissertation is helpful for optimizing noise without deteriorating functionality and quality in a economical way.**

Keywords: Psychological, Dissertation, Deteriorating

I. INTRODUCTION

Noise can be defined as unwanted sound. They may cause so many serious hazard cause and applications that reducing noise level is of great importance. Loss of hearing is only of the effect of continuous exposure to excessive noise. Noise can interfere with sleep and speech, and cause discomfort and other non-auditory effects. Moreover, high level noise and vibration lead to structural failures as well as reduction in life span in many industrial equipments. The importance of noise issue could be well understood by looking at regulations that have been passed by government to restrict noise production in society.

II. NOISE EXPOSURE LIMIT

The permissible exposure limits for noise are stipulated in the factories (noise) regulations. No person shall be exposed to an equivalent sound pressure level of 85 dBA over an 8 hour work day.

The permissible exposure limits for noise are given in Table 1 for every 3dBA increase in sound pressure level in sound pressure level, the exposure duration is reduced by half.

III. FUNDAMENTAL OF SOUND

Noise is unwanted sound and Sound is a form of energy which is emitted by a vibrating body and on reaching the ear causes the sensation of hearing through nerves. Some times sound is not audible when vibrating boby is near by. The frequency limits of audibility of sound frequency are from 20 HZ to 20,000 HZ.

There are three basic elements in any noise control system:

1. Sound source.
2. Distance travel by sound
3. The receiver of the sound.

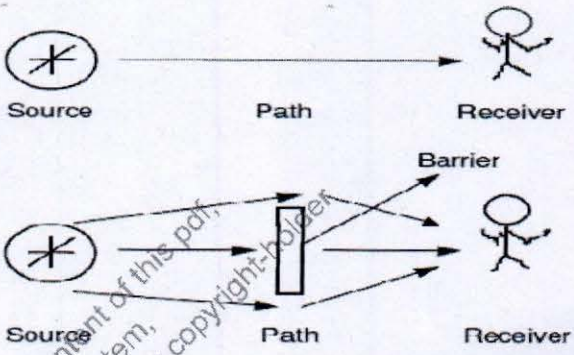

Fig. 1: Interrelationship between the Elements of Noise

TABLE 1: PERMISSIBLE NOISE LEVEL TABLE NO 1

Sound Pressure Level (dBA)	Maximum Duration
82	16 hrs
83	12 hrs
84	10 hrs
85	8 hrs
86	6 hrs
87	5 hrs
88	4 hrs
89	3 hrs
90	2 hrs
91	2 hrs
92	1 hrs 35mins
93	1 hrs16 mins
94	1 hrs
95	48mins
96	38mins
97	30 mins
98	24 mins
99	19 mins
100	15 mins
101	12 mins
102	9 mins
103	7.5 mins
104	6 mins
105	5 mins
106	5 mins
107	3 mins
108	2.5mins
109	2 mins
110	1 mins

Noise is some times continuous or intermittent. Noise may be of high frequency or of low frequency which is undesired for a normal hearing. For example, the typical cry of a child produces sound, which is mostly unfavorable to normal hearing. Since it is unwanted sound, we call it noise.

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Effect of Feed Rates on Residual Stress Generation and their Estimation during Micro Milling

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***Abstract*—Service qualities like wear and tear and other tribological properties of surfaces of machined components and sub-surfaces are influence by the residual stresses as it is predicted and controlled for enhanced performance. Here analytical approach, using XRD (X Ray diffraction) technique are suggested to estimate the residual stress profile through mechanical micro machining by considering variable feed rates. Lattice strain and crystallite sizes are also determined for different specimens. Correlation between feed rates and residual stresses are found significantly affecting in micro milled Low Carbon Steel Specimens.**

Keywords: Micro-machining, Residual Stresses, Feed Rates, X-Ray diffraction

I. Introduction

The material removal through WEDM (Wire Electrical discharge machining) involve erosion by electrical discharges (sparks) occurring between work piece and wire separated by a stream of dielectric fluid, which is continuously fed to the machining zone. It is an indispensable machining technique and can machine almost anything that is electrically conductive regardless of hardness from relatively common materials such as tool steel, Al, Cu and graphite with no physical pressure imparted on the work piece compared to grinding wheels and milling cutters such that leaves no residual burrs on the work piece, and reduces or eliminates the need for subsequent finishing operations.

The wire electrical discharge machining, material removal rate and surface integrity etc may be affected by various process parameters such as wire electrode (type, diameter and feed of wire), workpiece material (structure, conductivity, thickness), dielectric liquid (type, impurities, flow rate, temperature), discharge current, gap voltage, pulse duration and frequency, polarity, feed control mechanism

Submerged WEDM promotes thermal stabilization and efficient flushing while generating a channel of plasma between terminals and may turn thermal energy as high as 20,000°C results into melting of material. When power supply is turned off, the plasma channel breaks down, causes a sudden reduction in temperature allowing the circulating dielectric fluid to implore the plasma channel and flush the molten particles from the pole surfaces in the form of microscopic debris, enable parts of complex shapes to be machined with exceptionally high accuracy. Kunieda and Furudate tested the feasibility of conducting dry WEDM to improve the accuracy of the finishing operations, which was conducted in a gas atmosphere without using dielectric fluid. In addition, WEDM uses deionised water instead of hydrocarbon oil as the dielectric fluid and contains it within the sparking zone. The deionised water is not suitable for conventional EDM as it causes rapid electrode wear, but its low viscosity and rapid cooling rate make it ideal for WEDM. Optimum machining parameters for WEDM are selected with significant amount of literature as inaccuracy may lead to short-circuit, wire breakage, surface damage of work piece. With axial depth of cut and spindle speed the experiment has been designed to study the residual stress generation during mechanical micro machining at different feed rates. Micro-mechanical machining is a tool based fabrication method for creating miniature devices and components with features that range from tens of micrometers to a few millimeters in size." The surface finish and integrity of manufactured components is also a very important aspect which in turn gets affected by residual stresses. Hence it is important to estimate, predict and control residual stresses.

II. Experiment

A. Micro-Milling Setup

Half immersion end-milling operations were performed using micromachining tool MIKROTOOLS DT-110 on the long edges of low carbon steel work pieces of size 50mm x 30mm x 10mm with a 500μm diameter end-mill at feed rates of 10mm/min and 15mm/min respectively. Following operations performed to conduct experiment successfully are listed as below:

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PARAMETRIC OPTIMIZATION OF SURFACE ROUGHNESS OF D3 TOOL STEEL WHILE TURNING USING TAGUCHI METHOD

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Abstract

The objective of the paper is to obtain an optimal setting of turning process parameters (cutting speed, feed rate and depth of cut) resulting in an optimal value of the surface roughness while turning D3 tool steel TiC-coated tungsten carbide tool under wet condition. Taguchi L9 array has been used to design the experiments, the results are further analysis of variance (ANOVA) is employed to investigate the cutting characteristics of D3 tool steel bars. Results have shown most dominating factor for roughness was feed rate Finally the confirmation tests that have been carried out to compare the predicted values with the experimental values confirm its effectiveness in the analysis of surface roughness.

Keyword: *Taguchi, DOE, Anova,L9.*

1. INTRODUCTION

Production hubs around the world constantly looking for lower cost solutions with reduced lead time and better surface quality in order to maintain their competitiveness. Traditionally, most ferrous metal parts are rough turned, heat-treated and finished by grinding. In recent years, hard turning which uses a single point cutting tool has replaced grinding to some extent for such applications. Surface roughness has received serious attention for many years. It has formulated an important design feature in many situations such as parts subject to fatigue loads, precision fits, fastener holes, and aesthetic requirements (Singh and Rao, 2007). D3 tool steel is one of the widely used materials due to its high and unique strength that is maintained at elevated temperature and its exceptional wear resistance. It is suitable for manufacturing of cold work dies and rolls.D3 steel possessing high strength and toughness is usually known to create major challenges during machining. Turning is traditional machining method that could be cost effective method of machining of D3 tool steel. However there is not much evidence regarding turning of material like tool steel in literature.

2. LITERATURE SURVEY

Ravinder et al. (2014) worked on AISI O3 steel in order to optimize the parameter for surface roughness and material removal rate and compared the different method for multi optimize the output parameter, they found the WSN method best for multi optimize the input parameters. Chaudhari et al. (2011) worked on mild steel using L9 orthogonal array with output parameter surface roughness and tool wear under the environment of MQL(minimum quantity lubrication). The experimental results shows that the cutting speed, feed rate and depth of cut are the main parameters that can control the tool wear. They also showed that MQL provides solution for many problem during turning. Thamizhmanii et al. (2007); applied Taguchi method for finding out the optimum cutting conditions for surface roughness in turning SCM 440 alloy steel using speed, depth of cut and feed rate. The experiment was designed by using L18 orthogonal array and

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Tensile Behavior of Hybrid Polymer Nanocomposite Reinforced by Al_2O_3 Rod and Spherical shape Nano particles

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Abstract

Particulate composite reinforced with Nanofillers are getting increased attention because of their improved tensile and elastic properties. In this work alumina (Al2O3), with rod and sphere shape Nanofillers are used in the fabrication of hybrid epoxy composites. Probe sonicator has also been used for the proper mixing of Nanofillers in the vicinity of epoxy matrix, finally for making the hybrid composites. The dimensions of the Nanorods and spherical particles are 15-30nm diameter & 50nm in length and diameter 20-50nm respectively. Three different types of samples with weight fraction of 0.5%, 1% and 1.5% of Nanofillers are prepared by in-situ polymerization technique. The ASTM standard D638 is followed in the preparation of the samples. A series of unidirectional tensile tests has been performed on the fabricated samples. Best result has been obtained with 1.0 wt. % hybrid composites as compared to the composite without Nanofillers. This may be attributed to the good dispersion of Nanofillers in epoxy matrix. Tensile strength was found to be improved by 9% for 1.0 wt. % sample as compare to 0.5 and 1.5 wt. % hybrid composites. A decline in the properties was also noticed at higher wt. % i.e.1.5 hybrid composites. This may be due to the agglomerations of the filler particles as they have been used in different l/d ratios. Further Morphology of fracture surfaces has also been detected through optical microscopy at 1000X scale. More roughness of fracture surface indicates more energy absorbed during fracture. This experimental work provides the better insight to the researchers working for the materials to be developed for special coatings.

Keywords *Hybrid Polymer Nanocomposite, tensile behavior, in-situ polymerization, Alumina Nanoparticles*

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Investigation of Mechanical Characteristics of Amine Functionalized Graphene using Molecular Dynamics Simulation

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Graphene, a two dimensional (2D) and single layer nanosheet of sp^2-hybridized carbon atoms as been significantly increase the mechanical and thermal properties of graphene/epoxy omposites. The detention of interfacial interactions between graphene and epoxy plays a mportant role in the designing of nanocomposites with excellent physical and mechanical roperties.Epoxy resin exhibits excellent mechanical properties such ashigh elastic modulus and re strength, low creep and less environmental degradation which made it attractive andidate forcoatings, adhesives and resin for structural composites particularly inaerospace and lectronics industries. The mechanical performance of graphene and their epoxy nanocomposites s mostly depends on the interfacial strength of graphene in polymer matrices. Functionalized raphene have attracted several research activities, mostly because of their potential applications n fabrication of nanocomposites. In the present paper, we examine the effect of functionalization f graphene with ethylene-di-amine(E-NH_2), analyzing their elastic properties. Condensed-phase ptimized molecular potentials for atomistic simulations studies(COMPASS)force field is used o model the interatomic interactions for armchair and zigzag graphene. MD simulations for raphene with various densities of the attached ethylene-di-amine molecules have been erformed. This study quantitatively investigates the effect of amine functionalization (up to 12 umbers of ethylene-di-amine groups) on the Young's, bulk, and shear moduli and tensile trengths of different structures of graphene.

Keywords: Functionalization, computational modeling, mechanical properties, molecular ynamics

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Effect of Initial Microstructure on Overall Properties of Electroactive Polymer Nano-Composite

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Electroactive polymers with quick response time, suitable for most actuator applications, are broadly classified into three categories: Piezoelectric polymers, exhibiting electromechanical coupling from the torque exerted by electric field on the molecular dipoles, Dielectric elastomers (synthetic rubbers), exhibiting electromechanical coupling from Coulomb interaction between the charges on the electrodes coated on to the specimen (Maxwell stress effect), and Electrostrictive polymers, deforming when placed in electric field from changes in molecular conformations and phase changes in the crystalline regions. Among the above three, dielectric elastomers polymers offer the best performance characteristics and shall therefore be the focus of this work. Extremely high dielectric constant EAP composites (with dielectric constant k~1000) allow us to design novel actuation mechanics for applications such as movement of legs or flapping of wings in miniaturized robots. It is well known that the underlying microstructure influences the overall properties of a composite. In this regard, our first objective here is to investigate the effect of volume fraction and distribution of high dielectric constant (K~10000) filler particles on the overall dielectric constant of EAP composites. The filler particles are taken to be cylindrical with circular cross-sections and the dielectric behavior of the phases is taken to be linear or paraelectric. Both random as well as periodic microstructures are analyzed. More specifically among the periodic microstructures, a square and hexagonal arrangement of cylindrical fibers is considered for which the overall behavior is transversely isotropic (isotropic in the plane transverse to the fibers). In experiments, nano-composite containing very high dielectric constant inclusions is shown to result in very high overall dielectric constant at volume fractions less than 10%. Various explanations have been put forth to explain these observations on a qualitative basis. Here, we test these explanations using finite element analyses (FEA) of dielectric behavior of periodic nano-composite. More specifically, we look at the effect of interfaces and charge injection in nano-composites. Secondly, in this work, we investigate the deformation behavior of uni-morphs (beam like structures with a thin layer of EAP attached to a

Necessary Constraints for an Equation of State to be Physically Acceptable

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Abstract. We have pointed out the constraints required for an equation of state (EOS) to be physically acceptable and universally applicable for the entire range of compressions for a material at high pressures. We have discussed the boundary conditions valid at zero pressure and infinite pressure. The concept of infinite pressure behavior has been discussed. It has been emphasized that the Stacey reciprocal K- primed EOS satisfies all the necessary criterion for the validity of EOS. On the other hand, equations of state reported previously do not satisfy the condition of physical acceptability of an equation of state.

INTRODUCTION

An equation of state (EOS) for solids at high pressures and high temperatures provides valuable information regarding their thermodynamic and thermoelastic properties [1]. Knowledge of the equation of state based on either calculation or measurement is of primary importance in both basic and applied sciences. It provides insight into the nature of solid state theories, and determines the values of fundamental thermodynamic parameters. Equation of state normally means a relationship between pressure P, volume V and temperature T for minerals [2]. Studies of equations of state for a solid have been extremely useful in the field of geophysics and condensed matter physics [3]. The EOS of solids can be used to study thermodynamic and themoelastic properties of solids under high pressures and high temperatures [4-11]. The EOS of a solid can be derived theoretically from the knowledge of inter atomic potentials [12]. The relationship between P and relative volumes $\mathbf{V/V_0}$ at a given temperature represents an isothermal equation of state, and that between volume and temperature at constant pressure is known as isobaric EOS. Isothermal EOS provides information on the non – linear compressibility of solids and is widely used in the basic and applied sciences [13]. An EOS can be used for meaningful interpretation and chemical phenomena at arbitrary temperatures and matter densities. An EOS can be classified into two categories, viz. (i) Inverted type EOS, and (ii) non inverted type EOS [14]. In inverted type EOS, the volume change is expressed as a function of pressure, and in non inverted type EOS the pressure is expressed as a function of change in volume. The EOS given by Murnaghan [15] can be expressed as inverted type as well as non inverted type EOS. The Murnaghan EOS has inverse power dependence for isothermal bulk modulus on compressions. All equations of state generally tend to agree well with data at small compressions but only a few selected succeed to cope up with a large compression resulting from the rapid advances in the ultra high pressure regime [16].

INFINITE PRESSURE BEHAVIOR

The Stacey EOS is valid for the entire range from zero-pressure to infinite pressure. This is true that infinite pressure can not be achieved in experiments. Also no materials can exist at infinite pressure. There are some materials, specifically some geophysical minerals which are stable only at finite high pressures and do not exist at zero pressure. But the extrapolated zero- pressure values of properties such as $K_0, K_0^{'}, K_0^{''}$ for these materials are useful and important parameters for an EOS. The infinite pressure properties are not observables in any direct sense, but are simply the extrapolated values of the equation of state parameters. This extrapolation is done by considering that the material does not undergo any phase transitions that is the material remains in the same structure and the same phase up to the extreme compression (V $\rightarrow$0, P $\rightarrow\infty$). The infinite pressure EOS parameters $K_\infty^{'}$, γ_∞ are material dependent parameters in the same sense as are the zero pressure EOS parameters. The infinite pressure parameters are just as legitimate as physical entities as are zero pressure parameters for high pressure materials that do not survive decompression to P=0. The infinite pressure theory developed by Stacey is based on the principle that an equation of state including thermodynamic relationships must satisfy basic physical laws even outside the pressure ranges over which the materials that it describes can exist. The Stacey reciprocal K-primed EOS is formulated such that it satisfies the boundary conditions at zero

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High pressure compression in semiconductors using equations of state

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Abstract

In the present study, the compression behavior of some semiconductors such as SiC, Ge, MoN2,MoN has been studied under pressure using the isothermal equations of state. The results from the isothermal equation of state such as Birch Murnaghan EOS (BMEOS), Murnaghan EOS (MEOS), Vinet EOS, Kholiya EOS, Shankar EOS are obtained and to analyse the best equation of state are compared with the experimental values. On comparison, Vinet EOS gives results close to the experimental data and proved best approach for semiconductors.

Keywords: Semiconductors; Isothermal equations; Compression; Bulk Modulus.

1. Introduction

The semiconductors are solids whose electrical properties lie intermediate between conductors and insulators. The study of semiconductors under high pressure and high temperature opens the possibility of wide range of applications. They exhibit many promising characteristics because of their structure, hardness and electronic properties [1,2]. This is why they have attracted the attention of the researchers working in this field. Semiconductors are widely used in transistors, electronic and optical devices [3, 4]. Silicon carbide exists in different structural phases at different pressures and characterized by high strength with large cohesive energy. During past years, experimental studies have been carried out to study the pressure effect on semiconductors. To understand the thermophysical properties of semiconductors, their study under high pressure and temperature is need to be done. Study of rutile type TiO_2 help in understanding the deep earth interior and planetary sciences. In the present study the author has calculated the pressure dependence on volume compression in semiconductors SiC, Ge, MoN2, MoN using equations of state such as BMEOS, MEOS, Vinet EOS, Kholiya EOS, Shankar EOS.

2. Method of Analysis

Murnaghan equation (MEOS) [5, 6] explains the linear dependence of bulk modulus with pressure as follows:

$$B(P,T) = B_0 + B_0^{'}P \tag{1}$$

Murnaghan equation is obtained on integrating the differential equation which gives:

$$P = \frac{B_o}{B_o^{'}}\left[\left(\frac{V}{V_o}\right)^{-B_o^{'}} - 1\right] \tag{2}$$

At constant temperature, the variation of bulk modulus is given by following relation:

$$\frac{B}{B_o} = \left(\frac{V}{V_o}\right)^{-B_o^{'}} \tag{3}$$

Vinet EOS applied for the study of properties of solids reads as follows [8]:

$$P = 3(1-\chi)B_o[\exp\eta(1-\chi)]/\chi^2 \tag{4}$$

where $\eta = \frac{3(B_o^{'}-1)}{2}$ and $\chi = \left(\frac{V_o}{V}\right)^{\frac{1}{3}}$ (5)

The bulk modulus corresponding to Vinet EOS is given by:

$$B = \frac{B_o}{\chi^2}\left[1 + \left\{\frac{3}{2}(B_0^{'}-1)\chi + 1\right\}(1-\chi)\right] Xexp\left[\frac{3}{2}(B_0^{'}-1)(1-\chi)\right] \tag{6}$$

Analysis of Elastic Properties of nc-BC_2N

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Abstract- The isothermal equations of state are applied to analyze the elastic properties of cubic shaped nanocrystalline BC_2N under pressure. The equations of state (EOS) used are Usual Tait's EOS, Shanker EOS and its empirically modified form used earlier for the study of nanomaterials. It is noted that Usual Tait's equation yields results in between the results obtained using Shanker EOS and its modified form. The results for volume compression from the applied EOS's are compared with the experimental data available and the best results are found from modified Shanker EOS.A good agreement of theoretical results with the experimental proves the validity of the potential independent approach used for explaining the elastic properties of nanocrystalline BC_2N. The variation in elastic parameters across the nanocrystal in BC_2N under pressure is studied using Usual Tait's EOS and empirically modified Shanker EOS. Further, we have determined the variation in poisson's ratio with pressure using these theoretical models considered .The variation of elastic constants for cubic crystal ,i.e. C_{11}, C_{12} and C_{44}, are also determined with pressure.

***Keywords*:** Compression; isothermal equations of state; pressure, elastic parameters.

I. INTRODUCTION

The elastic properties of the solid material explain its physical and mechanical behavior under the effect of pressure. Under pressure, the interatomic separation between atoms and molecules get modified leading to change in particle size both in bulk and nanomaterials. This results in change in physical and chemical interactions taking place inside the material [1-3]. The elastic behavior of nanomaterials has been studied by researchers using both theoretical and experimental methods [4, 5, 6]. Both experimental and theoretical methods are developed by scientists all over the world to synthesize cubic boron carbon nitride and explore its mechanical properties [7, 8, 9, 10]. The study of elastic properties of nanocrystalline boron carbon nitride (nc-BC_2N) is of great interest to researchers because of its chemical stability and extreme hardness in comparison to cubic boron nitride [11, 12, 13, 14]. The limited study of nc-BC_2N reveals that nanocrystalline cubic boron carbon nitride is a potential material for mechanical applications due to its super hardness and ability to withstand high temperatures.

Here the compression and elastic properties of boron carbon nitride (nc- BC_2N) having cubic structure is studied. Isothermal equations of state are used in the present study. The variation of bulk modulus, Shear modulus Young's modulus, poisson's ratio and C_{11}, C_{12}, C_{44} are evaluated under varying pressure with increase in pressure up to 65 GPa to judge the stability of the nanocrystalline BC_2N. The methodology adopted is discussed in section II along with results in section III.

II. METHODOLOGY ADOPTED

According to quasi-harmonic approximation, under high pressure [15, 16],

$$\alpha_o B_o = \alpha_T B_T = constant \qquad (1)$$

Where α_T is coefficient of thermal expansivity and B is bulk modulus.

Differentiation of equation (1) w.r.t. volume gives:

$$\alpha\left(\frac{dB}{dV}\right)_T + B\left(\frac{d\alpha}{dV}\right)_T = 0 \qquad (2)$$

Anderson-Gruneisen parameter δ_T is given by [17]:

$$\delta_T = \frac{V}{\alpha}\left(\frac{d\alpha}{dV}\right)_T \qquad (3)$$

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TRAGEDY OR TRIUMPH: RUSSIANS AGONIES OVER HOW TO MARK 1917 REVOLUTION

Dr. Divya Gupta

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ABSTRACT

On the 100th anniversary of Russian Revolution and 150th anniversary of Karl Marx' Das Kapital, it is very important to analyze that whether the term revolution and communism has any relevance with the progress and liberation of Russia especially when Stalin came into power of Soviet Union. This paper intends to discuss the merits and demerits of Russian Revolution. It is true that the debate on the same topic has already taken place without coming to any proper conclusion.

However, it is important to discuss the role of Russian Revolution and Soviet Communist system to pave way for anti-capitalist worker's struggle. Bolsheviks seized power against Mensheviks and then ruled by terror of Soviet system. This system became more intricate because its principles were based on slave labor and political dissident. These ideologies became an unequivocal alternative for this social struggle. Even NEP (New Economic Policy) which was smiting its victims one by one, was promoted by Lenin in 1920s. How was Soviet Communist system forced to lodge capitalism although the latter was deadly? Though people were aware that they were manipulated, they didn't raise voice against collectivization. Due to this, the Kulak class was liquidated. Even the results of so many casualties (owing to famines) could not indicate that the Soviet Communist system is a total failure. The major target of Soviet Communist machinery was to create an industrial class with the most developed weapons and armory on the expense of the poor peasants' precious lives. Though, in World War II against Hitler, they proved their superiority, but a cobweb of ambiguity lied regarding their Molotov-Ribbentrop Pact with Hitler on August 23, 1939. Some of the Russians (like Alexander Zinoviev, for example) call the whole unfortunate Soviet Communist episode russkaya tragediya "Russian Tragedy, Roads Long Sunk".

In this paper, efforts have been put in to illumine specific problems that the October Revolution could not assume at all. In this paper, efforts have been put in to illumine specific problems that the October Revolution could not assume at all. Is the twenty first century condition of New Russia – a nation fraught with Post capitalist mechanization is a Commodity Fetish of the 1917 child of the communist idea, will be an attempt to comprehend and analyze through this paper.

Keywords: Capitalism, Soviet communist, Commodity Fetish, Bolsheviks, New Economic policy

I. INTRODUCTION

Remember, remember The fifth of November.
The gunpowder treason and plot. (V for Vendetta)

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Delineation of Indian Culture in the Works of Gita Mehta

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Gita Mehta, a prolific writer of the Indian Diaspora, has emerged as a Non- British, English writer of eminence. She has secured a place for herself in the galaxy of Indian women novelists by contributing in the form of fiction as well as non-fiction, with her distinct style of writing and innovative themes. Her literary career commenced with the publication of *Karma Cola: Marketing the Mystic East* (1979), followed by *Raj* (1989), *A River Sutra* (1993), *Snakes and Ladders: A View of Modern India* (1997) and *Eternal Ganesha* (2006). Besides these, she has made a significant contribution to literature through her articles and interviews.

In all her works, Gita Mehta has described India from the honest view of a passionate émigré. The study of her books from the point of view of her interpretation of Indian culture affirms that she is, no doubt, a great exponent of India and its culture. She perhaps inherited her sensibilities for India from her highly patriotic family in which her parents along with other relatives were actively involved in fighting against the British. Her marriage to Sonny Mehta, an important member of the New York publishing circle, took her to America and developed in her the consciousness of a member of the Indian Diaspora. Being a cosmopolitan, she invariably had to satisfy the misinterpreted inquisitiveness of the Westerners regarding Indian customs and values. Even before she stepped into the field of writing books, she had directed a number of documentaries about India for BBC and NBC. She narrates in her interview with C. J. S. Wallia, "I would charge into the offices of BBC and NBC and ask them, "Why don't you let Indians make films about India?" They were astonished and let me do the film" ("India Star Review of Books"). This clearly indicates that Mehta was not satisfied with the image of India as presented to the world. Being a part of the family of freedom fighters, she felt she had an obligation to portray her native land from her personal experience, as she has surveyed it. John Walsh, while giving his comments on his interview with Gita Mehta, also states that she is "the intelligent voice of India itself, its soul and classy embodiment …" ("Karma Chameleon").

A close reading of her books and articles indicates that her main purpose of writing books was to demystify those vistas of Indian culture which have been either incomprehensible for the world or are often misapprehended and re-present them in the right perspective. India is the centre of her works and she takes care not to shift the focus. Thematically, her novels are varied, exploring skillfully India's age-long beliefs, the East-West cross-currents and historical as well as political changes in India. She travels fascinatingly from the world of *sadhus* to the maneuvers of the palace, to the spiritual isolation of the forest rest house at the banks of the *Narmada* and then gives a candid assessment of India through her non-fiction. According to Usha Bande, Gita Mehta "observes India in all its colours; and with keen insight and by the flow of her language she is able to make the familiar appear unusual …" (2).

The focus of the present study is to explore the re-presentation of Indian culture as depicted in the fiction and non-fiction of Gita Mehta. Keeping this in mind, answers to some pertinent questions have been searched. First, which features of Indian culture has the author focused upon? Secondly, how has she presented them in her own unique way to achieve her objective? Thirdly, in what way can the author's exploration of the cultural values be interpreted from the angle of the contemporary scenario?

India's leading cultural aspects are unique and rich in their way and need to be explained to the world in order to clarify their misinterpreted versions. Spiritualism is one of its richest facets incorporating in its fold, features like karmic philosophy, self-renunciation, self-realization, yoga, penance, love and kindness. Belief in mythology and its significance and indulgence in rituals is a way of life for Indians. Indian culture has a very high level of tolerance and hence the arrival of so many outer cultures was never delimited. In *The Discovery of India,* Jawaharlal Nehru comments that India "… influenced them and was influenced by them, her cultural basis was strong enough to endure" (41-42). India has a legacy of peaceful coexistence and secularism. Richard Lannoy reports from a Rock Edict of Emperor Ashoka: "…one should honour another man's sect … by doing otherwise, one diminishes the

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PROSPECTS OF ENGLISH AS A LANGUAGE OF COMMERCE

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ABSTRACT

Today's world of globalization marks an unprecedented simultaneous growth of business, communication and transportation. It is notable that the volume of national and international trade is growing at a rapid pace and has brought the world economies and culture in a closer union. The modern trade and communication, often being complex activities, bring with them a greater reliance on a Lingua Franca. Regional languages appear to be the preferred medium of communication for localized trade and commerce, but as the trade grows and becomes inter-regional; businessmen seem to shift their use of language to English. A similar kind of trend can be seen in some areas of Europe, where French, German and Spanish are being used as the languages of trade. However, the overall pattern seemingly suggests that in spite of the use of other languages in the national and international trading, English has become a common language of interaction.

Number of the speakers of English has crossed almost a billion and it has given birth to innumerable varieties of English, ironically creating a chaos in the international communication. In such pressing circumstances, Global English, which has already started emerging on the international arena, seems to be the sole solution for communication in the business world. Now the question arises what should be the style of writing Global English so that the problem of unintelligibility can be tackled? What kind of adaptation, style, level, selection of words, grammar is required to communicate within an inter-cultural as well as cross- cultural current setting. This paper tries to seek answers to these questions. There is also an attempt to study the contemporary scene of English as a Business Lingua Franca. At the same time the paper explores its future taking into consideration the emergence of Brexit vis-à-vis India and China as the newly recognized economies of the world.

Keywords: Brexit, Commerce, Commercialese, Global English, Globalization, Lingua Franca.

I. INTRODUCTION

Today's world of globalization marks an unparalleled concurrent growth of commerce, communication and transportation. The amount of national and international trade is mounting at a brisk tempo and it has brought countries and cultures in a closer union. The contemporary trade and communication are often intricate: goods are purchased from one country, developed by another, sold to yet another, resold and so on. Such multilateral channels bring with them an increased dependence on a Lingua Franca. Provincial languages appear to be the favored medium of communication for localized trade, but as it grows and achieves an inter-regional scale; men seem to transfer their focus of language to English. A comparable tendency can be observed in some areas of

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TEACHING/LEARNING LANGUAGE THROUGH LITERATURE

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I. INTRODUCTION

Language and Literature are the two sides of the same coin in teaching and learning process in any language. The language skills like listening, speaking, reading and writing can be improved through Literature. The language process like pronunciation, grammar and vocabulary is learnt automatically when Literature is introduced in a natural process otherwise language learning becomes tough for the new learners. When the skills like listening and speaking involve the language study of grammar and vocabulary come in an easy way. Mother is the first teacher of us all in imparting the skill of making us to speak our mother tongue. She never taught us the grammar separately. So easily we could pick up the vocabulary when we learnt new words in the meaningful activities. When appropriate materials as authentic texts designed by the language experts for the standard of classes are used to make the learning process, it becomes a pleasurable activity in language classes. While teaching bilingualism, translation helps the students understand the syntactic, lexical, semantic, pragmatic and stylistic knowledge by comparative study of two languages. Literature proves to be powerful resource in the class rooms when it gives the cultural enrichment, variety and personal involvement. Let us see why a language teacher is required to use literary texts in the language classroom and what type of literature language teachers are supposed to use in the class. We shall see the benefits as well.

II. VIEWS OF PLATO, GORGIAS, ROUSSEAU, IMMANUEL KANT FERDINAND DE SAUSSURE AND NOAM CHOMSKYARE

Language is the ability to acquire and use complex systems of communication, The scientific study of language is called linguistics. Since Gorgias and Plato in Ancient Greece it has been debated whether words can represent experience as questions concerning the philosophy of language. Rousseau the great thinker has argued that language originated from emotions. Immanuel Kant was of the opinion that it originated from rational and logical thought. 20th-century philosophers such as Wittgenstein argued that philosophy is really the study of language. Ferdinand de Saussure and Noam Chomskyare the authority for linguistics.

III. VIEWS OF COLLIE AND SLATER

Teaching Literature needs the use of basic language skills like listening, speaking reading and writing, and language areas like vocabulary, grammar and pronunciation, while teaching Grammar and translation teachers make their students translate literary texts like drama, poetry and short stories into the mother tongue.

THE MORAL STATUS OF CORPORATIONS

Nirbhay Mishra

ABSTRACT

In this chapter, I analyze the notion of corporate responsibility from the person-centric perspective. I offer a four-dimensional exposition in terms of which I examine the corporate moral personhood view. These four dimensions are explained and critiqued to arrive at a definition of moral responsibility and status appropriate to corporations. I suggest that a corporation cannot be construed as a person in the sense in which individuals are persons. Since a corporation cannot be an independently existing entity, it cannot have an independent moral personality of its own as individual persons have. Therefore, I argue that a reasonable construal of corporate moral personhood has to exploit a different point of view altogether. With this difference of standpoint, I develop what is called the institutional personhood view. I argue that corporations do acquire a sort of collective institutional moral personality.

Keywords: Moral responsibility; personhood; intentionality; causality; individualism

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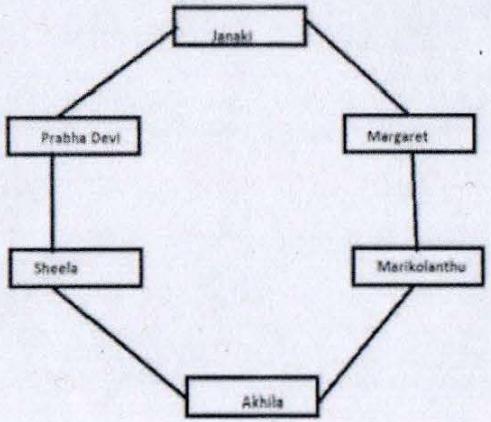

woman's search for strength and independence. Nair beautifully fleshes out the minutes details of her woman characters, bring alive their everyday dilemmas, desires and thoughts.

Exploring certain issues that were important to her, "The author takes the reader through the remarking of a man in the quite manner which for from being dissatisfying is truly the reason for its success". What is remarkable in the novel is the strong message of hope through change and even ending is revealed as a new beginning.

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Evolution of Cinema as Literature

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Abstract

Literature has been the source for cinema since its birth. The melange of literature and cinema in their different hues over last hundred years has given birth to a new genre of literature. The present study looks into their intermingling and emergence of a new form of literature.

Introduction

The history of motion pictures shows that literature and cinema are tied in a strong, or what seems to be, an unbreakable bond. Both have been regarded essentially as modes of expression. As Robert Richardson in the 'Prologue' to his book *Literature and Film* (1969: 4) remarks:

The overarching likeness that makes it possible to consider most films and much of literature together is the very simple but possibly crucial observation that, in general, literature and film are story-telling arts.

This great capacity of story-telling or narration by both these arts – literature and film – has, in fact, kept them inseparable. Since the advent of motion pictures (otherwise termed as 'cinema' or 'films' or 'movies') more than a century ago, filmmakers have borrowed extensively from literary sources such as novels, plays, histories, and biographies, translating words on a page to pictures on a screen (in the

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Biogenic Nanoparticles for Effective Cancer Treatment: A Review

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ABSTRACT

Nanotechnology is a branch of nanoscience which includes the manipulation of particles at their atomic level in order to obtain certain desirable properties that enhance their use in the treatment of various metabolic disorders including cancer. Nanoparticles being eco-friendly, reliable and cost effective, are now synthesized by utilizing the plant extracts. This biogenic route of nanoparticles synthesis is emerging as beneficial method as plants contain diverse bioactive phytochemicals which act as reducing and capping agent thus increases the stability and reduction rate of nanoparticles. The most commonly used nanoparticles are of silver, gold, iron oxides and copper. In few studies platinum and palladium nanoparticles have been reported to have anticancer potential. The use of medicinal plants for the purpose of designing nanoparticles has paved a way for targeting a drug to the particular affected site of tumor. This review focuses on the synthesis of nanoparticles of different metals using a variety of medicinal plants. These biogenic nanoparticles could limit the use of chemotherapy and radiation therapy, as these therapies have huge side effects which cannot be tolerated by the cancer patients and in many cases the patients die because of these treatments. Hence nanoparticles mediated therapy is now gaining attention for the treatment of cancer as targeted drug therapy, without side effects.

Keywords: Nanoparticles; Anticancer activity; Medicinal plants.

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ABSTRACT BOOK

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Effect of enviormental stress on Physiological responses in jamunapari goats

[illegible] Rakesh[1], Anjana Goel[1] and P.K Rout[2]

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The aim of the study was to investigate the effect of physiological responses of Jamunapari goats experimented at ICAR-CIRG, Makhdoom, Farah, Mathura. Increased respiration rate and heart rate are the most important signs for heat stress in goat. A total 1214 animals were utilized for the experiment. The rectal temperature (RT), Respiration rate (RR) and heart rate (HR) were recorded during heat, cold and thermo-neutral period. The physiological responses were recorded after grazing (1330-1430Hrs) in heat stress and thermo-neutral period while cold stress responses were also recorded at 0900 to 1000hrs before grazing. During the experimental period, the temperature humidity index (THI) range of heat stress, cold stress and thermo-neutral was 85.34-86.86, 53.0-59.8 and 65.32-73.12 respectively. The rectal temperature (RT), Respiration rate (RR) and heart rate (HR) had highly significant effect ($P<0.01$) during different stress period as THI. RT, RR and HR values were significantly ($P<0.01$) higher in heat stress period. The multiple comparison (LSD) of different stress period was significant ($p<0.05$) in RT, RR and HR. It can be concluded that heat stress had significant changes on some physiological parameters of goat.

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significantly (P<0.01) following the proces[illegible] more evident after freeze-thawing. The HSP70 and HSP90 [illegible] spermatozoa was significantly (P<0.01) correlated [illegible] expression of HSP70 and HSP90 mRNA is associated with [illegible] of the spermatozoa.

POS 3

DEVELOPMENT OF ES-TETRAPLOID COMPLEMENTATION IN DIFFERENT CULTURE SYSTEMS

J. Pathak, A. K. S. Sikarwar, R. Ranjan, S. D. Kharche, A. K. Goel, S. K. Jindal and M. S. Chauhan*

ICAR-Central Institute for Research on Goats, Makhdoom, Mathura

The aim of this study was to generate a new and [illegible] with oviductal epithelial cells and granulosa cells to produce chimera complementation so as to increase the chimeric embryo production [illegible] cells. 12/22-cell stage IVF embryos were used for electrofusion and were de[illegible] while parthenogenetic embryonic stem cells were produced by culturing [illegible] obtained from parthenogenetic activation of *in vitro* matured oocytes. The chim[illegible] produced by ES-tetraploid complementation and were randomly divided into 4 [illegible] (control), group 2 (Well of Well system), group 3 (Oviductal monolayer) and [illegible] monolayer). Chimeric embryos in these different culture systems were cultured [illegible] supplemented with 10% FBS in humidified atmosphere at 38.5°C with 5% CO_2. After aggregate formation, these were shifted to BVEC monolayer for further [illegible] humidified atmosphere at 38.5°C with 5% CO_2 in CO_2 incubator. Aggregat[illegible] in Group 1, group 2, group 3 and group 4 was [illegible] 91.04±3.34% respectively. Furthermore, percentage of aggregates that reached [illegible] group 1, group 2, group 3 and group 4 were [illegible] 51.03±6.43%, respectively while percentage of aggregates that reached morula [illegible] group 2, group 3 and group 4 were 0.00±0.00%, 13.61 [illegible] respectively. Blastocyst formation in Group 1, group 2, group 3 and group 4 were 5.00±3.67%, 15.22±5.51% and 17.67±5.18%, respectively. The aggregation efficiency of aggregates at 8-16 cell, morula and blastocyst stage in group 3 and group 4 were significantly higher than obtained in group 1 and group 2. However, the aggregation efficiency, percentage of aggregates at 8-16 cell, morula and blastocyst stage in group 3 were comparatively higher than group 4. So it can be concluded that use of co-culture with oviductal and granulosa monolayer increases aggregation efficiency, percentage of aggregates at 8-16 cell, morula and blastocyst stage to many folds in ES-tetraploid complementation assay.

Association of vitamin D level with Leprosy Spectrum and Reactions

Vikram Singh, Mallika Lavania, Madhavi Ahuja, Vinay Pathak, Bandana Dubey, Ravindra P. Turankar, U. Sengupta

Stanley Browne Laboratory, The Leprosy Mission Trust India (TLMTI), New Delhi

Background: Leprosy is a chronic, debilitating infectious disease caused by Mycobacterium leprae. Vitamin D Receptor (VDR) is a member of the nuclear receptor family. Vitamin D facilitates several immuno-modulatory properties through VDR. VDR polymorphism has been found to be associated with leprosy. Vitamin D deficiency was found to be linked with increased risk of some infectious and metabolic diseases.

Objective: In the present study, we investigated the association of polymorphism of VDR, mRNA gene expression of VDR and level of vitamin D with the leprosy, different phenotypes of leprosy and reactional group of leprosy.

Methodology: A total of 305 leprosy patients across the spectrum and 150 healthy controls were recruited in the study. VDR polymorphism was done by PCR-RFLP method, mRNA gene expression of VDR was quantitated by real-time PCR. Level of vitamin D was measured by M/s Thyrocare.

Result: We observed that SNP of VDR gene (Fok1 and Apa1) are associated with the leprosy per se and TT/BT and BL/LL group of leprosy. t-F-a haplotype is significantly associated with leprosy per se and TT/BT phenotype of leprosy. Further, VDR gene expression was found to be lower in non-reaction group of leprosy in comparison to reactional group of leprosy and healthy controls. Paradoxically, we noted that level of vitamin D is approximately same in healthy controls as well as leprosy patients.

Conclusion: Level of vitamin D in leprosy patients does not play any role in the clinical forms of disease expression. FF genotype of Fok1 was found to be associated with leprosy per se. AA genotype was found to be associated with TT/BT group of leprosy.

Vikram Singh, Senior Research Fellow, Stanley Browne Research Laboratory, The leprosy Mission Community Hospital, New Delhi.

I am currently working as senior research fellow in Stanley Browne Research Laboratory and also pursuing my Ph.D. from GLA University, Mathura. I have 2 years of working experience. Previously I worked as Teaching Associate in Veterinary College, Mathura (DUVASU). I have two research articles. I completed my Post Graduation in Biotechnology with silver medal. The area of my dissertation was related to vaccine development. I have keen interest in the field of Microbiology, Molecular Biology and Immunology, to get the exposure in the same I have attended several conferences.

Email : Ravikram.singh10@gmail.com

Distribution of Non-tuberculous Mycobacteria in Leprosy endemic regions of Purulia (West Bengal) and Champa (Chattisgarh)

Vikram Singh1, Ravindra P Turankar1, Mallika Lavania1, Itu Singh1, Vinay Pathak1, Madhavi Ahuja1, Joydeepa Dorlong1, Sundeep Kumar, 1Anjana Goel2 and Utpal Sengupta1.

Introduction:

Leprosy control programme has been truly a success story worldwide with lowering of prevalence to < 1/10000, but the last stone still remains unturned. India still houses 58.58 percent of total leprosy cases of the world. Some regions of India continue to be endemic for leprosy. The distribution of various mycobacterial species in the environment can be one of the important reasons as it may function as immunomodulator and may help in the susceptibility towards leprosy.

Methodology:

The environmental samples collected from endemic leprosy regions were cultured on the LJ slant and the DNA was isolated from the colonies grown on media. The 16S rRNA gene for NTM w amplified by using PCR. Amplified DNA was sequenced and the species was confirmed by NC

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Industrial Pollution: A Threat for the Existence of River Yamuna

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River Yamuna is one of the holy rivers of India. It starts its journey from Yamunotri at an elevation of approximately 6000 m. In its entire journey it passes from seven states across the country i.e. Himachal Pradesh, Uttarakhand, Haryana, Delhi NCR, Uttar Pradesh, Rajasthan and Madhya Pradesh. But due to rapid industrialization and growing population, the water of River Yamuna becomes polluted. Its water become too toxic that it can't be used in irrigation and washing also. It was also found that before entering in Delhi NCR, it passed through two major industrial areas of Haryana i.e. Yamuna Nagar and Panipat, where the industrial effluent mixed with water of River Yamuna and pollute it. In Delhi NCR its dissolved oxygen (DO) become zero i.e. it became too toxic for the human consumption. In this review paper we have focused on different physicochemical parameters (pH, DO, COD, BOD, TDS, Alkalinity, Total hardness) of River Yamuna water at various places (from Delhi to Mathura) and also emphasize on different industrial effluents that pollute it because if we continuing these practices of polluting it, then there is a big threat for the existence of River Yamuna in near future.

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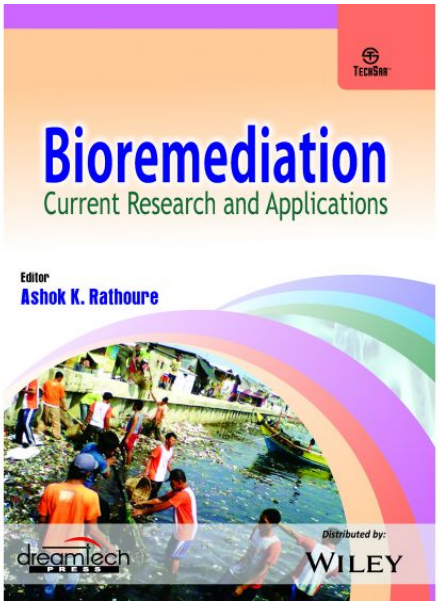

Description

Bioremediation is one of the most promising technological approaches to the problem of hazardous waste, which relies on microorganisms such as bacteria or fungi to transform hazardous chemicals into less toxic or nontoxic substances. Such biological transformation is more attractive than direct chemical or physical treatment. Microorganisms directly degrade contaminants rather than merely transferring them from one medium to another, employ metabolic degradation pathways and can be used in situ to minimize disturbance of the cleanup site. Hence, microorganisms can be effective, economical and non-disruptive tools for eliminating hazardous chemicals. There is no doubt that bioremediation is in the process of paving a way to greater pastures.

About the Author

Dr. Ashok K Rathoure, with a doctoral degree in Bioremediation, shares his knowledge and experience in the field of Environment Impact Assessment (EIA) with a doctoral degree in Bioremediation for M/s Eco Group, Surat as GM- Consultancy. Previously, he was associated with M/s Vardan environet Gurgaon and En-vision Group Surat (En-vision Environmental Services and En-vision Enviro Engineers Pvt. Ltd.) for EIA studies; Himachal Institute of Life Sciences Paonta and

Beehive College of Advanced Studies Dehradun for teaching to Biotechnology, Microbiology, Biochemistry and other biosciences subjects. He has more than 9 years of working experience in various domains.

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Reclamation of Saline Soil Using Vermicomposting for Sustainable Agriculture

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1. INTRODUCTION

Soil is the outermost covering of the earth's crust, which consists of loosely arranged layers of materials composed of inorganic and organic constituents in different stages of organization. It is a natural medium in which plants grow, multiply and die thus providing a perennial source of organic matter, which could be recycled for plant nutrition. It also provides the physical support for the anchorage of root system and also serves as a reservoir of air, water and nutrients, which are essentially required for growth of the plants. The portion of earth beneath the soil is known as bedrock and it does not contribute directly to the growth of plants (Subba Rao, 1986; Giri et al., 2005).

Reclamation and management of degraded soils have gained global attention in view of the increasing needs of growing population, rapid industrialization and deteriorating environmental quality. In north India, particularly in states like Uttar Pradesh, a large area of land (1.3 mha) is suffering from the problem of high salinity or alkalinity and is lying either unutilized or partially utilized. Such land constitutes potential land resources for meeting future needs. Intensive R&D efforts are, however, required to manage these soils for sustainable development, for prosperity of the society and for environmental conservation.

District Mathura, the chosen study site is having a vast area of land affected with salinity (nearly 5718 ha), as in major part of the area, the water used for irrigation and other purposes is saline in nature. Considering the potentiality of organic matter amendments in reclaiming and managing saline/usar soils, the present investigation has

ASSIMILATING TECHNOLOGY WITH HUMAN RESOURCE PRACTICES

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ABSTRACT

Human resource management is a key occupation of any organization. Without strategically managing people organization cannot think of their survival and sustainability in this competitive era. On the other hand, technology management also becomes another reality of organizational success. Technology helps the organizations to save the valuable resources including time and money and helps in responding the employees, organization and market demands speedily.

In the information age, technology is quickly becoming an integral part of human resource management and reshaped the day to day practices of man-power management. Today, HR technology is gradually used by most of organizations in the country to meet the demands of its key stakeholders.

This is a literature review paper includes a review of research articles in area of human resource information management and studies related to integration of technology with human resource processes of an organization.

This research article talks about the concept and evolution of HR technology, HRIS, importance of executing HR technology, its major aspects, few popular software details available in this area and also the case of corporate practicing technology in management of HR and earning strategic benefits.

Keywords: Technology, Human resource management, HR technology.

INTRODUCTION

Now a day's a number of challenges are being faced by an organization such as globalization, increased competition in market, workforce diversity, technology transformation, e-business applications, and many more. Among all, technology is having a major impact on the organizational practices. It can be understood by observing the organization's everyday response regarding certain issues including,

- No of e-mails received every day related to work,
- E-invitation received related to meetings, webinars, social events, development workshop of professionals,
- Conducting any work meetings on social networking sites (like- Facebook, LinkedIn and Twitter),
- Use Skype to communicate with business partner or with colleagues of different nations or of same nation,
- Use of Internet to search new information, and
- Use of Intranet for internal communication etc.

These all issues together indicate about the role technology play in management and control of that organization.

As Carroll and Wager (2010), said that "Technology has further revolutionalized the ways in which many companies do business, forcing a paradigm shift for management

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ADOPTION OF GREEN PRACTICES FOR ATTAINING ORGANIZATIONAL SUSTAINABILITY

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ABSTRACT

Green marketing is the technique of selling products and services depending on their environmental benefits. Such type of product or service may be environmental friendly in one way or on the other side, can be manufactured and packaged in an environmental friendly way. The basic assumption of this concept is that consumers view "greenness' of a product or service as a merit and it creates a base for their purchasing decision. Consumers are ready to pay some extra amount for green products in comparison to the alternative product. Likewise, Green HRM is using HRM policies in order to promote the resources in the sustainable way within the company and hence it promotes the reason of environmental sustainability. This paper focuses on the concept of integration of green practices of marketing and human resource management for attaining sustainability in the organization through different strategies and suggests certain measures for going green.

Keywords: *Green Marketing, Green HRM, Sustainability*

INTRODUCTION

The other way to understand green marketing as it is increasing greatly as large number of consumers are willing to back their environmental consciousness with their money, can become dangerous. The public tends to be skeptical of green claims to begin with and companies can seriously damage their brands and their sales if a green claim is discovered to be false or contradicted by a company's other products or practices. Presenting a product or service as green when it's not is called green washing.

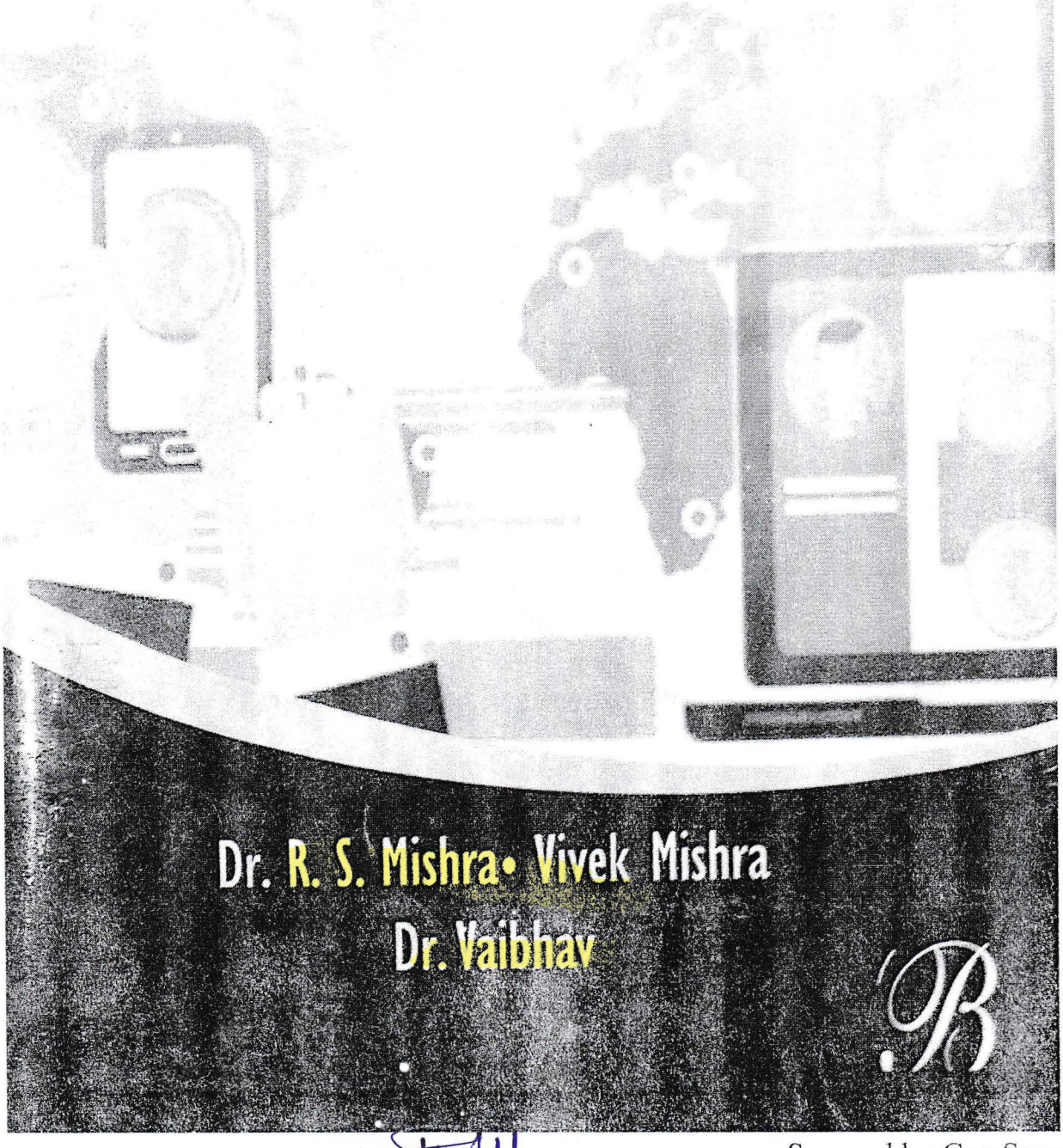
Green marketing is said to be the marketing of environmental-safe products. Some other terms used for this concept are Environmental marketing and Ecological marketing. The environmental changes across the globe are becoming critical for the consumers but also for the management as well.

Green HR Practices

In the present times, both the developed and the developing countries are considering the fruitfulness of the environmental related issues and sustainable development. Increasing concern for the environment as well as the development of standards worldwide has forced the business houses to adopt 'Green Practices'. Nowadays business houses are considering the importance of 'Green HRM Practices' i.e. none other than the combination of environmental management and HR management. This relates to the involvement of HR initiatives for the endorsement of sustainable practices and also to enhance employee awareness and commitments on sustainability related issues. Green human resource includes environment friendly HR practices as well as knowledge management as its two essential elements. It relates with following the environment friendly initiatives which results in increase in efficiency, reduction in expenditure, and good employee retention which in a way helps the businesses to develop a suitable environment corporate culture (Dutta Sumanta, 2012).

Digital India

and Cashless Economy



Dr. R. S. Mishra • Vivek Mishra
Dr. Vaibhav

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Digital Banking in India: Shift from Cash to Online Payments

Prashant Tiwari*, Shiv Kant Tiwari & Trilok Pratap Singh*****

ABSTRACT

The emergence of electronic-commerce has produced new financial needs in the economy that in majority of the cases, these financial needs cannot be utilized by the conventional payment systems. Knowing this, banks and other financial institutions are finding various types of virtual payment system and identifying the various issue related with online banking and payment system. The payments between the various parties do not only contribute to their income but also paves the way for economic development of the economy. The Government of India is also working upon the digital and cashless India movement and in the same series various technological advancements in the field of banking and electronic payments have been developed. Post demonetization the awareness for cashless economy and other virtual payment mechanism such as IMPS, UPI have gained a marvelous attention for digitalized banking operations. In the recent past, e-payment has gained tremendous development in usage. This study discusses the various methods adopted for e-

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