GLA UNIVERSITY MATHURA
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GLA University (Track ID: UPUNGN11537)

Index (2016)

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

Sl. No.	Name of the teacher	Title of the book/chapters published	ISBN/ISSN number of the proceeding	Page No./ Hyperlink
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Self-adaptive ontology-based focused crawling: A literature survey

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Abstract

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Abstract

Web crawlers are known to us since the birth of the internet since 1990, as the web pages are interconnected among themselves and form a unique path along which the crawler travels to fetch the information requested by the user/author. But the traditional crawlers are not able to distinguish between the relevant and the partially relevant web pages. Due to this the crawler had to fetch a huge amount of data from the web even if the web was not fully relevant to the user. This resulted in formation of the crawlers that were committed to the single topic given by the user. These crawlers were known as focused crawlers. These focused crawlers do not crawl the whole web as opposed to the traditional crawlers, as they only crawl the specific part of the web that is related to the given topic. This paper summarizes different qualities of various focused crawlers at present. Basically it divides the focused crawler into two different classes namely Semantic and Social Semantic. Semantic Focused Crawlers uses the ontology to its advantage and to obtain the topics that are contextually related to the given topic. Social Semantic Focused Crawlers takes the advantages of the social networking sites to obtain the web pages that are contextually related to the given topic, and usually the pages are shared by the people that have some interest in some topic related to the queried topic. © 2016 IEEE.

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Rule-based system for automated classification of non-functional requirements from requirement specifications

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Abstract

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Indexed keywords

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Abstract

Unmasking the non-functional requirements (NFRs) such as quality attributes, interface requirements and design constraints of software is crucial in finding the architectural alternatives for software starting from early design opinions. For developing quality software product, extraction of NFRs from requirement documents is needed to be carried out and it's beneficiary if this process becomes automated, reducing the human efforts, time and mental fatigue involved in identifying specific requirements from a large number of requirements in a document. The proposal presented in this paper combines automated identification and classification of requirement sentences into NFR sub-classes with the help of rule-based classification technique using thematic roles and identifying the priority of extracted NFR sentences within the document according to their occurrence in multiple NFR classes. F1-measure of 97% is obtained on PROMISE corpus and 94% F1-Measure on Concordia RE corpus. The results established validates the claim that proposal provides specific and higher results than the previous state of art approaches. © 2016 IEEE.

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A measure for modelling non-functional requirements using extended use case

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Abstract

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Abstract

In order to describe requirements for the proposed software, use case plays a very significant role. Generally use case models the functional requirements. However, Non-Functional Requirements (NFRs) are often captured only generically at a fairly high level therefore there is vital need to include details regarding NFRs necessary for the proposed software's at initial stages of system development. Modeling NFR with Use Case has been a subject of many research projects in the past but because of great diversity in number and types of NFR it makes use case distracting and hard to read. This paper attempts to propose an aspect oriented approach with new artifacts to model required NFRs associated with a particular use case to improve the modularity and complexity of Use Case. These artifacts are Kernel to represent standard Use Case functionality, Applicability condition to apply constraint and NFRCase to mitigate risk associated with an applicability condition. The proposal is illustrated with an example and metric has been formulated. Result validates that the proposal is compared well with prevalent approaches proposed in past. © 2016 IEEE.

Author keywords

Applicability Condition; Modeling; NFRCase; Non Functional Requirements; UM; Use Cases

Indexed keywords

Related documents

A versatile approach for ranking and modelling of non-functional requirements
Kaur, H. , Sharma, A.
(2019) International Journal of Critical Computer-Based Systems

A UML profile for goal-oriented and use case-driven representation of NFRs and FRs
Supakkul, S. , Chung, L.
(2005) Proceedings - Third ACIS International Conference on Software Engineering Research, Management and Applications, SERA 2005

Representing NFRs and FRs: A goal-oriented and use case driven approach
Chung, L. , Supakkul, S.
(2005) Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)

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Distortion aware novel routing protocol for video transmission over MANETs

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Abstract
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Abstract

High packet error probability due to congestion and noise in Mobile Ad-Hoc Networks (MANETs) can cause high levels of distortion in transmitted video. Hence, modeling of the impact of packet loss on video quality and the resulting distortion is an important task. Many conventional distortion modeling techniques simply consider a linear relationship between the packet loss and distortion, which is inaccurate. The main contributions of the current work are twofold. At first, a probabilistic model to estimate video distortion has been developed and based on this model a feedback based routing strategy is proposed using smart mobile nodes capable of making decisions considering network-specific constraints like congestion and signal-to noise ratio(SNR). Loss-induced distortion associated with a video source is targeted in the proposed protocol using cross-layer design technique. The experiment results are obtained and compared with contemporary rate-adaptive strategy. The results show improvement in video quality for most of the channel environments. © 2016 IEEE.

Author keywords

Congestion; Distortion Model; MANETs; Packet Loss; QoS; Signal-to-Noise Ratio; Video

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A methodology for multiple fault handling in QoS based service oriented architecture

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Abstract

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SciVal Topics

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Abstract

Observing last decades of emerging paradigms in technology, distributed system has played a significant role in new generation applications. Distributed systems in contrast with web services have paved a recognizable strategy for software development across the software industries. Web services participated in next generation application development through cross domain integration of targeted functionalities. Web services became an important component for the software generation globally by lay down on the principles of Service Oriented Architecture (SOA). SOA frames the casting of web services from independent developers in a single module keeping in consideration the Quality of Service constraint such as cost, response time and availability etc. On developing an application with the help of independent web services there is always a chance of service failure, which may directly or indirectly lead to the break in service supply by the overall integration. In such situations there may be the necessity to replace these failed services in spite of redeveloping a new application. Through this paper we are proposing an efficient algorithm for handling such run time service failures to support the system working. As configuring a new system in such failures is very expensive and a tedious task

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Hindi word sense disambiguation using cosine similarity

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Abstract

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SciVal Topics

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Abstract

Hindi is the regional language of India. Most of the people access, retrieve, and share documents in Hindi language. As all the natural languages possess property of being ambiguous, so does Hindi language, which creates obstacles in usage of information technology properly. In order to remove ambiguity from Hindi language, we need a system called Hindi word sense disambiguation (HWSD). In this paper, we present a supervised method, called HWSD using cosine similarity in which vectors are created for testing query and sense knowledge data for the ambiguous word by considering weights. Experiment is performed on dataset consisting of 90 Hindi ambiguous words and it is found that this method outperforms Lesk's algorithm which is well known algorithm for Word sense disambiguation (WSD). We obtained an overall average precision of 78.99% and average recall of 72.58%. © Springer Science+Business Media Singapore 2016.

Author keywords

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Salient region detection using fusion of image contrast and boundary information

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Abstract

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Indexed keywords

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Metrics

Abstract

Finding most striking region in an image is known as salient region detection. This area is becoming an area of research in recent years due to its wide applicability in computer vision, robotics and data transmission. To find salient region various parameters like color, texture, location, semantics etc are used. In this paper, a method is proposed which uses the fact that image boundary is rarely touched by salient object and then poisson distribution is used to find the probability of each pixel being part of salient object. Thus, the saliency map is obtained by computing the absolute difference of pixel intensity with the mean of boundary pixels. No former training is essential for this approach. Experiments are performed to evaluate the performance of proposed approach on MSRA dataset and compared with 4 recent state-of-Arts. Precision, recall and F-measure proves the consistency of proposed work. © 2016 IEEE.

Author keywords

Poisson distribution; Saliency

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LBP based face recognition system for multi-view face using single sample per person

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Abstract

Most of the traditional approaches of face recognition techniques use more than one training sample per person in training stage for feature extraction. In various face recognition systems like Aadhar-card, e-passport, drive license, safety certification, access control, and law enhancement may not have multiple samples. But these systems have only single sample per person (SSPP) in training database. So, various famous systems fail to give accurate results because in which enough sample are not available. To advance the recognition accuracy of single subject per person, this paper proposed a robust one sample image recognition algorithm. Firstly, the features extraction of the face is done by using Local Binary Pattern (LBP) which is less sensitive to scaling and illumination condition, after that classification is done. Then recognition is carried out using Euclidean distance to identify the face. Experiments are done on the Face94 data-set and our own dataset having different poses, illumination and age difference. The proposed algorithm's results shows improvement in recognition rate. © 2016 IEEE.

Author keywords

Euclidean distance; LBP; SSPP

Related documents

Single Sample per Person Face Recognition Based on Sparse Representation with Extended Generic Set

Qi, L. , Tie, Y. , Liang, C.
(2019) Proceedings - 2018 International Conference on Cyber-Enabled Distributed Computing and Knowledge Discovery, CyberC 2018

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Xu, T. , Hu, H. , Ma, Q.
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A One-Sample per Individual Face Recognition Algorithm Based on Multiple One-Dimensional Projection Lines

Delgado-Gómez, D. , Ruiz-Hernández, D.

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Human fall detection for video surveillance by handling partial occlusion scenario

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Abstract

Video Surveillance is a usual topic when it comes to enhancing security and safety in the intelligent home environments. With the advancement of technology in medical science over past decades, and large amount of increment in the population of elderly people. Falls is the one of main cause of injuries among the elderly people. Therefore, there is urgent need of such surveillance systems that are able to send a cell/message/alarm for help, in the case of some incident happens where a person slips and falls and is unable to call for help i.e. he/she loses consciousness. The proposed fall detection system is based on a change in human shape in daily activities. In the proposed approach, features are extracted from the human silhouette and a fall is detected by analyzing the change in its shape. The proposed approach also handles the problem of partial occlusion during the fall detection. The approach shows satisfactory results as compared to the sate-of-Art method. © 2016 IEEE.

Indexed keywords

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Related documents

A simple vision-based fall detection technique for indoor video surveillance
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(2015) Signal, Image and Video Processing

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(2012) Proceedings - 2012 International Symposium on Computer, Consumer and Control, IS3C 2012

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Ong, P.S. , Ooi, C.P. , Chang, Y.C.
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A framework for dynamic hand Gesture Recognition using key frames extraction

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Abstract
Author keywords
Indexed keywords
SciVal Topics
Metrics

Abstract

Hand Gesture Recognition is one of the natural ways of human computer interaction (HCI) which has wide range of technological as well as social applications. A dynamic hand gesture can be characterized by its shape, position and movement. This paper presents a user independent framework for dynamic hand gesture recognition in which a novel algorithm for extraction of key frames is proposed. This algorithm is based on the change in hand shape and position, to find out the most important and distinguishing frames from the video of the hand gesture, using certain parameters and dynamic threshold. For classification, Multiclass Support Vector Machine (MSVM) is used. Experiments using the videos of hand gestures of Indian Sign Language show the effectiveness of the proposed system for various dynamic hand gestures. The use of key frame extraction algorithm speeds up the system by selecting essential frames and therefore eliminating extra computation on redundant frames. © 2015 IEEE.

Author keywords

Hand gesture recognition; Key frame extraction; Muliclass support vector machine; Sign language recognition; Skin color segmentation

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Consideration of Similarity Factors in Integration of FP and SLOC for Software Project Estimation

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Abstract
Author keywords
Indexed keywords
SciVal Topics
Metrics

Abstract

This research paper includes the use and explanations related to advantages of two "public domain" costing methods i.e., Function Point and Source Lines of Codes for size estimation. Research paper demonstrates the effect of deviation between SLOC and FP and use of homogeneous data can provide the acceptable results by reducing deviation as established. It is demonstrated and established that the combination of physical size and functional size using the LOC and function points can affect the productivity. Such estimates are of very high degree of accuracy. © 2015 IEEE.

Author keywords

COCOMO; Function Point; homogeneous data Productivity; Source Lines of Codes

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A service selection algorithm for QoS based web services

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Abstract

Author keywords

Indexed keywords

SciVal Topics

Metrics

Abstract

Web services are the emerging techniques that allow the interaction of one application to the other and also enable the re-usage of autonomous services over theweb. As several web services provide similar functionality for a single service, so in order to select the optimized web service there is a need to integrate different web services. Integrating several web services leads to composition which is known as web service composition, which helps the user to execute complex business processes and transactions. QoS is one of the major issues in designing of composite web services. In this paper, a systematic service selection approach is proposed to select the optimal service. © 2015 IEEE.

Author keywords

benefit function; Bi-directional search; utility function

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SAFSB: A self-adaptive focused crawler

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Abstract

Author keywords

Indexed keywords

SciVal Topics

Metrics

Abstract

There are about 3 billion indexed websites present in the WWW. Not all websites do not belong to a particular topic are indexed by a search engine say google.com, there are online platforms available where different users help the person asking for a (Universal Resource Locator) URL containing a topical information. To verify the authenticity and validity of the URL, an empirical methodology and its ranking to major its relevancy is presented through this paper. To semantically expand the search, topic ontology is used for the pre-processing of the focused crawler to make search more effective. The performance of our web crawler is further increased by using the ontology based learning which is constantly being updated by dictionary based learning and related words of the named entities. The harvest ratio is used which represents the ratio between the relevant pages and the crawled pages shows a significant improvement than the previous methods. © 2015 IEEE.

Author keywords

focused crawler; Self-Adaptive Ontology learning; social bookmarking

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Feature based clustering considering context dependent words

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Abstract

Author keywords

Indexed keywords

SciVal Topics

Metrics

Abstract

With the increase in the popularity of e-commerce, there is large amount of opinions available on the web. So there is a need to generate clustered summary of products based on features. Most of the opinions contain opinion words which has same polarity in all contexts. But there are some opinion words called context dependent words which have different polarity in different context. So there is a need to determine the polarity of ambiguous words (context dependent words) efficiently and effectively and then generate the aspect based summary. In this paper we used k nearest neighbor classifier to determine the polarity of context dependent words. Then short summary is produced for that particular product based on each feature. Experimental results show that our method gives better result in comparison to existing method. © 2015 IEEE.

Author keywords

Ambiguity; Context Dependent word; Opinion Mining; Word Polarity Disambiguation

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Review of ontology based focused crawling approaches

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Abstract

Author keywords

Indexed keywords

SciVal Topics

Metrics

Abstract

Web now has become a great source of information now-a-days but this information is not sequentially stored rather stored in a hyperlinked form. The generic crawlers are not able to differentiate between relevant and related. So to improve over the results returned by the generic web crawlers, topic specific crawlers were designed called as focused crawlers. The focused crawler crawl a specific part of the web to retrieve the relevant resources. Here in this paper the comparative analysis of the various focused crawler is shown. It classifies two types of focused crawlers: the learning focused crawlers and the classical focused crawlers. The classical crawlers are again categorized into two as : Semantic focused crawlers and social semantic focused crawlers. The semantic focused crawlers combine ontology with the focused crawlers to get semantics of the search topic related to the web pages. The Social semantic works on the social network to get semantically related web pages shared between people of common interest. © 2014 IEEE.

Author keywords

Focused crawlers; Ontology; Semantic crawlers; Social semantic crawlers; Tags

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A survey: Hyperlink analysis in webpage ranking algorithms

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Abstract

Author keywords

Indexed keywords

SciVal Topics

Metrics

Abstract

World Wide Web is the collection of web pages which are linked to each other directly or indirectly. Through these hyperlinks among webpages, web graph is created by following these hyperlinks. In the field of webpage ranking, hyperlink analysis is used in most of the researches. Hyperlink analysis is the approach to analyze various resources around the hyperlink in the webpage. In hyperlink analysis, there are various resources or parameters are used which affect the webpage ranking, these are number of inlinks and outlinks, anchor text, anchor-related text, etc. Different researchers use these parameters in their research alone or in combination. This paper provides a survey on hyperlink analysis in the webpage ranking algorithms. In this paper classification of webpage ranking algorithms is also given based on different parameters and web mining techniques. © 2014 IEEE.

Author keywords

Anchor Text; Hyperlink analysis; Web graph; Web Mining; WebPage Ranking

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Classification of software project risk factors using machine learning approach

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Abstract

Author keywords

Indexed keywords

SciVal Topics

Metrics

Abstract

Software project risk can be defined as a various future harms that could be possible on the software due to some non-noticeable mistakes done during the development of software project. Analyzing the risk is required in order to reduce the risk before it can harm the quality of the project. This paper interprets an idea of software project risk factors classification which involves the use of support vector machines (SVM) i.e., machine learning approach to improve the accuracy of the results. Risk assessment is a crucial task as the projects are facing increased complexity with higher uncertainties. In order to make the risk assessment easier, it is necessary for the developers to identify the hardbound and less hardbound risk factors. Classifying the risk factors will help the developers to identify the most effective risk which will ultimately become easy for the software developer to take some mitigation actions as early as possible. Hence the proposed approach reduces the developer's effort and increases the accuracy in identifying the harmful risk factors. © Springer International Publishing Switzerland 2016.

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Hindi word sense disambiguation using lesk approach on bigram and trigram words

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Abstract

Author keywords

Indexed keywords

SciVal Topics

Metrics

Abstract

Word Sense Disambiguation (WSD) is a vital task which provides the definition of particular words according to their sense or according to given context. Lesk algorithm is originally based on the gloss overlap that can be observed as the measure, semantics relatedness. Lesk algorithm is used to find the correct sense of ambiguous words. In India, the Hindi language is widely used for communication both in verbal and scripting. In this, research paper the Lesk Approach is applied for finding bigrams and trigrams words sentences written in the Hindi language, which contains the verb words as the polysemy words. Manually 15 words of the verb are used which are ambiguous in nature from Hindi Wordnet. These verb words on evaluation, provide the overall average precision of bigram words as 52.98% and trigram words as 37.04% and an overall average recall of bigram word as 33.17% and trigram words as 18.56%. © 2016 ACM.

Author keywords

Hindi word sense disambiguation; Lesk algorithm; Natural language problems; Verb words

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Opinion mining classification based on extension of opinion mining phrases

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Abstract

Author keywords

Indexed keywords

SciVal Topics

Metrics

Abstract

Opinion mining is the field of study that analyses people's thoughts, sentiments, emotions and attitude towards entities, product, services, issues, topics, events and their attributes. There are many different tasks such as opinion extraction, sentiment mining, emotional analysis, review mining etc. The important aspect of opinion minion is to gather the information from reviews, blogs, etc. and then finding out the behavior of that information, i.e. the information is related to either positive or negative context. The positive and negative reviews or blogs deal with a numerical value. The value is to be calculated using SentiWordNet 3.0. The opinion words are mainly adjective words such as "good," "better," "awesome." But there arises several problems because identifiers negation words and the extension of the opinion words such as "very very good" are not considered. In this paper, details about opinion mining, how the polarity value deals with positive and negative and how to deal with Roman language reviews and blogs is discussed. © Springer Science+Business Media Singapore 2016.

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Sentiment classification of context dependent words

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Abstract

Author keywords

Indexed keywords

SciVal Topics

Metrics

Abstract

With the increase in the use of Web 2.0, there are lot of opinions on the web about any product. Most of the opinions contain opinion words which has same polarity in all contexts. But there are some opinion words called context dependent words which have different polarity in different context. So there is a need to determine the polarity of ambiguous words (context dependent words) efficiently and effectively. This task is also known as word polarity disambiguation (WPD). This literature survey is done to familiarize with general applications and approaches of opinion mining then it presents the context dependent word polarity problem in depth by explaining the existing literature of sentiment classification of context dependent words and finally, some open problems, conclusion, and future directions are discussed. © Springer Science+Business Media Singapore 2016.

Author keywords

Ambiguity; Context dependent word; Opinion mining; Word polarity disambiguation

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Resource allocation strategies used in cloud computing: A critical analysis

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Abstract

Author keywords

Indexed keywords

SciVal Topics

Metrics

Abstract

The revolution in utility computing paradigm is brought by Cloud computing which replaces the traditional software installation. The cloud computing service models are basically classified into three parts i.e. software as a service (Saas), Platform as a service (Paas) and Infrastructure as a service (Iaas). There are four deployment models followed by Cloud computing i.e. Public Cloud, Private Cloud, Hybrid Cloud and Community Cloud. The proposed system comes under the Iaas which provides memory and processor as a resource. Every user wanted to get the services of cloud as they submit the job immediately. In this situation the allocation of resource at real time is a challenging issue. Cloud services are efficiently and optimally allocated to satisfy the requirements of customer. The focus of this paper is detailed and comparative study on different resource allocation strategies by preserving the service level agreement (SLA). The paper brief the algorithms used by the cloud service provider to allocate resources when the multiple jobs arrive with different burst time and different resource requirement. © 2016 IEEE.

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Comparative Error Rate Analysis of Cooperative Spectrum Sensing in Non-Fading and Fading Environments

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***Abstract*—In cognitive radio network spectrum sensing is a fundamental element to detect the presence of primary user. In this paper cooperative spectrum sensing scheme is employed to optimize the performance in fading channel environments. This paper will focus on AWGN, rayleigh and rician fading channels to compare the error rates for 'n' number of cognitive users. Neyman's hypothesis testing and data fusion rules are used to satisfy and compare the error bounds in a large network for different values of SNR. Finally error rates are compared by considering different threshold values and keeping the SNR as fixed. This comparative analysis can be extended further for double threshold energy detection scheme.**

Keywords—Cooperative Spectrum Sensing, Fading Channels, Optimization, Total Error rate

I. INTRODUCTION

In wireless communication Cognitive Radio (CR) is an exceptional approach in which radios are incorporated with an outstanding level of intelligence and dexterity. One key aspect of CR network is the prospective to find out its adjacent radio environment which is performed by the spectrum sensing. Cognitive radios have an unprecedented ability to reconfigure their own characteristics to the matching conditions after precisely observe, sense, and detect the operating conditions of environment [1], [2]. Spectrum sensing is one of the most critical components of cognitive radio which includes serving the users by filling up the spectrum voids without causing any interference to primary users. But the re-appearance of primary user also leads to interference. So the cognitive radio must continuously sense the spectrum used to serve other users and after the detection of primary user, CR must release spectrum instantly to avoid any interference [3].

A CR must possess the ability to observe the presence of licensed or primary user even if the signal received is weaker than the desired value which is generally observed in multipath fading and shadowed environment. So to avoid the interference caused to primary user cognitive radio may collaborate the information obtained from multiple CR's in a network for successful conduction of spectrum sensing. In [4] it is shown that with the assistance of multiple secondary users can enhance the performance of spectrum sensing, but each cognitive user has to send its own decision via control channel to fusion centre located at the receiving base station. Cooperation of CR's has been extensively discussed in the literature [5-7] which provide detailed overview of its implementation, merits and demerits. The existed works mainly examined the receiver operating characteristics in basic non-fading environments. The cooperative spectrum sensing performance in different fading environment and with diversity reception has been analysed in [8], [9] which investigate that by applying a combined distribution function for diverse and shadowed environments in real time environment the perfect prototype of the channel behaviour can be implemented.

In this paper the optimality of cooperative spectrum sensing is evaluated using different fading channel environments. The cooperation of all the cognitive users will be considered in a CR network with the application of energy detection and distributed decision fusion. We deduce the optimal number of CR's required to minimize the error rate in different channel conditions. Further we evaluate and compare the target error bound in a large cognitive radio network so as to analyse the effect of SNR and threshold parameters on the detection of primary user.

The remaining sections of this paper are organized as follows. The cooperative spectrum sensing scheme and its model is presented in Section II. We have also discussed probability of detection for AWGN, rayleigh and rician fading channels. Section III will focus on the optimum number of CR's in a large network so as to analyse the target error bound for different fading channels. We also present some numerical results for the comparative analysis of error rates. Finally we conclude the paper in Section IV.

II. COOPERATIVE SPECTRUM SENSING

In the spectrum sensing system model, there is a primary user, K numbers of cognitive users and one receiving base station. All cognitive users are cooperating with each other needs to send their decisions to the fusion centre located at the receiving base station. For local decision, each cognitive user

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Design of 3 Stage Low Noise Operational Amplifier

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***Abstract*—In this paper a high gain low noise Op-Amp has been designed. In designing of a high gain Op-Amp, for large values of coupling capacitor, gain will decrease. Since our requirement was to increase the gain, so we have designed a three stage Op-Amp. Our designed circuit provides gain of 78.4 dB, which is very much larger than two stage Op-Amp. There is a trade-off between various parameters like Phase margin, gain, slew rate etc. For example, to achieve larger values of GBW, PM will decrease. We have compared the results for two values of input common mode range. Improvement in the designed circuit is done to achieve the desired GBW by recalculating the transistor's W/L ratios and then simulating the results. Gain Bandwidth product of 176.9 MHz and Phase Margin greater than 60 degrees is achieved but at the cost of power dissipation and area. The Op-Amp is designed in gpdk 180 nm CMOS technology.**

***Keywords*—GBW, PM, GM**

I. INTRODUCTION

Generally a differential amplifier is used as the input stage of an Operational Amplifier. The performance of Op-Amp affects overall performance of integrated circuits. Depending on the application, proper design of Op-Amp is necessary. Op-Amp has different topologies such as single stage Op-Amp, cascade Op-Amp, two stage Op-Amp, and three stage Op-Amp. Single stage Op-Amp has limited gain. In two stage Op-Amp first stage is designed to provide high gain whereas second stage is beneficial for high swing. Three stage Op-Amp achieves higher gain than two stage Op-Amp [1].

Noise is one of the important parameter to minimize as it will affect the minimum signal level of a circuit to be processed with acceptable quality. The noise can be either thermal noise or flicker noise that is generated randomly by the amplifier which provide nonzero output while there is no input signal is applied. So noise is the important parameter in the devices where high gain and high bandwidth is desired. Device noise can be classified into two categories, one is electronic noise and other is environmental noise [2]. Electronic noise consists of thermal noise and flicker noise. Noise can be minimized by choosing proper size and aspect ratio of the MOSFETs, bias current of the input transistors and by optimize selection of input transistors (transistor should be properly matched). Selection of input pair depends on the technology and the process used. If we are using CMOS technology then input pair will comprise an NMOS and a PMOS transistor [3]. An ideal Op-Amp has the characteristics of infinite CMRR, infinite gain, infinite input impedance and zero output impedance etc. CMRR basically defines the capacity of an Op-Amp to reject the noise. As in the field of bio-medical engineering there is requirement of high level amplification so three stage Op-Amps are preferred over two stage Op-Amps as they fulfilled this requirement. Besides having the advantage of high gain three stage Op-Amp will require a large number of transistors and will result in increased power dissipation.

II. CONDENSATIONAL OP-AMP

Block diagram of a simple two-stage Op–Amp is shown below. It basically has four parts. These parts can be hierarchically designed in the form of separate modules and then recombined to form a single circuit.

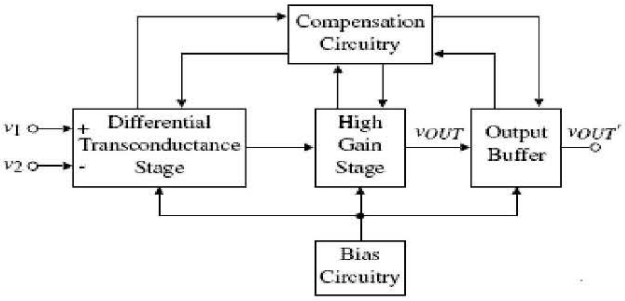

Fig. 1: Block Diagram of Conventional Op-Amp

Method of designing a circuit depends on application and the chosen technology. Each topology will have its own advantages and disadvantages.

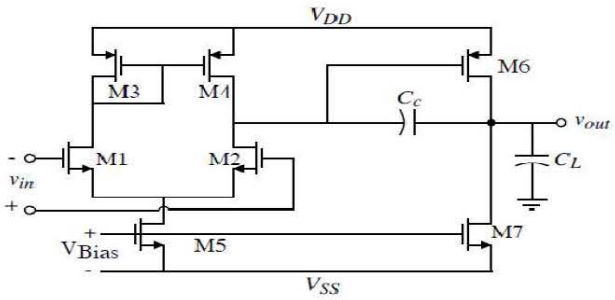

Fig. 2: Structure of Two Stage Op-Amp

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Design of UWB LNA using Active Resistors in 0.18µm CMOS Technology

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***Abstract*—The proposed design of LNA uses common gate topology as an amplifying section. Noise cancelling technique is used and special emphasis is laid on the use of active resistors so that overall Noise figure is minimized and gain is enhanced. Simulation is done on ADS tool using 0.18µm technology. Power supply provided is 1.8V. Maximum gain achieved is 14.774dB. Noise figure achieved is 1dB to 1.6 dB over entire bandwidth. Bandwidth achieved is 3-9GHz.**

Keywords: MOSFET; Low Noise Amplifier; Ultra Wide Band, Noise Figure, Active resistors

I. INTRODUCTION

Wireless sensor networks (WSNs) have rapidly increased their importance and utility in a large number of applications such as in medical field for health care purposes, environmental monitoring, industries and agricultural field [1]. With the rapid advancement in the wireless communication, it requests for the systems that have integrated low cost devices with multi GHz bandwidth. UWB (ultra wideband) appears as a new technology which is capable of transmitting data at high data rates within short distances at low power [3]. Basically two approaches are used to exploit the spectrum of UWB [10]. One approach uses the multiband OFDM which divides the whole UWB into 14 small sub bands and uses fast frequency hopping scheme [8]. Other approach uses impulse modulation scheme which includes the transmitting of short duration pulses with position or polarity modulation which results in signal spreading over multi GHz of bandwidth.

The major challenge imposed by high frequency wideband communication systems is the design of wideband low noise amplifier. Since the LNA is the first active component in the receiver chain and is one of the most power hungry blocks, it is desired that it should offer low noise and high gain [4]. In addition to that good linearity, integrated low cost and low power consumption over the entire band of interest is necessary to meet the design specifications [2].

Due to certain advantages of MOS technology from integration and fabrication point of view, MOS technology has become quite prominent in wideband LNA design. Some designs employ the use of filters for matching purposes [7]. Generally LNA designs can be classified as multiband amplifier, distributed amplifier and broadband noise cancelling LNAs [6]. However common gate LNA suffers from high noise figure and distributed amplifiers have high power consumption [1]. Also there is a tradeoff between input matching and noise figure which generally leads to high power consumption [12]. A combination of feedforward and feedback networks can be used to achieve optimum performance but the extra stages adds the parasitic capacitances and limit the bandwidth of operation [5].

In this paper, the concept of noise cancellation technique is implemented with the help of active resistors and is extended to higher frequencies. Actual resistors are replaced by active resistors thereby overcoming the disadvantages of actual resistors. It is shown that the use of active resistors not only helps in increasing the gain but also in reduction of the noise figure over the entire UWB.

The paper is organized in the following sections. In Section II, various aspects of the design of LNA and the approach employed in this work are discussed. In Section III, circuit designing part which consists of various parameters description is discussed. Section IV shows the simulation results of the proposed design. Finally, Section V states the conclusion.

I. CIRCUIT DESCRIPTION

The circuit diagram of conventional broadband noise cancelling technique is shown in Fig.1. At the drain of both the stages (common gate amplifier and noise cancelling stage), it uses a combination of the resistors and the inductors, thereby, increasing the power consumption and the die area. Also the gain offered by such an amplifier is less than 10dB and noise figure is greater than 3dB. Hence, the above limitations of this design decides the motive of the proposed design which consists of reducing the die area by removing the inductors and to achieve a better noise figure over the whole bandwidth by replacing resistors with a device which offers high resistance and provides better noise performance over the whole bandwidth.

This is achieved by the design of the LNA as shown in Fig. 2. Implementation of this design of LNA is done with the help of active resistors. Supply voltage provided is 1.8V. The proposed circuit diagram consists of PMOS active resistor in the form of load. In other words, it can also be referred to as diode connected load which provides high resistance as shown

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Digital Image Watermarking: An Approach by Different Transforms using Level Indicator

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***Abstract*—The expansion of the Internet in the past years has rapidly enlarged the accessibility of digital data like digital audio, images and videos to the common community of people. The rapid development in information technologies has given an extended and easy access to digital data. Digital data is a major trend of business communication today. Therefore, copyright protection of digital data has been a significant research issue of information security. Digital watermarking is one of the proposed solutions for copyright protection of multimedia and it is becoming a major player not only for use in images but also in the latest technology such as audio, image and video. It also has applications in defense, certification of business documents, distribution, anti-forgery of the digital media. It is an important area of study in information hiding and retrieval. The secrecy of the image may be adjusted using the level indicator (LI) introduced in this paper. Comparison of different watermarking techniques for various LI values is accomplished in this paper to test robustness.**

Keywords: Digital Watermarking, Simple Water Marking Technique, Discrete Cosine Transform (DCT), Fast Fourier Transform (FFT), Discrete Wavelet Transform (DWT), Signal to Noise Ratio (SNR), Level Indicator (LI)

I. INTRODUCTION

Digital image watermarking is a technology that has been made to protect digital information like images, audio & video from prohibited manipulations. The common characteristics of digital watermarking are: insensitivity, secrecy, and robustness. In Digital Image Watermarking the inserted watermark should not degrade the visual perception of an original image and must be robust. Therefore, it must withstand the attacks like JPEG compression, noise in the channel (during transmission) and common image processing operations and shall be secure to any attempt made by unauthorized user to tamper the watermark. Figure 1 is showing an image of Lena with three levels of watermark. Fig1 (a) shows a visible watermark, fig1(b) shows a invisible watermark and fig1(c) shows a watermark considerably visible when picture is under a keen observation [7, 9 & 12].

This paper describes an image hiding method using Simple watermarking technique, DCT, FFT and DWT algorithm. The experimental results show that the quality and embedding capacity of watermarked image for this scheme is higher as compared to other existing watermarking schemes.

(a) (b) (c)

Fig. 2: Image Showing Lena Picture with different Levels of Watermark

II. LITERATURE SURVEY

Nowadays a digital data can be easily transmitted, received, duplicated or modified by using the help of Internet. To restrict this type of things the copyright protection of digital data is necessary issue [1]. The main intention is to insert the watermark in the spectral/frequency domain coefficients of the original image [2]. The concept of digital watermarking is to insert extra data into the media. This can be used either to ensure that medium was not modified (such watermarks should be fragile i.e. they should be destroyed when the medium is altered in any way) or to allow copyright verification (such watermarks should be persistent i.e. removal of watermark should be impossible without damaging the watermarked medium beyond usability) [3].

The development of computer networks has increased the growth of the computer information technology area to a better degree through the internet and some other sources. Thus the secret digital information or simple information which includes images, videos, text etc is available to anyone. It is necessary to take care to avoid the unofficial use of the digital images commercially. People moved towards watermarking to protect secret images and data[4]. By applying this algorithm, the experimental results have demonstrated that the proposed algorithm is imperceptible, because the average PSNR for all test images is 48.033dB. Moreover, the proposed watermarking system is more robust, because it can keep the image quality well and achieves optimal NC values against many common image processing operations like adding various noises, image compression, and image rotation and so on [5].

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A High Speed Power Efficient Dynamic Comparator Designed in 90nm CMOS Technology

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***Abstract*—A fully dynamic latched comparator has been designed to meet the requirement of high speed and low power consumption. Such comparators are used in high speed data converters. In this work, dynamic comparators are designed in two different technologies and compared on the basis of delay, offset voltage and power consumption. These comparators work on the concept of charge sharing. Main focus is given towards reduction of both propagation delay and the power dissipation, which will be beneficial in improving performance of the comparator. 90nm CMOS technology is used to simulate the design with 1 V supply voltage. Hspice is used for designing and functional verification.**

Keywords—Hspice; Dynamic Comparator; Simulation and Results

I. INTRODUCTION

A comparator is an important building block in modern day applications. It is widely used in analog to digital converters. In modern data processing instruments, high speed is desired. In order to meet this requirement, comparators are designed using methodologies that provide ultra high speed. As the name indicates this circuit is used to compare two input signals and provides the output based on which input is larger [1].

In recent years focus has been given towards the design of high speed comparators with low power dissipation. As device size is getting reduced day by day, large number of components can be accommodated on a single chip. But reduction in device features also results in reduced supply voltage. So for low voltage and high speed applications power dissipation is one of the major concern [2]. As power dissipation increases in proportion of the frequency, a trade off exist between speed and power dissipation.

Although there exist a lot of technique to design comparators such as open loop comparator, preamplifier based comparator, dynamic latched comparator etc. Among these techniques, dynamic latched comparators are preferred for high speed applications. Dynamic latched comparator works on the principal of positive feedback that's why they are also known as regenerative comparator [3,7]. Positive feedback is provided with the help of one pair of back to back connected inverters. These back to back connected inverters are known as latch and convert a small difference in input voltage to a full scale output which is digital in nature, in a very short period of time. Along with the advantage of high speed these comparators has the drawback of larger offset voltage due to device mismatch. Device mismatch can exist due to variation in current factor β, threshold voltage V_{TH} and in parasitic capacitance. To reduce this mismatch large devices are used in the latching stage but at the same time this will increase the delay and power dissipation. So trade off must be taken between these two parameters.

II. DESIGN CONSIDERATIONS FOR VOLTAGE COMPARATOR

Comparator is used to compare two inputs. Inputs can be both analog and digital. Output of the comparator is digital one. Comparators can be voltage comparator or current comparator. Since voltages distribution is easier than current, most converters employ voltage comparators. A voltage comparator can be simply treated as a 1-bit analog to digital converter as shown in figure 1.

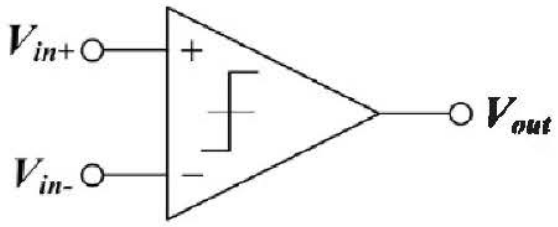

Fig. 1: Comparator Symbol

Parameters taken into consideration while designing a comparator are speed, accuracy, offset voltage, CMRR and power dissipation.

III. RESISTOR DIVIDER COMPARATOR (LEWIS GRAY COMPARATOR)

The comparator shown in figure 2 has input transistor M1A M1B and M2A and M2B operated in triode region and therefore act as a voltage controlled resistors. This comparator is also known as "Resistive Divider Comparator"[4]. Figure 3 shows the simplified form of this resistive divider comparator.

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Effectiveness of OFDM with Antenna Diversity

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***Abstract*—During the last two decades, there is a rapid growth in demand of data rate and quality of service. As in wireless environment, signals undergo fading, multipath delay spread and inter symbol interference due to frequency selectivity at the receiver side that's why single carrier mobile communication systems are not preferred. This leads to a high probability of error and degrade the system's overall performance. The solution to these problems is the use of multicarrier system such as OFDM (orthogonal frequency division multiplexing). The reason of using OFDM system is its low complexity implementation for high speed system compared to single carrier techniques. This paper will evaluate the performance of OFDM system using Space-Time diversity technique. Performance evaluation of OFDM system is measured in terms of BER *vs.* SNR simulation has been done using MATLAB.**

***Keywords*—BER, BPSK, Diversity, SNR, STBC, OFDM**

I. Introduction

One of the special cases of multicarrier transmission is OFDM, which uses multiplexing and modulation. In OFDM, single data stream is transmitted over a number of lower rate subcarriers in order to enhance the robustness against the selective fading. In single carrier system, the fading of signals lead to whole link get diminished whereas in multicarrier system, few of the subcarriers will be affected.

The entire signal bandwidth was divided earlier into K non-overlapping frequency sub-channels and every sub-channel was modulated as a separate symbol [3]. K sub-channels were frequency multiplexed. To eliminate the inter-carrier interference (ICI), general practice to avoid spectral overlap of sub-channels was applied as shown in Fig. 1 (A).

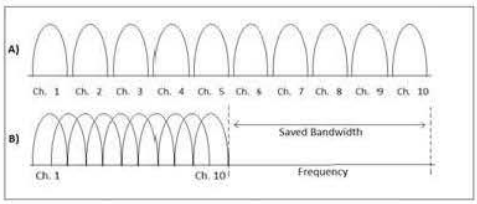

Fig. 1: Spectrum of FDM and OFDM

This result is inefficient use of existing spectrum. In the mid-1960s, the idea was proposed to deal with this wastefulness by the development of frequency division multiplexing (FDM) with overlapping sub-channels. In order to overlap the sidebands of the individual carriers without causing ICI, the sub-channels were arranged in a manner as shown in Fig. 1 (B). To achieve this, the carriers must be orthogonal to each other. This give birth to Orthogonal Frequency Division Multiplexing (OFDM) was born.

In OFDM, the signals first divided into separate symbols, modulated by data and then again multiplexed to create OFDM carriers. It is the frequently used case of Frequency Division Multiplexing (FDM).

High spectral efficiency and transmission rate are the challenging requirements of future wireless communication systems. High data rate transmission is achieved by the deployment of Multiple Input Multiple Output (MIMO) technology in multipath wireless channel. These are the form of spatial diversity. Space time block coding is an effective and practical way to approach the capacity of MIMO wireless channels. In space time block coding, transmission data reliability is increased by coding in space and time, as original data redundant copies are sent over independent channels. Then, to extract as much information all the signal copies are combined at the receiver in an optimal way.

Space Time diversity-OFDM is one of the popular combination of MIMO and OFDM. In this to enhance the system performance inherent in MIMO-OFDM, Space Time diversity technique is applied across multiple OFDM blocks [1]. In coding symbols are distributed along different transmit antennas and time slots. In this context, STBC-OFDM is the promising system configuration adopted for 4th generation communication systems. Simple linear decoding and low complexity are the few advantages which make it popular choice for the future wireless communications.

II. Implementation/ System Model

A. *OFDM System*

According to Fig. 2, OFDM is implemented, block by block and then interconnect all of them to form complete OFDM system. The simulation of Modulator, Demodulator, IFFT and FFT blocks are done in MATLAB. The results are shown in Fig. 7, 8, 9, 10, 11(a), 11(b) respectively at the paper end.

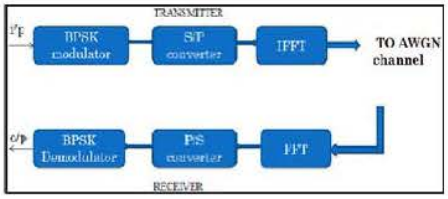

Fig. 2: OFDM System Model

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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.

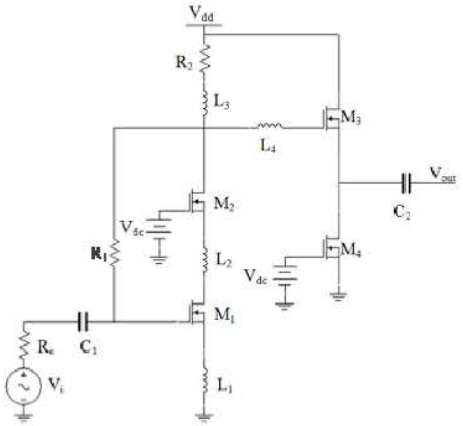

Fig. 1: The Proposed Circuit

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Frequency Scaling Based Thermally Tolerable Wi-Fi Enable 32-bit ALU Design on 90nm FPGA

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***Abstract*—In this paper, Wi-Fi Enable ALU on 90nm based Virtex-4 FPGA is analyzed using thermal scaling and frequency scaling. It is Wi-Fi enable because we are operating our ALU with frequencies of different IEEE 802.11 Wi-Fi Channel. Frequency scaling and temperature scaling results in power consumption variation and finally saving of energy. Clock power, logic power, signal power, IOs power, leakage power all are dependent on frequency and temperature. The ALU is analyzed to work efficiently at Wi-Fi channel ah, having frequency around 0.9GHz. We are also achieving reduction in range of 30-60% for leakage power using frequency scaling and thermal scaling. For further reduction of power dissipation at high frequency range, we are also using different Clock Gating techniques.**

Keywords—Frequency Scaling, Thermally Tolerable, Wi-Fi Enable, 32-bit ALU, 90nm FPGA

I. INTRODUCTION

ALU is an essential component used in central processing unit (CPU).In this paper we have proposed and implemented a 32-bit ALU which performs 32 different arithmetic and logical operations. Arithmetic operations such as addition, subtraction and logical operations like AND, NOT ,NAND, NOR ,XOR are used to make 32 different operations .We have designed a high range temperature compatible ALU which is capable of withstanding highest world temperature and also at lower temperature equivalent to water freezing point . Also the device is tested and proved to work efficiently at maximum temperatures ever recorded in month of April of Delhi as shown in TABLE 1. Different dynamic power analyses based on thermal and frequency based, are performed. And it has been observed that power dissipation has a direct relation with temperature. By performing frequency analyses we observed that our design is also Wi-Fi Channel (802.11) compatible as shown in Table 2.

TABLE 1: TEMPERATURE OF DIFFERENT REGIONS

Place	Temperature
Delhi (max,in april month)	49.1^0 C
Shimla(max)	29.6^0 C
World(max)	56.7^0 C
Delhi (min,in april month)	26.5^0 C
Water freezing point	0^0 C

We are using 90nm technology based Virtex-4 FPGA and Verilog hardware programming language. For thermal aware design, we are scaling ambient temperature and frequency scaling (by operating our device at different Wi-Fi channel frequencies) to achieve energy efficiency.

TABLE 2: FREQUENCY OF DIFFERENT WI-FI CHANNEL

Wi-Fi Channel(802.11 Protocol)	**Released Date**	Frequency
b/g	Sep 1999/Jun 2003	2.4GHz
ac	Dec 2013	5GHz
ah	Est. 2016	0.9GHz
a	Sep 1999	3.7GHz

In section 3, power and thermal analysis of ALU on 90nm based Virtex-4 FPGA is analyzed .In section 4, thermal and power analysis of ALU using Clock Gating techniques is done. In section 5, functions and schematics of ALU is added. In section 6, result is concluded. In section 7, future scope of our high range ALU is discussed.

II. LITERATURE REVIEW

In [1], researchers worked on thermal aware design of Vedic multiplier with LVCMOS IO Standards. We are also designing thermal aware ALU design but with IEEE 802.11 Wi-Fi Standards. There are only 16 arithmetic and logic functions in global res*et al*U [2]. But, we have enhanced the functionality of ALU and our function count reaches to 32.

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Different I/O Standard Based Wi-Fi Enable 32-bit ALU Design on 90nm FPGA

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***Abstract*—In this paper, we have tried to make energy efficient ALU on 90nm based Virtex-4 FPGA using different I/O standards, as with the scaling of technology power dissipation has become a major concern for high performance ALU design. As 50% of the total power of ALU is dissipated only in clock and I/O pads, hence in order to make it energy efficient clock gating technique is introduced and the analysis of power dissipation has taken on different I/O standards. It is Wi-Fi enable because we are operating our ALU on frequencies of different IEEE. We are analyzing the value of power dissipation using different I/O standards and on different Wi-Fi channel frequencies. We are achieving reduction in total power dissipation to 95.13% with LVCMOS15 and 95.18% with LVDCI_15 and after introducing Clock Gating we are achieving reduction in total power dissipation to 95.35% with LVCMOS_15 and 94.99% with LVDCI_15.**

Keywords*—IO standard, Clock Gating, 90nm based FPGA, Wi-Fi enable

I. INTRODUCTION

All the arithmetic and logical operations, which are executed in central processing unit is done by ALU (Arithmetic Logical Unit). It performs operation on 2 inputs and generates a signal output. And the operation which is to be performed is selected by the select lines. Here we are using 32-bit ALU, which performs arithmetic and logical operation out of 32 operations selected by 5-bit select line, on two 32-bit inputs and generates a 32-bit output as shown in Figure.

We are using different I/O standards on 90nm based Virtex-4 FPGA to analyze the minimum power dissipation. I/O standards match the impedance of line, port and device in FPGA in order to avoid transmission line reflection. We are also introducing Clock Gating technique which is power saving technique. Clock Gating switched off the module which is not active by introducing a gate and hence increases the efficiency of the targeted device. Here we have used Latch free clock gating technique. In latch free clock gating technique we use "AND" or "OR" gate for gating the clock signal in sequential circuits as shown in Fig. For negative edge triggered sequential circuit "AND" gate is used and for positive edge triggered sequential circuit "OR" gate is used. After analyzing we had seen our device is Wi-Fi enable because it is reliable to operate on Wi-Fi channel 802.11 frequencies that is at 0.9GHz which is an estimated ah channel, 2.4GHz which is b and g channel, 3.7GHz which is a channel, 5GHz which is ac channel, and 60GHz which is ad and estimated ay channel of Wi-Fi. By doing the analysis of power dissipation at different IO standards, variation in power dissipation at different frequencies is found. The variations in values due to change in frequency is because of the direct relation of power dissipation with capacitance, frequency and square of voltage (Fig. 2).

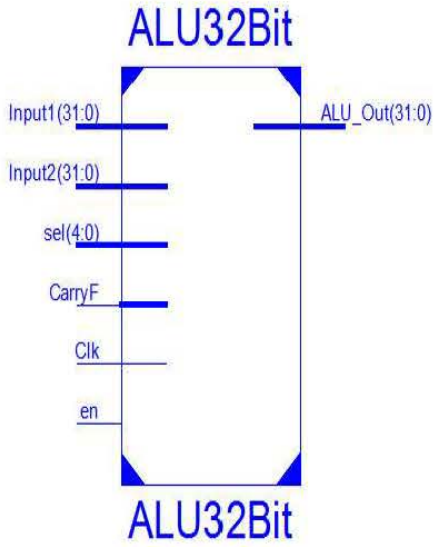

Fig. 1. Top Level Schematic of 32-bit ALU

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An Application of SVM in Character Recognition with Chain Code

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***Abstract*—Artificial intelligence, pattern recognition and computer vision has a significant importance in the field of electronics and image processing. Optical character recognition (OCR) is one of the main aspects of pattern recognition and has evolved greatly since its beginning. OCR is a system which recognized the readable characters from optical data and converts it into digital form. Various methodologies have been developed for this purpose using different approaches. In this paper, general architecture of modern OCR system with details of each module is discussed. We applied Moore neighborhood tracing for extracting boundary of characters and then chain rule for feature extraction. In the classification stage for character recognition, SVM is trained and is applied on suitable example.**

Keywords—OCR, SVM, chain rule, Moore neighborhood tracing, feature extraction

I. INTRODUCTION

In Optical character recognition (OCR), Visual data of text (videos, images, scans, etc.) is converted into machine-encoded character information by using numerous techniques. OCR is considered as a major technique for computerization of text from a handwritten, printed or typewritten text. Main use of computerization of text are text-to-speech translation, machine translation, biometrics, electronic data searching, text storage optimization, identification, data mining, etc [1].

One of the early OCR was used to help blind people. In this, a handheld scanner was developed which moved across any text, produces tone corresponding to scanned text. Even before that, the OCR was designed for telegraphy. The first OCR system designed to detect characters and create standard telegraph code with the audio support. Now a days OCR system are used in a very routine manner. Almost every scanner manufacturer provides support system to convert scanned document into various other formats viz. PDF to word, jpeg to word etc [1], [2].

In OCR system, its performance is highly dependent on the type of text of scanned documents. In general, text can be categorized in three types of text i.e. handwritten text, printed text and typewritten text. Printed and typewritten text are more predictable for any OCR system and can be read in a more precise manner attributing to the fact that they represent the combination of a finite number of different characters. Characters can be of different fonts depending on the properties of printer or typewriter. Variations of character forms depending on the font change are not critical: every font preserves basic structure of the character. So, any character can be found in various different forms. While handwritten text may have infinite number of forms depending on the handwriting of the person. This leads to a less accurate result in recognition of handwritten than printed and typewritten text [3].

In this paper we propose an algorithm which works on basis of the feature recognition based OCR. The proposed algorithm extracts details about the lines or curves which the alphabet is made of, and then based on the extracted details, it takes a decision about the alphabet in the image. Moore neighborhood used for boundary extraction and then chain rule is used for extracting features of characters. Here we use databases to compare with the image alphabets then training done by SVM mechanisms.

OCR system consist major five steps namely document scanning, pre-processing, segmentation, feature extraction, classification and recognition. These steps are discussed one by one in detail in the next section.

II. THE PROPOSED METHOD

This section describes the major steps of OCR system and the proposed recognition system. The main diagram of the proposed system is shown in Fig. 1

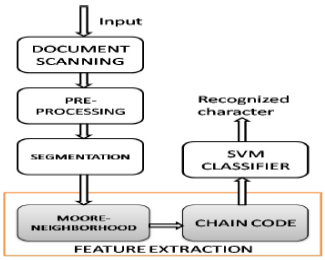

Fig. 1. Proposed OCR System

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GLCM Based Analysis of Combustion Flame Parameters Using Edge Detection of Flame Radiation Images

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***Abstract*-Monitoring and analysis of industrial flames is becoming progressively important to achieve comprehensive understanding and successive optimization of combustion process. This is becoming increasingly a prominent research field in order to increase combustion efficiency and to decrease toxic pollutant emissions. Now, in recent years, with the arrival of digital image processing techniques, CCD (Charge Coupled Device) or vision based analysis, the characterisation of combustion flames have been developed. This paper presents GLCM (Gray Level Co-occurance Matrix) based two-dimensional (2D) imaging technique to measure various geometric & luminous parameters from the radiation images of a pulverized coal flame. LBP (Local binary Pattern) based edge detection of red color component of radiation images at different temperatures is carried out. With the help of GLCM of radiation gray scale images, various statistical image features are calculated & correlated with certain flame parameters. Experimental results provide a visual inspection to predict flame parameters variation with respect to the temperature through the analysis of statistical features of the image.**

Keywords- combustion; geometric; GLCM; luminous; statistical

I. INTRODUCTION

In many countries, maximum part of the used electrical energy is generated through fossil fuel power stations. These power stations burns fossil fuel such as coal, petroleum, or natural gas to produce electrical energy. The burning of a fossil fuel in the presence of an oxidant usually atmospheric oxygen is called combustion process. Although environment pollution, problems related to health, increasing cost of the fuel are some non beneficial facts which are related to combustion process, but its dominance in near future cannot be ignored. In such combustion process, excellent operating conditions are required to minimize CO_2 and other toxic byproducts emission. It is possible to obtain desirable optimal conditions if the quality & performance of combustion process could be analyzed properly. Instantaneous information about the combustion efficiency is provided by a flame, which is a central reaction zone of any combustion process.

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Therefore, flame monitoring i.e. flame parameters analysis is necessary to get in-depth interpretation of fuel required for a pollutant free combustion process.

A number of techniques are widely used in many power generation & thermal industries for flame monitoring [1-3]. Techniques based on ultraviolet & infrared are generally flame failure detectors. Some flame diagnostic methods have been developed as in [4] for the proper operation of the boiler but unable to provide an elementary information due to lack of suitable sensing techniques. Earlier methods like two color or multicolor pyrometry, thermocouples, thermistors, etc are used for flame analysis by measuring the non contact temperature [5-7]. However, these pyrometers do not measure accurate particle temperature of high emissivity flame. Optical fiber sensor probes as in [8, 9] have also been used but these probes can measure only single point temperature when they are properly inserted in the combustion region. Proper depiction & continuous monitoring of flames become feasible with the advent of image based or visualization based systems. In digital imaging, flame monitoring is done by extracting certain geometric parameters (shape, size & location), luminous parameters (brightness & non uniformity) and thermodynamic parameters (flicker & temperature). Many researchers explored pulverized coal flames by acquiring a flame image with the help of CCD cameras [10-12].

Edge detection can be proved a crucial image preprocessing step before flame features extraction if edges could be detected clear and continuous. In general, edge detection act as the foundation in almost all the applications of digital image processing. Edge detection is done at the preprocessing stage to reduce the time taken to simulate data and computational complexity. This is one of the reasons that why flame edge detection is necessary before parameters extraction. Instead of complete flame image, only flame edges are considered. Other reasons include elimination of background noise & calculation of various parameters significantly.

In this paper, flame radiation edges at different temperatures are detected through LBP and thresholding approach [13].

Performance Analysis of Current Starved VCO in 180nm

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***Abstract*—This paper depicts a comparative study of different topologies of Current Starved Voltage Controlled Oscillator (CS-VCO) of (3-stage, 5-stage and 7-stage) on the basis of power dissipation, phase noise and centre frequency parameters with the variation in number of inverter stages. This comparative analysis observe that the power dissipation can be reduced up to 28.53% for 3-stage topology w.r.t. 5-stage topology and can be reduced up-to 36.89% w.r.t. 7-stage topology of VCO. In such context a design methodology for robust and optimal current starved VCO is implemented. The circuit performance is validated using 0.18µm CMOS Technology.**

***Keywords*—PLL; CMOS; CSVCO; P-Noise; PSS; LPF**

I. INTRODUCTION

VCO is an essential part for wireless communication system. The designing of such kind of VCO involves many trade-offs among power dissipation, oscillation frequency, phase noise and switching speed. So for a designer it is important to evaluate all these parameters accurately. For designing the modern IC's, it is important to construct the VCO of low power dissipation. In this contrast, an effective method to reduce the power dissipation is by reducing power supply voltage.

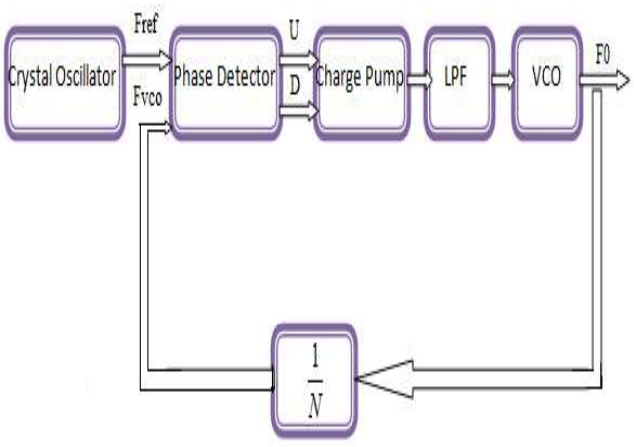

Fig.1. Basic Block Diagram of PLL

Phase Locked Loop (PLL) plays a crucial role in many electronic communication systems which consists of phase detector, low pass filter (LPF), charge-pump, voltage controlled oscillator (VCO) and a divider circuit as shown in figure 1 [1], [2], [12].

VCO is one of a major block of PLL system operates at high frequency. Low power VCO design is important for PLL design with reduced power. There are basically two types of VCO which is widely used in nature: LC oscillator and ring oscillator or current starved VCO. LC oscillator shows better phase noise performance but occupies large area due to on-spiral inductor winding which is undesirable for design cost and also the tuning range is less or limited for LC-VCO while for CS-VCO, the phase noise performance is not too good as compared to LC-VCO but the tuning range is much large and also the area occupied by CS-VCO is very less [3], [4]. The wide tuning range produced by CS-VCO is helpful to overcome the variation in the process. The main motivation behind the design of such kind of several stages CS-VCO is to reduce the power consumption, area occupied by the PLL and to reduce the phase noise performance for PLL circuit as well. Two types of noise are in nature: first one is long term jitter which is generated due to deviation over time in the output clock edge from those of an ideal one which is perfectly periodic and other one is periodic jitter which is due to variation over time in the output clock period [9], [5]. VCO is an important part for many RF transceivers for frequency selection and signal generation. PLL dependent RF transceivers require programmable carrier frequency. PLL generally has less precise oscillator in feedback path which is a function of control voltage at the input. For ideal voltage-controlled oscillator, there is always a linear relationship in the controlled voltage and oscillation frequency. Most of the application requires tunable oscillator [17].

In this paper, 3-stage, 5-stage and 7-stage CS-VCO is designed with the variation in inverter stages. It is observed that 3-stage CS-VCO consume less power for proper circuit operation as compared to other two configurations because according to the relation, oscillation frequency is inversely proportional to the number of inverter stages. So according to that relation for 3-inverter stage CS-VCO, the oscillation frequency will be high as compared to other two CS-VCO configurations (5-stage and 7-stage) because the number of inverter stages in 3-stage CS-VCO is less as compared to 5-stage CS-VCO and 7-stage CS-VCO. It is advantageous to

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Design of Power Optimal, Low Phase Noise Three Stage Current Starved VCO

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***Abstract*—This paper presents a method for designing of low power dissipation, low phase noise and high oscillation frequency based three stage Current Starved VCO (CS-VCO). In this design approach, 3-inverter stages are cascaded to achieve an optimal power dissipation of (7.48508 mW) for fundamental frequency of (3.9955 GHz). The simulation results depict that such VCO has linear voltage-frequency characteristics over a wide tuning range. The circuit performance is validated using 0.18µm CMOS technology. The analysis also shows that for 3-stage CS-VCO, the phase noise is -80.17dbc/Hz @1MHz offset frequency and -105.31dbc/Hz @10MHz offset frequency.**

Keywords—PLL; CS-VCO; CMOS; Low Power; Phase Noise; Oscillation Frequency; dbc/Hz

I. INTRODUCTION

Phase Locked Loop (PLL) is an important part in modern transceivers for wireless communication. VCO is one of a crucial component in PLL which itself plays a key role in many transceivers. In the present scenario the most important thing which has major concern is the ability of VCO to perform with reasonably low power dissipation, high oscillation frequency and low phase noise performance [13]. There are mainly two types of VCO: LC- VCO and Current Starved VCO or Ring VCO. In case of LC-VCO, better phase noise performance is gained but due to spiral inductor in the design it occupies a large area which is the point of concern. Also such kind of VCO is suitable for narrow range of frequencies, not for wide range [3]-[5].

In this paper a CS-VCO of 3-stage is designed to overcome the problems occurred in LC-VCO. Three-stage means 3-inverter stages which are cascaded to produce high oscillator gain at the output with high oscillation frequency. As we know that the oscillation frequency is inversely proportional to number of inverter stages (N). So when number of stages is reduced the oscillation frequency will get increased. Here in this context the number of stages are three (N=3). So the main advantage of using 3-stage VCO is that the oscillation frequency produced at the output will be increased due to reduced number of stages as compared to higher order stages, also power dissipation is reduced with improved phase noise performance. This architecture requires less number of transistors, occupy less area with cost effective performance [1], [2], [12].

The oscillation frequency is achieved at the output according to the variation in the controlled voltage at input of the VCO. PLL design consists of phase detector, low pass filter (LPF), charge-pump, voltage controlled oscillator (VCO) and a divider circuit as shown in figure 1 [16]. This paper is divided into four sections: Section II: describes the architecture of 3-stage (CS-VCO) and its test circuit, Section III: describes design equations for the sizing of (CS-VCO) transistors, In Section IV: Simulation results are shown, finally Section V: draws the conclusion.

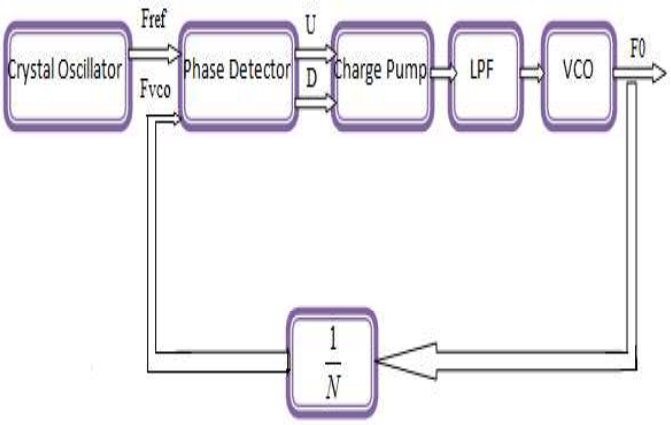

Fig.1. Basic Block Diagram of PLL

II. CIRCUIT DESCRIPTION

Figure 2 shows the schematic of three-stage (CS-VCO). In this design approach, the MOSFETs placed in the middle stages behave as different inverter circuits connected in cascaded manner. The MOSFETs (M1) and (M4) of VCO circuit behave as current sources. The role of current sources is to limit the current available at inverter stages or in other words we can say that inverter is current starved. For MOSFETs (M0) and (M3), the drain current is same and is produced by the control voltage at input side. Currents in MOSFETs (M0) and (M3) are mirrored for each inverter

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Characterization of 6T CMOS SRAM in 90nm Technology for Various Leakage Reduction Techniques

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***Abstract*—As the scale down the feature size of transistor, leakage important factor .One of the major area where leakage is effective memory to reduce the leakage power in memory. In memory to reduce the leakage dissipation there are different types of technique were used in 6T Static RAM. The technique that can be implemented includes gated Vdd, Source basing, Sleep stack and MT-CMOS the technology used for 6T memory is 90nm using Tanner Tool_V13.0_LND.**

Keyword- Gated Vdd, leakage power, MTCMOS, source biasing, sleep stack, 6T static RAM.

NOMENCLATURE

SRAM	Static random access memory
DRAM	Dynamic random access memory
6T	Six transistor SRAM bit-cell
BL	Bit line
BLB	Bit line bar
WL	Word line bar
PMOS	P-Channel metal oxide semiconductor
NMOS	N-Channel metal oxide semiconductor
Vth	Threshold voltage

I.INTRODUCTION

The ever-more increasing the necessity for huge data storage ability has driven the fabrication technology. Maximum data storing capacity in single chip double every year[4]. In semiconductor memory that can be classified as the level of data stores and access .Memory basically allow to modified stored information (writing) of data and retrieval (reading) on requirement, there are two categories (i) Volatile and (ii) non volatile Memory) [2].

The widest example of volatile memory is RAM and ROM is the widest example of non volatile memory. Volatile means data stored in present of supply and in the absence of the Supply, data to be stored.RAM (Random Access memory).

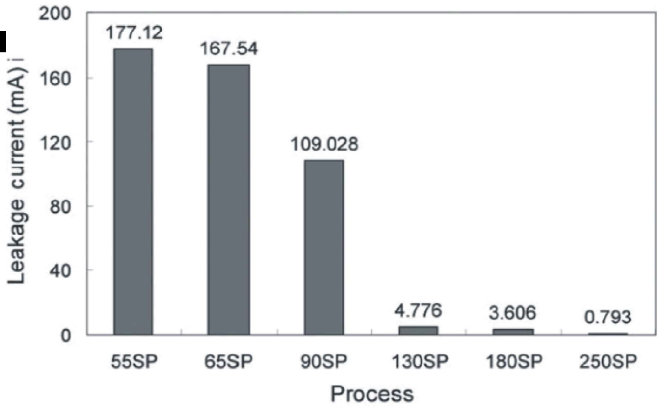

Fig. 1. SRAM leakage current with technology scaling [1].

II NECESSITY OF LOW POWER

As the requirement of portable devices in the market (cell phones, laptop, pacemakers, wristwatch etc.)that depends upon battery-life and battery life is related to the power dissipation. Most of the factor no. of transistor increased that support Moor's low .there are different –different sources of dissipation of power[4].In digital systems, first is dynamic and second is the static power dissipation, in dynamic short and switching power dissipation .In static dissipation there are no. of leakage includes Subthreshold, reverse-biased diffusion leakage current. During logic transformation of charge and discharge of capacitance in dynamic ,power dissipation is directly related to the voltage level of supply .

$$p_{switching} \quad \alpha \quad Vdd^{2} c_{load} f \qquad (1)$$

Second power dissipating source is short circuit power that directly flow from Vdd to the GND while nMOS and pMOS n/w works simultaneously.

$$P_{shortckt} \quad Vdd * I \qquad (2)$$

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Documents

Chauhan, A., Chauhan, D.S., Sharan, N.

Reliable techniques of leakage current reduction for SRAM-6T Cell: A review

(2016) *Proceedings of the 10th INDIACom; 2016 3rd International Conference on Computing for Sustainable Global Development, INDIACom 2016*, art. no. 7724664, pp. 2251-2254.

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Abstract
Feature size of the transistor is shrinking by the rapid progress in semiconductor technology in deep sub-micron (DSM) technology. At the present time; these days's leakage power is more important in hardware's and microprocessors. Memory contains large number of transistor in advanced computer system. Mainly the leakage dissipation is directly related to the no. of transistors. As technology scaling static random memory in standby leakage power is becoming one of the more important concerns for low power application. In this paper we have study of different leakage components of sram cell and some leakage reduction techniques like Gated Vdd, MTCMOS, transistor stacking, source biasing and negative word line scheme approach to optimizing low leakage in sram memory cell. © 2016 IEEE.

Author Keywords
Gated Vdd; Leakage component; MTCMOS SRAM; Source biasing; Transistor stacking

Index Keywords
CMOS integrated circuits, Leakage currents, Semiconductor device manufacture, Static random access storage, T-cells; Deep sub-micron technology, Gated Vdd, Leakage components, Leakage current reduction, Leakage reduction techniques, Semiconductor technology, Source biasing, Transistor stacking; Transistors

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A Designing of Random Access Memory Using Different IO Standard Technology

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ABSTRACT
In this work, we proposed simulation of RAM memory using different IO Standard technologies on 28nm feature size FPGA. LVTTL and Mobile-DDR IO standard is used for designing RAM circuit, power consumption by this Memory has been calculated by applying two different technologies i.e. Mobile-DDR and Low Voltage Transistor- Transistor Logic. Both IO Standards are compared with each other to find out the most power efficient one. We validated our circuit with different IO Standards and on Different frequency range to obtain a most power efficient circuit. In our work, there is 28.05% power reduction when LVTTL is replaced with Mobile-DDR on 1 GHz frequency and 47.93% power reduction at 4GHz operating frequency. To design this energy efficient memory circuit, we are using Verilog as HDL, Xilinx ISE 14.2 simulator with Artix-7 FPGA.

Keywords
FPGA; IO Standard; RAM; LVTTL; Mobile-DDR; Low Power.

1. INTRODUCTION
In now a day under the world of VLSI there is trend of Low power VLSI. Selecting the more power efficient family among the various different families plays key role to develop a most efficient circuit. These various families of IO Standard having different IO configuration such as Single ended stage, differential configuration, push pull configuration etc [15]. every IO standard has specific range of operating voltage as well as operating frequency, so according to particular application one can select easily IO Standard. As there is trend of low power VLSI, means low power consumption, size of device is to be compact, VLSI Engineer is interested reducing the size of transistor, according to Moore's law [12]. Xilinx provides various FPGA's that are basically differing by feature size such pas Artix- 7and Kintex-7 FPGA (28nm), Spartan-6 FPGA (45nm), Virtex-6 FPGA (40nm), Virtex-5 FPGA (65nm), Spartan-3 FPGA (90nm) etc. All Xilinx FPGA contains CLB's, IOBs, PI, RAM blocks and other resources such as buffers, dedicated multiplier, Global clock buffer etc [7].

In this paper, our design is implemented on family Arttix-7 having feature size of 28nm FPGA using LVTTL and Mobile-DDR IO Standard. Artix-7 family of FPGA supports various family of IO standard like HSTL, LVCMOS, and SSTL etc. The motivation behind this work is to realize a most energy optimized designing of circuit to save the energy. In order to get the better performance in device and also lower cost and area, manufacturer scale the geometry of IC [9]. During scaling manufacturer must remember one thing with each reduction parameters of IC [13]. Under the shadow of the electronics industries day by day as the semiconductor technology is booming. LVCMOS supply voltage and interface standards for decreasing voltages have been defined by JEDEC. The basic memory element holds the data; Memory can be volatile or Non-Volatile in nature. 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 writes operation quickly [8].

Depending upon how exactly the data is stored in RAM, the RAM can be broadly classified into 2 types.

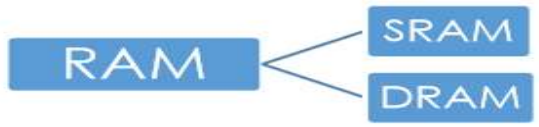

Figure 1 Classification of RAM

SRAM is a kind of static memory while DRAM is kind of Dynamic Memory. SRAM uses bunch of flip-flops for storing data, so data stored in binary form [14]. while DRAM stores data in form of charge i.e. by using transistor and capacitor. For storing single bit of data SRAM uses 6 transistors while in case of DRAM for storing single bit it uses 1 capacitor and 1 transistor, so SRAM is costly then DRAM [11].

2. NOMENCLATURE

IOB	Input Output Block
CLB	Common Logic Block
IO Standard	Input Output standard
PI	Programmable Interconnects
Mobile-DDR	Mobile- Double Data Rate
LPDDR	Low Power Double Data Rate
SSTL	Stub Series Terminated Logic
HSTL	High Speed Transciever Logic
HSUL	High Speed Unterminated Logic

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***Abstract* — This paper contains designing of energy efficient memory circuit using two different IO standard i.e. LVTTL and Mobile-DDR on 28nm (Artix-7) Field Programmable Gate Array. We are using Xilinx ISE simulator version 14.2, Verilog hardware description language and Artix-7 FPGA. The design has been tested at different operating frequencies of Latest Intel processor that are at Intel I-3, Intel I-5 and Intel I-7 to check the compatibility of the design with processors available in the market and to find most efficient IO standard at different operating frequencies.**

Keywords – ROM, Power Efficient, Low Power, LVTTL, Mobile-DDR, FPGA, IO Standard.

I. INTRODUCTION

In VLSI industries designing of any circuit the aim is behind that is to make circuit with faster speed, less power consumption, more efficient and also today there is trend of Low Power VLSI. The Selection of best IO standard is very essential to design any digital circuit. Digital circuit may be combinational circuit or sequential circuit. The aim behind choosing the IO standard for designing any digital circuit is to save power consumption of circuit in our work, we implemented Read Only Memory (ROM) circuit design on 28nm Family Artix-7 FPGA using Low Voltage Transistor-Transistor (LVTTL) and Mobile Double Data Rate (Mobile-DDR) Logic family of IO standard. Artix-7 FPGA supports various family of IO standard like HSTL, HSUL, SSTL, LVCMOS, Mobile DDR and LVDCI. Artix-7 FPGA requires very less input power and result into very high performing circuit. Mobile DDR (mDDR) is also known as LPDDR (Low Power Double Data Rate). Normally LVTTL operates in three different operating voltages that are first is 1.8-V LVTTL, which defines DC parameters for low voltage and high speed digital circuits. Second is 2.5-V LVTTL, which also defines DC parameters for same as 1.8-V LVTTL. And third is 3.3-V LVTTL, which also defines DC parameters for same as 1.8-V LVTTL and 2.5-V LVTTL but here the voltage range is from 3.0V to 3.3V driving or driven by Digital Circuit. These three ranges are also shown in figure-1.

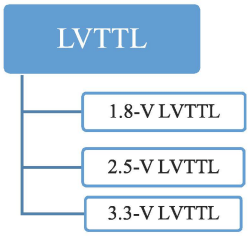

Figure 1: Different LVTTL Operating Voltage Region

In our design we implemented our logic on a ROM chip. ROM stands for "Read Only Memory". It is Nonvolatile memory which means data will not be lost after switching off the system or supply as the name suggest Read Only Memory, we can't write, can only read. ROM is classified into basically 3 categories which are shown in Figure-2.

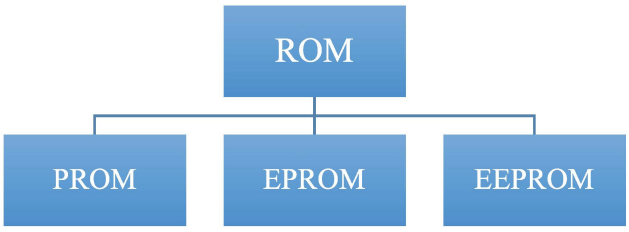

Figure 2: Classification of ROM

PROM stands for "Programmable Read Only Memory" in which is programmed at the manufacturer end and it can't be erased or programmed at user end. EPROM stand for "Erasable Programmable Read Only Memory "in which we can erase the data by use of UV rays. EEPROM stands for "Electrical Erasable Programmable Read Only Memory" this type of memory is erased with the help of electricity. ROM has potential to use in the software defined radio [7]. In our work we are using Artix-7 Family with LVTTL and Mobile-DDR IO standard FPGA. And we tested our ROM circuit at two temperatures with operating frequency of 2.0 GHz, 2.1 GHz, 2.5GHz, 2.9 GHz, 3.1GHz and 3.5 GHz. these frequencies are of INTEL processors that are of Intel-I3, Intel-I5 and Intel-I7 latest processor.

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Simulation And Verification Of Voltage And Capacitance Scalable 32-bit Wi-Fi ah Channel Enable ALU Design on 40nm FPGA

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***Abstract*-In this paper, Wi-Fi ah channel enable 32-bit ALU on 40nm based Virtex-6 FPGA is designed using voltage scaling and Capacitance scaling. It is Wi-Fi ah channel enable because we are operating our ALU with frequency of 0.9 GHz which is the frequency of ah Wi-Fi channel estimated to be released in 2016 . We are analyzing effect of Voltage scaling and capacitance scaling which are two of the different factors responsible for variation in power dissipation. We operated our ALU at 0.9 GHz at different voltages by also using capacitance scaling. Then we also analysed our design to work on different voltages irrespective of capacitances. In this Verilog is used as Hardware Description Language and XPower Analyser for Power calculation and Xilinx ISE Design Suite 14.2 as simulator.**

Keywords- Voltage Scaling,Capacitance Scaling,40 nm FPGA,simulation,Wi-Fi enable,Wi-Fi ah channel.

I. INTRODUCTION

ALU also called as math-coprocessor is a basic element used in central processing unit.(CPU).We designed and verified a 32-bit ALU with 32 different logical and arithmetic operations. We made use of logical operations like NOT, OR, AND, NAND, XOR, NOR and basic arithmetic operations to make our ALU work with 32 different operations.

Fig.1: Different Operations Of ALU

We scaled our design for different voltages: 0.5V, 0.8V, 1.0V and 1.2V and for different capacitances: 5pF, 15pF, 25pF, 35pF, 45pF.

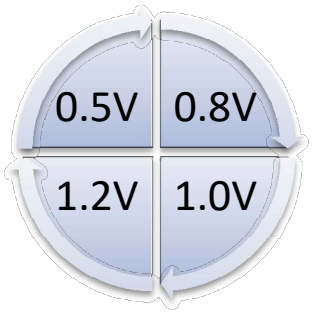

Fig.2:Voltage Scaling

And power analysis based on voltage and capacitance scaling is done it is observed through analysis that power dissipation has a direct relation with capacitance and voltage. We used frequency 0.9GHz throughout our analysis which is the estimated new Wi-Fi standard called ah standard estimated to be released in 2016.

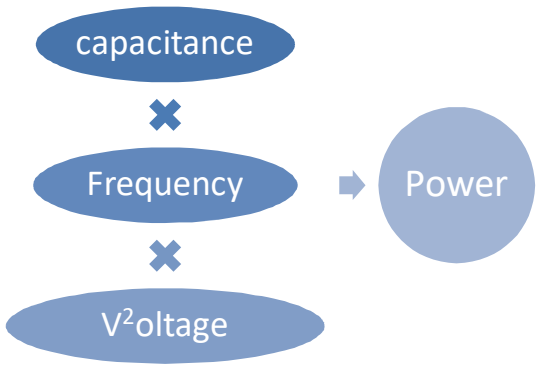

Fig. 3: Components Responsible For Power Dissipation

Above relation in Fig.3,was verified by doing power analysis using voltage and capacitance scaling for ah band. Output load

Stacked Transistor Based Multimode Power Efficient MTCMOS Full Adder Design in 90nm CMOS Technology

Sneha Solanki, Anjan Kumar and Richa Dubey

***Abstract*—High rate of power consumption in the digital integrated circuit is the major field of concern in the development of VLSI circuits. Demand of higher speed, multiple operations and smaller process geometry contributes in the leakage power. So today leakage power consumption is the most important source of power dissipation rather than run time power consumption. Previously many techniques have been proposed for the leakage reduction. Amongst all MTCMOS technique carries the property of being most efficient in leakage reduction. In this paper we are going to analyze the different types of low power adder circuits with different types of low power design methodologies. The comparison results have also been displayed in this paper. The circuits are simulated in 90nm CMOS technology using tanner EDA simulator.**

***Index terms*—Active mode, Combinational circuits, Leakage current, Multi-threshold voltage CMOS, Standby mode, Threshold Voltage**

I. INTRODUCTION

VLSI industry in the recent years suffers from the critical challenge in the management of power consumption. With the scaling down of the CMOS the supply voltage and threshold voltage is scaled down respectively. Leakage current has an inverse relationship with the threshold voltage the more and more threshold voltage is scaled, more is the leakage power dissipation [1].40% of the total power consumed by the device in active mode is dissipated by the leakage current [1]. With the aggressively scaling down of CMOS and need of multiple operations we are putting more and more transistors on a chip. With this increasing transistor density the leakage current dominates the total power dissipation of the chip. On the other hand leakage current is the only source of power dissipation when device is in standby mode.

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In portable device leakage current need to be managed as it directly affects the battery life of the device. Leakage needs to be reduced for the longer battery life. There are several leakage components which overall result in leakage power dissipation. The Leakage components in the deep submicron technology are depicted below in the figure.

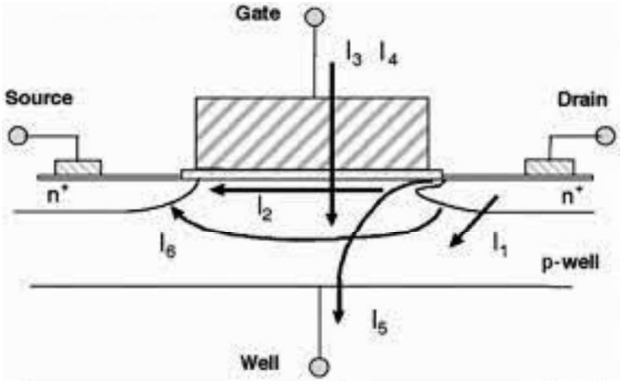

Fig. 1. Leakage components in the deep submicron transistor

I1= Reverse bias p-n junction diode leakage
I2= Sub threshold leakage current
13= Gate oxide tunneling current
14= Hot-carrier injection current
I5= Gate induced drain leakage current
I6= Channel punch-through

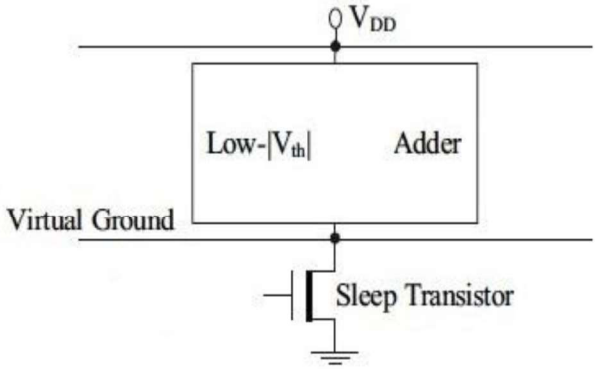

Fig. 2. MTCMOS Technique (Dark Line shows High Vth)

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A Low-Voltage, Low-Power Bulk-Driven Mixer using 0.18 μm CMOS Technology

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***Abstract*—A low voltage, low power CMOS down-conversion mixer is presented for Ultra-wideband (UWB) systems. The proposed mixer is designed for a 3.35 GHz input RF signal and 250 MHz output IF signal in 0.18µm CMOS technology and simulated using Advanced design system (ADS) software. The proposed mixer is based on the conventional Gilbert cell architecture with bulk driven technique. Two element LC matching topology is used at the LO switching stage to improve the performance of the mixer. The proposed mixer exhibits maximum conversion gain of 7.10 dB, double side-band noise figure (DSB NF) of 2.5 dB, IIP3 of -2.2 dBm, 1 dB gain compression point of -20.6 dBm. The power consumed by the circuit is 0.195 mW at a DC supply of 1V.**

Keywords— Down-Conversion Mixer, UWB, CMOS, Gilbert Mixer.

I. INTRODUCTION

In 2002, the FCC formally approved the UWB technology with official authorization for unlicensed use of spectrum. UWB spectrum has bandwidth of 7.5 GHz from 3.1-10.6 GHz frequency band and its output power for transmitting the signal is limited to -41.3 dBm/MHz [5]. UWB is peculiarly suitable for indoor dense multi-path places such as high-performance wireless access and defense communication applications.

The paper is structured as follows. Proposed mixer circuit is discussed in section II. Simulation results are presented in section III and conclusion is provided in Section IV.

II. CIRCUIT DESIGN

In mixer design, double balanced Gilbert cell mixer is preferred as a core of many mixers due to benefits, such as higher linearity, reduced even order distortion and decent port to port isolation. The basic double-balanced CMOS Gilbert cell mixer has three stacked stages namely RF trans-conductance stage, LO switching stage and output load stage as given in Fig. 1 [10].

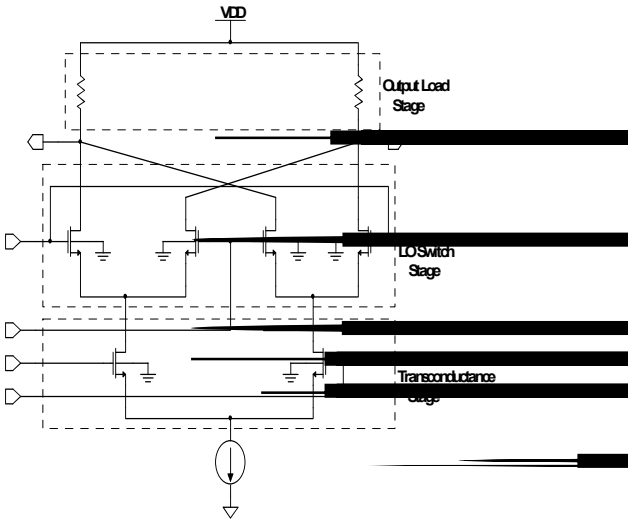

Fig.1. Schematic of conventional double balanced CMOS Gilbert cell mixer [10]

RF and LO stages are operated in saturation region to provide higher gain and as a result power consumption increases. One of the issue with basic Gilbert cell mixer is that it has low voltage headroom across the output load stage. To increase the voltage headroom and to reduce power consumption, the bulk-driven technique can be used which allows the RF trans-conductance and LO switching stages of the core of basic Gilbert mixer to be merged to a single stage, consisting of only four transistors, as shown in Fig. 2 [11]. Bulk-driven technique lowers the threshold voltage, therefore, the condition of $V_{GS} > V_T$ is relaxed [14].

Input RF signal is applied to the bulk terminal of the LO switching stage transistors to regulate the threshold voltage, and turn the transistor ON and OFF [7]. Local oscillator (LO) signal is applied to gate terminal of LO switching transistors while the output IF signal taken out from the drain. The bulk driven mixer uses the bulk terminal of the switching stage transistors as the RF signal input, as a consequence, number of stack stage transistors are reduced and therefore requirement of bias voltage supply is reduced [6, 13].

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A High Gain Down-Conversion Mixer in 0.18um CMOS Technology for Ultra Wideband Applications

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Abstract— In this paper, a high gain as well as highly linear down-conversion mixer is presented for UWB applications. The proposed mixer circuit is implemented and simulated in a 0.18µm CMOS technology using Advanced Design System (ADS) software. The core of the proposed mixer is based on the Gilbert cell (double-balanced) mixer with source degeneration (inductive) at the RF driver stage and the inductors between the RF (or driver) stage and the LO (or switching) stage. An LC type impedance matching network is employed at the RF port to minimize reflections at RF port. The mixer circuit is designed for a RF frequency of 3.35 GHz, LO frequency of 3.60 GHz, and IF frequency of 250 MHz. The proposed mixer circuit achieves a conversion gain of 11.679 dB, an IIP3 of -1.536 dBm, 1dB compression point of -12.764 dBm and a single sideband noise figure of 5.460 dB while operating at a DC supply of 1.8V.

Keywords— Gilbert cell; trans-conductance stage; CMOS; down-conversion mixer; UWB.

I. INTRODUCTION

Ultra wideband (UWB) is a new attractive wireless communication technology which is used to transmit data over a huge bandwidth (>500 MHz). It fulfils the need of low-power, high-speed and short range wireless communication [6]. In February 2002, the Federal Communications Commission (FCC) opened up the licensed-free use of 7500 MHz spectrum in the frequency band of 3.1-10.6 GHz, known as the UWB frequency band [5].

An RF receiver is typically composed of many important blocks such as LNA (low noise amplifier), mixer and filter etc. Among all these components, the down-conversion mixer plays a vital role in wireless communication systems. The down-conversion mixer performs the multiplication of RF and LO signals to convert the RF signal into the IF signal [8]. The designing of mixer requires trade-off among its different performance parameters like conversion gain, noise figure, linearity, power consumption and so on [3]. The high gain mixers have the issues of low linearity and high power consumption while highly linear mixers suffer from the low conversion gain and degraded noise figure. Since the linearity of mixer affects overall linearity of the receiver, therefore, the designing of front-end transceivers require a highly linear mixer. A typical RF front-end is shown in Figure 1.

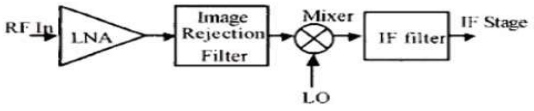

Figure. 1. RF Front-end

This paper proposes a down-conversion mixer with high gain as well as high linearity for UWB system. The rest of the mixer is summarized as follows: the Gilbert cell mixer and the proposed mixer circuit design is briefly described in section II. In section III, the simulation results are presented and finally, the conclusion is given in section IV.

II. CIRCUIT DESIGN

The most commonly used mixer topology is the Gilbert cell mixer which is shown in Figure 2. It is composed of mainly three stages: the trans-conductance stage which is formed by the bottom two transistors, the switching stage which is formed by the upper four transistors and the load stage. The trans-conductance stage is used to amplify and convert the RF voltage signal into the RF current. Then this RF current gets transformed to the load stage by using LO switching transistors and then the current of the loads generate the desired IF output voltage [3].

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Comparative Analysis of Digital Watermarking Techniques

Neha Bansal, Vinay Kumar Deolia, Atul Bansal and Pooja Pathak

Abstract In this paper various techniques used for digital watermarking such as least significant bit (LSB) technique, discrete cosine transform (DCT), discrete wavelet transform (DWT), and back propagation neural network (BPN) algorithm have been compared. These techniques are used to embed and extract a watermark of an image. The performance of these algorithms is evaluated using various parameters such as mean square error, peak signal-to-noise ratio (PSNR), and normalized correlation (NC). Parameters for each technique are compared for various noises like Gaussian noise, Poisson noise, salt-and-pepper noise, and speckle noise. Based on comparison it is suggested that BPN gives better result in terms of PSNR and NC.

Keywords Digital watermarking · Least significant bit (LSB) technique · Discrete fourier transform (DFT) · Discrete cosine transform (DCT) · Discrete wavelet transform (DWT) · Back propagation neural network (BPN) · Counter propagation neural network (CPN) · Normalized cross-correlation (NC) · Peak signal-to-noise ratio (PSNR)

1 Introduction

Digital watermarking is a method to prevent illegal copying of digital content as it can be copied and edited easily. Digital watermarking can be done in various ways. It can be done in spatial domain using least significant bit (LSB) technique. It can also be done in spectral domain using various transforms such as discrete fourier transform (DFT), discrete cosine transform (DCT), and discrete wavelet transform (DWT). Another method of digital watermarking is based on neural network.

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Sharma, T.N., Deolia, V.K.

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PREDICTOR BASED UNKNOWN NON-LINEAR DISCRETE TIME DELAYED SYSTEM USING SLIDING MODE CONTROL

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***Abstract*—Sliding Mode Control (SMC) technique has been used in an extensive manner in many practical applications especially in motion control systems. This paper investigates non-linear discrete time systems accommodating input delay. Firstly, input delay is removed by introducing a smith predictor that converts the original discrete system into delayed free version of the system and makes it solvable. Then, for an effective control "reaching law method" is used to design control law and construction of sliding surface for the delayed free system. The Chebyshev Neural Networks (CNNs) are used to approximate the unknown non-linearity. Simulation shows the robustness of the control scheme.**

***Keywords*- Chattering, Chebyshev Neural Network (CNN), Sliding Mode Control (SMC), Smith Predictor, Variable Structure Control (VSC).**

I. INTRODUCTION

There are various undesirable parameters in control engineering that degrades the system performance which results in the slight deviation from the equilibrium state of the system. Some of the undesirable parameters are parametric and non-parametric uncertainties, disturbance, non-linearity and time-delay. The main cause of time-delay is transportation lag. In industry, the material has to be transferred from place to place in course of operation and material transfer flow of liquid movement takes time. This is called transportation lag. The SMC has been proved to be robust under above non-linearity.

In early seventies, SMC has been studied and developed by [1]-[3] under the name "variable structure control" (VSC). The time-delay system's control problem has been studied by many researchers via predictor-based controllers [6]-[11]. With the introduction of predictor controller, the original system which has delayed input is converted into delayed free version of system and makes this control problem solvable [12]. In [11], a predictor has been used for balancing the time delay input and leading to the derivation of control law, thus, proving the existence of sliding mode. A delay dependent SMC is used for effective stabilization and has a reaching motion at $t_s > t_o + \tau$, where t_s is the reaching rate, t_o is the sliding mode's initial time and τ is an input time delay of the system. SMC is well established for both continuous time system as well as discrete time non-linear systems. It is insensitive to external disturbances, plant uncertainties [4] and parametric deviations [5]. Good transient response and fast response [13]-[14] are some attractive features of SMC. The chattering problem is more in continuous time SMC compared to discrete time SMC. It is not easy to directly implement discrete time SMC from the continuous time SMC.

Smith predictor [17] has been frequently used in continuous time for balancing an input delay by removing the time delay from the inner closed loop of the system. This paper uses discrete time predictor for balancing delay in input. A predictor helps in converting an original discrete time delayed input system into delayed free version of system and the new states known to be predicted states [17] of the constructed design of the control system. Then, the predictor based sliding surface is designed with the help of new predicted system's state. The designed control law has to assure the existence of system's trajectory on predicted sliding surface by taking help of Gao's reaching law [15]. The neural networks are

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Multi Carrier PWM and Selective Harmonic Elimination technique for Cascade Multilevel Inverter

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***Abstract*—This paper presents the multi carrier pulse width modulation (MCPWM) and selective harmonic elimination (SHE) technique for cascade multilevel inverter (CMI) to reduce the total harmonic distortion (THD) of the output voltage waveform. A comparison has been done between the SHE and MCPWM technique to show the advantage of SHE technique over the MCPWM technique. To find the accuracy of total harmonic distortion (THD) between the MCPWM and SHE technique is achieved by comparing the FFT based result for nine level cascade multilevel inverter.**

Index Terms*—*Cascade multilevel inverter, Multi carrier pulse width modulation, Selective harmonic elimination technique, Total harmonic distortion.

I. INTRODUCTION

MULTILEVEL inverters are one of the extensively studied research area of power converters. The multilevel inverter is used to produce sinusoidal voltage waveform from several levels of dc voltage. However, two-level voltage source converter incapable to get good system performance and efficiency such as optimum filter size, THD and losses. The improved performance and efficiency of high voltage system can be achieved by the use of multilevel inverter [1]. With increased number of levels in cascade multilevel inverter, the output voltage quality increases in terms of total harmonic distortion. Since, the number of levels increases, the intricacy of control schemes and voltage imbalance condition occurs.

Among the three commercial topologies of multilevel voltage source inverter such as : neutral point clamped, cascade multilevel inverter and, flying capacitor, use of CMI results in higher output voltage and power levels and are more reliable due to its modular topology [2].

The levels in a CMI are formalized as $k = 2s + 1$, where k defines the output phase voltage level and *s* defines the number of dc sources used in single phase. The use of multilevel inverters has a great enthuse to reduce of voltage stress on the switching devices [3], less harmonic distortion, producing of smaller common mode voltage, less electromagnetic compatibility problems and capable to produce higher voltage with reduced device rating.

The CMI is a good solution due to its modularity and simplicity in control mechanism. Fig.1 shows the basic structure of CMI, in which four cells are connected in series to get nine level of output voltage per phase.

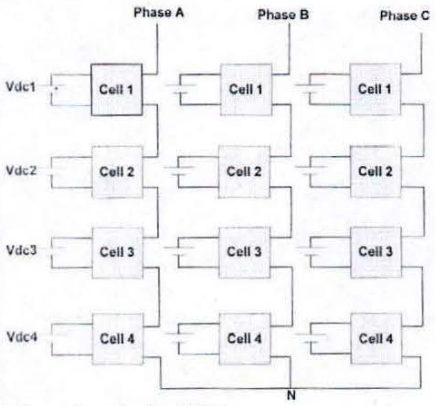

Fig.1 Three-phase nine-level CMI

II. CASCADE MULTILEVEL INVERTER TOPOLOGIES

There are various CMI configuration available for both single-phase and three-phase application as shown in fig.2. The single phase cascade half bridge is a one leg converter consisting of two switching element is used to produce two level output of the voltage source converter. The cascade H bridge inverter uses string of single phase full bridge inverter connected in series to construct multiple phase leg [4]. Cascade H bridge topology allows a low voltage rating of the semiconductor devices. The operating voltage and manufacturing cost plays a important role to decide number of power cells in cascade H bridge invverter. For instance, a nine-level inverter will use low rating

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On the Aspect of Feature Extraction and Classification of the ECG Signal

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***Abstract*—The electrocardiogram provides a physician with a view of the heart's activity through electrical signals generated during the cardiac cycle and measured with external electrodes. Because of the high mortality rates of heart diseases faithful detection and classification of ECG arrhythmias is essential for the treatment of patients in the clinics. Arrhythmia classification is one of the most important research domains of computer aided medical systems. The authors have made an exploratory investigation of the classification of ECG signal. DWT (Discrete Wavelet Transform) method has been used to determine the wavelet coefficients which were associated with five features. The features were ranked by using class separability criteria. The authors have established the Shannon Entropy as one of the most suitable features for the purpose of classification.**

Keywords: Feature, Classification, Rank, Arrhythmias, Wavelet Transform

I. Introduction

It is well nigh impossible to get accurate result for every biomedical signal recording while patient is diagnosed by medical monitoring equipment specially ECG. ECG signal gets corrupted due to external and internal interferences. Electrocardiogram is a well established diagnostic tool. Many algorithms have been developed for the detection and classification of the ECG signals [1]. A typical classifiaction task is to separate the healthy persons from disease patients. ECG signals need be classified by selected features which will provide faster and most cost effective predictions and a better understanding of the underlying process that generates data. ECG features can be extracted in time domain, in fequency domain or represented as statistical measures [2]. These methods show impressive results in some classification tasks, but they usually lack in discrimination power throughout all types of ECG beats. Wavelet transformation belongs to another category of methods.

II. Feature Extraction

The authors have employed wavelet-based feature extraction method because DWT (Discrete Wavelet Transform) provides good time resolution at high frequency and good frequency resolution at low frequency. It decomposes a signal into signals in different coarseness. Features extracted from wavelet coefficients depict the characteristics of the original signal in different details.

For our study 13 ECG records were selected [3]. These records contain 6 ECG beat types including the Normal beat (N), the Left Bundle Branch Block beat (LBBB), the Right Bundle Branch Block beat (RBBB), the Atrial Premature beat (APB), the Premature Ventricular Contraction beat (PVC) and the Paced beat (PB) (Table 1).

TABLE 1: TYPE OF ECG BEATS *VS.* RECORD NUMBER

Record No.	Type
103	N
107	PB
109	LBBB
111	LBBB
113	N
115	N
118	RBBB
119	PVC
124	RBBB
209	APB
217	PB
221	PVC
222	APB

It is well known that the QRS complex is one of the most important ECG components, in the sense that it is associated with electrical ventricular activation. The QRS complexes were segmented from the ECG data files as suggested by Yu and Chen [4]. Based on the R-peak position identified in the annotation file provided by the MIT/BIH database 64-point QRS segments centred at R peaks were extracted from the record. The DC value of each 64-point QRS segment was removed.

It was decided to initially use for empirical determination two level DWT decomposition where each QRS signal is decomposed into three sets of wavelet coefficients, high frequency detail coefficients D1, D2 and low frequency approximate coefficient A2 covering frequency bands 90-180 Hz, 45-90 Hz and 0-45 Hz respectively.

To limit the process of feature selection only five features namely Inter Quartile Range (IQR), Median Absolute Deviation (MAD), Shannon entropy, Energy and Variance were selected[5] and they were associated with each wavelet coefficient. Thus there are 15 features in total and they were ranked by the method of class separability criteria[6]. Ranking

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A Comparative Study of Control Techniques of Distribution-STATCOM under Abnormal Source Voltage

Mohit Bajaj *Student Member* IEEE, Chetan Bhardwaj and Mukesh Pushkarna

***Abstract*— The most important concern regarding a power system is the quality of its power. The main cause of most of the issues is nonlinear loads only. D-STATCOM has turned out to be a good solution to solve this problem because of its ability to compensate reactive power and harmonic components demand of the nonlinear loads. This paper presents comprehensive analysis of comparison the performance of five control techniques for reference currents extraction of D-STATCOM under balanced, un-balanced and distorted voltage condition. The algorithms to be compared are symmetrical components based algorithm, IRP theory, generalized IRP theory, SRF method, and synchronous detection method respectively those are widely used in D-STATCOM. These all algorithms have been simulated in Matlab/Simulink environment. The theoretical study and simulation testing shows the performance and accuracy of considered algorithms in case of balanced unbalanced and distorted source voltage conditions.**

Key words*— *Reactive current; Compensation current; Instantaneous Reactive Power; Detection; Harmonics; Reference Frame; Simulation.

I. INTRODUCTION

Present-Generation consumer appliance, with power electronic devices and µp-based controls, are very sensitive to quality of power with respect to conventional appliances [1]. The increasing importance of efficiency of distribution system has resulted in constant growth of use of devices for example drives of variable-speed motor and shunt capacitors connection for improvement of power-factor to minimize transmission losses [2-4]. Further this has given rise to bigger levels of harmonic on transmission systems and several researchers are worried about the future effect on capabilities of power system. Due to higher power and voltage conducting capacity of present power-electronics devices, their application is very common in industry and in domestic purposes also [5]. Although these benefits are surely good but such extreme usage of power-electronic based devices is a serious difficulty itself that is production of reactive power and current harmonics in the modern power system. Consequently, the voltage of several buses and PCCs of system networks is becoming distorted and the consumers connected to those PCCs are not being functioned as designed [6]. The too much VAR drawn by load results in greater than before transmission losses and greater than before utility charges due to poor power factor [7, 8]. DSTATCOM is implemented using smart circuits to detect the reactive power and harmonic components demanded by nonlinear loads then inject that itself in to the load after tracking so that it may not be supplied by the source [9]. After injecting tracked reference current at PCC, the ideal sine wave like source currents is obtained. Thus, together harmonic as well as compensation of reactive power of the nonlinear loads are completed.

The detection of reference current is one of the vital core technologies of DSTATCOM, for effectually enhancing the power quality by D-STATCOM and mostly in case of abnormal source voltage; the precision of detecting reference current becomes particularly crucial. That is why current detection technique analysis has much significance since with wrong detection of current Compensator could become the source of power quality problem for the system itself. As a load compensator the performance of DSTATCOM is determined by the control algorithm that is precise extraction of the load current components [10]. Hence the detected compensation current components are according to the compensation purpose required, and those components are taken out of the load current. As per the variation between objectives of load compensation in distribution system, the components of detection are also different up to some extent. This work mainly discusses the detections which comprises harmonic and reactive detection respectively. DSTATCOM is a device that can be used for compensating reactive power and load unbalance in distribution network. The enactment of DSTATCOM being a load compensator is influenced by the control technique that is the exact taking out of the reactive and harmonic current components [11]. Aimed at this objective various control techniques was recommended in the literature. In this work five broadly used control techniques for reference

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An Improved SRF based Control Algorithm for D-STATCOM under Abnormal Source Voltage

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***Abstract*— This paper describes an improved SRF (Synchronous Reference Frame) based control technique or algorithm for time varying power flow control and optimum load compensation of non-linear loading under abnormal or disturbed source voltage by D-STATCOM designed for three-phase three wire systems. The improved algorithm is based on the active power separation and imaginary symmetrical components of voltage and has been compared with conventional IRP based algorithm to show the preciseness in finding the reference current for a DSTATCOM under abnormal i.e. asymmetric and distorted source voltage. Individually the algorithms were implemented and simulated under MATLAB/Simulink. The simulation results also show which algorithm can accurately detect the harmonics and reactive component of load current even under the asymmetric and distorted source voltage condition. Additionally by the control loop of reactive power of improved algorithm, load reactive power can be compensated as well as regulated under variations of load. Thus this additional control arrangement can help system operators improve overall system performances.**

***Keywords*—Comprehensive, abnormal source voltage, active power separation, asymmetric, distorted, power control loop.**

I. INTRODUCTION

PRESENT-GENERATION consumer appliances, with power electronic devices and µp-based controls, is very sensitive to quality of power with respect to conventional appliances [1]. The increasing importance of efficiency of global power system has caused the sustained growth of use of devices such that variable-speed motor drives and connecting shunt capacitors for power-factor improvement to minimize transmission losses [2-4]. Further this has resulted in increased levels of harmonic on transmission systems and several researchers are worried about the future effect on capabilities of power system. Due to higher power and voltage conducting capacity of present power-electronics devices, their application is very common in industry and in domestic purposes also [5]. Although these benefits are surely good but such extreme use of power-electronic devices is a serious problem itself that is generation of current harmonics and reactive power in the modern power system. Consequently, the voltage of several buses and PCCs of system networks is becoming distorted and the consumers connected to those PCCs are not being functioned as designed [6]. The too much VAR drawn by load results in greater than before transmission losses and greater than before utility charges due to poor power factor [7, 8].

DSTATCOM is implemented using smart circuits to detect the components of harmonic and reactive power drawn by nonlinear loads and inject that itself to the load after tracking so that it may not be supplied by the source [9]. After injecting tracked reference current at PCC, the ideal sinusoidal source currents are obtained. Thus, both harmonic as well as reactive power compensation of the nonlinear loads are achieved. The detection of reference current is one of the vital core technologies of DSTATCOM, for effectually enhancing the power quality by D-STATCOM and mostly in case of abnormal source voltage, the precision of detecting reference current becomes particularly crucial. That is why current detection technique analysis has much significance since with wrong detection of current Compensator could become the source of power quality problem for the system itself.

The D-STATCOM based on the Improved Algorithm takes the challenge and provides exact results under unbalanced and distorted source voltage, compared to D-STATCOM based on conventional control algorithms. Additionally by the reactive power control loop of modified algorithm load reactive power will be compensated as well as regulated under load variations. Thus this additional control arrangement can help system operators improve overall system performances. The algorithm proposed has been simulated under environment of MATLAB using Simulink.

II. SYSTEM CONFIGURATION

The D-STATCOM mainly consists of a three-phase PWM controlled voltage source converter (VSC) of six IGBTs, DC capacitor and an inductor. Capacitor acts for active filter energy storage. As per according to the switching algorithm, inverter obtains direction of transmitting energy between DC capacitor and network by inductor. Fig. 1 is showing the basic compensation principle of a distribution static compensator. It is made controllable to draw and supply the compensating current i_c from/ to the compensator, so as to eliminate current components of harmonics and reactive power on the source side, thereby making the source side current purely sinusoidal and in phase with the source voltage also.

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A Modified Algorithm for Time Varying Reactive Power Control and Harmonics Compensation by D-STATCOM

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***Abstract*— This paper presents a modified i_d-i_q based control algorithm for time varying active and reactive power control and load harmonics compensation by DSTATCOM under load fluctuations. The proposed scheme of control algorithm has been introduced for enhancing steady-state performances in addition to useful elimination of power quality disturbances. Employing a preexisting D-STATCOM to attain these added control purposes can advantage system handling operators to maximize complete response of the system. For regulating the time varying active and reactive power control, an extra current control loop system is provided and consequently comprised in the control block. To validate its application, a 200-V electricity feeder with a 3-phase rectifier as a non-linear load was simulated. Results obtained proved that addition of an extra control loop of current component of reactive power can regulate active as well as reactive power drawn on controlled feeder completely under the fluctuations of load.**

Keywords*— *Harmonics; Reactive current; Instantaneous Reactive Power; compensation current; MATLAB simulation.

I. INTRODUCTION

PRESENT-GENERATION consumer appliances, with power electronic devices and µp-based controls, is very sensitive to quality of power with respect to conventional appliances [1]. The increasing importance of efficiency of global power system has caused the sustained growth of use of devices such that variable-speed motor drives and connecting shunt capacitors for power-factor improvement to minimize transmission losses [2-4]. Further this has resulted in increased levels of harmonic on transmission systems and several researchers are worried about the future effect on capabilities of power system. Due to higher power and voltage conducting capacity of present power-electronics devices, their application is very common in industry and in domestic purposes also [5]. Although these benefits are surely good but such extreme use of power-electronic devices is a serious problem itself that is generation of current harmonics and reactive power in the modern power system. Consequently, the voltage of several buses and PCCs of system networks is becoming distorted and the consumers connected to those PCCs are not being functioned as designed [6]. The too much VAR drawn by load results in greater than before transmission losses and greater than before utility charges due to poor power factor [7, 8].

DSTATCOM is implemented using smart circuits to detect the components of harmonic and reactive power drawn by nonlinear loads and inject those itself to the load after tracking so that they may not be supplied by the source[9]. After injecting tracked reference current at PCC, the ideal sinusoidal source currents are obtained. Thus, both harmonic as well as reactive power compensation of the nonlinear loads are achieved. The detection of reference current is one of the vital core technologies of DSTATCOM, for effectually enhancing the power quality by D-STATCOM and mostly in case of abnormal source voltage, the precision of detecting reference current becomes particularly crucial. That is why, current detection technique analysis has much significance since with wrong detection of current Compensator could become the source of power quality problem for the system itself. Moreover under normal operating conditions, compensating the load by D-STACOM, it can have various objectives for example, power oscillation elimination, improvement of power factor, removal of harmonic current, etc. Still certain criteria must be fulfilled to optimize the whole system performance that is for condition of non-linear loading technique can guarantee only single optimal criterion or in other words during compensating load harmonics by D-STATCOM reactive power cannot be compensated or regulated under load fluctuations. To fulfill this purpose so many control schemes which have been proposed and are described in the literature and two of these are the Instantaneous Reactive Power Theory (IRP), Synchronous Reference Frame Theory (SRF) which are most broadly used.

In this paper a modified i_d-i_q based control algorithm for time varying active and reactive power control and harmonics compensation of load by DSTATCOM under load fluctuations is implemented for three-phase three wire systems and has been compared with conventional synchronous reference frame (i_d-i_q) based algorithm. A MATLAB based simulation analysis of these two control algorithms of DSTATCOM is presented. Simulation results compare and validate the efficacy of these control techniques to compensate

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An IRP based Control Algorithm for Load Compensation by DSTATCOM under Polluted Supply System

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***Abstract*— When D-STATCOM which stands for DISTRIBUTION STATIC COMPENSATOR is used for load compensation, the accuracy of identifying the compensation current needed by the tracking system is very essential for effective compensation under polluted source voltage condition and that further depends upon the control algorithm applied. At present there is several control algorithms presented in literature. This paper describes and analyzes the basic of the conventional IRP based control algorithm and presents and simulates an improved instantaneous reactive power (IRP) based control algorithm to eliminate the errors caused by conventional control algorithm, and thereby overcomes the shortcomings of conventional algorithm. These both algorithms were simulated under MATLAB/Simulink. The theoretical exploration and simulation results illustrate the performance and accuracy of the proposed algorithm under asymmetric and distorted source voltage. Hence the results obtained by simulation also show which algorithm can accurately detect the harmonics, reactive component of load current even under the asymmetric and distorted source voltage condition, and the precision and advantage the of control algorithms are verified as well.**

Keywords*— *Harmonics, Reactive current, Instantaneous Reactive Power, compensation current, MATLAB simulation.

I. INTRODUCTION

PRESENT-GENERATION consumer appliances, with power electronic devices and µp-based controls, is very sensitive to quality of power with respect to conventional appliances [1]. The increasing importance of efficiency of global power system has caused the sustained growth of use of devices such that variable-speed motor drives and connecting shunt capacitors for power-factor improvement to minimize transmission losses [2-4]. Further this has resulted in increased levels of harmonic on transmission systems and several researchers are worried about the future effect on capabilities of power system. Due to higher power and voltage conducting capacity of present power-electronics devices, their application is very common in industry and in domestic purposes also [5]. Although these benefits are surely good but such extreme use of power-electronic devices is a serious problem itself that is generation of current harmonics and reactive power in the modern power system. Consequently, the voltage of several buses and PCCs of system networks is becoming distorted and the consumers connected to those PCCs are not being functioned as designed [6]. The too much VAR drawn by load results in greater than before transmission losses and greater than before utility charges due to poor power factor [7, 8]. DSTATCOM is implemented using smart circuits to detect the components of harmonic and reactive power drawn by nonlinear loads and inject that itself to the load after tracking so that it may not be supplied by the source [9]. After injecting tracked reference current at PCC, the ideal sinusoidal source currents are obtained. Thus, both harmonic as well as reactive power compensation of the nonlinear loads are achieved.

The detection of reference current is one of the vital core technologies of DSTATCOM, for effectually enhancing the power quality by D-STATCOM and mostly in case of abnormal source voltage, the precision of detecting reference current becomes particularly crucial. That is why current detection technique analysis has much significance since with wrong detection of current Compensator could become the source of power quality problem for the system itself. As a load compensator the performance of DSTATCOM is determined by the control algorithm that is precise extraction of the load current components. Hence the detected compensation current components are according to the compensation purpose required, and those components are separated from load current. This paper mainly studies the detections which comprises harmonic and reactive detection respectively. DSTATCOM is a device that can be used for compensating reactive power and load unbalance in distribution system. The performance of DSTATCOM as a load compensator is influenced by the control algorithm that is the precise taking out of the current components. For this purpose so many control techniques have been proposed in the literature and two of these are the Instantaneous Reactive Power Theory (IRP) [4], Synchronous Reference Frame Theory (SRF) [5] which is most broadly used.

In this paper a modified Instantaneous Reactive Power based control algorithm for load compensation under polluted supply system by DSTATCOM, is implemented and has been compared with conventional IRP based algorithm. A MATLAB

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Outline

Abstract
Keywords
References

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Investigation of Process Parameter of EDM using Genetic Algorithm (GA) Approach for Carbon Fiber based Two Phase Epoxy composites

Kuwar Mausam [a], Pradeep Kumar Singh [a], Kamal Sharma [a], R.C. Gupta [b]

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https://doi.org/10.1016/j.matpr.2016.11.081

Abstract

In this work Genetic Algorithm (GA) Approach is used for the optimization of the major process parameter of Electric Discharge machining (EDM). GA is used to determine the optimal level of process parameter of EDM during machining of Carbon fiber based two phase epoxy composite. Tool wear rate (TWR) and Material Removal Rate (MRR) are two input variable. Peak current (I_p), gap voltage (V_g), pulse-on-time (T_{on}) and duty cycle (η) are considered as the four major parameter. In this work effect of these parameters are calculated on the TWR. MATLAB is used for the better convergence of GA. GA is run for 15 generations using MATLAB

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

S.K Verma, A.K Tiwari

https://doi.org/10.1016/j.matpr.2017.02.313

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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Characterization and performance of nanofluids in plate heat exchanger

Vikas Kumar [a], Arun Kumar Tiwari [b], Subrata Kumar Ghosh [a]

https://doi.org/10.1016/j.matpr.2017.02.310

Abstract

In the present study, the authors emphasized on characterization, heat transfer and exergetic performance of nanofluid in plate heat exchanger (PHE) experimentally. The characterization of nanofluid incorporates the systematic measurement of thermophysical properties of nanofluids. The heat transfer performance incorporate the heat transfer rate, convective heat transfer coefficient, pumping power, exergy loss and exergetic efficiency of nanofluids. In this work, two types of nanofluids namely CeO_2/water and ZnO/water are employed. The experimental outcomes are compared with water and between nanofluids. The experimental results revealed the best heat transfer performance is shown by ZnO/water nanofluid. The volume concentration of the nanofluids varied from 0.5 - 2.0%. Flow rate of coolant varied from 0.5.0-2.0 lpm at 2 lpm of hot fluid. The inlet temperatures of cold and hot fluid are 25° C and 50° C respectively.

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Materials Today: Proceedings
Volume 11, Part 2, 2019, Pages 837-842

Investigating the Effects of Amine Functionalized Graphene on the Mechanical Properties of Epoxy Nanocomposites

Anurag Yadav, Amit Kumar, Kamal Sharma, Manoj K Shukla

Show more

https://doi.org/10.1016/j.matpr.2019.03.054

Abstract

In this study, effects of functionalization of graphene based epoxy nanocomposites were analyzed. Epoxy composites filled with both amine functionalized graphene (NH_2-f-Gr) and epoxy (LY556) were fabricated at different filler loading levels. The NH_2-f-Gr loading employed in the nanocomposites were 0.25, 0.5, 1.0 and 2.0 wt%. Moreover, through mechanical testing was found that functionalized nanocomposites shows better mechanical properties as compared to pure epoxy nanocomposites. The tensile test indicates that the NH_2-f-Gr epoxy nanocomposites showed higher Young's modulus and tensile strength than the pure epoxy composites. However, as the loading of NH_2-f-Gr increases the Young's modulus and strength of nanocomposites also increases.

Previous Next

Keywords

Proceedings of the 6th International and 43rd National Conference on Fluid Mechanics and Fluid Power
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FMFP2016–PAPER NO.9

APPLICATION OF NANOFLUIDS IN PLATE HEAT EXCHANGER: AN EXPERIMENTAL INVESTIGATION

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Abstract

An attempt has been made for comparing the Al_2O_3 / water and hybrid (Al_2O_3+Cu/water) nanofluid as a coolant on the basis of heat transfer characteristics and exergetic performance in a chevron- type corrugated plate heat exchanger (PHE) experimentally. The 1.0 vol. % was chosen as tested concentration under different coolant volume flow rates (1.0, 2.0, 3.0, and 4.0 lpm) at 3 lpm of hot water volume flow rate. The inlet temperatures of hot water and coolant (nanofluids) were 50°C and 20°C respectively. Based on experimental data, heat transfer coefficient, pressure drop and exergetic performance (exergy destruction and exergetic efficiency) have been studied under different conditions. Based on these data, the heat transfer coefficient is amplified by approximately 8.38% and 22.28% as compared to Al_2O_3/water nanofluid and water respectively with slight penalty in pressure drop. The experimental results also revealed that hybrid nanofluids indicate 6.06% lesser exergy loss along with 5.96% higher exergetic efficiency than Al_2O_3/water nanofluid.

Keywords: *Hybrid nanofluid; chevron angle; heat transfer coefficient; exergy loss; exergetic efficiency.*

I. INTRODUCTION

Various engineering applications have to deal with the phenomenon of heat exchange between two fluid mediums, separated by plates due to temperature gradient. The device which enables transfer of heat from one medium to another is called plate heat exchanger (PHE). A PHE consists of corrugated metallic plates with specific chevron angle. Each of the two corrugated plates has port holes at its corner making route for fluid flow, which results in heat transfer between them.

Nanofluid, which was developed at Argonne National Laboratory (ANL), USA in 1995 by Choi [1] have an enhanced ability of heat transfer despite pressure drop penalty, have attracted researchers for the last two decades[2].

Hybrid nanofluids, which are the composition of two or more dissimilar nanoparticles in a base fluid, are a new generation nanofluids. The hybrid composite has the ability to achieve the physicochemical properties of its constituent nanomaterial. Generally, the mono nanoparticle does not have all favourable properties (thermal properties/rheological properties) required for practical application.

Huang *et al.* [3] investigated pressure drop and heat transfer characteristics of Al_2O_3/water and multiwalled carbon nanotubes (MWCNT)/water nanofluids in chevron type PHE. Their observation revealed that on the basis of constant flow velocity, MWCNT/water nanofluid shows greater deterioration in heat transfer due to enhancements in viscosity. Khairul *et al.* [4] studied the performance of heat transfer and exergy analysis of a PHE using CuO/water (0.5~1.5 vol.%) nanofluid. They obtained valuable information from their experimentation and found that 18.5~27.2% enhancement in HTC along with a 24% reduction in exergy loss by the use of CuO/water nanofluid.

Huang *et al.* [5] investigated the effect hybrid mixture (Al_2O_3+MWCNT/water) in PHE experimentally. They revealed that the HTC of the hybrid nanofluid mixture was higher than that of the Al_2O_3/water nanofluid and water.

In the present work, a thermo chemical process has been employed for synthesizing Al_2O_3+Cu nanocomposite powder. Afterward, the aforesaid synthesized nano composite powders were dispersed in demineralized water (DM water) for preparing the Al_2O_3+Cu /water hybrid nanofluids. The objective of the present investigation is to study a comparative analysis of hybrid (Cu+Al_2O_3/water) nanofluid with Al_2O_3/water nanofluid and water in terms of the heat transfer rate (HTR), heat transfer coefficient (HTC), overall heat transfer coefficient (OHTC), pressure drop, exergy loss and exergetic efficiency under different operating conditions.

II. Experimentation

A. Materials and method

Water based nanofluid was prepared by using commercially available alumina (Al_2O_3, 45nm) procured by Alfa Aesar. The Copper (Cu, 30nm) nanoparticles dispersed in Al_2O_3/water

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List of Experts

Plenary Talk-I

Title: Flexibility

11.30 AM – 12.00 Noon, 19th December 2016

Dr. Sushil
Professor
Department of Management Studies
Indian Institute of Technology Delhi New
Delhi – 110 016

Plenary Talk-II

Title: Issues and Challenges in the Modelling of Metal Forming Processes

12.00 Noon – 12.30 PM, 19th December 2016

Dr. U. S. Dixit
Professor
Department of Mechanical Engineering
Indian Institute of Technology, Guwahati
Assam, India- 781 039

Plenary Talk-III

Title: Machining at small length-scales

11.30 AM – 12.00 Noon, 20th December 2016

Dr. Anish Roy
Reader in Mechanics of Materials and Processes
Loughborough University,
UK

Biodiesel Production from Waste Cooking Oil and Its Characterization

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ABSTRACT

Biodiesel, a clean renewable fuel, has recently been considered as the best substitute for a diesel fuel because it can be used in any compression ignition engine without the need for modification. In present research article waste cooking oil is used as a feedstock for biodiesel production. Mechanical Stirring and Ultrasonic Cavitation techniques were used for biodiesel production. A comparative study has been done for the maximum production of biodiesel yield using both techniques. Characterization of biodiesel shows that biodiesel can be good alternative of petroleum-based fuel and it can be used in any compression ignition engine without any modification.

Keywords: Biodiesel, Waste cooking oil, Ultrasonic cavitation

1. INTRODUCTION

In the age of modernization, technology is upgraded continuously. The consumption of energy increases rapidly. Petroleum reserves are limited and available in specific locations. The combustion of petroleum products increases the air pollution. Air pollution reached in alarming situation. The availability of fresh air for human being is now a big issue. Limited resources and environment concern both are big challenges for humans. Therefore importance of alternative fuels is increases. Biodiesel is a good alternative of conventional diesel. It is environment friendly and its engine performance is very close to that petroleum diesel. Biodiesel is considered as a mixture of methyl esters and fatty acids. It can be derived from edible and non-edible oils, animal fats, waste cooking oils (WCO) etc. The cost of biodiesel depends upon the cost of feedstocks. So the cost of feedstock should be low as much as possible. The properties of biodiesel and yield % depend upon the type of feedstocks. Also, the yield and properties of biodiesel products produced from different feedstocks would be quite different from each other [1].

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IVTH INTERNATIONAL CONFERENCE ON PRODUCTION AND INDUSTRIAL ENGINEERING, CPIE-2016

Development of Genetic Algorithm (GA) Model for optimization of Tool Wear Rate (TWR) for 6 Layered Carbon Fiber based Epoxy composites

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ABSTRACT

Genetic Algorithm (GA) model developed for the optimization of TWR of Electric Discharge machine (EDM) electrode. GA is used to determine the optimal level of process parameter of EDM during machining of 6 Layered Carbon Fiber based Epoxy composites. Peak current (I_p), gap voltage (V_g), pulse-on-time (T_{on}) and duty cycle (η) are considered as the four major parameter. In this work effect of these parameters are calculated on the TWR. MATLAB is used for the better convergence of GA. GA is run for 25 generations using MATLAB 2010 and the algorithm is converged to the objective function value of 0.0000127. TWR is decreased to 70.24% using the optimum values of parameters.

Keywords: EDM, GA, TWR, MATLAB

1. INTRODUCTION

EDM is the thermal erosion process in which metal is removed by a series of recurring electrical discharges between a cutting tool acting as an electrode and a conductive work piece, in the presence of a dielectric fluid. Electrical discharge machining is a machining method primarily used for hard metals or those that would be very difficult to machine with traditional techniques. EDM typically works with materials that are electrically conductive, although methods for machining insulating ceramics with EDM have also been proposed. The process parameter if EDM play the very important role in the optimization of EDM machining process for EDM especially for the 6 Layered Carbon Fiber based Epoxy composites. In this paper author developed Genetic Algorithm model for optimization of TWR.

2. MATHEMATICAL MODEL USED

In this work the functional relationship between the process response (MRR and TWR) and four machining parameters (Peak current, Gap voltage, Pulse-on-time and Duty cycle) is established using regression analysis (M. Chandrasekaran et al., 2014). The linear functional relationship between the process response and different machining parameters is predicted from the MINITAB 15 statistical software using the experimental data. The multiple linear regression equation for MRR and TWR are given as,

$$MRR = 0.0003667 + 0.0002875\ I_p + 0.0000101\ V_g - 0.0000021\ T_{on} - 0.0007036\ \eta \quad (1)$$

$$TWR = 0.0000176 + 0.0000794\ I_p + 0.0000024\ V_g - 0.0000014\ T_{on} - 0.0000404\ \eta \quad (2)$$

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Game Analysis of Risk of Contractual Underperformance in Engineering Contracts

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Abstract

Construction or engineering projects involve repeated and multiple interactions between contractor and procurement officials giving rise to opportunity of cooperative strategies which may induce collusive corruption. This may lead to acceptance of performance lower than contractually agreed. Though contract execution phase plays a critical role in achieving the desired level of contractual performance, it remains under researched. Quality of supervision is also considered to have a major influence on the risk of under-performance. Various factors like insufficient numbers, low level of supervisor' skill and suboptimal use of limited human resources affect quality of supervision. These factors need to be studied because effective procurement contract management can help in furthering economic, social and environmental development, protecting and supporting national industry. The paper therefore establishes a game model of the collusive behaviour and relationship between human actors of different level; owner, contractor, and supervision unit. The results indicate that supervision is necessary though supervisors and contractors may collude. Further project complexity and supervisor's knowledge deficit increase the risk of collusion and underperformance. Effective use of human resources by combining random and regular inspection may not only help in reducing the supervision cost but also in reducing the risk of collusion and contractual underperformance.

Keywords: contractual underperformance; collusion; complexity; Knowledge deficit; supervision cost.

Computer Assisted Industrial Ergonomics: A Review

Harish Sharma*, Pankaj Sonia and Piyush Singhal
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Abstract

Ergonomics involves multidisciplinary approach that requires knowledge from several branches of engineering and sciences. The paper proposes a literature survey on computer integrated techniques for the identification of industrial ergonomic factors. The motivation behind the paper is to review the applications of software packages in research papers of

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Sustainable Ergonomics Study: Different Causes of Musculoskeletal Disorders (MSDs) and their Prevention

Rahul Goswami* and Piyush Singhal
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Abstract

With two important ergonomics research terms Biomechanics and kinesiology we found lot of things which are related with human body (workers) movements and the analysis of the body parts. In this paper we will cover the different parts of the human body which are affected by Musculoskeletal disorders, the work related and non work related factors causes MSDs, MSD risk factors, the important occupations for MSDs and the solutions, preventions and control the ergonomics risk factors. This paper also describes the different training and ergonomics program for reducing the MSD hazards. The purpose of this research study or paper is to reduce the injury rates of workers, increase productivity, increase worker safety, reduce worker fatigue and improve worker morale.

Keywords: Musculoskeletal disorders; Biomechanics; Kinesiology.

Ergonomic Evaluation of Bar Benders in Construction Industry

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Abstract

Construction industry is one of the riskiest industries in which the chances for developing musculoskeletal disorders (MSDs) are very high among the workers as it is more fragmented and labour intensive. Moreover, the construction labourers are the most neglected workforce in terms of the incentives towards comfort is concerned. In addition, not much research is reported in detail and available that specifies the actual causes of their musculoskeletal disorders or discomforts. Among the various categories of workers in the construction industry, a special and skilled workforce which is normally neglected is the 'bar benders'. This paper investigates the prevalence of symptoms of MSDs and also attempts to build a relation of working postures and MSDs through postural assessment tools, among the bar benders in the Indian construction industry.

A questionnaire survey was carried out for twenty five bar benders to assess the MSDs and also the associated psychosocial factors that affect them in a routine manner. It is found that the shoulder, knee and upper back were the body parts most commonly reported

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of the predominant arm. Maximum grip strength was observed to be at Flexor90°, Elbow Flexor120°, Wrist0°. The Heart Rate monitor was used to evaluate the physiological stress of different work postures of the workers in radial drilling machine. Based on this study, it is concluded that risk of worker is evaluated and compared with the modifed posture by reducing the wMSD to improve the performance of workers and increase productivity.

Keywords: Musculoskeletal disorder; Surface Electromyography; Heart rate monitor; Radial drilling machine.

Ergonomic Design Analysis of Welding Workshop of Educational Institutions

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Abstract

Ergonomics is the science of biotechnology or human engineering deals with designing and sequencing the things people use so that we can reduce human fatigue and enhance efficiency. From literature it has found that few attempts have been made to study ergonomics of welding at educational institutions. From studies it has been observed that while students observe the welding experiment, sometimes due to wrong ergonomic design, students have to stand in awkward body posture which tends to have musculoskeletal disorder i.e. pain in their neck, backbone and waist etc., thus not able to concentrate on experiment followed by lose in interest to learn. Repeated exposure to same conditions may cause Relative Stress Injuries (RSIs). The fatigue / RSIs caused by above stated problem also interfere while students carry out other daily activities. With the increase in time duration of experiment, this problem increases rapidly and may cause serious injury. The objective of the current study is to find correct Ergonomic Configuration so as to eliminate the related problems. A thorough study is done to identify and analyse the factors responsible and, thus, are designed to get best ergonomic configuration. Results and observations, made while students are observing the process from a lab technician/ instructor, are also shown in the study.

Keywords: Ergonomics principles; welding table; welding; instructor-students posture; MATLAB.

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Dynamic Optimization of Health Care Supply Networks under Multi-disruptions using Model Predictive Controller

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Abstract

Organizations dealing with health care and allied services have some kind of supply networks behind them. These networks play a very crucial and pivotal role in growth and survival of the health care organizations. The utmost aim of these supply networks is to take care of client's demand with full satisfaction along-with ideal system cost. This aim seems hard to achieve due to presence of unavoidable and inherent disruptions in inventory networks such as delay in transportation/generation, instability in transportation/creation, degradation/deterioration/harming of the item in storage/transportation, cancelation of backorders, and so on. This requires a way to manage store networks issues and taking right choices to minimize the impact of inventory network disruptions. Numerous analysts have been observed to handle store network challenges by utilizing distinctive decision support mechanisms such as fuzzy, neural systems, artificial intelligence and many more.

In this paper an effort has been made to develop dynamic optimizer as a decision support mechanism of the supply networks to handle multi disruptions utilizing Model Predictive Control. It is observed that any kind of production network can be demonstrated and simulated with eight conceivable choices. In this study each of the eight options is rigorously analyzed and demonstrated by implying MPC. It is noted that if number of products in a single node multi-product plant and number of nodes in a multi-node single product supply chain are same, their nature will be similar and they both have the same modeling effect. Reenacted results indicate possibility to meet all the requests with fewer inventories at various echelons of the system under concealed and unavoidable circumstances.

The paper provides a specialized and tested framework for Inventory Managers and Store network persons for taking decisions for right choices at right time under various disruptive and unavoidable events which in turn results in smooth running of organizations and enhancing the revenues and save human life.

Keyword: Health care; Model Predictive Control; Supply Chain, Uncertainties; Disruptions; Delays

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BOOK OF ABSTRACTS

XX ANNUAL INTERNATIONAL CONFERENCE OF SOCIETY OF OPERATIONS MANAGEMENT

SOM – 2016

Operations for Sustainable Development

Green Supply Chain Management Using Fuzzy Set Theory Under Uncertainty

Amarendra Rai[1], Pooja Pathak[2] and Vijay Kumar Dwivedi[3*]

[1,2,3] *GLA University, Mathura*

Purpose: In recent times, many companies have startup to implement green supply chain management (GSCM).The GSCM is used to extend the positive effects of supply chain operations increase the capability of companies using emerging environment regulations. In GSCM, the companies have to measure the environmental performance of the suppliers. This study is used to fuzzy decision making method to find impressive factors in selecting GSCM criteria. The fuzzy theory is used to evaluate GSCM practices to improve both environmental and economic performances.

Methodology: In this paper, the fuzzy set theory is used to find the uncertainty in green supply chain management system. The fuzzy set theory is implemented in GSCM to reduce the uncertainty and increased the performance and economic factor in automobile industries.

Finding: In automobile manufacturing industry, the growth has created business opportunities, but it has concurrently increased substantial environmental burdens. The GSCM has emerged an important approach to reduce the environmental burdens and to improve green image. There are reliable results related to evaluation of GSCM performance in automobile industry using fuzzy method.

Practical Implications: This study can help in automobile industry to deal uncertainty in manufacturing, transportation, and logistics for maximize the profit.

Originality/ Value: - This work can be valuable guide for the setup of new automobile plant.

Keywords: *Green Supply Chain Management, Fuzzy set theory, Automobile, Uncertainty.*

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BOOK OF ABSTRACTS

XX ANNUAL INTERNATIONAL CONFERENCE OF SOCIETY OF OPERATIONS MANAGEMENT

SOM – 2016

Operations for Sustainable Development

Sustainability Through Leasing: A Case of Indian Automobile Sector

Sunil Anand[1*], Piyush Singal[2] and Ashutosh Kumar Choudhary[3]

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Purpose: The focus of today's automobile sector especially passenger car division is mainly on the environmental pressure. The purpose of this paper is to analyze the impact of Government legislation on the consumer regarding the life of automobile in India and to propose leasing as, Sustainable approach for automobile sector.

Design/Methodology/Approach: The study began with a systematic review and content analysis of articles in various journals on environmental impact due to automobile, various mode of vehicle acquisition, close loop supply chain and sustainability. Through the concept of Design research methodology (DRM), initial problem is presented in the form of reference model, which shows the present situation.

Findings: The findings develops the understanding of forces that create a threat for the environment as well as creating dissatisfaction to the consumer of automobile, and highlight the need for change in the approach with the aid of closed-loop capabilities that have the ability to mitigate the problem stated.

Practical Implications: The paper presents a practical issue regarding Government legislations and its effect on main channel partner. No empirical analysis is provided. Future researches should evaluate the impact of the approach proposed at all the links.

Originality/Value: The study under taken is on the current situation through, which Indian automobile sector is going through. This paper seeks to increase discussion about the impact of Automobile pollution on environment along with the effect of steps taken in favor environment through government legislation in India regarding life of vehicle. A real situation is portrayed and the way out is suggested.

Keywords: *Automobile Sector, Leasing, Sustainability, DRM.*

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BOOK OF ABSTRACTS

XX ANNUAL INTERNATIONAL CONFERENCE OF SOCIETY OF OPERATIONS MANAGEMENT

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Operations for Sustainable Development

An Expert System to Manage Multi-Disruptions in Extended Supply Networks for Improving Supply Chain Performance using Neural Network and Model Predictive Controller Combination

Rajkumar Sharma[1]*, Piyush Singhal[2]

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Purpose: In the era of globalization, most of the firms have supply networks to support them. On one side, supply networks make the system efficient and agile, but on the flip side, they cause the dependency risks in form of delays and disruptions. Due to a number of supply chain uncertainties, inventory management becomes a critical problem for most of the organizations. It is not feasible and uneconomical to maintain high stock levels due to budgetary constraints, perishable nature of product, and space limitations. In this paper, an effort has been made to manage the appropriate inventories under uncertain business environment using neural network and model predictive controller combination.

Methodology: Since neural network has the ability to predict the demands more accurately as compared to other processes, we have decided to use neural networks for making the demand model. A Model Predictive Controller (MPC) is capable of incorporating and handling the delays and uncertainties present in industrial supply chains. The main reason of choosing MPC is application and easier handling of simple and custom constraints affecting the supply chain systems.

Findings: It is noticed that supply networks can be modeled as one of eight possible alternatives. Out of eight models, the multi-node multi-product model is the complex model. Simulated result on this model shows that demand can be fulfilled by keeping fewer inventories at the different nodes of the network.

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HWWE

Humanizing Work and Work Envioronment

Abstract

14th International Conference on Humanizing Work and Work Environment December 8-11, 2016

Editors :
Prof Arvind Bhardwaj
Dr Lakhwinder Pal Singh
Dr Sarbjit Singh

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Work Related Musculoskeletal Disorders (WMSDs) Risk Assessment For Different Welding Positions And Processes

Bharat Singh and Piyush Singhal

Abstract*—Work related musculoskeletal disorders (WMSDs) are the result of handling the heavy objects manually and repetitively especially in confronting task such as welding and fabrication. Welding process is an overlaying of material over a parent metal by using welding torch in different positions such as horizontal, vertical and overhead. Therefore Ergonomics assessment for product design, process layout, welding postures is the key approach to prevent musculoskeletal disorders which significantly found among workers during manual welding. Various studies report that these musculoskeletal disorders risks can be preventable by ergonomics design. In this paper, an attempt has been made to assess the risk in structural steel welding especially injuries of the muscles, tendons by field observation and motion study during manual handling of welding. Assessment observations at soft floor in some construction and manufacturing industries have been made during various welding tasks. Ergonomic study at soft floor is also carried out by the application of motion study by video recorder. We have also observed the common kneeling and bending positions of a welder. These hybrid observations including posture analysis strongly revealed that work related musculoskeletal disorders such back pain, fatigue, muscle injuries, tendon injuries, are adverse effects of awkward posture, overuse of the musculoskeletal system activities which are frequent and repetitive. Work related musculoskeletal disorders are depending upon workplace elements and methodology of welding and environmental factors. Less skilled welder has more risk of WMSDs during welding tasks. A vital part of the ergonomic process is a periodic review of the facility, specific workstation designs and work practices, and the overall production layout, from an ergonomics point of view. Welder should train in such a manner to recognize the WMSDs and early reporting of WMSDs symptom. Proper ergonomics design for different welding positions required.

I. Introduction

Ergonomics is the science of biotechnology or human engineering deals with designing and sequencing the things people use so that we can reduce human fatigue and enhance efficiency. It has been observed from literature that Work related musculoskeletal disorders (WMSDs) are commonly found in welders engaged in manual handling (MH) tasks, e.g. structural steel welding trades. Several research studies and industry reports revealed that such risks are mostly preventable e.g. through relevant ergonomic assessments, facilitating arrangements and job/ workplace redesigns. Most frequently used approaches for ergonomic risk evaluations of manual handling tasks in workplaces are:

(i) Experience based information
(ii) Soft floor observations,

It is found that these approaches have some limitations and challenges, therefore, applying Rapid Upper Limb Assessment (RULA) technique with kinematic motion captures and simulation studies in virtual environment have been additionally considered in our research. This hybrid approach has conventionally enabled and will provide reliable data for the MSD risk evaluations

This study results will be useful for further developing WMSDs related decision support system.

Rapid Upper Limb Assessment (RULA) is very versatile and has employed for ergonomic evaluation, especially for work related musculoskeletal disorders (WMSDs) during structural steel welding tasks in construction and manufacturing industries.

Assessment of manual handling (MH) with reference to ergonomics is very vital because these have strong relation with work related WMSDs. Through a hybrid research approach including field observations with different tools of assessment with advanced risk assessments is being carried out in current research.

II. Background

It is observed from literature that 43% of manual handling related injuries in the workplace are sprains and strains of joints/ adjacent muscles and 33% WMSDs are due to muscular stress arise from lifting and handling the heavy objects [1]. In general, common forms of WMSDs such as back pain and joint injuries are associated with muscular stress from MH tasks, fatigue and other effects from repetitions, risks of awkward postures, adverse impacts of force and frequency of tasks [2].

RULA- Rapid Upper Limb Assessment is useful frameworks [6]. Our current research employed a present-day hybrid approach including motion captures, postural analyses as well as qualitative research from literature, assessment tools, discussions and expert consultations.

In this paper, A basic model of RULA study for assessing MSD for arc welding process with different welding positions are presented. The risk of injury is also related to the activity duration, frequency, or a combined exposure to risk factors. The effect of various factors i.e. psychological factors, whole body vibration, fumes and UV radiation and environmental factors are not covered in our current research.

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Review of Literature on Methods for Identification of Basic Ergonomic Considerations that Affect Employees in Workplace Environment

Harish Kumar Sharma, Piyush Singhal and Rahul Goswami

Abstract— **The paper proposes a literature review on methods for identification of ergonomic considerations that affect the effectiveness of employee in workplace. The purpose of the paper is to review the findings of research papers of various authors to develop the considerations that affect employee in the workplace environment. The analysis of the literature reveals diversity in the content of the scientific approaches due to the different methods and tools which have been applied by several researchers to improve the efficacy of humans in their workplace environment.**

I. INTRODUCTION

Ergonomics involves multidisciplinary approach that requires knowledge from several branches of engineering and sciences. New open doors for advance show up when distinctive concepts are consolidated. A review of recent ergonomics studies in last two decades reveals new concepts and approaches proposed. The purpose of the review was to enlist and compare available methods in occupational ergonomics. This paper summarizes the results of analyzing 109 papers, articles, and books. Contributions from this field are documented as a set of findings and recommendations. Both Nationally and Internationally available scholarly journals, papers, articles and publications related to the topic of this review have been considered by the authors.

The increasing complexity of workplace environment is continuously evolving new challenges for the researchers. Ergonomics aims at safety, health and efficiency of worker. Therefore, the accessible evaluation instruments and strategies should risk chance variables that are in charge of musculoskeletal issue. It's important to check just the accessibility of techniques and apparatuses that consider the most up and coming. The article will subsequently break down and evaluate the powerful materialness, specifically work settings, of the strategies for appraisal. In the light of these contemplations, the creators find diverse logical methodologies in view of various standards.

First step for the analysis is capturing body postures and movements and analyzed using standard analysis methods with or without the help of software and verified by biomechanical approaches.

Section II describes Workplace assessment methods. Section III presents Standard Analysis Methods for the data collected from workplace assessment. Section IV reveals different computer aided tools and their modules. In the last section the conclusion reports contributions of the several authors.

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II. WORKPLACE ASSESSMENT METHODS

A. *Self-reports:*

Workers can self-report which is utilized as gathered information on work environment presentation. It can include physical and psychosocial components both. The strategies are not standard which can incorporate workers meetings and surveys. Information accumulation should likewise be possible independent from anyone else assessment of video movies of work undertakings or the utilization of questionnaires [12].

B. *Videotapes:*

It is an observational method by data recording in video tapes.

Paola Cocca et al. [1] broke down rehashed endeavors of the upper limbs on manual complex deburring workstations in an Italian organization working at the worldwide level. It got to be conceivable to decide the quantity of specialized activities performed amid handling by looking at tapes taken of the laborers. It empowered assessing independently errands including the two upper appendages in this way to decide the successful time cycle.

Raghunathan Rajesh et al. [2] broke down a venture of material taking care of movement in an assembling plant for decreasing the exhaustion for specialists. A field consider in light of work-inspecting which took over a month was utilized to recognize chance figures the plant. In this duration, videotapes were used for the recording of the details of movements and postures for the material handling activity.

Pamela McCauley Bush et al. [61] did recording of a variety of tasks for the solid waste collection project.

Das and Sengupta [15] provide the guidelines for reducing risk factors to design a good workplace by observing workstation procedures and collecting data by videotaping the operators as well by considering an application in the field of supermarket check-stand.

Kadefors et al. [16] also used the same approach based on video tape for data collection. In this process the video film

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Application of 10 Ergonomics Checkpoints for Improving Working Conditions and Productivity in Agriculture Sector of India

A. Rahul Goswami, B. Piyush Singhal, and C. Harish Kumar Sharma

***Abstract*—The Agriculture is a primary occupation in India which provides employment to around 70% of the overall population. Despite providing employment to a large chunk of people, the working conditions of Indian agricultural sector is miserable and the Indian farmers and workers are facing enormous challenges with respect to occupational wellbeing. They regularly work under extraordinary climate conditions and hazardous surroundings at different plane and remote locations with difficult land, scantily designed tools, poor low quality nutrition, lack of access to proper drinking water and sanitary facilities. They also face low standard medical and health services in agriculture settings, accidents in the agricultural workplace have unfortunately become a very common phenomenon. All these things are resulting in decline of worker's productivity. Keeping these things in consideration, this paper will focus on the ergonomics checkpoints which can be applied to the farmers and workers of Indian agriculture sector in order to develop positive sign in the health, reduce accidental conditions and improve working environment and thereby increasing productivity.**

I. Introduction

Ergonomics An incorporated approach to agricultural labor or workers 'fitness, security and health' is an significant factor in rural improvement guidelines and initiative. For reducing the accidents and ill health in rural and agricultural areas it is needed to take practical actions, it is also important for improving the productivity and living conditions. For improving the working conditions and reducing the obstacles in agricultural settings there are two organizations. The International Labour Organization (ILO) and the International Ergonomics Association (IEA) have teamed up and mirroring the basic ergonomic philosophy required in horticultural and country settings, essentially in creating nations [1]. The principal version of Ergonomic Checkpoints in Horticulture, distributed by the ILO as a team with the IEA in 2012, plots 100 unmistakable check focuses, with detail case of practical, effective and ease change. Therefore, take 10 selected important check points for Indian farmers and labors for improving the working condition and health and reducing the accidents level. First section will describe the introductory part of importance of ergonomics checkpoints in agriculture .Section II shows the economics checklist for farming according to the Indian agriculture farmers or workers. Section III describes the different selected checkpoints, approaches for advance participation, some more indications and focus points. Section IV presents increasing development proposals and organizing follow-up activities. In the last Vth section the conclusion reports of working conditions and health of farmers working in agriculture field.

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II. ERGONOMIC CHECKLIST FOR FARMING

A. Significant the place of work

First we must know about the different products and the method of production, the strength or numbers of farmers, the time spending by the farmers or workers and the problem of the workers or farmers.

B. Describe the work area which has to be checked.

Depict the work zone to be checked in dialog with the administrator and other critical gathering. On account of a little venture, the whole creation territory can be checked. On the off chance that there is a greater wander, particular work ranges can be clear for individual checking.

C. First walk-through

With the assistance of perusing the checklist, and invest some energy strolling through the work territory preceding begin to check, by the checklist.

D. Characters of check outcome

Carefully invest each .If required, ask the questions to the farm worker or farm owner.
—If the evaluation has previously been taken accurately mark NO under.
— If the evaluation would be valuable, mark YES.

E. Collection conversation regarding the confirm outcome

In the group discussion check the results with all members who have been part of walk- through.. Correspond with owner of farm and labors about the workers about the planned actions, and pursue on their accomplishment.

III. 10 CHECKPOINTS

A. Checkpoint 1

For the movement of people and materials the transportation route must be plain and in good in quality

Hot Deformation Behaviour and Microstructural Evaluation of Zr-1Nb Alloy

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Keywords: Zr-alloy, Themo-mechanical processing, Microstrutural evaluation, Processing map, Kinetic analysis.

Abstract: In nuclear water reactors, zirconium alloys are extensively used as fuel cladding material and in other structural applications. Uniaxial hot compression tests were performed to understand the deformation behavior of Zr-1Nb alloy. Therefore, hot compression tests were performed in the temperature range of 700- 1050°C, which envelopes *α-phase, (α+β) phase*, and *β-phase*. True stress- strain curves, processing maps, microstructural observation and kinetic analysis were used to discuss the deformation behavior of Zr-1Nb alloy. Deformation at a strain rate of 10^{-2} s^{-1} reveals softening at lower temperatures and steady state behavior at higher temperatures. Processing map also reveals domain of high efficiency at 10^{-2} s^{-1} strain rate for a wide range of deformation temperatures. The flow softening and high power dissipation efficiency predicts dynamic recrystallization or dynamic recovery during the hot deformation of studied alloy.

Introduction

Zirconium alloys are extensively used in fuel cladding and other in-core structural components of water – cooled nuclear reactors due to their relevant mechanical properties [1]. The mechanical properties are fully dependand on final microstructural of material. The complex two phase behavior of Zr- alloy provides variety of microstrucuture (i.e. β- transformed lamellar or martensitic to equiaxed α- β microstructure), and bears a lot of challenges in microstructural control during hot deformation to get desired component properties. The microstructural mechanism operated during the different deformation conditions can be observed using flow stress data and microstructural observation. Additionally, processing map approach is helpful to identifying the safe deformation condition for hot working. In the present work, hot deformation study of the Zr-1Nb alloy is made using flow stress data, processing map approach, microstructural observation and kinetic analysis.

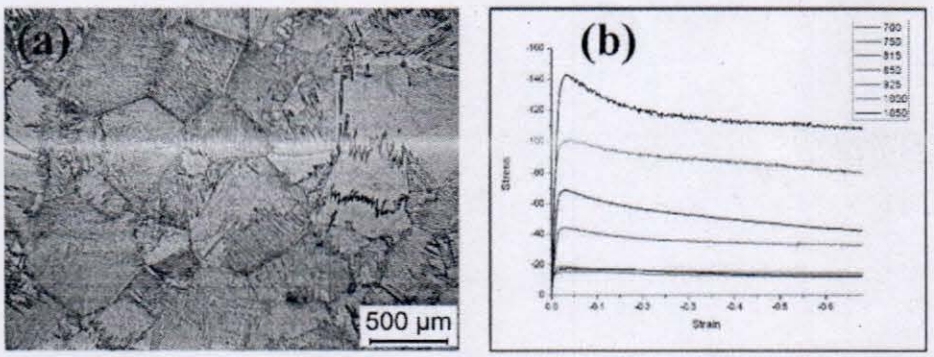

Figure 1. (a) Microstructure of undeformed Zr-1Nb alloy, (b) True stress- true strain curves at constant strain rate of 10^{-2}.

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Characterization of TiO_2, Al_2O_3 and SiO_2 Nanoparticle based Cutting Fluids

Anuj Kumar Sharma [a], Arun Kumar Tiwari [b], Amit Rai Dixit [a]

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https://doi.org/10.1016/j.matpr.2016.04.089

Abstract

Extravagant use of conventional cutting fluids during conventional wet machining and wrong methods of its disposal can affect human health and the environment badly. This has led to the development of new class of cutting fluid enriched with nanoparticles having better thermo physical and tribological properties. In this work, three different nanofluids are prepared by mixing Titanium dioxide (TiO2), Silicon oxide (SiO2) and Aluminum oxide (Al2O3) nanoparticles in vegetable oil-water emulsion at room temperature in different volumetric concentrations. Furthermore, its thermal conductivity, specific heat, density and viscosity are measured at different temperatures for various nanoparticle volumetric concentrations. The results reveal that increase of nanoparticle concentration in base fluid increased its thermal conductivity, viscosity and decreases its specific heat. The thermal conductivity, density, specific heat and viscosity of three different nanofluids are compared with each other and found that addition of nanoparticles

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Characterization and experimental investigation of Al_2O_3 nanoparticle based cutting fluid in turning of AISI 1040 steel under minimum quantity lubrication (MQL)

Anuj Kumar Sharma [a], Rabesh Kumar Singh [a], Amit Rai Dixit [a], Arun Kumar Tiwari [b]

Show more

https://doi.org/10.1016/j.matpr.2016.04.090

Abstract

During metal cutting operation, cutting fluid plays a vital role by cooling and lubricating the tool-work piece interface and removing chips from the cutting zone. As a result, a cutting fluid may significantly affect the tribological conditions at these interfaces. However, human health and environment both are affected negatively by the excessive use of conventional cutting fluid. This has led to the development of a new class of cutting fluid with superior thermal and tribological properties to restrict its extravagant use during machining. A colloidal mixture of metallic or non-metallic nano meter sized particles in a base fluid is called nanofluid. For the last one decade, nanofluids have attracted the attention of researchers due to its improved thermal conductivity and heat extraction capability. In the present work, a new nanofluid is prepared by mixing Al_2O_3 nanoparticles in conventional cutting fluid at different concentrations. The prepared nanofluid is characterized for its thermal conductivity and viscosity at a

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Tribological Investigation of TiO_2 Nanoparticle based Cutting Fluid in Machining under Minimum Quantity Lubrication (MQL)

Anuj Kumar Sharma [a], Arun Kumar Tiwari [b], Rabesh Kumar Singh [a], Amit Rai Dixit [a]

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Abstract

A colloidal mixture of metallic or non-metallic nano meter sized particles in a base fluid is called nanofluid (NF). In the present work, a nanofluid with superior thermal and tribological properties is developed by mixing TiO_2 nanoparticles in vegetable oil-water emulsion in different concentrations. The developed nanofluid is characterized for its thermal conductivity and viscosity for various nanoparticle concentrations at different temperatures. Furthermore, its machining performance is examined in turning of AISI 1040 steel using minimum quantity lubrication (MQL) technique. The obtained results are also compared with that of dry machining and wet/MQL machining using conventional cutting fluid. The experimental study clearly reveals that performance of TiO_2 nanofluid in terms of surface roughness, tool wear, cutting force and chip morphology is found to be better compared to dry machining, wet/MQL machining with conventional cutting fluid.

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Optimization of Welding Parameters for Weld Dilution in GMAW using Genetic Algorithm

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Abstract: *Hardfacing is a technique in which deposition of material on the surface of similar/dissimilar material is done to improve its wear resistant properties. The benefits also include the minimization of downtime needed to replace worn components and reduction of spare part inventory and finally saves money. So, it is essential to select welding process parameters carefully, to achieve a quality bead which is defect free. In order to achieve the above objective, a set of mathematical models has been developed for the prediction of weld bead dilution using 5-factor, 2 – levels Factorial design for 140MXC Nano structured wire with IS2062 substrate. The developed model was checked for its adequacy. The main and the interaction effects of the process parameters on weld bead dilution are presented in graphical form. Moreover, Genetic Algorithm computational model was used for the optimization of welding parameters to achieve desired optimum weld dilution.*

Keywords: *Harfacing, Gas Metal Arc Welding; Factorial Design Approach, Genetic Algorithm.*

1. INTRODUCTION

The welding process, due to its complexity, has relied on empirical and experimental data to determine its welding conditions. However, trial-and-error methods to determine optimal conditions incur considerable time and cost,as stated by Kim et al. [1]. In order to overcome these problems optimization of welding input parameters, for making high quality weldment can be envisaged as a vital area of research. Weld bead shape plays an important role in determining the quality and mechanical strength of the weldment. Weld bead geometry is dependent on number of input parameters such as wire feed rate, welding speed, voltage, nozzle to plate distance, gas flow rate etc. as stated by Kim et al. [2].To predict the effect of various welding parameters on weld bead geometry various researchers used variety of techniques. (Benyounis et al. [3]; Kannan and Yoganandh, [4]; Singla et al. [5];Sudhakaran et al.[6]).Statistical approach is one way to increase the amount of information-rich data gathered. Numerous studies validated that efficient use of statistical design of experiment techniques, works as an excellent tool for the development of a mathematical model for the prediction of weld bead geometry. (Murugan and Parmer[7], Subramaniam[8], Allen et al.[9], Kim et al.[10].

So, to achieve the above mentioned objective statistical designing technique was employed to depict weld bead geometry of surfaced steel. Experiments were conducted based on fractional factorial designing i.e., 2 level 5 factors. Process control variables considered were wire feed rate, welding speed, welding voltage, nozzle to plate distance and torch angle.

To ascertain the acceptability of weldment, control of dilution is very important in hardfacing, where low dilution is typically desirable. For the present research, it was planned to use GA computational technique for the optimization of welding parameters to minimize dilution, as it owns high reliability, robustness and accuracy. Palaniswamy et al. [12].

2. MATERIALS AND METHODS

2.1 MATERIALS

The experiments were carried out by the deposition of 140MXC Nano-structured wire of 1.6 mm diameter using Miller Migmatic 273 welding machine onIS2062 substrate. The chemical composition of substrate and filler wire are given in table 1. Shielding gas used was pure Argon with flow rate kept constant at 25 l/min. Bead- on – plate technique was used to make the weld runs.

TABLE 1: Chemical composition of base plate and filler wire

IS 2062						
Element	C	Si	Mn	S	P	Fe
%	0.227	0.161	0.50	0.05	0.023	Balance

TAFA 140MXC Nano-structured wire								
Element	Cr	C	Mo	B	W	Si	Nb	Fe
%	20.8	2.84	12.1	0.64	9.79	0.54	0.8	Balance

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Optimization of Wire Electrical Discharge Machining Process of EN-31 for Surface Roughness and Material Removal Rate Using Artificial Neural Networks

June 2019

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GLA University

Ghanshyam Bansalz

National Conference on Recent Advances in Science and Engin

Optimization of Wire Electrical Discharge

Optimization of Wire Electrical Discharge ... Surface Roughness and Material Remova... Networks

Chetan Raj Singh[1], Dr. RudraPratap Sin[2]

[1]G.L.A. University, M
[2]Aligarh Muslim Univers

Wire electrical discharge machining (WEDM) is a nor special thermo-electrical machining process. It uses hi from the wire to the work piece. When electrical spark material takes place. The work material used for this v resisting parts of machines, punches and dies etc. Du parameters in WEDM process, it becomes difficult t properly when two or more output parameters are requi present work is to optimize the effect of six input paran time, peak current, dielectric pressure, wire feed and namely material removal rate and surface roughness with

Keywords: Wire Electrical Discharge Machining, WEDI Optimization, Artificial Neural Networks.

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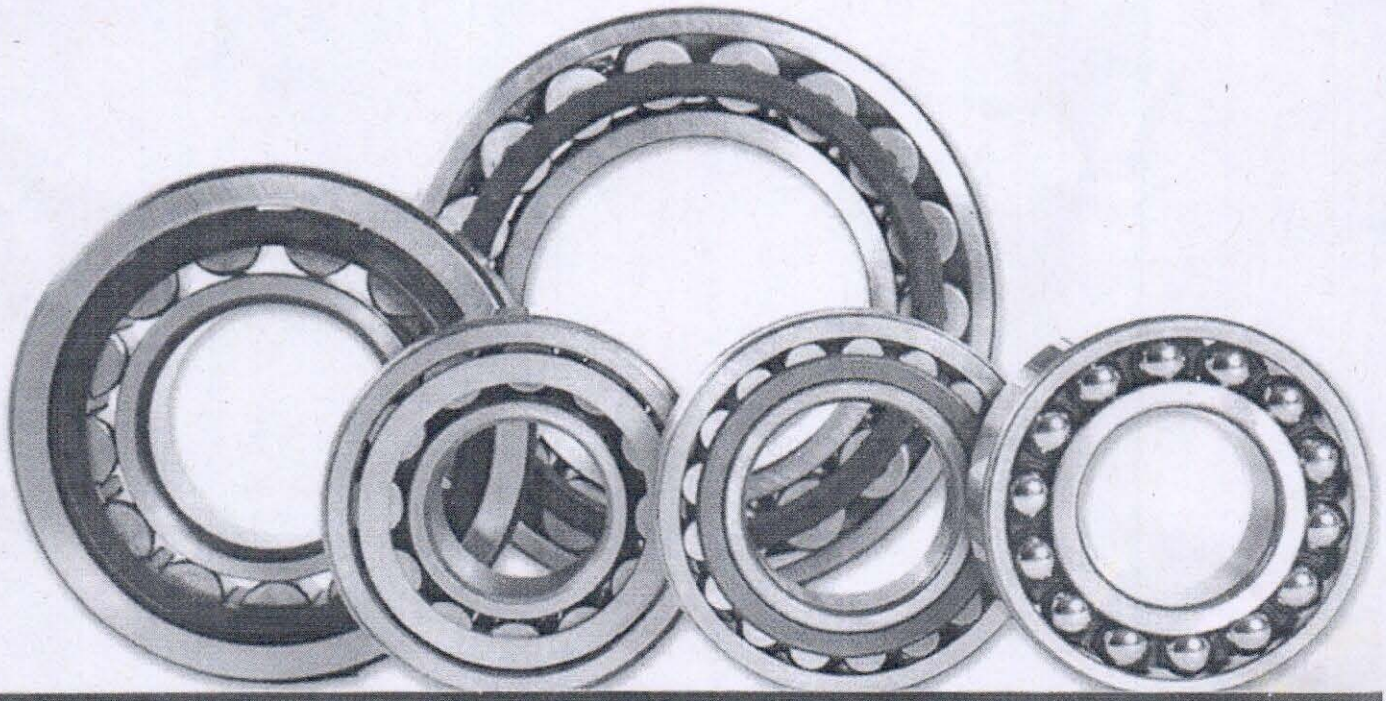

Analysis of groove dimensions and orientation effect on the characteristic performance parameters and stability of axial grooved journal bearings

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Keywords : Axial groove; damping coefficient; stability

ABSTRACT – Dynamic performance parameters and stability of axial grooved hybrid journal bearings depend on the dimensions and orientations of groove in a great extent at higher speeds. In this work the Reynolds equation governing the flow of lubricant in the clearance space between bearing and journal has been solved using a FORTRAN program. The bearing performance characteristics have been simulated for the various dimensions and orientation of groove. Non linear journal centre trajectories are drawn for different Reynolds number for stability analysis. It was found that the smaller groove length yielded lower load carrying capacity and the turbulence decreases the stability.

1. INTRODUCTION

Non recessed hybrid journal bearing with grooves, are often used when applied load and shaft speed are high. Lubricant is usually supplied in the journal bearing through a hole or groove. Twin groove journal bearings are widely used, especially when the journal is expected to assume both direction of rotation. Morton et al. [6] presented the influence of grooves in bearing on the stability and response of rotating systems. Costa et al. [4] found that single groove bearing configuration perform better with a groove located along the load line. Brito et al. [1-3] have investigated the influence of temperature, pressure and load on the performance of a two-axial grooves bearing located at ± 90^0 to the load line. They concluded that the increase in feeding pressure yields an increase in oil flow rate, a decrease in oil temperature and slight increase in attitude angle and minimum film thickness. Kini et al. [5] obtained the stability characteristics of water lubricated journal bearing having three axial grooves theoretically and obtained stiffness and damping coefficient for various bearing number and eccentricity ratio. Dwivedi et al. [7-9] has studied the effect of turbulence on the dynamic performance of accelerated/decelerated hydrodynamic bearing. They also carried the stability analysis of the journal bearing in different flow regimes.

In this paper the influence of the location of the grooves with respect to the load line and influence of groove dimensions on the performance parameter were investigated. The effect of turbulence in terms of stability is also studied.

2. METHODOLOGY

Reynolds equation, which governs flow of lubricant in the clearance space of a journal bearing, is modified to study the laminar, transition and turbulent flows, by including turbulence coefficients $\overline{K}_X$ and $\overline{K}_Y$.

$$\frac{\partial}{\partial\alpha}\left[\frac{\overline{h}^3}{\overline{\mu}\overline{K}_\alpha}\frac{\partial\overline{p}}{\partial\alpha}\right]+\frac{\partial}{\partial\beta}\left[\frac{\overline{h}^3}{\overline{\mu}\overline{K}_\beta}\frac{\partial\overline{p}}{\partial\beta}\right]$$
$$=\frac{1}{2}\overline{\Omega}\left(\overline{X}_j\sin\alpha-\overline{Z}_j\cos\alpha\right)-\overline{\dot{X}}_j\cos\alpha$$
$$-\overline{\dot{Z}}_j\sin\alpha \qquad (1)$$

The short bearing approximation has been used to solve the Reynolds equation. With the short bearing approximation, the closed form expression for pressure has been obtained by integrating twice the Reynolds equation and using boundary condition. Positive pressure zone is established by deleting pressure below atmospheric (subambient) and 100 kPa supply pressure (p_s) is taken at entire groove area. A FORTRAN computer program with modified boundary conditions was developed for calculating pressure at all grid point.

3. RESULT AND DISCUSSION

The analysis and solution algorithm were used to compute the pressure profile, fluid film reaction or load capacity, fluid film stiffness and damping coefficients. These studies are conducted by taking bearing aspect ratio (L/D) 0.5 and 0.25. Assuming bearing and journal axes parallel and ratio of nominal clearance to the journal radius 0.001 (C/R = 0.001).

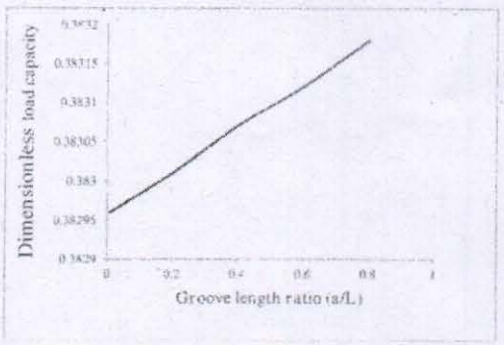

Figure 1 Influence of groove length ratio on load carrying capacity

Fig 1, Fig 2 and Fig 3 show the effect of groove length, groove width and orientation of groove on the load carrying capacity respectively. As the length of the groove increases the load bearing capacity increases

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SOLAR POWER PROFILE OF INDIA: ON THE PATH OF SUSTAINABLE DEVELOPMENT

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— Being a country of developing economy and the second most populated country of the world, India's energy security has become the biggest concern for sustainable development. This article analyses the barriers and opportunity of solar power in India, which includes costing and pricing, solar hotspots in India, government policies, education & training and solar radiation data. The paper also suggests some key policies which can help to overcome some identified barriers to the growth of solar power in India. It has been found that policies must be established for more usage and application of solar power for sustainable growth and for energy security. The solar alliance must be envisaged for countries lying fully or partially between tropics to meet the rising demand of power.

Keywords- Solar, Power, India, Energy

I. INTRODUCTION

Being the second most populated country of the world the energy demand of India is continuously rising. In the last decade the power generation capacity has been increased to [illegible] GW, which is almost twice the capacity before 10 years [illegible]. Due to continuous increase in demand country is still facing a power deficit and thus, this capacity addition is insufficient to meet the power requirement. Going forward, according to International Energy Agency report in order to attain energy security India will require 300 GW by 2017 and until 2035 India must have installed capacity of around [illegible] GW [2]. To achieve the above said target India has to switch its power generation from conventional fossil fuels to non-conventional energy because the fossil market is continuously depleting. Fossil markets are important for developing country like India, where around 60% of power generation is coal based [3], but these fossil fuels are limited in reserved based which will necessarily deplete and run out. Apart from this the burning of fossil fuel leads to the production of greenhouse gasses, therefore it is necessary to switch the power production to clean energy resources like solar, hydro, wind and ocean. Hydro, wind and ocean have their own limitations in terms of where, how much and how quickly the capacity can be added. But if we search out India solar potential, by contrast, is virtually limitless. Being a tropical country and having around 300 sunny days/year, India's theoretically calculated solar energy incidence on its land area alone, is about 5,000 trillion kilowatt-hours (kWh) per year (or 5 Wh/yr) [5]. Of course the biggest drawback associated with stand alone solar power plant is that the power supply is not continuous due to seasonal variation periodical variations, but this barrier is also overcome by integrating the stand alone solar energy system with grid [6] for continuous power supply. In a country like India, where the rural population doesn't have access to electricity, stand alone PV system can play an important role for rural electrification. The generation and transmission losses in a centralized power plant are more. In India the power transmission losses are 25% in urban area and more than 35% in rural areas [7], therefore decentralized power energy system is required to minimize such losses which may be in the form of standalone PV power energy source. In this article the author has attempted to show the potential of solar energy in India and various initiatives taken by the central government for the growth and development of solar power in India. The article also shows key barriers faced by the solar power market in their growth. At the end the author has concluded with key recommendation which will definitely help in the growth of the solar PV sector in India.

II. METHODOLOGY

This research helps us in finding out bottlenecks and opportunities of the solar power sector in India. It uses certain tools for data collection from various sources, which are then analyzed for better understanding of the problem and suggesting solutions or solution approaches. One of such tools is an exploratory research tool. Exploratory research often relies on qualitative approaches such as: case studies, in-depth interviews, pilot studies, and focus groups [8]. This research article deeply analyses the already published statistical reports of various Governments/private

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Compression and Elastic Behavior of nc-MgO under high pressure

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***Abstract*-In the present study, a theoretical model is developed by presenting the empirically modified extended form of the usual Tait equation of state to study the volume compression and elastic properties in nc-MgO under pressure. It is found that the extended form of usual Tait equation yields results very close to the experimental data. The validity of modified equation and usual Tait equation are tested according to Stacey criterion [13, 14, 15] under infinite pressure and noted that the modified equation satisfies the Stacey criteria of stability while the usual Tait equation does not follow this criteria especially in high pressure range. Using modified form of Tait equation, we have thus determined the bulk modulus, shear modulus; Young's modulus and Poisson's ratio for MgO nanocrystal (7 nm) under pressure and the results so obtained are compared with the available experimental data. The pressure dependent elastic constants C_{11}, C_{12}, C_{44}, shear velocity and compressional velocity are also determined with varying pressure. A good agreement with the available experimental data justifies the validity and applicability of the present model theory to explain the elastic behavior of nc-MgO under the effect of high pressure successfully.**

***Keywords*: Mechanical compression; Bulk modulus; Equation of state; High pressure, Elastic constants.**

I. Introduction

Elasticity relates the microscopic and macroscopic properties of the solids under pressure. Elastic properties help in understanding the physical and mechanical behavior of solid materials. So, the study of elastic properties of material under high pressure and temperature has been the subject of great interest to researchers both from theoretical and experimental aspects. Pressure application leads to continuous modification of the interionic separation in bulk as well as the nano-object and helps to explore physical and chemical interactions inside the material. Several studies have been carried out to explore the various properties of materials with change in their particle size [1-3]. Magnesium oxide has been studied intensively by different research groups because of its stable nature up to very high pressure and also it is a major constituent of the earth's deep mantle. The high pressure behavior of MgO helps in understanding the deep earth geophysics [4] and therefore the elastic behavior of bulk MgO and MgO nanocrystal (nc) has been studied both theoretically and experimentally [4-12] during past years.

Karki et al. [5] studied the structural and elastic properties of MgO periclase up to 150 GPa using the first principles pseudo potential method. Duffy et al. [6] carried out experimental studies using diamond cell measurements and found that the B1 structure of MgO remains stable up to 227 GPa indicating the absence of usual structural phase transition from B1 to B2 phase in this pressure range. Srivastava et al. [7] have developed an empirical relation to indicate the temperature dependence of thermal pressure for MgO and predicted thermal pressure in high temperature zone. The thermoelastic properties of MgO are also extrapolated in this study to understand its high temperature behavior. Rekhi et al. [8] carried out X-Ray diffractometry study on MgO with different particle size (100nm and 200 nm). Zha et al. [9] studied the elastic behavior of MgO using high pressure single crystal Brillouin scattering and XRD techniques. The Poisson's ratio calculated from aggregate sound velocity determination in bulk MgO is found to increase with increasing pressure [9]. Marquardt et al. [10] performed high pressure synchrotron X-Ray diffraction experiments on nc-MgO compressed under both quasi hydrostatic and non-hydrostatic conditions in a diamond anvil cells. Data obtained from this study reveals that nc-MgO (20nm) is 8-9% more compressible than bulk MgO under quasi hydrostatic compression. Also Brillouin scattering experimental technique has been used by Marquardt et al. [11] in nc- MgO. The evolution of both particle and crystallite sizes in nc- MgO powder under pressure using XRD line broadening analysis, high resolution SEM and TEM is monitored. The dynamic elastic moduli of nc-MgO ceramics crystallite were studied by Yeheshel et al. [12] using the acoustic wave velocities obtained by ultrasonic method at room temperature.

The aim of the present work is to study the pressure dependence of volume compression and elastic constants of nc-MgO. In the present study, a simple theoretical model formulated by empirically modifying the Usual Tait equation is used to study the volume compression in nc-MgO under varying pressure conditions. The validity of modified equation and Usual Tait's equation are tested

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Sizing up the Form: A Study of Richard Flanagan's *The Narrow Road to the Deep North*

Ravi Prakash Dubey

The 2014 Booker winning novel *The Narrow Road to the Deep North* is a sensational saga of boundless love and limitless pain. The narrator's statement that "a great book compels you to reread your own soul" (27) is fully applicable to this novel. The story of the infamous death railway and its climax in August 1943 has been there since last 75 years or so. Novels, stories, poems have been written; films and documentaries have been made on this. So the story is not new. What makes the story of the novel so special is not the story but the presentation of the story, i.e., the narrative technique employed. The present paper is a study of some of narrative tools used in the construction of this novel. It studies the following ideas summarily:

1. The story-plot (fibula and suzet discourse)
2. The narrator and the focalizer
3. The imagery
4. The language
5. The art of characterization in the novel
6. The use of poetry
7. And other devices used in the making of the novel.

1

The Plot of the novel can be traced along with the three lines.

1. The growth of Dorrigo from a lost child to a war celebrity via an unethical and passionate lover of his uncle's young wife.
2. The war, the Japanese aggression, their fear of defeat, the construction of the Line, the prisoner of wars and their deaths, Japan's defeat and its consequences.
3. The Amy-Dorrigo relationship which permeates and overlaps most of the events in the novel.

The plot of the novel uses the stream of consciousness technique. Here the reader finds all time present in one time and no time gone past ever. At which point on the time line the novel begins is tough to gauge precisely. The beginning is philosophical and one that brings great curiosity in the reader. It also gives some hints directly and ironically that come true with the further reading of the novel. The beginning is worth quoting:

> Why at the beginning of things are there always light? Dorrigo Evans' earliest memories were of sun flooding and a church hall in which he sat with his mother and grandmother. A wooden church hall. Blinding light and him toddling back and forth, in and out of transcendent welcome, into the arms of women. Women who loved him. Like entering the sea and returning to the beach. Over and over. (1)

In the latest part of his life Dorrigo Evans becomes a figure of patriotism in his country. He talks about his past on television talks and does press conferences as a government officer. In the mid part he suffers from great agony of working as a POW. Thus his life is full of upheavals and the plot of the story never allows the reader to understand everything well.

The second aspect of the plot is much more painful. It encompasses the war, the Japanese aggression, their fear of defeat, the construction of *the Line*, the prisoner of wars and their deaths, Japan's defeat and its consequences; though only some aspects are discussed here.

The condition of the POWs when they are trafficked down to the spot, where they are to start constructing *the Line* and

9

“Murmuring Your Praise”:[1] Shakespearean Echoes in Early Bengali Drama

Sayantan Roy Moulick and Sandip Debnath[2]

Prolegomenon

Kironmoy Raha says that it was to ease the tedium of English social life in India that theatre, in the Western sense of the term, made its inroad to Calcutta in 1775.[3] Soon, the need for a Bengali theatre, following the English model, was felt and it was poignantly expressed as early as 1826 in the editorial of *Shomachar Chondrika*:[4]

> In this vast city, various centres have already been established for the benefit and amelioration of the citizens which is unprecedented. But, unlike the English community, no public space has been created to provide them amusement.[5]

भारत में विदेशी लोग एवं विदेशी भाषाएँ

समाजभाषा-वैज्ञानिक इतिहास

श्रीश चौधरी

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Chapter 11

Assessing Precept of Behavioural Finance Aligned to Investment Attributes Among Retail Investors

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Abstract

Behavioural finance attempts to explain and increase understanding of the reasoning patterns of investors, including the emotional processes involved and the degree to which they influence the decision making process. Essentially, behavioral finance attempts to explain the what, why, and how of finance and investing, form a human perspective.

A healthier understanding of the behavioral process of investors and its outcomes is significant for financial planners, because if financial planners get an understanding that how investor responds to market movements helps them in developing suitable strategies of asset allocation for their clients.

This research explores and evaluates the level of Heuristic, prospect, market and herding variables affecting investment decision and then the significance of difference has been assessed among retail investors segmented via investment returns, investment experience and investment approach. The study was conducted on retail investors of western UP region.

The major implication of research underlines that representativeness was found to have highest impact among heuristic variables. Mental accounting has high impact, highest among prospect variables among three prospect factors viz. loss aversion, regret aversion, mental accounting. Market variables is moderately important, however, herding variables' impact on the investors'