PRIYADARSHINI COLLEGE OF ENGINEERING
CRITERIA NUMBER III
RESEARCH, INNOVATION AND EXTENSION

Key Indicator 3.3 : Research Publication and Awards

Key Indicator	Metric Number	Particulars
3.3	3.3.4	Number of research papers per teachers in the Journals notified on UGC website during the last five years

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2	Impact of C^{5+} ion beam on Dy activated $Sr_2B_5O_9Cl$ TL phosphor	Abha H. Oza, Vibha Chopra, N.S. Dhoble, & S.J. Dhoble	Applied Physics	Journal of Materials Science: Materials in Electronics	2018	ISSN: 1573-482X (Online)	https://www.ugc.ac.in/journallist/ugc_admin_journal_report.aspx?eid=MjQ0NjQ=	3
3	Prediction of multiple sclerosis in brain MRI images using hybrid segmentation	S.P.Washimkar	Electronics &Telecommunication Engineering	Proceedings of IEEE International Conference on Signal Processing and Communication, ICSPC 2017	2018		https://www.scopus.com/authid/detail.uri?authorId=57191042593	4

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An improved multiclass support vector machine classifier using reduced hyper-plane with skewed binary tree

Pranjal S. Bogawar[1] · Kishor K. Bhoyar[2]

Abstract

Support Vector Machine (SVM) is mainly used to classify the data into two categories. To solve the multi-category problems using SVM, researchers used two approaches. The first approach based on solving multiple SVM binary classifiers, whereas another approach based on solving a single optimization problem. In this paper, we have used the first approach and proposed an Efficient Multiclass Support Vector Machine (ESVM) algorithm using a skewed binary tree. To construct the skewed binary tree, no extra efforts are required as compared to the binary tree approach. The algorithm is tested on the benchmark data sets, and the results are compared with both the multiclass approaches of SVM. The ESVM's results are compared with five techniques of solving multiple binary SVM classifiers and four techniques of solving a single optimization problem. The comparative experiments prove the efficiency of the ESVM in terms of its accuracy as compared to other contemporary algorithms. Further, ESVM is successfully applied for classification of the email dataset into positive, negative and neutral sentiments.

Keywords SVM · Multiclass classification · Efficient multiclass SVM · Email dataset · ESVM · Skewed binary tree

1 Introduction

Support vector machine (SVM) is one of the famous methods of supervised machine learning algorithms used for classification. Although initially it was used for binary classification, now it is also being used for multiclass classification by combing independently solved multiple binary classifiers and solving a single optimization problem. The most popular methods of multiclass classifications based on solving independent multiple binary classifiers are one against one (OAO) [3], one against all (OAA) [3], direct acyclic graph (DAG) [3, 7], binary tree of SVM (BTS) [8], binary decision tree (SVM-BDT) [5], SVM with reduced hyperplane (SVM-RH) [9], efficient binary tree multiclass SVM

(EBTSVM) [10]. One against one, direct acyclic graph create 'N (N-1)/2' binary classifiers, one against all creates 'N' classifiers whereas SVM-BDT, SVM-RH, EBTSVM creates 'N-1' classifiers to separate the data of 'N' class data.

Some researchers solve SVM multiclass classification using single optimization problem [3]. This approach creates the 'N' decision function to classify the data into 'N' classes by solving one problem. Weston et al. created the 'N' class SVM and 'N' class linear programming machines which solves the N-class problem in single optimization [4]. Crammer et al. suggested generalized concept of margin, and used that idea for multiclass categorization by optimizing quadratic objective function [14]. Wang et al. proposed the fast fuzzy multi-category algorithm based on support vector domain description. The algorithm found fuzzy membership for every input-output pair and reduces the noise and outliers [11]. Other approaches classified the multiclass data by using the margin loss function [15, 17, 20]. Liu et al. created reinforced multi-category SVM [16] and Zang et al. created fisher consistent, reinforced angle based multi-category classification by combining angle based classification framework with hinge loss [17].

In this work, we have tried to improve the efficiency of binary classifier one-against-all by reducing the number

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Impact of C^{5+} ion beam on Dy activated $Sr_2B_5O_9Cl$ TL phosphor

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Abstract

$Sr_2B_5O_9Cl$: Dy phosphor was synthesized by modified solid state diffusion method and the impact of C^{5+} ion-beam on its TL behavior was studied in detail. Phosphor was annealed at 1000 °C for obtaining single phase host. XRD technique was used to confirm the formation of the material and was matched with JCPDS-27-08835. The synthesized phosphor was characterized for photoluminescent spectra. Characteristic emission at 484 nm ($^4F_{9/2} \rightarrow {}^6H_{15/2}$) and 575 nm ($^4F_{9/2} \rightarrow {}^6H_{13/2}$) confirms the presence of Dy^{3+} ions in the $Sr_2B_5O_9Cl$ host matrix. Further TL properties of the synthesized material were studied for fluence range $1.5 \times 10^{11} - 30 \times 10^{11}$ ion/cm^2 (i.e. 40.14–802.9 kGy dose) of C^{5+} ion-beam (75 MeV) and were found to show the non linear behavior between a dose range 40.14–802.9 kGy. TL glow curve for $Sr_2B_5O_9Cl$:Dy irradiated with C^{5+} ion-beam (75 MeV) was compared with that of γ-ray irradiated phosphor. TRIM/SRIM calculations were performed to correlate the changes in TL properties of $Sr_2B_5O_9Cl$:Dy phosphor.

1 Introduction

The measurement of radiation doses is one of the important areas of research due to the fact that radiation above a permissible dose is harmful to human kind. Thermoluminescence is a very useful technique to estimate the quantity of absorbed dose of ionizing radiations. Practically, thermoluminescence dosimeter (TLD) badges are used for environment, personal, space, health and many more radiation monitoring applications [1–4]. Today, there are a number of commercial TL dosimeters available for users as TLD badges and are mostly based on oxides, fluorides and sulphates. However, each of these dosimeters has their own strengths and shortcomings in certain areas such as in the low or high radiation zones. For this reason continuous efforts have been made by the research community worldwide to develop new materials and to improve dosimetric properties of already available materials as efficient TLD material in the form of low Z_{eff} (tissue equivalence) as well as high Z_{eff} that can be used in different areas with low or high levels of radiations. Most of the phosphors can be used as TLDs within a specific range of radiation doses and not for all doses from very low to very high range because it depends on various factors including linearity, precision, dose rate, fading, reproducibility, and others. Thus there is a need to explore more sensitive materials that show linearity of TL response in the large range, materials which are energy independent, thermally stable and have low fading. Moreover there is a continuous demand for efficient TL dosimeters for monitoring high dose levels of swift heavy ions (SHI) that are growing daily as these ions are used extensively in medical applications.

Ion beam therapy is found to have an important role in the treatment of cancer as compare to the conventional photon beam. In conventional beam irradiation the dose deposition decreases in proportion to the penetration depth whereas in ion beams it gradually increases, and then decreases rapidly beyond a sharply defined maximum known as the Bragg peak near the end of the range of the ion beams. Bragg peak therapy offers the promise of excellent dose localization for treatment of tumors. Therefore, ion beams are important for treating tumors located deeply inside the body and is a better option for cancer therapy to avoid the high risk surgery and the side effects of medicinal drugs. Among various types of ion beams, carbon ion beams particularly are

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Prediction of Multiple Sclerosis in Brain MRI Images using Hybrid Segmentation

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Abstract- **Multiple Sclerosis is a brain disease that forms the number of lesions in white matter of brain as the disease progresses. In this paper texture analysis is done on brain MRI Images of real data of patients to observe the progress of disease by detection. The objective of this paper is to find the progression detection by utilizing the segmentation and feature extraction techniques .The image is segmented using the AM-FM segmentation, the filtering is done by using Saliency map method and these filtered segmented features are clustered using Fuzzy C means clustering method. The paper also proposes an adaptive iterative threshold based algorithm for detection of lesion from the clustered image. The detected features are extracted using feature extraction techniques such as morphological, local binary pattern, mean and standard deviation methods. These extracted features are classified using K-NN classifier. The experimental results obtained are efficient and provides an accuracy of 97% which helps in accurately predicting a disease. Along with detection and classification the patch based algorithm is used for reconstructing the damaged images.**

Keywords—Magnetic Resonance Imaging (MRI), Amplitude-Modulation, Frequency-Modulation (AM-FM), Multiple Sclerosis (MS) Silencing Map Detection, Fuzzy C-Means Clustering (FCM)

I. INTRODUCTION

The central nervous system consists of two components gray matter and white matter. The brain disease multiple sclerosis appears in brain white matter and spinal chord. It appears due to damage of myline shealth of nerve fibers This further develops no. of multifocal lesions in the central nervous system which relates with the disease progression.

Due to formation of lesions, volume of white matter shrinkages [1]. Multiple sclerosis (MS) normally appears in the age between 20-50 years and it affects more to women than men. The initial diagnosis based on clinical signs and symptoms is done by specialized neurologist [2]. McDonald criteria are followed by neurologist to see the disease progression with EDSS score. Several preclinical tests are helpful in disease verification. Magnetic Resonance Imaging (MRI) is one of the techniques to see the multifocal lesions in central nervous system. This relates to MS with the use of T2 weighted images. But still 5% patients who have been confirmed to have MS based on other criteria cannot observe in MRI. To cater this drawback, a texture analysis method is applied on multiple sclerosis in brain MRI images. Texture features can be significantly used to differentiate between normal and abnormal tissues. To avoid the intensity variation between successive scans of MRI, intensity normalization is applied on brain MRI [3]. The multiple image segmentation and feature extraction technique has been used to find the region of interest and lesion features in order to detect the disease in its initial stages. It will also be useful to see the progression of disease. The detection of disease in earlier stages helps to predict the type of disease with the patient might be suffering.

II. MRI DATASET

The dataset of normal brain MRI images and real patient brain MRI images carrying MS is collected from reputed hospital with reference from Radiologist and Neurologist. The data of 20 patient images in the age between 20 to 45 of both men and women have been taken. Out of the total Dataset some cases are identified as of progressive weeks and some are of initial stages.

III. REVIEW OF RELATED WORK

Yunyan Zhang (2012) describe that texture analysis is an image post processing approach that extracts quantitative information from a digital image based on mathematical analysis. A two dimensional MR images is a digitized picture of elements (pixels) characterized by spatial location and gray level intensities. MRI texture analysis evaluates the organizational pattern of image pixels. Texture features are in fact mathematical parameters that highlights the distribution of gray level intensities to reflect the structural regularity of image tissues [4]

Jing Zhang, Lei Wang, Longzheng Tong(2007) focuses on application of texture analysis on MR images which extract the classical texture analysis features to differentiate between normal appearing white matter(NAWM), normal white matter(NWM) and MS. The study demonstrates an accurate texture classification. It is high between MS lesion and NAWM also the classification is low between NAWM and NWM due to differences in selected features [5].The classification rate mentioned is 90%.

Victor Murray, Eduardo S.Barriga, Peter Soliz, Marios S. Pattichis focuses on the use of AM-FM method in series of medical Imaging problems ranging from ultrasound to retinal

Sample Research Publication in Year 2017

Sr. No.	Title of paper	Name of the author/s	Department of the teacher	Name of journal	Year of publication	ISBN/ISSN number	Link of the recognition in UGC enlistment of the Journal	Page No.
4	Implementation of new H-bridge 7 level inverter fed IM with lesser harmonic value	Dr. S. P. Muley	Electrical	Journal of Engg and applied Sciences	2017	1819-6608	https://www.ugc.ac.in/journallist/subjectwisejurnallist.aspx?tid=MTgxOTY2MDg=&&did=U2VhcmNoIGJ5IElTU04=	6
5	Photovoltaic based series Z-source Inverter fed IM Drive with improved shoot through technique	Mr. Rahul Adle/ Dr. S.P. Muley	Electrical	ELSEVIER Science Direct Energy Procedia	2017	1876-6102	https://www.ugc.ac.in/journallist/subjectwisejurnallist.aspx?tid=MTg3NjYxMDI=&&did=U2VhcmNoIGJ5IElTU04=	7
6	Formulation Of Mathematical Model For Processing Time Required For Bamboo Sliver Cutting Using HPFM	Siddharth K. Undirwade , M.P. Singh, C.N. Sakhale	Mechanical Engineering	Materials Today: Proceedings 4 (2017) Elsevier, SCOPUS INDEXED	2017	ISSN: 2214-7853	https://www.ugc.ac.in/journallist/subjectwisejurnallist.aspx?tid=MjIxNDc4NTM=&&did=U2VhcmNoIGJ5IElTU04=	8

Implementation of a New H-bridge 7-level Inverter Fed Induction Motor with Lesser Harmonic Values

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Abstract—A Multilevel structure with more than five levels can significantly reduce the harmonic content. The output voltage and power increase with number of levels. Adding a voltage level involves adding a main switching device to each phase.

The goal here is to implement the seven level H-Bridge inverter with less number of switches. The output of this circuit is fed to the induction motor. Using this scheme, we can control the speed and also reduce the noise and vibration of the Induction motor. This research stresses on improving the efficiency of multilevel inverter and quality of output voltage waveform. A new seven level scheme is implemented with only seven switches. The MATLAB simulation is done and hardware is implemented by using IGBT's for the seven switches of seven level inverter.

Keywords—*IGBT, Multilevel inverter, H-Bridge, Induction motor, etc.*

I. INTRODUCTION

Multilevel converters can be applied to utility interface systems and motor drives. These converters offer a low output voltage THD, and a high efficiency and power factor. There are three types of multilevel converters: (1) diode clamped, (2) flying capacitors, and (3) cascaded. The main advantages of multilevel converters include the following :

a) They are suitable for high-voltage and high current applications.

b) They have higher efficiency since the devices can be switched at a low frequency.

c) Power factor is close to unity for multilevel inverters used as rectifiers to convert ac to dc.

d) No Electromagnetic Interference (EMI) problem exists.

e) No charge unbalance problem results when the converters are in either rectification or inversion mode.

The multilevel converters require balancing the voltage across the series-connected dc bus capacitors. Capacitors tend to overcharge or completely discharge, at which condition the multilevel converter reverts to a three-level converter unless an explicit control is devised to balance the capacitor charge. The voltage-balancing technique must be applied to the capacitor during the operations of the rectifier and the inverter. Thus, the real power flow into a capacitor must be the same as the real power flow out of the capacitor, and the net charge on the capacitor over one cycle remains the same.

II. LITERATURE SURVEY

In the paper [1], two types of methods or topologies have been compared i.e. cascaded and reduced switches topology. Out of these two, this research uses reduced switches topology.

In the paper [7], the THD contents of 7, 11 and 15 level cascaded multilevel inverters have been discussed. The total harmonic distortion depends on the switching angles for different units of multilevel inverters; hence, the switching angles are calculated first by using Newton-Raphson method where some of harmonic components have been eliminated. Using the calculated switching angles, THD analysis is carried out analytically as well as using MATLAB simulation.

The paper [20] demonstrates how the reduced harmonic distortion can be obtained for a new topology of multilevel inverters. The new topology has the advantage of its reduced number of devices compared to conventional cascaded H-Bridge multilevel inverter and can be extended for any number of levels. Here, the harmonic reduction is obtained by selection of appropriate switching angles.

The paper [21] deals with the analysis and simulation of the seven level inverter. The percentage total harmonic distortion is calculated for seven level inverter. The functionality verification of seven level inverter is done using MATLAB.

1st International Conference on Power Engineering, Computing and CONtrol, PECCON-2017, 2-4 March 2017, VIT University, Chennai Campus

Photovoltaic Based Series Z-source Inverter fed Induction Motor Drive with Improved Shoot through Technique

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Abstract

This paper explores the series Z-source inverter (SZSI) topology for induction motor (IM) with solar photovoltaic (SPV) as source in drive application. Series Z-source inverter has single stage power conversion with buck-boost capability. Shoot through ratio is used for boosting dc link voltage in series Z- source inverter. In this paper, for enhancing the performance of SZSI improved shoot through envelop technique along with sinusoidal pulse width modulation control technique for solar PV based series Z-source inverter fed drive, is presented. The major benefits of modified boost control technique are current reduction and harmonics reduction in output voltage as compared to simple boost control scheme. The validity and feasibility of modified boost control technique for shoot through envelop to control SZSI fed induction motor is verified by simulation and experimental results.

1. Introduction

The use of conventional energy sources and their environmental effect have created an opportunity in choosing renewable energy sources such as solar PV. Due to low cost of renewable energy sources, solar PV system have given lot of importance particularly in the area where grid connected electricity is not available. SPV fed converter system requires buck-boost capability to satisfy the load requirement. It requires two stage power conversion. This two-stage power conversion increases volume, cost and degrades the reliability of system. For reducing cost and

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ICEMS 2016

Formulation of Mathematical Model for Processing Time Required for Bamboo Sliver Cutting Using HPFM

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Abstract

The present work is the formulation of models for sliver cutting from bamboo using human powered flywheel motor (HPFM).It reports the design of experimental work to be executed for establishing approximate generalized empirical model for Resistive Torque, Processing Time &No. of slivers during Bamboo Sliver cutting process using human powered flywheel motor (HPFM) on the basis of experimentation data chosen, using methodology of engineering experimentation. Out of which process for formulation of mathematical model for Processing Time required for Bamboo Sliver cutting process is elaborated completely in this paper.

1. Introduction

The Bamboo Sliver cutting machine driven by human powered flywheel motor (HPFM) consists of Energy Unit and Process Unit. Energy unit consists of bicycle-drive mechanism with speed increasing gearing, appropriate clutch transmission and a flywheel. Process unit is the bamboo sliver cutting unit which is coupled to the energy unit.

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Sample Research Publication in Year 2016

Sr. No.	Title of paper	Name of the author/s	Department of the teacher	Name of journal	Year of publication	ISBN/ISSN number	Link of the recognition in UGC enlistment of the Journal	Page No.
7	VLSI architecture design for DWT: Using polyphase and pipelining and their effective comparasion	Dr.A.Rathkanthiwa	Electronics &Telecommunication Engineering	2016 Proceedings - IEEE International Conference on Information Processing, ICIP 2015	2016		https://www.scopus.com/authid/detail.uri?authorId=37051447500	10
8	Critical success factors for lean Six Sigma in SMEs (small and medium enterprises)	M. S.Lande, R. L. Shrivastav	Mechanical Engineering	The TQM Journal (Emerald Inside), SCOPUS INDEXED	2016	ISSN: 1754-2731	https://www.ugc.ac.in/journallist/ugc_admin_journal_report.aspx?eid=MjIwOQ==	11
9	Review of Six Sigma applications in clinical testing laboratory	Pranil V. Sawalakhe Sunil V. Deshmukh Ramesh R. Lakhe	Mechanical Engineering	International Journal of Six Sigma and Competitive Advantage INDERSCIENCE Publication SCOPUS INDEXED	2016	Print ISSN: 1479-2494 Online ISSN: 1479-2753	https://www.inderscienceonline.com/doi/abs/10.1504/IJSSCA.2016.080801	12

VLSI Architecture Design for DWT

Using Polyphase and Pipelining and

Their Effective Comparasion

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Abstract—Wavelet Transform have proven to be useful tool for several applications, the most popular image compression method is depends on selection of proper filter bank, Synthesis and analysis filter bank. Analysis filter bank is used for forward DWT and Synthesis filter bank is for backward DWT. This Paper proposes efficient ways for Designing these filter. They are discussed on the basis of filter response obtained for various methods. In this paper two architectures, one based on polyphase decomposition and other based on combination of polyphase decomposition with pipelining are proposed. Results are presented and compared. Also the effect of pipelining is discussed in detail. VLSI architecture for the DWT filter designed using proposed methods are simulated in Xilinx.

Keywords—DWT, FIR, Image, Polyphase, Pipeline

I. INTRODUCTION

Wavelet transform is a useful tool for several applications including signal analysis, signal coding and image compression. With the rapid progress of VLSI technology many processors which are based on image processing were developed. The discrete wavelet transform (DWT) has been widely used in many areas of science and engineering e.g., signal and image processing, bio-informatics ,meteorology and medical etc. for the applications involving compression and analysis of various forms of data. The well-known image coding standards, namely, MPEG-4 and JPEG2000 have adopted DWT as the transform coder due to its advantages over the other transforms. The coding efficiency and the quality of image resolution with DWT are higher than traditional methods also its gives high compression ratio Hence it is the more popular tool in the image compression.

At present many VLSI architecture are available for 1D and 2D DWT to meet the real time processing requirements .The practical implementation is quite difficult because of the complexity in computation and also needs extra memory for storing the intermediate results .Moreover for the real time image compression huge amount of data needs to be processed at a high speed. The simulation process provide flexibility to check various aspects and try to achieve some timing constrains or may not meet them .Hardware implementation has a major factor to be consider is cost.

The DWT is based on dyadic partition whose main block is filter bank which decomposes the signal into two band LOW PASS and HIGH PASS .This is first level of wavelet decomposition. Since most of the information is available in low pass component of the signal after decomposition , the low pass component is again decompose in the next level signal, the low pass signal is again decomposed into high pass and low pass portion again, This is second level of decomposition. Here filter plays major role in the wavelet decomposition. In DSP various methods of filter design are used based on the requirement.

The main objective of the work is to implement DWT. In this work we are using two different approaches one based on polyphase decomposition of filter and other based on ployphase decomposition with pipelining. Polyphase decomposition increases throughput and pipelining increases clock speed by reducing critical path .We have implemented single level decomposition of DWT using above two approaches .The simulation is performed to verify the functionality of DWT.

A. Intruction to DWT

Consider the function f(x) which has discrete values we want to locate all its values hence we have to decompose the signal into lower resolution level .Hence we smooth or average out f(x) or low pass f(x) .Then by comparing the original signal and the low pass signal we can depict the decompose signal where α is the scaling factor, for dyadic style of decomposition the scaling is set to 2.

$$\alpha d(x) = f(x) - \alpha f(x) \tag{1}$$

Two dimensional discrete wavelet transform (DWT) is defined as:

$$X_{LL}^j (n_1, n_2) = \sum_{i_1=0}^{K-1} \sum_{i_2=0}^{k-1} g(i_1)g(i_2)X_{LL}^{j-1}(2n-i_1)(2n_2-i_2) \tag{2}$$

Critical success factors for Lean Six Sigma in SMEs (small and medium enterprises)

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Abstract

Purpose – The purpose of this paper is to identify and list critical success factors (CSFs) of Lean Six Sigma (LSS) framework affecting and influencing quality, operational and financial performance of small and medium enterprises (SMEs). It also intends to guide researchers and practitioners in selecting appropriate set of CSFs for empirical studies, developing frameworks and to ensure effective implementation experience of LSS.

Design/methodology/approach – It systematically reviews literature on CSFs and Indian experience regarding LSS. It uses exploratory approach for data collection and documents various studies depicting both manufacturing and service experiences by using time tested statistical tools to prioritize CSFs, which critically influence LSS implementation.

Findings – The study guides and facilitates researchers and practitioners in using the most appropriate set of CSFs for empirical studies and in developing/modifying/reviewing application frameworks. It also guides implementation experience regarding LSS, which can be beneficiary for both developing and developed country contexts. Industries can accelerate implementation by understanding and using most important CSFs, which influence LSS framework.

Research limitations/implications – The study mainly remains confined to the CSFs for LSS implementation in SMEs from Indian subcontinent.

Originality/value – The value lies in documenting, and prioritizing CSFs influencing LSS in a meaningful manner so that researchers/companies take advantage of Indian experience in prioritizing CSFs for framework. The study drastically reduces implementation hassles and simplifies execution for empirical studies. The findings are not restricted to India but are generalizable and can globally utilized in deciding determinants of LSS framework.

Keywords Lean Six Sigma, SMEs, Quality, Productivity, Critical success factors, Pareto analysis

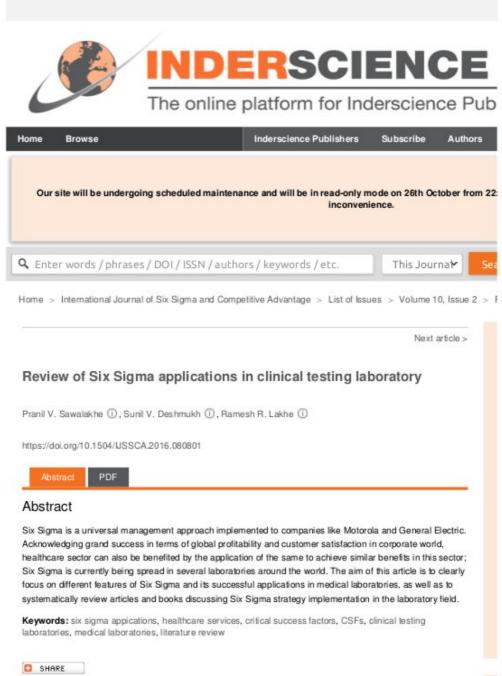**Paper type** Literature review

Introduction

This study is especially motivated by India's fast-changing business scenario influencing small and medium enterprises (SMEs) sector which is the backbone of industry, corporate and economy. This change is creating hope for development and, is offering tremendous opportunities to try newer techno managerial models, practices

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Review of Six Sigma applications in clinical testing laboratory

Pranil V. Sawalakhe ⓘ, Sunil V. Deshmukh ⓘ, Ramesh R. Lakhe ⓘ

Abstract   PDF

Abstract

Six Sigma is a universal management approach implemented to companies like Motorola and General Electric. Acknowledging grand success in terms of global profitability and customer satisfaction in corporate world, healthcare sector can also be benefited by the application of the same to achieve similar benefits in this sector; Six Sigma is currently being spread in several laboratories around the world. The aim of this article is to clearly focus on different features of Six Sigma and its successful applications in medical laboratories, as well as to systematically review articles and books discussing Six Sigma strategy implementation in the laboratory field.

Keywords: six sigma appications, healthcare services, critical success factors, CSFs, clinical testing laboratories, medical laboratories, literature review

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Sample Research Publication in Year 2015

Sr. No.	Title of paper	Name of the author/s	Department of the teacher	Name of journal	Year of publication	ISBN/ISSN number	Link of the recognition in UGC enlistment of the Journal	Page No.
10	Luminescence study of γ-ray and C5+ ion beam irradiationLiCaBO3 :Cu phosphor	Abha H. Oza, N.S. Dhoble, S.P.Lochab & S.J. Dhoble	Applied Physics	Radiation Effects and Defects in Solids(Taylor & Francis)	2015	ISSN: 1042-0150	https://www.ugc.ac.in/journallist/ugc_admin_journal_report.aspx?eid=MzI1MzU=	14
11	Effect of Ce3+ ion on Dy3+ or Mn2+ in KMgSO4Cl synthesized by centrifuge method	Nita Shinde, N. S. Dhoble, S.C. Gedam and S. J. Dhoble	Applied Physics	Journal of luminescence(Elesiver)	2015	ISSN: 0022-2313	www.ugc.ac.in/journallist/ugc_admin_journal_report.aspx?eid=MjQzNTY=	15
12	Correlation of Ionic Conductivity of Lithium Borosilicotitanate Glasses with Structure	N. S. Satpute and A. V. Deshpande	Applied Physics	Transactions of the Indian Institute of Metals	2015	Print ISSN 0972-2815,·On line ISSN 0975-1645	https://link.springer.com/article/10.1007/s12666-014-0454-z	16

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Luminescence study of γ-ray and C^{5+} ion beam-irradiated LiCaBO$_3$:Cu phosphor

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Cu-doped LiCaBO$_3$ phosphors were prepared by modified solid-state synthesis and the formation of compound was confirmed by X-ray diffraction study. LiCaBO$_3$:Cu$^+$ (Cu = 0.02, 0.05, 0.1 and 0.2 mol%) were studied for photoluminescence (PL) study and prominent PL emission spectra were obtained for Cu$^+$ with transition ^{3}d$_9$^{4}s$_1$ → ^{3}d$_{10}$. The phosphors were further studied by thermoluminescence (TL) property for exposure to γ-ray irradiation of 1.2 rad with ^{137}Cs source. TL of LiCaBO$_3$:Cu was also studied for C^{5+} (3.75 × 10^{12} ion cm^{-2}) beam irradiation for 1 min exposure time. Trapping parameters (activation energy and frequency factor) for single deconvoluted peaks were obtained by Chen's peak shape method.

Keywords: modified solid-state synthesis; γ-ray irradiation; C^{5+} ion beam irradiation; trapping parameters

1. Introduction

The heavy ion therapy term uses particles more massively than protons or neutrons, such as carbon ions. Compared with protons, carbon ions have some advantages due to the higher density of ionization at the end of their range, correlated damages of the DNA structure within one cell occur more often so that it becomes more difficult for the cancerous cell to repair the damage. This increases the biological efficiency of the dose by a factor between 1.5 and 3. Compared with protons the disadvantage of carbon ions is that beyond the Bragg peak, the dose does not increase to zero. The nuclear reactions between the carbon ions and the atoms of the tissue lead to the production of lighter ions which have a higher range. Therefore, some damage occurs also beyond the Bragg peak. Due to this the penetration depths of those ions can be projected to have a maximum absorption at the tumor positions. However, the dose of these energetic ions needs to be measured with great precision and accuracy, especially when dealing with human beings. This has triggered investigations to use thermoluminescent dosimeters (TLDs) for dose verification in heavy ion irradiation. In this respect, Salah have investigated carbon ions irradiation on nano and microcrystalline CaSO$_4$:Dy a well-known TL material (*I*).

Borate-based materials have earned a significant place in dosimetry for their neutron sensitivity and near tissue-equivalent absorption coefficient (*2*, *3*). Thermoluminescence (TL)

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Full Length Article

Effect of Ce^{3+} ion on Dy^{3+} or Mn^{2+} in $KMgSO_4Cl$ synthesized by centrifuge method

CrossMark

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ARTICLE INFO

ABSTRACT

In this paper effect of Ce^{3+} ion on Dy^{3+} and Mn^{2+} ions in microcrystalline $KMgSO_4Cl$ host prepared by ethanol (centrifuge technique) method has been discussed. In $KMgSO_4Cl$ sample X-ray diffraction (XRD), scanning electron microscopy (SEM) and photoluminescence (PL) characteristics have been studied. Powder X-ray diffraction analysis shows the crystalline nature of the phosphor prepared by this new route. The morphological structures of the samples were conducted using SEM technique. An average crystallite size was found to be 5 μm. Photoluminescence in $KMgSO_4Cl:Ce^{3+}$ is observed at 324 nm and 344 nm along with red emission broad band at around 644 nm. In $KMgSO_4Cl:$ Ce, Dy phosphor Ce^{3+} emission around 324 and 344 nm overlaps rather well with Dy^{3+} excitation. The addition of Ce^{3+} showed higher photoluminescence (PL) intensity for the Dy^{3+} emissions around 482 and 576 nm excited via Ce^{3+} ions at 284 nm due to $^4F_{9/2}$ to $^6H_{15/2}$ and $^6H_{13/2}$ levels. $Ce^{3+} \rightarrow Mn^{2+}$ energy transfer process occurs in $KMgSO_4Cl$ host. $KMgSO_4Cl:$ Mn does not give PL at 284 nm excitation but for co-doped samples with cerium, Mn^{2+} ions exhibits efficient fluorescence at around 560 nm due to $^4T_1-^6A_1$ transition. $KMgSO_4Cl:$ Dy or $KMgSO_4Cl:$ Mn directly exciting does not show any emission while addition of Mn^{2+}, enhances red emission of Ce^{3+} at 644 nm. The CIE co-ordinates of $KMgSO_4Cl:Ce$; $KMgSO_4Cl:Ce$, Dy and $KMgSO_4Cl:Ce$, Mn phosphors reveals that the emission colour varies from blue to deep-red. Hence this material may be a potential lamp phosphor.

1. Introduction

By continuing the study on the same $KMgSO_4Cl$ host by adopting new ethanol synthesis method (centrifuge technique), we could successfully prepare it. Previously we have worked on $KMgSO_4Cl:$ Ce; $KMgSO_4Cl:$ Ce, Dy and $KMgSO_4Cl:$ Ce, Mn (S.C. Gedam, S. J. Dhoble, S. V. Moharil J. Lumin. 124 (2007) 120–126) by using wet chemical method. The luminescence properties of co-activator compounds have received considerable interest. The main interest has been received concerned with the utilization of efficient energy migration on sensitizer to activator. Energy transfer phenomena have led to the development of new and efficient photoluminescence materials. Cerium doped materials usually show strong broad- band PL. The luminescence is very strongly dependent on the host lattice and can occur from the ultraviolet to the red region of the electromagnetic spectrum. Ce^{3+} emission results from 5d to 4 f type of transition. As far as the

spectroscopy is concerned, the Ce^{3+} ground state [1,2] is split between $^2F_{5/2}$ and $^2F_{7/2}$ and these are the only levels possible for 4 f configuration. f–f transition in Ce^{3+} is in the IR region. At room temperature, they occur as unresolved bands with a maximum at about $2200–2300\ cm^{-1}$ and half width of $250–300\ cm^{-1}$. The excited state, above $^2F_{7/2}$ level, belongs to 5d configuration in the form of broad bands. Energy transfer process from Ce to activators in different host matrices is well known. Broad band emitters are often used to sensitize the luminescence of RE ions. Optical transitions within a $4f^n$ configuration are so strongly forbidden that they appear in the absorption spectra as very weak. However, excitation resulting in high light output can be achieved by exciting a different ion (i.e., sensitizer) with an optically allowed transition which transfers the excitation energy to the RE activator.

Efficient energy transfer from the broad (i.e. Ce^{3+}) to the narrow-line emitter (i.e, Dy^{3+} or Mn^{2+}) is possible only between nearest neighbours in the crystal lattice and optimal spectral overlap. If the spectral overlap is small, only partial energy transfer is possible. CaF_2: Mn does not give any fluorescence under the UV excitation while CaF_2: Ce gives a characteristic Ce^{3+} fluorescence emission with UV

TECHNICAL PAPER

TP 2852

Correlation of Ionic Conductivity of Lithium Borosilicotitanate Glasses with Structure

N. S. Satpute · A. V. Deshpande

Abstract Lithium ion conducting glasses containing TiO_2 have been prepared by the conventional melt quenching technique. Electrical conductivity σ_{dc}, activation energy E_a, density ρ, molar volume V_m, coefficient of thermal expansion (CTE) and glass transition temperature T_g for all the glass samples were measured. The variation of electrical conductivity with addition of TiO_2 in lithium borosilicate system has been studied. The FTIR spectroscopy has been used for structural studies of these glasses. The decrease in conductivity with the addition of TiO_2 at the cost of modifier Li_2O is explained on the basis of changes in glass structure revealed by the IR spectrum which is also supported by the T_g, density and CTE variation. The electrical modulus spectra of the glasses have been studied to understand the conduction mechanism.

Keywords Lithium borosilicate glasses ·
Electrical conductivity · Titanium dioxide · Density ·
CTE · FTIR

1 Introduction

Glassy solid electrolytes are promising for potential application in a variety of electrochemical devices like all solid state batteries because of their several advantages over the crystalline solid electrolytes viz. a wide range of selection of compositions, isotropic properties, no grain boundaries, easy film formation and so on [1, 2]. The ionic conductivity of glasses is generally higher than that of corresponding crystalline solids due to their so called open structure. The glasses containing TiO_2 have gained much importance in recent years due to their possible applications in non linear optical devices such as ultra fast switches and power limiters [3–5]. The presence of small quantity of TiO_2 in the glass matrices is observed to enhance the glass forming ability and chemical durability of the glasses [6]. The presence of TiO_2 also helps to decrease the viscosity of the glass melts [7].

Since lithium is more electropositive, lithium based systems are particularly attractive due to their high energy densities and high open circuit potentials, find potential applications in solid state batteries [8]. Oxide based Li^+ ion conductors are more interesting as they are chemically stable in air and generally easier to fabricate and handle. The glasses in the $Li_2O:B_2O_3:SiO_2$ system are of considerable interest because large amount of lithia can be incorporated into these glasses and still they yield stable glasses [9–11]. It has been reported that the composition $30Li_2O:60B_2O_3:10SiO_2$ gives maximum conductivity in the glass system $30Li_2O:(70 − x)B_2O_3:xSiO_2$ [12]. Earlier, effect of addition of TiO_2 at the cost of formers on conductivity, glass transition temperature T_g, coefficient of thermal expansion (CTE) of lithium borosilicate glass was studied [13]. In addition, a number of reports have been published concerning the coordination structure of Ti ions in glass. Sakka et al. [14] reported that most Ti ions existed in TiO_4 units in $K_2O–TiO_2$ and $Cs_2O–TiO_2$ glass systems. Kusabiraki et al. [15] reported that co-ordination number of Ti ions in $Na_2O–TiO_2–SiO_2$ glasses changed from 4 to 6 with increasing Na_2O content. Cheng [16] reported that Ti ions substitute for Si ions in the tetrahedral coordinated

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Sample Research Publication in Year 2014

Sr. No.	Title of paper	Name of the author/s	Department of the teacher	Name of journal	Year of publication	ISBN/ISSN number	Link of the recognition in UGC enlistment of the Journal	Page No.
13	Density and viscosity of nicotinic acid and nicotinamide in dilute solutions at and around temperature of maximum density of water.	P. N. Dahasahasra, S. S. Dhondge, L. J. Paliwal, D.W. Deshmukh	Applied Chemistry	Journal of Chemical Thermodynamics, , 76, 16-23	2014	ISSN No. 0021,9614	https://www.sciencedirect.com/science/article/pii/S0021961414000755	18
14	Design Of Experimental Set-Up For Establishing Empirical Relationship For Chaff Cutter Energized By Human PoweredFlywheel Motor	J.P.Modak, P.B. Khope	Mechanical Engineering	Journal of Agricultural Technology 2013,Vol. 9(4): 779-791 SCOPUS INDEXED	2014	ISSN 1686-9141	https://www.ugc.ac.in/journallist/subjectwisejournallist.aspx?tid=MTY4NjkxNDE=&&did=U2VhcmNoIGJ5IElTU04=	19
15	Formulation And Comparison Of Experimental Based Mathematical Model With Artificial Neural Network Simulation And RSM (Response	C.N. Sakhale M.P. Singh S.K Undirwade S.N. Waghmare V.M. Sonde	Mechanical Engineering	Elsevier Journal-Index-9 Procedia Materials Science 6 (2014) 1710 – 1724, 3rd International Conference on Materials	2014	SSN: 1005-0302	https://www.sciencedirect.com/science/article/pii/S2211812814004702	20

	Surface Methodology) Model For Optimal Performance Of Sliver Cutting Operation Of Bamboo			Processing and Characterisation (ICMPC 2014),Pp1710-1724 Elsevier, SCOPUS INDEXED				

Density and viscosity study of nicotinic acid and nicotinamide in dilute aqueous solutions at and around the temperature of the maximum density of water

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ABSTRACT

In the present study, we report experimental densities (ρ) and viscosities (η) of aqueous solutions of nicotinic acid and nicotinamide within the concentration range (0 to 0.1) mol · kg^{-1} at T = (275.15, 277.15 and 279.15) K. These parameters are then used to obtain thermodynamic and transport functions such as apparent molar volume of solute (V_ϕ), limiting apparent molar volume of solute (V_ϕ^0), limiting apparent molar expansivity of solute (E_ϕ^0), coefficient of thermal expansion (α^*), Jones–Dole equation viscosity A, B and D coefficients, temperature derivative of B coefficient i.e. (dB/dT) and hydration number (n_H), etc. The activation parameters of viscous flow for the binary mixtures have been determined and discussed in terms of Eyring's transition state theory. These significant parameters are helpful to study the structure promoting or destroying tendency of solute and various interactions present in (nicotinic acid + water) and (nicotinamide + water) binary mixtures.

1. Introduction

Vitamins are essential for the normal growth and development of multicellular organisms. Nicotinic acid and its amide form called as nicotinamide are biosynthetically converted to nicotinamide adenine dinucleotide (NAD$^+$) which readily accepts hydride equivalents to form reduced dinucleotide, NADH. Within the cells, NADP/NADPH performs similar chemical functions [1]. Nicotinic acid plays a very important role to maintain the normal function of the digestive systems and cholesterol levels in human body [2–6]. Nicotinamide is widely used for treating Pellagra and various skin problems like acne, rosacea, autoimmune bullous [7,8]. The physiological and biochemical aspects of vitamins have been studied in detail. However, physicochemical data on vitamins is minimal [9–16]. At low temperatures the water is in a highly ordered state, especially at T/K = 277.15. It exhibits maximum density as a function of temperature, which may be due to a change in equilibrium ratio of the polymeric low density structured form to the monomeric high density unstructured form. Thus in the neighbourhood of temperature of maximum density, nature and size of solute plays a very important role in affecting the structure

of water rather than that observed at higher temperatures [17]. Systematic work has been done on volumetric and ultrasonic properties of some alcohols [18,19] and amino acids [20,21] around TMD, in our laboratory. Partial molar volumes and compressibility of various important class of organic compounds, such as aliphatic alcohols [22], glycols [23,24], thiourea and its derivatives [25] have been reported at lower temperatures. A considerable amount of work has been done on thermodynamic and transport properties of aqueous solutions of nicotinic acid and nicotinamide [26–35]. But all these measurements have been reported at higher temperatures. It is observed that very few researchers have focused their study on volumetric and transport properties of aqueous solution of vitamins around TMD of water. So the objective of this work is to discuss (solute + solute) and (solute + solvent) interactions amongst (nicotinic acid + water) and (nicotinamide + water) binary systems at and around TMD. Hence it would be interesting to study how these biologically important vitamins affect the highly structured solvent at lower temperatures.

2. Materials and methods

The details of solutes used in this work for the nicotinic acid and nicotinamide are listed in table 1. A chromatographic analysis (LCMS) has been carried out in order to evaluate the nature and

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Design of Experimental Set-up for Establishing Empirical Relationship for Chaff Cutter Energized by Human Powered Flywheel Motor

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Abstract A human powered chaff cutter has been developed in the absence of any data. Literature survey reveals thata system for pumping using muscular energy in the flywheel is feasible and then the energy stored in flywheel can used for different applications. Accordingly, it was decided to work on chaff cutter with this concept and to establish an empirical relationship for human powered chaff cutting process. Since this is a man-machine system, it is rather difficult and unreliable to adopt total theoretical approach for the development, thus, the experimental approach was adopted. This set up consists of three subsystems namely. (i) Human powered flywheel motor (HPFM) i.e. energy unit. (ii)Torque amplification gears and clutch unit and (iii) process unit i.e. chaff cutter. This paper reports the design of experimental setup for carrying out the experimentation to establish empirical relationship for chaff cutter energized by human powered flywheel motor.

Key words: Human powered Flywheel Motor, Chaff cutter.

Introduction

In India, animal husbandry is an integral part of the rural economy. The forage (dry or wet) production requires high labor, coupled with a lack of sufficient land for forage. Production and forage scarcity during the dry season means that available forage must be efficiently used to minimize waste.

Traditionally, the farmers chop forage into small pieces for easy consumption by the animals as shown in Figure1. This method is tedious, time consuming and quite dangerous to operator, as well as low output and lack of

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3rd International Conference on Materials Processing and Characterisation (ICMPC 2014)

Formulation and Comparison of Experimental based Mathematical Model with Artificial Neural Network Simulation and RSM (Response Surface Methodology) Model for Optimal Performance of Sliver Cutting Operation of Bamboo

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Abstract

Bamboo enterprises are continuously sustaining national economy through providing employment opportunities for rural people including raw material collection, processing and marketing. Bamboo has many industrial uses, through this work tried to make the maximum operations feasible so that the machine can prove employment in rural areas at very low manual efforts. This paper reports on design and development of machine with specialty of multiple operations of bamboo processing incorporated in a single machine. It also includes designing of measuring devices for measurement of current drawn, processing torque, Energy, and time required for each processing operations using specially designed electronic kit. The present work reports the design of experimental work to be executed for establishing approximate generalized empirical model for Bamboo(machining properties) processing operations such as cross cutting, external knot removal(two side planning),splitting, internal knot removal, sliver(slats) and stick making, on the basis of experimentation data chosen, using methodology of engineering experimentation. Out of all processing operations, formulation and analysis only for sliver cutting operation is completely mentioned in this paper. The evolution of bamboo machining properties using processing cutters is a complex phenomenon. There are many factors (like geometric variables of machine and bamboo, variation in angular speed, processing torque and variation in current) affecting the performance of bamboo processing machine. This paper presents an experimental investigations and Sequential classical experimentation technique has been used to perform experiments for various sizes of bamboo at different varying speed. An attempt of mini-max principle has been made to optimize the range bound process parameters for minimizing processing torque, Energy, and time required for bamboo Sliver Cutting operation. The test results proved that processing torque, Energy, and time values were significantly influenced by changing important seven dimensionless π terms. The process parameters grouped in π terms were suggested the effective guidelines to the manufacturer for improving productivity by changing any one or all from the available process parameters.

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Sample Research Publication in Year 2013

Sr. No.	Title of paper	Name of the author/s	Department of the teacher	Name of journal	Year of publication	ISBN/ISSN number	Link of the recognition in UGC enlistment of the Journal	Page No.
16	Impact of Wind Power on Generation Economy and Pollution from Coal Based Thermal Power Plant.	Dr. K. B. Porate	Electrical	Elsevier's International Journal of Electrical Power and Energy Systems (IJEPES),	2013	0142-0615	https://www.ugc.ac.in/journallist/subjectwisejurnallist.aspx?tid=MDE0MjA2MTU=&&did=U2VhcmNoIGJ5IElTU04=	22
17	New algorithm with simple training symbol for timing error estimation of OFDM system	Dr.A.P Rathkanthiwar	Electronics &Telecommunication Engineering	Proceedings of the 2013 International Conference on Advances in Computing, Communications and Informatics, ICACCI 2013	2013		https://www.scopus.com/authid/detail.uri?authorId=3705144 7500	23
18	Design and Fabrication of a Dual Powered Mini Pelletizer	Y.M.Sonkhaskar V.S.Deshpande J.P. Modak	Mechanical Engineering	Applied Mechanics and Materials SCOPUS INDEXED	2013	ISSN 1662-7482	https://www.scientific.net/AMM.465-466.242	24

Power plants coordination for economic and environmental load dispatch of thermal power plants with wind generation systems

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Abstract: Economic load dispatch (ELD) and economic emission dispatch (EED) have been applied to obtain generation scheduling of thermal power plants at optimum fuel cost and emissions. Due to limited availability of quality coal, issue of environmental emissions and high prices of coal, installation of renewable energy systems are suggested in power grid. Renewable energy system preferably wind generators are used in co-working with thermal plant which reduces generation cost, coal requirement and environmental emissions. This paper presents Newton-Raphson method to obtain ELD and EED. System simulation and programming is carried out in MATLAB® environment. Analysis has been made on generation cost and for nitrous oxides emissions only due to its harmful effects and its rising tendency with excess air. Price penalty factor is also calculated to determine emission cost. Doubly fed induction generator (DFIG) is suggested as wind energy systems in combination with coal-based thermal plant. Performance results related to generation scheduling, transmission line loading, bus voltages, total cost and environmental emissions are shown for coal-based thermal power plant and with co-generation. The investigation shows that with co-generation, coal-based thermal power plant runs at minimum emissions level which further reflects on the generation economy.

Keywords: economic load dispatch; ELD; economic emission dispatch; EED; environmental emissions; coal-based thermal power plants; doubly fed induction generators.

New Algorithm With Simple Training Symbol For Timing Error Estimation Of OFDM System

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In many wireless communication systems, the data packet or frame start with the preamble called training symbol or reference symbol. This training symbol is designed to have some specific pattern. In this research work the frame used has training symbol in the beginning before data symbols. We are proposing new pattern for training symbol which consists of all identical samples and a new algorithm for timing error estimation. Timing metric of proposed algorithm shows a peak at the end of training symbol. The peak is detected for estimation of timing error. Performance analysis of proposed algorithm is presented in terms of detection error probability, mean error and standard deviation of estimation. BER graph is also presented for 4QAM and 16 QAM. The results are shown for AWGN channel and Rayleigh channel.

Keywords- Synchronization; orthogonal frequency division multiplexing (OFDM); timing estimation;

I. INTRODUCTION

With the improvements in digital signal processing and VLSI technology, OFDM technique is being applied extensively to high data rate digital transmission. Orthogonal frequency division multiplexing (OFDM) is a bandwidth efficient modulation scheme for high speed data communication in frequency-selective multi-path fading channels[1]. The mitigation of frequency selectivity in multi-path fading channels is possible with OFDM, because the frequency selective fading channel is transformed into multiple flat fading channels, one for each sub-carrier. The orthogonality among sub-carriers makes a more compact signal bandwidth for a given data rate. Furthermore, it provides larger flexibility by allowing independent selection of the modulation parameters (like the constellation size and coding scheme) over each sub-carrier. OFDM Modulation can be realized with Inverse Fast Fourier Transform (IFFT). Due to all these favorable features, many digital transmission systems have adopted OFDM as the modulation technique such as digital video broadcasting terrestrial TV (DVB-T), digital audio broadcasting (DAB), terrestrial integrated services digital broadcasting (ISDB-T), digital subscriber line (xDSL) etc. Now it is being used in packet based systems like multimedia mobile access communications (MMAC),

and the fixed wireless access (FWA) system in IEEE 802.16.3 standard [2]. OFDM is a fundamental technology in the 3GPP LTE and 4G-multimedia mobile communication systems.

There are some disadvantages in the OFDM systems, for example, the large Peak-to Average Power Ratio (PAPR) and high sensitivity to the synchronization errors. Synchronization errors not only cause inter-symbol interference (ISI) but also introduce inter-carrier interference (ICI) due to the loss of orthogonality among all sub-carriers. In OFDM downlink transmission, each terminal has to perform timing and frequency synchronization. In the process of synchronization, the synchronization errors are estimated and corrected. This paper addresses only timing synchronization.

II. TIMING OFFSET IN OFDM

Data stream is mapped into N complex symbols in frequency domain. These N complex symbols are modulated on N subcarriers by using N-point inverse fast Fourier transform (IFFT) to get time domain complex OFDM symbol. In an AWGN channel, without frequency offset, received signal is given by

$$r(n) = x(n - \Delta\theta)e^{j\varphi} + w(n) \qquad (I)$$

Where $\Delta\theta$ is time offset, φ is the carrier phase and $w(n)$ is complex white Gaussian noise. Timing error or timing offset $\Delta\theta$ occurs because of channel delay and multipath dispersion. Due to this timing error, the receiver's time-domain FFT window spans samples from two consecutive OFDM symbols. This results in inter symbol interference (ISI) leading to BER degradation [3]. Hence it is very important to estimate and correct the timing error at the receiver before FFT window. Assume that the channel impulse response (CIR) is shorter than the guard interval i.e. Cyclic Prefix (CP), the position of FFT window can have several situations, as shown in figure1 [4]. The desired start position of FFT window is at the boundary of region B and C. If the start position is in region B, the signals in FFT window will not be contaminated by the previous symbol because of Cyclic Prefix (CP) and thus no inter-symbol interference (ISI) occurs.

Design and Fabrication of a Dual Powered Mini Pelletizer

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Keywords: Pelletizer, Pellets, Human Powered Pelletizing Machine (HPPM)

Abstract

Wood pellets are compressed wood particles that are used as fuel. Pellets are gaining popularity and are commonly used in some areas of India owing to the cost effectiveness. One of the major reasons is the increase in the cost of primary fuels and concerns about global climate change. For research and development work and for the production of small quantities of pellets for specific applications, it is important to have a low-cost apparatus or machine for making pellets. The paper discusses the local design and manufacturing of a dual-mode pelletizing machine. It can be powered either electrically or manually. Therefore, it can be used by both rural as well as urban dwellers. It can be a backup in conditions of power failure, and can also prove a boon in rural areas where there is no electricity.

The objective of this work was to analyze, design and fabricate a model for a Dual Mode Pelletizing Machine which would be used for production of pellets on small scale and can be powered by either electrical motor or human pedaling. The Pelletizing Machine was designed, fabricated and experiments were performed to obtain pellets from sawdust, powered by electric motor as well as human pedaling.

1. Introduction

Pelletization is defined as the process of compressing or moulding the biomass into small lengthened particles such that the length is always greater than the width for general purpose usage. Wood pellets have increased tremendously in popularity as a heating fuel in recent years with many homes and commercial plants choosing pellet stoves or boilers over traditional wood-fired equipments due to their relative ease of use. As a result, the demand for fuel pellets has also grown by and large. However, wood is not the only suitable feedstock for manufacturing pellet fuel. A wide array of biomass materials can be used to manufacture pellets, such saw dust, corn stalk, rice husk, wheat bran, coconut skins and perennial grasses such as switch-grass. The variety of biomass that can be used along with their sources are given in table-1. Not only that, but the necessary equipment for making pellets is available in different sizes and scales, which allows small scale manufacturers (single home) for their personal use to the largest commercial plants producing more than 500 million tons of pellets per year.

Sample Research Publication in Year 2012

Sr. No.	Title of paper	Name of the author/s	Department of the teacher	Name of journal	Year of publication	ISBN/ISSN number	Link of the recognition in UGC enlistment of the Journal	Page No.
19	Post Harvest Crop Processing Machine	K.S. Zakiuddin, J.P.Modak	Mechanical Engineering	Agricultural Engineering International: the CIGR Ejournal,Vol-14 No. 3 99, 2012 SCOPUS INDEXED	2012	ISSN: 1682-1130	https://www.ugc.ac.in/journallist/subjectwisejurnallist.aspx?tid=MTY4MjExMzA=&&did=U2VhcmNoIGJ5IElTU04=	26
20	History Of Human Powered Threshing Machines: A Literature Review	K.S. Zakiuddin, H.V. Sondawale, J.P. Modak, Marco Ceccarelli	Mechanical Engineering	Springer Science + Business Media Dordrecht ,Pp. 431–445. SPRINGER, SCOPUS INDEXED	2012	ISSN: 1875-3426	https://www.ugc.ac.in/journallist/subjectwisejurnallist.aspx?tid=MTg3NTM0MjY=&&did=U2VhcmNoIGJ5IElTU04=	27
21	Formulation Of Experimental Data Based Model For Oil Press Using Human Powered Flywheel Motor As Energy Source	J. P. Modak, A. D. Dhale	Mechanical Engineering	Agricultural Engineering International: the CIGR Ejournal,Vol. 14, No.3, September, 2012, Pp 218-229 SCOPUS INDEXED	2012	ISSN :16821130	https://www.ugc.ac.in/journallist/subjectwisejurnallist.aspx?tid=MTY4MjExMzA=&&did=U2VhcmNoIGJ5IElTU04=	28

Post harvest crop processing machine

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Abstract: Chaff is hay cut into small pieces for feeding to livestock. Chaff can be carried by manually operated machine and electricity operated machine. This paper presents experimental work executed for establishing mathematical model and simulation for chaff cutting operation establishment of mathematical model and its optimization. Has been established for responses of the system such as instantaneous resistive torque (π_{D1}), number of cuts (π_{D2}) and process time (π_{D3}). Model for dependent term instantaneous resistive torque: π_{D1}. The models are: $\frac{D}{gJ}\ T_c = 1.645 \times 10^3\ (\pi_1)^{3.8074}\ (\pi_2)^{0.5141}\ (\pi_3)^{-0.4521}$ $(\pi_4)^{1.686}\ (\pi_5)^{2.3237}\ (\pi_6)^{0.8162}\ (\pi_7)^{-0.4189}\ (\pi_8)^{-0.3840}$. Model for dependent term number of cut (C) π_{D2}: $\pi_{D2}= 0.6449\ (\pi_1)^{0.0001}\ (\pi_2)^{-0.0146}$ $(\pi_3)^{0.3471}\ (\pi_4)^{1.0151}\ (\pi_5)^{0.2781}\ (\pi_6)^{0.1233}\ (\pi_7)^{0.9701}\ (\pi_8)^{0.4773}$. Model for the dependent term process time, π_{D3}: $\pi_{D3} = 43.43\ (\pi_1)^{0.0001}$ $(\pi_2)^{0.1753}\ (\pi_3)^{0.0012}\ (\pi_4)^{0.0001}\ (\pi_5)^{0.0505}\ (\pi_6)^{0.2508}\ (\pi_7)^{1.0008}\ (\pi_8)^{0.0004}$. This paper discusses about the applications for pedal power technology.

Keywords: manually energized flywheel motor, spiral jaw clutch, fodder

1   Introduction

Developing countries like India are facing problems of power storage due to rapid industrialization, like non availability of power in interior areas and large scale unemployment of semi-skilled worker. In the context of the present condition in India of power shortage and exhaustion of coal reserves and unemployment, crop cutting machine is very necessary. As far as manually operated machine is concerned for the operator the machine is physically demanding energy and postural requirements and is commonly regarded as source of drudgery. In the recent years, a human-powered process machine has been developed for brick making (Modak, 1998) wood turning, finger type torsionally flexible clutch for a low capacity manually energized chemical unit and battery charging (Modak, 1993). The machine consists of a human powered flywheel motor using a

bicycle-drive mechanism with speed increasing gearing and a flywheel, which drives the process unit through a clutch and torque-increasing gearing (Dhakate, 1995).

2   Materials and methods

2.1   Working principle of fodder chopper machine

Working principle of manually energized fodder chopper machine is described as was shown in Figures 1 and 2. Each rider accelerates the flywheel to the speed of 600 r/min in 1 min (Alexandrove, 1981). The size flywheel is 1 m in rim diameter, 10 cm in rim width and 2 cm in rim thickness such a flywheel when it is energized to the speed of 600 r/min stores energy. In this machine, first energy is stored in the flywheel by accelerating it to a desired speed by pedal through chain and gear drive. When flywheel attains the desired speed, it is connected to the torque amplification gear by engaging a spiral two jaw clutch (Gupta, 1997). The energy stored in flywheel is supplied at the required rate to shaft of the chaff cutter and cutting of fodder, to obtain small pieces of fodder. A free wheel is used between pedals and the flywheel to prevent the back flow of

History of Human Powered Threshing Machines: A Literature Review

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Abstract. The objective of this paper is to present the recent developments in the field of agricultural technology with respect to human powered threshing machines. This paper covers the form and existence of human powered threshing machines as well as manual methods from last decades. The different types of designs and progressive developments with operating parameters and mechanisms used can be overviewed from the literature review to find out the scope for further developments in human powered threshing machines.

1 Introduction

Area of agriculture is leading towards the commercialization in economic point of view. Emphasis is on the mechanization of pre- harvesting and post- harvesting equipment's. Post harvesting equipment's including threshing, have promising future towards the industrialization and local employment if the equipment is available at low cost and with the ease of operation. Then the recommendation will be given to human powered threshing machine which is eco friendly as well as operated with the human power which is recognized as a renewable source of energy.

The early methods of threshing includes hand threshing, bullock threshing, human powered thresher and the modern one of using a power operated thresher or tractor, and intermediate one where part of the output is threshed by bullocks and part by a thresher or a tractor. The paper focus on human powered threshing machine so taking a brief history with the traditional methods of threshing.

2 Materials and Methods

This study was designed on the basis of Investigative Survey Research Approach (ISRA) as developed by Anazodo (1975, 1983). The investigative survey research approach for operating data entails the history and forms of the human powered

Formulation of experimental data based model for oil press using human powered flywheel motor as energy source

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Abstract: Human powered oil press extracts oil from oilseeds. The extracted oil can be used for eating purpose or even in laboratories where one can take different tests on the oil. A machine was fabricated which will perform this pressing operation not by electric power but by human power. It is seen that human power is sufficient enough to be converted into work. The evolution of oil press by using human power is a complex phenomenon. There are many factors affecting the performance of oil press. To study man-machine interaction and human fatigue in various agricultural tasks, AICRP on HESA (All India Coordinated Research Project on "Human Engineering and Safety in Agriculture") (1996) started by Indian Council of Agricultural Research, used experimental approach. As a result of the continuous variation of speed of the process unit input shaft, understanding of the phenomenon of execution of the process cannot be logic based. Hence it is necessary to adopt application of Methodology of Experimentation to such a process for formulating experimental data based model. Hence Theory of Experimentation, provided by H. Schenck Jr. was applied. In this paper, an approximate generalized data based model for such a human powered oil press is developed by varying independent parameters during the experimentation. Subsequently the optimization of the model was established. Thus the results of this experimental research would be useful to farmers or small scale entrepreneurs in the rural area, where there is 10 to 12 hours load sheding of electricity, especially in rural Maharashtra (India). This technology will not only improve the socioeconomic condition of the rural population, but also reduce the gap between supply and demand of edible oils.

Keywords: Human powered flywheel motor, energy, oilseed, oil press, dependent variables, and independent variables

Citation: A. D. Dhale, J. P. Modak. 2012. Formulation of experimental data based model for oil press using human powered flywheel motor as energy source. Agric Eng Int: CIGR Journal, 14(3): 218–229.

1   Introduction

Modak and some other engineers developed human powered process machines which energized process units needing 3 to 7 kW and which have intermittent operation.

This machine system comprised of three subsystems; energy unit, mechanical power transmission system and process unit. Energy unit comprised of an arrangement similar to a bicycle, a speed raising gear pair and a flywheel. The flywheel size is 1m diameter, 10 cm width and 2 cm thickness. The flywheel is with 6 armed

constructions and each arm is with elliptical cross section. Mechanical transmission comprises of spiral jaw clutch and torque amplification gear pair. The process units used are for brick making, wood turning, Algae formation machine, wood strips cutter and Smiths hammer and electricity generation.

A young operator with a slim stature and 165cm height sped up crusher flywheel to 700 to 800 r/min in a minute. Then pedaling was stopped and clutch was engaged connecting this human powered flywheel through torque amplification gears to a process unit. The stored energy in the flywheel around 28000 joules exhausted within 10 s to 20 s in operating a process unit depending on its process resistance. Recently Modak