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Length Research Paper

Production of extra cellular enzymes by microbial strains in molasses and additives supplemented fermentation media

Jenllarani, D.[1], Parthasarathy, N.[2], Dhasarathan, P.[1]* and Yuvashree, R[1].

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ıls work investigates the use of molasses (a cheap substrate) together with additives in fermentation edium to produce extra cellular protease, amylase and lipase, with the aid of *Aspergillus oryzae* and *acillus subtilis*. The concentration of molasses (0.1 – 1.0%) used for enzyme production by *A. oryzae* gnificantly influenced the extracellular lipase, amylase and protease biosynthesis/ secretion. The ghest extracellular enzyme activities were found at 96 h of processing (72, 52 and 65 U/ml for lipase, nylase and protease, respectively). As additives, two different carbon sources: *Avena sativa* and *Cicer ietinum* were tested for production of extracellular enzymes by *A. oryzae*. Among the different ıncentrations of *A. sativa*, high enzyme activity (61, 83 and 121 U/ml, respectively for lipase, amylase ıd protease) was noted at concentration of 2.5 g/L. For another additive, *C. arietinum*, highest :tracellular enzyme activity was found at 96 h (71; 61, 80 U/ml for lipase, amylase and protease). In this udy, it is concluded that the production of extracellular enzyme using molasses with additives had aximum value compared to using molasses alone in 96 h fermentation by *Aspergillus oryzae*.

ɔy words: Molasses, extracellular enzyme, *Aspergillus oryzae*.

)DUCTION

ıes are proteins that function as specialized catalysts emical reactions. They have contributed greatly to raditional and modern chemical industry by ving existing processes (Rao et al., 1998). The use yme-mediated processes can be traced to ancient ıtions. Today, more than 3000 enzymes are known, f these, about 600 are in commercial use; the ty of the industrial enzymes are of microbial origin. he 1960s, the total sales of enzymes were only a illion dollars annually, but the market has since grown spectacularly (Godfrey and West, 1996; Wilke 1999; Gilbert and Dupont, 2011). Because of improve understanding of production biochemistry, the fermentatio processes, and recovery methods, an increasing numbe of enzymes can be produced affordably. Also, advance in methods of using enzymes have greatly expande demand. Furthermore, because of the many differe transformations that enzymes can catalyze, the numbe of enzymes used in commerce continues to multiply (Ha et al., 2006). The world enzyme demand is satisfied b

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Original Research Paper

MICROBIAL DISTRIBUTION IN SPENT WASH MOLASSES EFFLUENT FROM SUGAR FACTORY

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ABSTRACT

Sugar factory effluent produces obnoxious odour and unpleasant color. Molasses-based distilleries are one of the most polluting industries generating large volumes of high strength wastewater. Distribution of the beneficial microbial load in the molasses could be reflecting in bio-product formation. In the present investigation, THBP of molasses sample was enumerated as 39 x 10^{-3} CFU/ ml. The countable ranges of fungal colonies (42 CFU/ml) were found in as such sample poured plates. The countable ranges of yeast colonies (47 CFU/ml) were found in 10^{-1} dilution plates. Forty two microbial strains were isolated and identified. The 12 chosen bacterial isolates of each cycle showed three predominant genera of Gram negative and Gram positive bacteria. The most frequently isolated bacterial genera included *Bacillus sp.*, *Micrococcus sp* and *Pseudomonas sp.* Based on the morphological and biochemical characteristics. The total heterotrophic bacteria population in the molasses was also found to be more in the other types of microorganisms.

Keywords: *Microbial distribution, molasses, generic composition and effluent.*

1.INTRODUCTION

Sugar factory effluent produces obnoxious odour and unpleasant color when released into the environment without proper treatment. Molasses-based distilleries are one of the most polluting industries generating large volumes of high strength wastewater (Satyawali and Balakrishnan, 2007). Farmers have been using these effluents for irrigation, found that the growth, yield and soil health were reduced. Along with the effects of various industrial

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Invitro effectiveness of Vertebrate steroids on oocyte maturation in the mud crab *Scyllaserrata* with reference to protein metabolism

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ABSTRACT

Reproduction in crustaceans involves spermatogenesis in the males and oogenesis in the females. These are very complex processes and as such are regulated by a wide variety of hormones. These hormones include vertebrates- type steroids (estradiol-17β and progesterone), gonad inhibiting hormone and biogenic amines. In some cases these hormones act directly on an organ involved in reproduction, while in other cases they inhibit or stimulate the action of other hormones. Despite these differences, the hormones all work together to regulate the reproduction. Steroid hormones are not stored prior to release and so must be synthesized de novo upon each new stimulus. There is large amount of interconversion between them. For example, the female sex hormone estradiol can be converted to the male sex hormone testosterone, and vice versa. Studies related to ovarian follicle maturation have been carried out with three purposes. The first is connected to the search for phenomena involved from the end of the oocyte growth period to ovulation. The second idea behind this considers oocyte maturation as a bioassay to test the potency of different hormonal preparations. The third one is to develop and determine the best physiological state of females for hormonal administration.

Keywords: oocyte,hormones, reproduction

1.INTRODUCTION:

Reproduction in crustaceans involves spermatogenesis in the males and oogenesis in the females . These are very complex processes and as such are regulated by a wide variety of hormones. These hormones include vertebrates- type steroids (estradiol-17β and progesterone). Ecdysterroid, methyl farnesoate, gonad inhibiting hormone and biogenic amines.In some cases these hormones act directly on an organ involved in reproduction, while in other cases they inhibit or stimulate the action of another hormones. Despite these differences, the hormones all work together to regulate the reproduction.

Production of biofilm vaccine for Aeromonas hydrophila and studying its efficacy in a fish model

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1st K. Gopalakrishnan

2nd D. Jenila Rani

3rd K. Karthick Raj

4th A. Uma

ABSTRACT

Aeromonas hydrophila isolate was obtained from the infected gold fish exhibiting dropsy. The isolate was confirmed by various biochemical tests and Polymerase Chain Reaction (PCR). PCR amplification targeting the aerolysin gene of A.hydrophila resulted in a PCR product of 232 bp size. This confirmed isolate was used for the preparation of free cell vaccine and biofilm vaccine of A.hydrophila. The protein profiles of these vaccines were compared by SDS Polyacrylamide gel electrophoresis (SDS-PAGE). The efficacies of these vaccines were studied by administering them to healthy gold fishes by immersion treatment. The antiserum from the vaccinated fishes agglutinated the A.hydrophila when confirmed by microscopic agglutination test. The antibody titre in the biofilm vaccine administered was 1:32 against 1:8 in the free cell vaccine administered fishes. The results of the study showed that biofilm vaccine would confer better protection against A.hydrophila infection and immersion method of administration is effective for vaccinating the ornamental fishes like gold fish.

Comparison of Kernel and Decision Tree-Based Algorithms for Prediction of MicroRNAs Associated with Cancer

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Abstract: The discovery of microRNAs (miRs) in the 1990's spawned a genre of research which has thrown light on the involvement of these small non-coding RNAs in several developmental pathways and diseases, one of which happens to be cancer. While algorithms which predict the binding of miRNAs to their targets are abundant, the same is not true for the association of miRNAs to targets which can be implicated in cancer. Machine learning approaches, which have been implemented in target prediction need to be extrapolated with proper feature selection to reach an acceptable level of accuracy in the prediction of associations of miRNAs to cancer. In this study we present a comparison of three different learning algorithms *viz.*, the kernel-based Support Vector Machines (SVM), Decision Tree-based Random Forest (RF) and C4.5 to predict miRNAs associated with cancer. 60 informative features were extracted from a dataset of experimentally validated miRNA based on sequence, thermodynamics of miRNA-mRNA binding and their hybridization. Initially, features were ranked based on F-score and a two-stage Recursive Feature Elimination (RFE) process was employed to select the optimal subset of features for individual classifier. Class imbalance in the training set was overcome by employing cost-sensitive approach. The performance of each individual learning algorithm was evaluated in terms of precision, recall, F-measure and AUC. Subsequently, the learning algorithm with better performance measure would be utilized for constructing a two-step binary classifier *viz.*, miRSEQ and miRINT, which will identify a miRNA to be associated with the cancer pathway. Based on our comparative analysis, it was evident that the decision tree based RF model performed well in terms of better precision and AUC (for miRSEQ), but was moderate (for miRINT).

Keywords: AUC, RFE, Cost-sensitive, Class imbalance, Thermodynamics of miRNA-mRNA binding.

1. BACKGROUND

Victor Ambros' discovery of small, non-coding RNAs present in *Caenorhabditis elegans* in the 1990's opened the floodgates for the discovery of hundreds of miRNAs in the ensuing decades. The association of these miRNAs with their target mRNA and to diseases has been a vibrant area of research during the following years. Where experimental methods have delayed in delivering results, theoretical prospecting has taken over, and a considerable number of software for the identification of miRNA and prediction of target have been in use. While some consider the base complementarity of the miRNA-mRNA hybrid [1-3], others have looked into stronger areas of binding, *viz.*, the seed region [4, 5]. There have been predictions based on the thermodynamics of binding [6, 7] but improvements where statistical methods have been coupled with thermodynamics replaced them very soon [8]. Inevitably, the indulgence of SVM was applied to the realm of miRNA binding predictions and several such algorithms provided an improved tool for the researcher [9-13]. While different machine learning approaches [14, 15] have been employed for predictions, few authors have actually compared and integrated the performances [16] of these individually on miRNA datasets. Even more scarce has been the association of miRNA with diseases, and only recently some groups [17, 18] have taken up the challenge of deciphering miRNA networks in the development of various diseases.

Consequently, there has been a noticeable void when looking for algorithms which would predict the association of miRNAs involved in cancer. The prediction of potential miRNA-mRNA interactions leading to cancer from a huge database of targets has not been attempted till date. Some of our own results [19, 20] were indicative of signatures which might predict a carcinogenic interaction. However, integrating the signatures available at the complementarity level (both seed and outside seed) and thermodynamic data, required the progression into machine based approaches. While most of the existing algorithms limit themselves to conserved rules, few consider the deviations [21, 22] in established binding patterns. Therefore, while looking into this problem, utmost care was taken to encompass all features and parameters, whether they be in the so-called seed regions or in hairpins.

Like most studies, initial efforts at supervised learning were attempted using kernel-based algorithms *viz.*, SVM. This algorithm utilizes a part of the training set for the construction of support vectors or decision boundaries, and hence, may exclude valuable inputs which can add to the discrimination. This led to the deploying of tree-based algorithms (viz., Random Forest and C4.5) which utilize all the inputs for training. The frame work involved in our study involves two major steps (1) Training individual machine

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Insilico approach to study the molecular simulation of Collagen like peptide based Biomaterial.

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Abstract— **The triple helical characteristic structure of collagen protein is insoluble protein, it is the most prominent component found in the extracellular matrix. The biological function of the collagen is not limited because it is a structural protein with its mechanical strength of various tissues and organs, and it has capable of interacting with other macromolecules.GPO collagen like peptides is modeled using helix builder, energy value and its stability are calculated The energy stabilized GPO peptide is docked with cyclodextrin and estimated free energy of binding is calculated using auto dock. The docked complex is analysed in Accelrys Discovery studio 2.0. This analysis provides the stability information about the docked complex. Molecular dynamic simulation is used to investigate small artificial systems, but still is, a well inclination to apply it to more realistic and more complex systems. For the study of such systems, the software provides a large suite of computational tools that include number of conformational and sampling of path methods, free energy calculators, energy minimization, dynamics simulation, and analysis techniques, and model-building methods. The CHARMM is applicable to solve problems involving a much broader class of many-particle systems. For reasonable information of the nanostructure to be modeled it is often need to investigate the real system by experimental observation, to formulate logical assumptions, or to conduct theoretical arguments. It is well know that triple helical structure of collagen are thermostable by nature with medical applications similarly collagen peptide GPO used for future biomedical application.**

Keywords—Collagen triple helix, Collagen mimetic peptides (CMPs) or Collagen like peptides (CLPs), Wound healing, MMPs, Molecular dynamics simulations.

I. Introduction

The triple helical characteristic structure of collagen protein is an insoluble protein, it is the most prominent component found in the extracellular matrix. It accounts for more than 25 % of all proteins in the body, about 30 % of all vertebrate body proteins, more than 90 % of the extracellular proteins in the tendon and bone, and more than 50 % of the proteins in the skin1, 2. Collagen generally consists of two identical chains (α1) and the third chain (α2) that is slightly different from other two chains in chemical composition3. Amino acid a composition of the collagen structure, especially the role of glycine and proline the and in some cases it is hydroxyl proline3.In a normal human system, about 34 genes are associated with collagen formation and mutation or abnormal change in the gene lead to disorder in the body4. There are 28 types of collagen have been reported so far, among them type I, II, III, I and V are very common, the biological function of the collagen is not limited because it is a structural protein with its mechanical strength of various tissues and organs, and it is capable of interacting with other macromolecules5,6. Trenton et al., reports, oral intake of type II collagen improves symptoms of rheumatoid arthritis7. Similarly, collagen was widely used in cosmetic surgery and treatment, the application of collagen is not restricted to a study. As like as native collagen, collagen mimetic peptides also have the same properties and it is also known as collagen-related peptides. Smethurst et al., stated that GPO is one of the collagen-mimetic peptide is a selective agonist for the platelet collagen receptor Glycoprotein VI. Also Phosphorylation of protein tyrosine and platelet aggregation were induced only by cross-linking of two or more GPO triplets, This GPO triplets are abundant in collagens, four or three GPO triplets is observed in the N - terminal domain of collagen I (α1) and III (α1),whereas five GPO triplets is seen in the C - terminal domain of collagen I α18.This present study concentrates on the construction of a GPO triplet domain using a collagen builder, usually the collagen-like peptides are less stable by nature. Hence, in order to increase its stability cyclodextrin is allowed to interact with a hydrophobic pocket of amino acid residues, since it has been computed designing peptides using the appropriate software its energy values must be investigated at each step, molecular docking is carried for GPO peptide with cyclodextrin using auto dock 4.01 software. On the other hand, simulations were carried in three different steps such as dynamics heating/cooling, equilibrate and production using two different ensembles. Finally, a comparison between the two ensembles is carried out to finalize the best output model with the least energy of complex GPO collagen-like peptide with α -cyclodextrin.

II. Materials and Methods

A. Collagen builder

The Triple Helical collagen Builder Script, or THeBuScr – is used to build the any type triple helical molecule using statistically derived conformations as per user requirements. The program Tcl/Tk provides a user friendly platform to perform this task,Tcl is a scripting language that aims at

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RESEARCH ARTICLE

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ANALYSIS OF IMMUNOLOGICAL EFFICIENCY OF *TAMARINDUS INDICA* USING FISH MODEL

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Tamarindus indica, immunomodulation and Rohu Fish

ABSTRACT

Medicinal plants have an important role in normal life. The plants immunostimulant activity was screened using animal model. The efficiency of immunostimulant was analyzed antibody titration, B and T cell counts and lymphocyte migration assay method. When the result is normal experimental animal, the plant extract increased T cell counts compared to B cell counts and antibody level. From the result suggested the chosen plant ext5rach have potential to develop immunomodulatory effect in host.

INTRODUCTION

Indian plants are most effective and most commonly studied in relation to diabetes and their complications are *Allium cepa, Allium satium, Aloe vera, ociumum sanctum, Trigonella foenum.* Among these Sujatha *et al* (2010) have evaluated *M.charantia, Eugenia jambolana, Brassica juncea.* Medicinal Plants are having many secondary metabolites; they are potential source for formulation of drugs (Khatune *et al*., 2005). Plant based medicines are initially used in the form of tinctures, teas, poultices, powders, and other herbal formulations (Samuelsson, 2004).The plant based medicines are widely used because they are very low cost compared to synthetic drugs (Iwu *et al*., 1999). The effects of plants inhibit growth of micro-organisms and are important for human health (Erdogrul, 2002). Of the reasons in the development of resistance to chemotherapeutic agent is due to abuse of these drugs (Reuters, 2005).Hence in the present investigation screened immunomodulatory efficiency of *Tamarindus indica.*

Identifications of drug from medicinal plants have traditionally been lengthier and more complicated than other research methods. Therefore, many pharmaceutical companies have eliminated or scaled down their natural product research (Koehn and Carter, 2005). *T. indicia* was also reported to possess antimicrobial activity (Ahmed *et al.*, 2006). Reports related to antimicrobial activity of this plant using various organic solvents have not been thoroughly studied. Based on the thorough scrutiny of scientific literatures, no scientific information on bioactivity of *T. indica* was found. This study, thus presents the influence of various extracts of *T. indica* against bacterial pathogens.

MATERIALS AND METHODS

Immunization of animals

For the experimental study, fish weighing 24 ± 0.2 gm (35 days old) were recruited from the acclimatized stock. Fish were grouped into several groups with six individuals each. These animals were housed in specially designed cage with provision for systematic supply of pellets and water. Test bacterial antigens were given through intramuscular injection at optimum levels with primary and secondary doses, along with standard pellet feed given every day in *ad libitum*

Immunization of animals with plant extracts

For the experimental study, fish weighing 24 ± 0.2 gm (35 days old) were recruited from the acclimatized stock. Fish were grouped into several groups with six individuals each. These animals were housed in specially designed cage with provision for systematic supply of pellets and

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EXCELLENT PUBLISHERS

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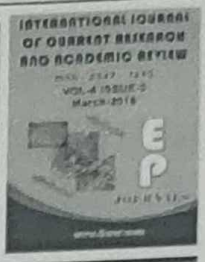

Cell Mediated Immune Response in a Fresh Water Fish, *Catla catla* against a Bacterial Antigen

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KEYWORDS

Catla catla,
Bacterial antigen.

A B S T R A C T

In this investigation found a bacterial pathogen, *Pseudomonas aeruginosa* strain, two different of antigens such as whole cell antigen and nucleotide antigens were prepared and injected into the experimental fish(*Catla catla*) groups and control for the study of cell mediated immune response and cell mediated immune response. Cell mediated response analysed by T cell counts as whole bacterial antigen in fish showed the increased the productions of T cells in primary (56±1) and secondary immune response (58±2)compare with nucleotide antigen exposes is low. DTH response was showed inflammation at 3rd week of secondary response but postive reaction was showed in primary and secondary response. Lympocyte migration was showed in both types of strains fishes exposed inhibition of pathogens. The enhancement of this type of immune responses confirms the potential of chosen antigen to be used as a vaccine.

Introduction

The immune system is known to be involved in the etiology as well as pathogenic mechanism by many diseases. Immunology is the probably one of the most rapidly developing areas of biomedical research and has great promises with regard to the prevention and treatment of a wide range of disorder. Fish are the first group of vertebrate animals with both innate and adaptive immune responses and are essential for proper understanding of the immune system and its evolution. The fish adaptive immune responses are less effective than in mammals because they are pokilotherms and completely dependent on their environment temperature. Overall the mechanism and molecules involved in the immune responses are quite well conserved during the immune system evolution. Aquaculture represents one of the fastest growing food producing sectors. The uses of natural immunostimulants are in fish culture for the prevention of diseases in a promising new development in vaccine (Anderson, 1992; Ruscetti *et al.*, 1993; Tatiya *et al.*, 2007).

CSE
15-16

Design and Implementation of Wearable Antenna for Biosignal Monitoring

Authors: Beulah Devamalar, P. M.; Thulasibai, V.; Kavya, G.; Jayanandan, T.
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Abstract | References | Citations | Supplementary Data | Article Media | Metrics | Suggestions

This work presents a novel method for designing and fabrication of a wearable antenna for tracking bio-signals of soldiers during military operations. The antenna is incorporated in existing fabric and operates in the widely used ISM Band (2.4 GHz) and uses cotton textile as dielectric substrate, and is thereby flexible, light and rigid enough to be worn on the body of the soldiers to monitor their bio-signals. The simulation of designed antenna shows that it resonates at the operating frequency of 2.48 GHz with a return loss of −30 dB under normal condition and ~23 dB under bent condition, which argues well with the measured results for the design. The fabricated wearable antenna has advantages such as low fabrication cost, high flexibility and virtually maintenance free design.

Keywords: BIOSENSORS; HEALTH MONITORING; HFSS; ISM BAND; WEARABLE ANTENNA
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Original Article

An Efficient Spectrum Sensing Framework and Attack Detection in Cognitive Radio Networks using Hybrid ANFIS

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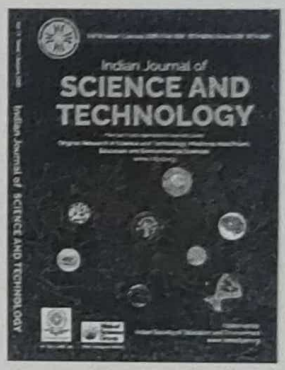

Year: 2015, Volume: 8, Issue: 28

ABSTRACT

Background: Cognitive radio is being recognized as an intelligent technology due to its ability to rapidly and autonomously adapt operating parameters to changing environments and conditions. In order to reliably and swiftly detect spectrum holes in cognitive radios, spectrum sensing must be used. Accurate spectrum sensing is important in improving the efficiency of cognitive radio networks. False sensing results in either waste of spectrum or harmful interference to primary users who may remotely or physically capture the sensors and manipulate the sensing reports. Methods: A novel framework and an innovative approach have been introduced to eliminate the malicious behaviors of secondary users. It is found that spectrum sensing alone cannot prevent the malicious behavior without any information on users' reputation. Based on the evaluation of malicious behavior resistance methods, joint spectrum sensing and malicious nodes detection approach for optimal prevention from sensing falsification is being proposed. Findings: The proposed approach minimizes Linear Minimum Mean-Square Errors (LMMSEs) when it is compared with the existing algorithms such spectrum sensing based on HSMM and FNN based spectrum sensing are plotted versus detection probability, false alarm probability. With more malicious nodes proposed schemes are more effective to restrain the false alarms. Improvement/Application: The proposed spectrum sensesframework with attack detection which is very effective to determine the malicious users in spectrum holes.

Keywords: Fuzzy Neural Network, Linear Minimum Mean Square Error, Primary User, Secondary User, Spectrum Sensing

CSE 15-16

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A Graph theory algorithmic approach to data clustering and its Application

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Abstract

Clustering is the unproven classification of data items, into groups known as clusters. The clustering problem has been discussed in many area of research in many disciplines; this reflects its huge usefulness in the field of data analysis. However, clustering may be a difficult problem statistically, and the differences in assumptions in different disciplines made concepts and methodologies slow to occur. This paperpresentstaxonomy of clustering techniques, and recent advances in graphtheorytic approach. We also describe some important applications of clustering algorithms such as image segmentation, object recognition, and information retrieval.

Key words- weighted graph, clustering, image segmentation, image retrieval.

1. Introduction

Data clustering is an key methodology in explore the data analysis. The main objective of clustering is to partition a dataset into clusters in terms of its basic structure, without resorting to any a priori knowledge such as the number of clusters, the distribution of the data elements, etc. Clustering is a powerful tool and has been studied and applied in many research areas, which include image segmentation [1,2], machine learning, data mining [3], and bioinformatics [4,5]. Although many clustering methods have been proposed in the recent decades, there is no universal one that can deal with all cluster problems, since in the real world clusters may be of arbitrary shapes, varied densities and unbalanced sizes [6,7]. In addition, Kleinberg [8] presented an impossibility theorem to indicate that it is difficult to develop a universal clustering scheme. However, in general, users have not any a priori knowledge on their datasets, which makes it a tough task for them to select suitable clustering methods. This is the dilemma of clustering.

Wu, Zhenyu et al [9], introduced a novel graph theoretic approach for data clustering and its application to the image segmentation problem where The data to be clustered are represented by an undirected adjacency graph with arc capacities assigned to reflect the similarity between the linked vertices. Clustering is achieved by removing arcs of to form mutually exclusive subgraphs such that the largest inter-sub-graph maximum flow is minimized. The segmentation is achieved by effectively searching for closed contours of edge elements (equivalent to minimum cuts), which consist mostly of strong edges, while rejecting contours containing isolated strong edges. This method is able to accurately locate region boundaries and at the same time guarantees the formation of closed edge contours.

2. Graph–Theoretic Clustering

We represent the data to be clustered as an undirected edge-weighted graph with no self-loops G =(V, E,w) , where V = {1,...,n} is the vertex set, $E \subseteq V \times V$ is the edge set, and $w : E \rightarrow IR^{*+}$is the (positive) weight function. Vertices in G correspond to data points, edges represent neighborhood relationships, and edge-weights reflect similarity between pairs of linked vertices (fig-1). As customary, we represent the graph G with the corresponding weighted adjacency (or similarity) matrix, which is the $n \times n$ symmetric matrix $A = (a_{ij})$ defined as[10]-

$$a_{ij}=\begin{cases} w(i,j), & if\ (i,j) \in E \\ 0, & otherwise. \end{cases}$$

Hence, a clusteris a set of alike entities and should satisfy two fundamental conditions [11]: (a) it should have high internal homogeneity; (b) there should be high inhomogeneity between the entities in the

Calculation of Noisy Level for CAD using Markov Chain Process

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Abstract - This paper is a novel methodology for indentifying blocks in the heart using CMR (Cardiac Magnetic Resonance) for Coronary Artery Disease(Cardiomyopathy). This is a type of Image De-noising, taking image from video-graphic way from CMR and by applying fast Fourier transform(FFT) resultant value is compared Markov Model from this a physician can identify whether a person is in need of CABG (Coronary Artery Bye Pass Grafting). This novel method makes new technology era to go forward from previous one.

Key Words: Cardiomyopathy, Cardiac Magnetic Resonance, Coronary Artery Bye Pass Grafting(CABG), FFT, Markov Model.

1. INTRODUCTION

Coronary Artery Disease (or) cardiomyopathy is one of the main issues in all over the world. Still there is awareness but many people lost their life due to this disease, this is because not maintaining their health properly. After getting Heart attack peoples know about Cardiomyopathy. Indians are affected by this cardiac disease. It is a disease about the heart muscle. The heart was disturbed and unable to pump blood; heart rhythm is disturbed which leads to irregular heart beat called as arrhythmias. The exact cause of the muscle damage is yet to be found. It affects middle-aged and older persons. Different types of this disease made into two categories a. Ischemic b. Non-Ischemic Ischemic refers to heart muscle damage and Non-Ischemic refers to Dilated, Hypertrophic and Restrictive.

2. Objectives of the Study

- To determine the percentage of block in the heart
- To determine flow of blood
- To determine need of CABG or not.

3. Literature Review

[1] Jole Shackelford discussed about Sir William Harvey famous and a Royal Physician made his work on the operation of the heart and moment of blood into and out of the heart. Harveys discoveries was the heart forcefully contracts and presses blood into the arteries in the phase called "SYSTOLE". When the contraction of two small chambers that sit atop the ventricles called as "DIASTOLE" which causes the ventricles to fill with blood and expand. [4] According to VU Reddy Fast Fourier Transform is an efficient way for computing DFT. It is a method of Spectrum estimation FFT is used to change time domain signals into Frequency domain [2] Suyash P.Awate et al discussed about the re-construction problem in an Inverse Fourier Transform [5] Matthias W.Seeger et al in his work of Bayesian Experimental Design of Magnetic Resonance Imaging Sequence used the Bayesian inference of MR images and re-construction can be through FFT. [3] Thomas sangild Sorensen et al used non equi-spaced Fast Fourier Transform used in the medical imaging. [6] Seth J. Worley et al in his work by comparing Time Domain and Frequency Domain calculated through Single Averaged Electro-Cardiogram to determine whether signal processing beyond signal averaging improves identification of patients with ventricular tachycardia. To compare time domain analysis using methods similar to those of frequency domain analysis of the signal averaged ECG in the same group of patients to determine using multivariable analysis the best signal averaged ECG variable for identifying patients with ventricular tachycardia. According to Dale L.Bailey *et al* [10],Albert C.Lardo *et al*[11] in their work namely Positron Emission Tomography worked about sinogram and laminogram which is used in the Radon Transform.

4. Methodology

ECG is one of the most common tests for the heart problems to identify. It is simple and often very valuable. Fig 1 shows the basic representation of ECG. It contains PQRST Segments and tells the presence of Ischemia, and ECG cannot confirm the exact anatomical distribution or the severity of damage in the coronary artery involved.

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An Unidentified Position-Based Capable Routing Protocol in Mobile Adhoc Networks

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Abstract*— Attackers can explore vulnerabilities of a cloud system and compromise virtual machines to deploy further large-scale. DDoS attacks usually involve early stage actions such as multistep exploitation, low-frequency vulnerability scanning, and compromising identified vulnerable virtual machines as zombies, and finally DDoS attacks through the compromised zombies. Within the cloud system, especially the Infrastructure-as-a-Service (IaaS) clouds, the detection of zombie exploration attacks is extremely difficult. To prevent vulnerable virtual machines from being compromised in the cloud, a multi-phase distributed vulnerability detection, measurement, and countermeasure selection mechanism called NICE is been proposed, which is built on attack graph-based analytical models and reconfigurable virtual network-based countermeasures. The proposed framework leverages Open flow network programming APIs to build a monitor and control plane over distributed programmable virtual switches to significantly improve attack detection and mitigate attack consequences.

Keywords*— Cloud, DDos, IaaS, NICE, Open flow Network, API.

I. INTRODUCTION

RAPID development of Mobile Ad Hoc Networks (MANETs) has stimulated numerous wireless applications that can be used in a wide number of areas such as commerce, emergency services, military, education, and entertainment. MANETs feature self-organizing and independent infrastructures, which make them an ideal choice for uses such as communication and information sharing. Because of the openness and decentralization features of MANETs, it is usually not desirable to constrain the membership of the nodes in the network. Nodes in MANETs are vulnerable to malicious entities that aim to tamper and analyse data and traffic analysis by communication eavesdropping or attacking routing protocols.

Although anonymity may not be a requirement in civil oriented applications, it is critical in military applications (e.g., soldier communication). Consider a MANET deployed in a battlefield. Through traffic analysis, enemies may intercept transmitted packets, track our soldiers (i.e., nodes), attack the commander nodes, and block the data transmission by comprising relay nodes (RN), thus putting us at a tactical disadvantage.

Anonymous routing protocols are crucial in MANETs to provide secure communications by hiding node identities and preventing traffic analysis attacks from outside observers. Anonymity in MANETs includes identity and location anonymity of data sources (i.e., senders) and destinations (i.e., recipients), as well as route anonymity. "Identity and location anonymity of sources and destinations" means it is hard if possible for other nodes to obtain the real identities and exact locations of the sources and destinations.

For route anonymity, adversaries, either en route or out of the route, cannot trace a packet flow back to its source or destination, and no node has information about the real identities and locations of intermediate nodes en route. Also, in order to dissociate the relationship between source and destination it is important to form an anonymous path between the two endpoints and ensure that nodes en route do not know where the endpoints are, especially in MANETs where location devices may be equipped.

Existing anonymity routing protocols in MANETs can be mainly classified into two categories: hop-by-hop encryption and redundant traffic, Most of the current approaches are limited by focusing on enforcing anonymity at a heavy cost to precious resources because public-key-based encryption and high traffic generate significantly high cost. In addition, many approaches cannot provide all of the aforementioned Anonymity protections.

II. PROBLEM STATEMENT & DEFINITION:

Existing anonymity routing protocols in MANETs can be mainly classified into two categories: hop-by-hop encryption and redundant traffic. Most of the current approaches are limited by focusing on enforcing anonymity at a heavy costto precious resource because public-key-based encryption and high traffic generate significantly high cost. In addition, many approaches cannot provide all of the aforementioned anonymity protections. For example, ALARM cannot protect the location anonymity of source and destination, SDDR cannot provide route anonymity, and ZAP only focuses on destination anonymity

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Privacy Preserving Multi-Keyword Search Through Blind Storage in Cloud

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Abstract: **In portable distributed computing, a major application is to outsource the versatile information to outside cloud servers for adaptable information stockpiling. To test this issue, in this paper, We build up the Searchable encryption for multi-watchword positioned look over the capacity information. In particular, by considering the extensive number of outsourced the reports in the cloud, we use the significance score and k closest neighbor in methods to build up an effective multi-catchphrase look conspire that can give back the positioned indexed lists in view of the exactness. Security analysis demonstrates that our scheme can achieve confidentiality of documents and index, trapdoor privacy, access unlinkability, and obscuring access pattern of the search user. Finally, using extensive simulations.We leverage an efficient index to further improve the Search efficiency, and adopt the blind storage system to conceal access pattern of the search user.**

Keywords: **Searchable encryption, blind storage, access pattern.**

I. INTRODUCTION

Portable distributed computing disposes of the equipment impediment of cell phones by investigating the Open and virtualized distributed storage and registering assets, and hence can give considerably more legitimate and versatile portable administrations to clients. The subcontracted data typically contain sensitive privacy information, such as personal photos, emails etc., which would lead to normal confidentiality and privacy violations, if lacking efficient protections. Look over encoded information ought to bolster the accompanying three capacities. To begin with, the searchable encryption associations ought to bolster multi-watchword look, and give the comparable client experience as seeking in Google seek with various catchphrases; single-watchword pursuit is a long way from adequate by just returning exceptionally restricted and erroneous indexed lists. Second, to rapidly distinguish most significant results, the pursuit client would normally lean toward cloud servers to sort the returned list items in an importance based request positioned by the pertinence of the inquiry solicitation to the records. Likewise, demonstrating the positioned pursuit to clients can likewise dismiss the superfluous Network movement by just exchange back the most applicable results from cloud to inquiry clients.What's more, demonstrating the positioned hunt to clients can likewise neglect the pointless Network movement by just exchange back the most important results from cloud to pursuit clients. Third, concerning the pursuit proficiency, since the quantity of the archives contained in a database could be uncommonly extensive, searchable encryption plans ought to be proficient to rapidly react to the hunt demands with minimum deferrals. We give careful security examination to accept that the EMRS can achieve a high security level including secrecy of reports and file, trapdoor privacy,trapdoor unlinkability, and darkening access example of the pursuit client. The cloud server ought to be forestalled from prying into the outsourced reports and can't find any relationship between the records and catchphrases utilizing the file. To keep her quests from being presented to the cloud server, the cloud server ought to be kept from knowing the accurate catchphrases contained in the trapdoor of the seek client. Trapdoor Unlinkability: The trapdoors ought not to be linkable, which implies the trapdoors ought to be completely diverse regardless of the fact that they contain the same catchphrases. At the end of the day, the trapdoors ought to be randomized cloud server from realizing any extra data about the reports and the file, and to keep seek clients' trapdoors mystery, the EMRS ought to cover all the security prerequisites. We consider the Knowing Background model in the EMRS, which permits the cloud server to know more foundation data of the archives, for example, factual data of the watchwords. A visually impaired capacity

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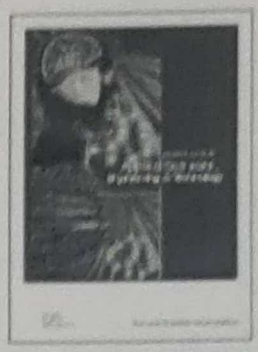

RESEARCH ARTICLE | OPEN ACCESS

Denoising using Non Local Linear Filtering and Quantization Matrix Estimation Using ANFIS Algorithm for JPEG Error Analysis to Digital Image Forensics

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Abstract

One of the most commonly used image format is Joint Photographic Experts Group (JPEG). The recognition of JPEG compression plays a significant part in digital forensics. In previous work, JPEG image can be compressed upto n times. However, in the compression techniques noise of the JPEG images and the error analysis in the JPEG images are not primarily concentrated. Hence, the recognition of the JPEG compression results will turn out to be complicated. With the intention of overcoming these concern and eliminate the noise from the image samples, in this study formulated a blend of non local-means filter and its method noise thresholding by means of wavelets. In order to diminish the size of the JPEG image, a Growcut based seam carving technique is employed in this study. Subsequently noises are added to image to carry out Non local Linear Filter (NLF) and its Method Noise Thresholding by means of wavelets (NLFMT) denoising framework. For the purpose of assessing the influence of image compression on the performance of JPEG, a sample Discrete Cosine Transform-Singular Value Decomposition (DCT-SVD) was computed for single and double image compression, images were quantized by means of numerous quantization matrices, quantization matrix results are assessed with the help of Adaptive Neuro Fuzzy Inference System (ANFIS). Based on ANFIS, the elevated frequency coefficients in quantization matrix are employed to make a distinction among singly and doubly compressed images. Extensive experiments and evaluations with previous techniques reveal that the proposed DCT-SVD-ANFIS scheme can discover the double JPEG compression efficiently and noise in the image samples are eliminated with the help of NLFMT methods; it outperforms the existing approaches considerably based on the parameters like Peak Signal to Noise Ratio (PSNR) and Mean Square Error (MSE). The quantization matrix results were assessed using ANFIS; it has extremely much significance in the field of digital forensics.

Keywords:
Adaptive Neuro Fuzzy Inference System (ANFIS) error analysis, Discrete Cosine Transform (DCT), filtering, Growcut Seam Carving (GCSC), image denoising, JPEG image compression, Singular Value Decomposition (SVD),

References

Competing Interests

The authors have no competing interests.

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An Effective Method for Reliable Data Delivery in Highly Dynamic Mobile Ad Hoc Networks

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Abstract: To prevent vulnerable virtual machines from being compromised in the cloud, a multi-phase distributed vulnerability detection, measurement and countermeasure selection mechanism called NICE is been proposed, which is built on attack graph-based analytical models and reconfigurable virtual network-based countermeasures. The proposed framework leverages Open flow network programming APIs to build a monitor and control plane over distributed programmable virtual switches to significantly improve attack detection and mitigate attack consequences. The greatest advantage of using the DSR over the AODV based protocols is that we do not have to use the beacon transmission, i.e. the periodic hello packet. In the previous research techniques the dynamic anomaly based detection schemes for the AODV based protocols have been studied and presented. Anomaly detection can be done in DSR based MANETs by sampling a section of the path and comparison with the general activity of the network determined by a baseline. This is achieved by first classifying the possible attacks in DSR. A training database is maintained and compared with a sample at any random area of the network. Using weighted co-efficient, it is possible to detect any anomaly behavior inside the network.

Key words: Training database · Open flow network · Graph-based analytical models · Counter measure selection

INTRODUCTION

A Mobile Ad-hoc Network is a kind of wireless ad-hoc network and it is a self-configuring network of mobile outers connected by wireless links. It is a wireless network without infrastructure. One of the important research areas in MANET is establishing and maintaining the adhoc network through the use of routing protocols.

The security is one of the essential requirements in mobile adhoc network. When the Mobile adhoc network is compared to wired network, MANET is more vulnerable to security attacks due to the lack of the trusted centralized authority and limited resources. Normally, attacks on adhoc networks are classified as passive and active attacks. A MANET is referred to as an infrastructure less network because the mobile nodes in the network dramatically set up paths among themselves to transmit packets temporarily. In the MANET, nodes within each other's wireless transmission ranges can communicate directly. However nodes outside each other's range have to rely on some other nodes to relay messages. Any routing protocol must encapsulate an essential set of security mechanisms. These mechanisms are used to prevent, detect and respond to security attacks.

In the existing paper uses the routing protocol named as Ad-hoc On Demand Distance Vector (AODV) which is a route discovery process. It is very different to maintain the routing information. It can maintain multiple route cache entries for each destination. Without source routing, AODV relies on routing table entries to propagate a route request back to a source and subsequently to route data packets to the destination. It uses a sequence number maintained at each destination to determine freshness of routing information and to prevent routing loops. These sequence numbers are carried by all routing packets. It is not suitable for all types of packets. To overcome this drawback design another routing process this is named as Dynamic Source Routing (DSR).

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DETECTING PACKETS IN WIRELESS ADHOC NETWORK

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Abstract— The sequence of packets losses in the network ,we are interested in determining whether the losses are caused by link error only or combined effects of link error and malicious drop. Because the packet dropping rate in this case is comparable to the channel error rate, conventional algorithms that are based on detecting the packet loss rate cannot achieve satisfactory detection accuracy. To improve the detection accuracy, we propose to exploit the correlations between loss packets. To ensure truthful calculation of this correlations, we develop a Homomorphic Linear Authenticator (HLA) based public auditing architecture that allow the detector to verify the truthfulness of the packet loss information reported by nodes. This construction is privacy preserving, collusion proof, and incurs low communication and storage overheads. We verify that the proposed mechanisms achieve significantly better detection accuracy than conventional methods such as a maximum-likelihood based detection.

Keywords—packet dropping,homomorphic linear authenticator(HLA),public auditing.

INTRODUCTION

Detecting selective packet-dropping attacks is extremely challenging in a highly dynamic wireless environment. The difficulty comes from the requirements that we need to not only detect the place where the packets is dropped ,but also identify whether the drop is intentional or unintentional. Specifically, due to the open nature of wireless medium, a packet drop in the network could be caused by harsh channel conditions .The accurate algorithm for detecting the selective packet drop made by insider attacks. Our algorithm also provides a truthful and publicly verifiable decision statistics as a proof to support the detection decision. The high detection accuracy by exploiting the correlations between the positions of lost packets, as calculated from the auto correlation function (ACF) of the packet loss bitmap.

The main challenge in our mechanism lies in how to guarantee that the packet loss bitmap reported by individual nodes along the route are truthful. Such that reflects the actual status of each packets transmission. Such truthful is essential for correct calculation of the correlation between the loss packets The public auditing problem is constructed based on the (HLA) cryptographic primitives which is basically a signature scheme widely used in cloud

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Secure Data Sharing With Efficient Cloud Storage

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***Abstract*— In the cloud, for achieving access control and keeping data confidential, the data owners could adopt attribute-based encryption to encrypt the stored data We propose key-aggregate cryptosystem (KAC), a special type of public-key encryption. In KAC, users encrypt files not only under a public key and also with private key. In this we explain how to compress secret keys in public-key cryptosystem which supports delegation of secret keys for different cipher text classes in cloud storage.Our approach is more flexible than hierarchical key assignment which can only save spaces if all key-holders share a similar set of privileges.Here the aggregate key is of constant size. In addition, the proposed scheme is proven to be secure based on k-multilinear Decisional Diffie-Hellman assumption. On the other hand, we implement our scheme over the integers.**

***Keywords*—smart grid, big data, TDEA, map-reduce algorithm, identity based encryption.**

I. INTRODUCTION

The emergence of cloud computing brings a revolutionary innovation to the management of the data resources. Within this computing environments, the cloud servers can offer various data services, such as remote data storage and outsourced delegation computation , etc. For data storage, the

servers store a large amount of shared data, which could be accessed by authorized users. For delegation computation, the servers could be used to handle and calculate numerous data according to the user's demands. As applications move to cloud computing platforms, ciphertext-policy attribute-based encryption(CP-ABE) and verifiable delegation (VD) are used to ensure the data confidentiality and the verifiability of delegation on dishonest cloud servers. Taking medical data sharing as an example (see Fig.1), with the increasing volumes of medical images and medical records, the healthcare organizations put a large amount of data in the cloud for reducing data storage costs and supporting medical cooperation. Since the cloud server may not be credible, the file cryptographic storage is an effective method to prevent private data from being stolen or tampered. In the meantime, they may need to share data with the person who satisfies some requirements. The requirements, i.e, access policy, could be {Medical Association Membership ∧ (Attending Doctor ∨ Chief Doctor) ∧ Orthopedics}. To make such data sharing be

achievable, attribute-based encryption is applicable. Fig. 1. Medical data sharing system There are two complementary forms of attribute based encryption. One is key-policy attribute-based encryption (KP-ABE), and the other is ciphertext-policy attribute-based encryption (CPABE). In a KP-ABE system, the decision of access policy is made by the key distributor instead of the encipherer, which limits the practicability and usability for the system in practical applications. On the contrary, in a CP-ABE system, each ciphertext is associated with an access structure, and each private key is labeled with a set of descriptive attributes. A user is able to decrypt a ciphertext if the key's attribute set satisfies the access structure associated with a ciphertext. Apparently, this system is conceptually closer to traditional access control methods. On the other hand, in a ABE system, the access policy for general circuits could be regarded as the strongest form of the policy expression that circuits can express any program of fixed running time. Delegation computing is another main service provided by the cloud servers. In the above scenario, the healthcare organizations store data files in the cloud by using CP-ABE under certain access policies. The users, who want to access the data files, choose not to handle the complex process of decryption locally due to limited resources. Instead, they are most likely

to outsource part of the decryption process to the cloud server. While the untrusted cloud servers who can translate the original ciphertext into a simple one could learn nothing about the plaintext from the delegation. The work of delegation is promising but inevitably suffers from two problems.

The cloud server might tamper or replace the data owner's original ciphertext for malicious attacks, and then respond a false transformed ciphertext.

The cloud server might cheat the authorized user for cost saving. Though the servers could not respond a correct transformed ciphertext to an unauthorized user, he could cheat an authorized one that he/she is not eligible.

Further, during the deployments of the storage and delegation services, the main requirements of this research are presented as

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Privacy Preserving Similarity Based Text Retrival through Blind Storage in Cloud

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ABSTRACT

In portable distributed computing, a major application is to outsource the versatile information to outside cloud servers for adaptable information stockpiling. To test this issue, in this paper, We build up the Searchable encryption for multi-watchword positioned look over the capacity information. In particular, by considering the extensive number of outsourced the reports in the cloud, we use the significance score and k closest neighbor in methods to build up an effective multi-catchphrase look conspire that can give back the positioned indexed lists in view of the exactness. Security analysis demonstrates that our scheme can achieve confidentiality of documents and index, trapdoor privacy, access unlinkability, and obscuring access pattern of the search user. Finally, using extensive simulations. We leverage an efficient index to further improve the Search efficiency, and adopt the blind storage system to conceal access pattern of the search user.

Keywords used: *Searchable encryption, blind storage, access pattern*

INTRODUCTION

Portable distributed computing disposes of the equipment impediment of cell phones by investigating the Open and virtualized distributed storage and registering assets, and hence can give considerably more legitimate and versatile portable administrations to clients. The subcontracted data typically contain sensitive privacy information, such as personal photos, emails etc., which would lead to normal confidentiality and privacy violations. if lacking efficient protections. Look over encoded information ought to bolster the accompanying three capacities. To begin with, the searchable encryption associations ought to bolster multi-watchword look, and give the comparable client experience as seeking in Google seek with various catchphrases; single-watchword pursuit is a long way from adequate by just returning exceptionally restricted and erroneous indexed lists. Second, to rapidly distinguish most significant results, the pursuit client would normally lean toward cloud servers to sort the returned list items in an importance based request positioned by the pertinence of the inquiry solicitation to the records. Likewise, demonstrating the positioned pursuit to clients can likewise dismiss the superfluous Network movement by just exchange back the most applicable results from cloud to inquiry clients. What's more, demonstrating the positioned hunt to clients can likewise neglect the pointless Network movement by just exchange back the most important results from cloud to pursuit clients. Third, concerning the pursuit proficiency, since the quantity of the archives contained in a database could be uncommonly extensive, searchable encryption plans ought to be proficient to rapidly react to the hunt demands with minimum deferrals. We give careful security examination to accept that the EMRS can achieve a high security level including secrecy of reports and file, trapdoor privacy, trapdoor unlink ability, and darkening access example of the pursuit client. The cloud server ought to be forestalled from prying into the outsourced reports and can't find any relationship between the records and catchphrases utilizing the file. To keep her quests from being presented to the cloud server, the cloud server ought to be kept from knowing the accurate catchphrases contained in the trapdoor of the seek client. Trapdoor Unlink ability: The trapdoors ought not to be linkable, which implies the trapdoors ought to be completely diverse regardless of the fact that they contain the same catchphrases. At the end of the day, the trapdoors ought to be randomized cloud server from realizing any extra data about the reports and the file, and to keep seek clients' trapdoors mystery, the EMRS ought to cover all the security prerequisites. We consider the Knowing Background model in the EMRS, which permits the cloud server to know more foundation data of the archives, for example, factual data of the watchwords. A visually unpaired capacity framework is based on the cloud server to bolster including, upgrading and erasing records and covering the entrance example of the hunt client from the cloud server. In the visually impaired capacity framework, all reports are separated into fixed-size squares. These pieces are filed by an arrangement of irregular whole numbers produced by an archive related seed. In the perspective of a cloud server, it can just see the squares of encoded records transferred and downloaded. Along these lines, the blind capacity framework releases little data to the cloud Server.

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Multi Cloud Access Using RFID

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Abstract*— Cloud is a data center that supplies hosted services to the people and it provides a scalable access to computing resources. At present, Cloud based Large Scale Big Data integration is still in Research Purpose. That too Cross Cloud is the most complex integration. Such analyses are not feasible to solve the problem. In our proposed system, we use Balanced Partition algorithm uses a easy way to classify a given data set through a certain number of clusters. This algorithm is used to prioritize the cloud data center. Cross Cloud is implemented by assigning Tasks to the various Web services. Different Tasks or same can be attained by different Cloud based on its availability. The future is our Implementation. We deploy Two Cloud Servers (Drop Box & Google drive) and one Big Data Database Storage (Mango DB). We Deploy Multi Access Smart Card Application. We Deploy Ration, Passport & Hospital Applications for User Access. User Personal Authentication included User Name, Password, Primary Key & RFID Card are all stored and Verified in Mango DB. Entire Data is splitted and stored in two servers parallely. User request is handled by the first Cloud and balance part is handled by another cloud in all Applications.

Keywords—Authentication, Privacy,Cross Cloud, Security, Balanced Partition Algorithm.

I. INTRODUCTION

Cloud Computing and big data receives enormous attention internationally due to various business-driven promises and expectations such as lower upfront IT costs, a faster time to market, and opportunities for creating value-add business . As the latest computing paradigm, cloud is characterized by delivering hardware and software resources as virtualized services by which users are free from the burden of acquiring the low level system administration details. Cloud computing promises a scalable infrastructure for processing big data applications such as the analysis of huge amount of medical data. Currently, Cloud providers including Amazon Web Services (AWS), Sales force.com, or Google App Engine, give users the options to deploy their application over a network of a nearly infinite resource pool. By leveraging Cloud services to host Web, big data applications can benefit from cloud advantages such as elasticity, pay-per-use, and abundance of resources with practically no capital investment and modest operating cost proportional to actual use. In practice, to satisfy different security and privacy requirements, cloud environments usually consist of public clouds, private clouds and hybrid clouds, which lead a rich ecosystem in big data applications. Generally, current implementations of public clouds mainly focus on providing easily scaled-up and scaled-down computing power and storage. If data centers or domain specific services center tend to avoid or delay migrations of themselves to the public cloud due to multiple hurdles, from risks and costs to security issues and service level expectations, they often provide their services in the form of private cloud or local service host . For a complex web-based application, it probably covers some public clouds, private clouds or some local service host For instance, the healthcare cloud service, a big data application illustrated in , involves many participants like governments, hospitals, pharmaceutical research centers and end users. As a result, a healthcare application often covers a series of services respectively derived from public cloud, private cloud and local host. In practice, some big data centers or software services cannot be migrated into a public cloud due to some security and privacy issues. If a web-based application covers some public cloud services, private cloud services and local web services in a hybrid way, cross-cloud. Collaboration is an ambition for promoting complex web based applications in the form of dynamic alliance for value-add applications lead a rich ecosystem in big data applications . Generally, current implementations of public clouds mainly focus on providing easily scaled-up and scaled-down computing power and storage. If data centers or domain specific services center tend to avoid or delay migrations of themselves to the public cloud due to multiple hurdles, from risks and costs to security issues and service level expectations, they often provide their services in the form of private cloud or local service host . For a complex web-based application, it probably covers some public clouds, private clouds or some local service host For instance, the healthcare cloud service, a big data application illustrated in , involves many participants like governments, hospitals, pharmaceutical research centres and end users. As a result, a healthcare application often covers a series of services respectively derived from public cloud, private cloud and local host. In practice, some big data centers or software services cannot be migrated into a public cloud due to some security and privacy issues. If a web-based application covers some public cloud services, private cloud services and local web services in a hybrid way, cross-cloud. Collaboration is an ambition for promoting complex web based applications in the form of dynamic alliance for value-add applications.

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Secured Transaction Using Secured Image

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Abstract: ***The Image processing is manipulating the image to provide a high quality of it.To improve the security in internet banking. The internet banking system has login using password and user id which can be captured in internet centre or by hackers. The main disadvantage of existing system is security is missing during transaction of money through internet.In this system the security is provided by giving captcha image during registration and asking user to select it any one and it will be asked for each and every time during sign in.Not only captcha we use a secured image and ask user to select any two co-ordinate points during registration which will be used during transaction process.The advantage of the proposed system is the user can use internet for transaction of money with security and no one hack our account.***

I. INTRODUCTION

Internet banking system provides many security measures for safety purpose. But it is not efficient. Initially banking system uses only user id and password for security but it can be hacked by any hackers easily. These issues are overcomes in the existing system. The existing system uses secure images for safety and the users are notice that secure images are missing or incorrect whenever the login into it. But 73% of user's are simply logging into it without noticing the secure image and the biggest disadvantage is that we are using security in banking to safeguard our money. But in the existing system the secure image nowhere deals with money transaction. It is the biggest drawback in the existing system.

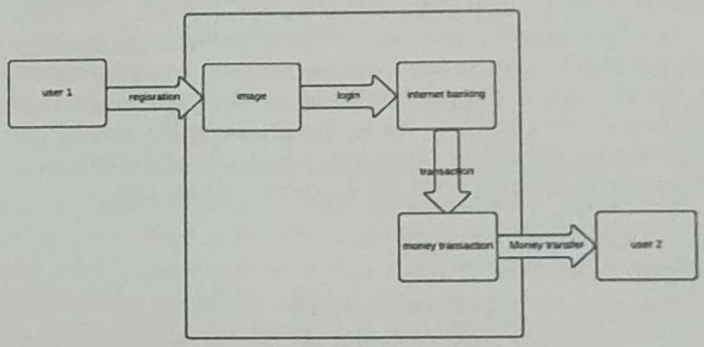

Fig 1 System architecture for Existing system

II. PROPOSED SYSTEM

These problems are overcomes in the proposed system. The proposed system use secure image and Captcha for security purpose. In the registration process user are asked to enter the user id and password. Then the user is displayed with the Captcha and users are instructed to select one Captcha from the given 3 Captcha. The selected Captcha should be entered and clicked. After that user will be provided with an secure image and user have to select two position. The selected position are converted to pixel to identify the exact position. The pixel are stored in x and y co-ordinates. Then the user have to click register button and the registration will be successful. After registration the admin will give user the authority to access your account then only the user can access the account. If the user want log in to his/her account he/she should enter the user id, password and also the recorded Captcha which the user have selected during the registration process and during money transaction the user will be displayed with the same image which he/she have selected during registration process and he/she have to select the exact same position which he/she had selected during the registration process and user have to record it.If some tries to hack your account he/she will not be able to select the same captcha which you have selected.If they hacked your captcha and log in to it during money transaction they have to select the exact same position which you have selected during the registration.But its critical for the hacker if once the hacker have selected the wrong position user account will be blocked and the user will get a mail that your account is deactivated.Then after informing the admin the admin only has the authority to unblock a particular account.It will be the best safety for the user. If the user itself

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Detection and blockage of malicious app in facebook

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ABSTRACT: Nowadays among Online Social Networks (OSN), Facebook is the widespread one and it is used by 1.5 billion people across the world. Hackers are finding many new ways to propagate spam and malware on these platforms, which we refer to as social malware. They can easily access the personal details. Social malware cannot be identified with existing security mechanisms (e.g., URLblacklists). Facebook app called MyPageKeeper is used to protect Facebook users from social malware. FRAppE stands for Face book's Rigorous Application Evaluator, arguably the first tool focused on detecting malicious apps on Facebook. FRAppE can detect malicious apps with complete accuracy. The objective of this project is to detect malicious application and block those applications in facebook using FRAppE tool under the set of constraints. Offensive words are detected and blocked using dictionary. There is already an overview given about just finding malicious app but not on blockage of offensive words or posts. It provides only a high-level overview about threats to the Facebook graph. The main disadvantage of existing system is security is missing. In proposed system certain techniques are implemented in finding the Offensive words or any posts, and dictionary detects the words. These words will not display in public wall. Instead of that such post will be automatically migrated to blocked post list. The user can view it secretly and also a warning mail is send to user. It is safe and secure. Unnecessary information will not be added in our wall. Thus the Offensive words and posts are blocked with the help of dictionary using filters and it is not publicly posted to user wall.

I. INTRODUCTION

Hackers are involved in many spam's propagating process. In many social networks, hackers spread malware and with the help of these they can easily access the personal details of the user. Third party apps are widespread now. Hackers have started taking advantage of the Third party apps platform and developing malicious applications. There are many ways that hackers can benefit from malicious app. Those apps can reach large number of users and their friends to spread spam, the app can obtain users personal information. It does not provide safety for users in Face book. Initially existing system contains only MyPageKeeper app, which is a security app in Face book. It shows notification about the spam spreading in Face book day-to-day. In existing system, a tool named FRAppE is developed using data from the MyPageKeeper app, a security app which already existing in Face book. This tool detects the malicious app but not on the blockage of those apps. It is not that much safe and secure. The biggest disadvantage is that we face many security issues and in this we focused on only identifying malicious applications. It provides only a high level overview about the threats in the Face book, does not provide deep analysis of the system. It is the biggest drawback in the existing system.

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Smart Grid Management Using Big Data In Cloud

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Abstract— Smart grid is a technological innovation that improves efficiency, reliability, and sustainability of electricity services. The main challenges of smart grids are how to manage different types of front-end intelligent devices such as power assets and smart meters effectively. Big data is used to process these huge amounts of data received from various devices. We propose a secure cloud computing based framework using Triple Data Encryption Algorithm (TDEA or Triple DEA).The data stored (or) collected from the smart grids can be used to estimate the future power consumption by using Map-Reduce Algorithm. In addition to this framework, we present a security solution based on Identity-based encryption, Signature and Proxy re-encryption to address critical security issues of the proposed framework.

Keywords—smart grid, big data, TDEA, map-reduce algorithm, identity based encryption.

I. INTRODUCTION

Power Consumption is a very important terminology which makes India to be in bright. Power Consumption refers to the electrical energy supplied over time to operate the electrical appliances like mobile, fridge, desktops, light, fan etc… where smart grid comes into existence. Smart grid is an electric grid which includes a variety of operational and energy measures including smart meters, smart appliances which is used to measure the power consumption of those devices, and it consists of renewable energy resources, and energy efficiency resources which can be used by those devices. From these devices a huge amount of data are received. That information is very complex, and the data processing over those data is inadequate. It is not an easy task to manage these set of data, which includes selection, monitoring, and analysis of smart grid data. The information,
apart from users, it is also usable for the management services, distribution services etc…
There are many challenges while processing data in big data include analysis, capture, search, sharing, storage, transfer, visualization, and information privacy. In real time, information processing is very difficult and it is required by smart grid. Delay in information processing may cause serious sequences to the whole system. To make use of those data effectively and efficiently across the globe, we go for cloud computing technology where the information from those smart devices is maintained in cloud storage. Smart-Frame is used as a general framework for big data information management. Our basic idea is to set up cloud computing centers at three hierarchical levels to manage information: top, regional, and end-user levels. While each regional cloud center is in charge of processing and managing regional data, the top cloud level provides a global view of the framework. The information storage performs heavy tasks of distributing confidential data. Data which are processing over devices and cloud will be more secure. We can provide security in data processing by using encryption algorithms.

II. BIG DATA

Big data is a concept which is used to describe a huge amount of data which is collected from various individuals, organizations etc… that may either be structured or unstructured. It becomes very difficult to process such data using traditional database models like (DBMS, RDMS) and software methodologies. A most important concern is that, if the volume of data is too big or it moves too fast or it exceeds current processing capacity, then it becomes a risky one. Big data has the ability to provide, improve operations and it makes process faster, and take more intelligent decisions for the organizations. It gets origin from Web search companies who had the problem of querying very large distributed

III. CLOUD COMPUTING

Cloud computing is a technology to access the resources available in the servers through Internet. Cloud computing technology becomes popular in the recent years due to its several advantages over traditional methods, like flexibility, scalability, agility, elasticity, energy efficiency, transparency, and cost saving. Cloud resources are shared resources which can be accessed by any one, anytime and anywhere. It is accessible through any devices like mobile, desktops, laptops, tablets etc... The resources and

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Automated Attendance Marking

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Abstract*— The Internet of Things (IoT) is the network of physical objects — devices, vehicles, buildings and other items embedded with electronics, software, sensors, and network connectivity — that enables these objects to collect and exchange data. The Internet of Things allows objects to be sensed and controlled remotely across existing network infrastructure, creating opportunities for more direct integration of the physical world into computer-based systems, and resulting in improved efficiency, accuracy and economic benefit. The attendance marking system comprises of manual roll call and involves a lot of paper work, making it difficult to search for any data and perform modifications on them. In this type of system, there is a lot of scope for proxy attendance. To solve these issues, our proposed system has automated the attendance marking process by using RFID and face detection technologies. RFID scanner is used for detecting the RFID tag; a camera captures the image of the student. The Robust Real Time Face Detection Technology detects the face in the image. The face extraction algorithm extracts the inner face to identify the cardholder. The outcome of this system is the automatic marking of attendance.

Keywords*— RFID, face detection, ultrasonic, verification, Viola Jones algorithm, extract features

I. INTRODUCTION

The Internet of Things (IoT) is the network of physical objects—devices, vehicles, buildings and other items embedded with electronics, software, sensors, and network connectivity—that enables these objects to collect and exchange data. The Internet of Things allows objects to be sensed and controlled remotely across existing network infrastructure, creating opportunities for more direct integration of the physical world into computer-based systems, and resulting in improved efficiency, accuracy and economic benefit. When IoT is augmented with sensors and actuators, the technology becomes an instance of the more general class of cyber-physical systems. Each thing is uniquely identifiable through its embedded computing system but is able to interoperate within the existing Internet infrastructure. Currently, the attendance is marked in the institutions by manual roll call. In this type of system, proxy attendance is unavoidable. Maintaining the attendance involves a lot of paper work. Records maintained on papers have the additional problems of difficulty in modifying the data. The records occupy huge amount of physical space for storage. The manpower required for taking attendance, record maintenance, storage, retrieval and modification is huge. Thus, by automating this system, we reduce the requirement of manpower drastically. Our contribution to automating this system is the usage of RFID and face detection technologies. The Radio-Frequency Identification (RFID) tag contains electronically stored information that is read by an RFID scanner. But an RFID access control system involves the problem of the cardholder not being the actual owner. To solve this problem, face recognizes technology is a widely used authentication technique that helps to extract the face from the image. Robust Real Time Face Detection is a powerful face detection technology with high accuracy. The algorithm consists of three major methods: Integral Image, AdaBoost and Cascade Detection. Once the face is detected, since the background and the hair significantly affect recognition, they are removed from the detected face by using face extraction algorithm to extract the "inner face".

A normalization process is used to adjust the size and intensity of the extracted face. The SURF algorithm is then performed to align the extracted and registered face. Finally, the CW-SSIM is adopted to calculate the similarity of the extracted and registered face. To further improve the system, an ultrasonic sensor is used to detect the interference caused by students trying to pass through when it is activated, thereby, discouraging the students from truanting.

A. Confidentiality

Access to the information stored in the database is governed by an authentication policy provided by username and password. Access is granted only to those who are authorized to access the data. Thus, the information stored in the database is confidential and cannot be modified unnecessarily.

B. Verifiability

Only those who are authorized to access the information regarding the attendance were allowed access. The server checks the level

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Wavelet Enhanced Fusion for Brain Tumor Detection Based On Stationary Wavelet Transform

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Abstract: ***Image processing is an active research area in which medical image processing is a highly challenging field. Medical image fusion techniques are used to show the inner parts of the human body for medical diagnosis.Image fusion helps in the extraction of suspicious regions from the medical images.In this paper we have proposed fusion of CT image and MRI image using stationary wavelet transform algorithm with local directional pattern and spatial frequency analysis which avoids the unwanted regions that can undoubtedly be formed after fusion of brain CT and MRI image for detection of tumour location.***

I. INTRODUCTION

Medical imaging plays vital role in the diagnosis of brain tumour which is a abnormal cells that grows in the human body. In order to extract more accurate information high resolution techniques are need such as MRI and CT. This multimodality images usually provide commendatory and periodically antipathetic information. For example, CT image can provide dense structures like bones and implants with less distortion, but it cannot analyze physiological changes, while the MRI image can provide normal and pathological soft tissues information, but it cannot support the bones information. In this case, only one type of image may not be sufficient to provide accurate clinical requirements for the physicians. So this techniques has become propitious and very challenging area in recent years.The main objective of image fusion is to integrate commendatory as well as redundant information from several images to get a fused image output. Therefore, the output image should contain the more accurate description of the scene than any other source images.Initially in existing system edge details are lossed due to blocking artifacts and it has high spatial distortion.It is the biggest drawback in the existing system.

II. PROPOSED SYSTEM

These problems are overcomes in the proposed system. In the proposed system using the Stationary Wavelet Transform (SWT) algorithm which is designed to overcome the lack of translation-invariance of the Discrete Wavelet Transform(DWT). Translation-invariance is achieved by removing the downsamplers and upsamplers in the DWT. Even though there are acceptable wavelet based fusion works today, many of them concerned on remote images, multifocus images, while less work has been done for medical image fusion. In recent years SWT has been applied for different image processing applications. The edges are embellished with high sharper resolution by using SWT which is similar to DWT, but it never uses downsampling, hence the subbands will have the similar size as the source image. Because of down sampling in DWT it causes information loss such as hides the boundaries of the tumour. That is why SWT is developed to minimize the loss.

The SWT is an inherently redundant scheme as the output of each level of SWT contains the same number of samples as the input – so for a decomposition of N levels there is a redundancy of N in the wavelet coefficients.

III. ARCHITECTURE DIAGRAM

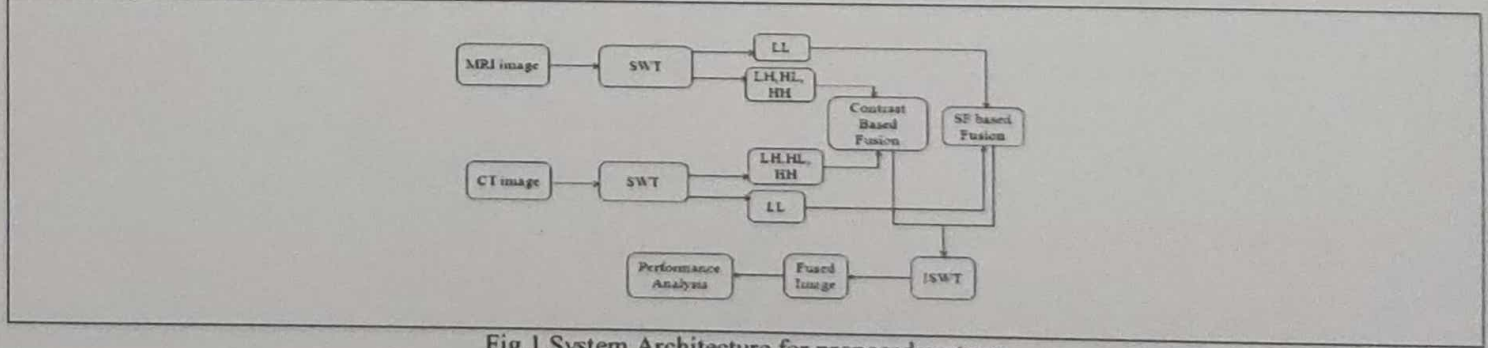

Fig 1 System Architecture for proposed system

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128 BIT KEY GENERATIONS FROM THE DYNAMIC BEHAVIOR OF ECG FOR SECURING WIRELESS BODY AREA NETWORK

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ABSTRACT

Wireless Body Area Network (WBAN) consists of resource constraints sensors and hence security methods with less computation are chosen. To make the resource consumption less, available information in the WBAN that is common to all the sensors is utilized. The proposed biometric security scheme is based on the distinctiveness and non-stationary behaviours of the ECG signal. This behaviour guarantees that the key generated for each individual is different. ECG also possesses the added advantage of generating keys with low latency that is a short duration of measured signal is enough. The above scheme reduces the need for the distribution of security key. The number of keys required by each node for secure communication is also reduced. The design constraints such as energy and randomness are considered in this work. In this research, the dynamic feature (i.e. ECG) is utilized to generate the key. The 128 bit key is generated from the R-R interval of the ECG signal. The generated 128 bit can be used as encryption keys in WBAN. The generated key shows randomness and distinctiveness.

Keywords: ECG, WBAN, cryptography.

INTRODUCTION

Rapid growth in Wireless Sensor Technology has increased the ability of easy and fast computing. The wireless sensors are connected to form Wireless Sensor Network (WSN). The most important application of Wireless Sensor Networks (WSN) is for healthcare application which includes the telemedicine. WSN that is used for healthcare application is called as Wireless Biomedical Area Network (WBAN). WBAN consists of sensors which are recognized as Biomedical Sensors. Improvements in sensors encompass the construction of small and lightweight biomedical sensors. Sensors such as electrocardiogram (ECG] sensors, pH value sensors pulse oximeters are worn on the individuals and the physiological data is measured. The measured value is communicated wirelessly to the base station from the human body. This has removed the usual way of wired communication between the biomedical sensors on the individual's body to a nearby monitoring system. The advantages of wireless communication are comfortability, flexibility and portability. The recent technique to enable secure communication in WBAN is Biometrics, where the physiological characteristics or behavioural qualities are used to provide authentication between the communicating entities. The body itself is used for managing cryptography keys between the nodes and the base station. The sensed value is used to generate a pseudo- random number which is same on both the sides. Next it is applied to encrypt and decrypt the data to be communicated. The physiological value for key generation should be chosen such that it exhibit time variance and randomness. ECG (electrocardiogram) proves to be appropriate for the above cause. The work reported in this paper bases its work on the idea of uniqueness and quasi-stationary characteristics of ECG signals. The rest of the paper is organized as follows. The related work is given in Section 2. In Section 3, the proposed algorithm for the 128-bit key generation is presented. In Section 4, the performance analysis of the proposed algorithm is described. Finally, conclusions are reported in Section 5.

RELATED WORK

Keys for symmetric crypto-systems are generated using standard key generating functions Cryptographic Random Numbers Standard (1995). These functions use pseudo random numbers as input parameters to generate unique keys. These functions are commonly known and hence the strength of the key generated depends upon the pseudo-random number. Any pseudo-random number irrespective of the source from which it is generated, it should satisfy certain conditions for them to be used for security purposes. This characteristic is known as cryptographic randomness. A random number generated from a particular source is said the cryptographically random, if it is not possible for an adversary with full knowledge of the working of the system to determine the number generated from the knowledge of previous numbers generated from the same source with a probability greater than half. This property ensures that the random number and hence the keys generated from it cannot be guessed by an adversary. In case of ordinary devices the pseudo-random number is generated from the hardware level and the key is generated at one node and is distributed to all the other nodes. This method is adopted because it is not possible to generate the same pseudo-random number at different nodes due to the differences in the hardware of the node. The conventional and generic sensor networks do not take into consideration the

Progressive quality coding for compression of medical images in telemedicine

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Abstract: Telemedicine network is used to transmit medical images from hospital to remote medical centres for diagnosis. In this connection, progressive quality coding algorithm has been developed to save storage space and better utilisation of bandwidth and to improve speed of data transmission. Generally, lossless compression should be used for region of interest (ROI) and lossy compression should be used for region of background (ROB) with a lower quality. In existing system, ROI is selected manually, but ROI is selected automatically in the proposed method, pre-processing is done to improve the visual quality of the image. Segmentation is carried out accurately and efficiently using canny edge operator and morphological processing method. The classification is done in medical image using particle swarm optimisation. ROB part of an image is compressed using set partition in hierarchical tree (SPIHT) algorithm in near lossless manner. Finally, the ROI is superimposed in compressed non-ROI (ROB) image. This method improves the compression ratio and increases the PSNR value compare to existing method. The proposed method is used for implementations of teleradiology and digital picture archiving and communications (PACS) systems practically.

Keywords: image compression; segmentation; particle swarm optimisation; PSO; decompression; compression ratio.

Reference to this paper should be made as follows: Moorthi, M. and Amutha, R. (2015) 'Progressive quality coding for compression of medical images in telemedicine', *Int. J. Telemedicine and Clinical Practices*, Vol. 1, No. 2, pp.125–140.

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Pattern Viable Restoration (PVR) Technique with Novel Viable Key (VK) Script for Secured Data Transmission in WSN

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ABSTRACT

The Data confidentiality and security are the two most important design goals for efficient energy utilization in data collection. This is a significant research concern in the wireless sensor networks. Multipath routing protocol is observed to provide efficient energy utilization by balancing the traffic among multiple paths. This paper proposes a pattern based Viable Key (VK) encryption technique for Secured Data Communication (SDC) to achieve data confidentiality and security in wireless sensor networks. The main objective of the proposed technique is to improve the security, confidentiality of data transmission and to enhance the network lifetime of the wireless sensor networks. This paper presents the novel Pattern Viable Restoration (PVR) with Viable Key (VK) script technique for secured data communication and also discusses on the unique encryption and decryption algorithm for data restoration. The method is observed to be adaptable for secure data transfer with multipath routing design with improved network life time. The results show that the data confidentiality has improved by the appropriate design of cipher text using VK encryption suitable for multipath routing protocols. The power consumption of the proposed PVR with VK technique is analysed through TINY-OS based IRIS motes and performance characteristics are compared with the standard encryption algorithms.

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INTRODUCTION

Wireless sensor network (WSN) is collection of a large number of nodes deployed as a protocol support network using processors that includes sensing device, power source such as battery, and transceiver with radio for communication discussed by Akyildiz et al. (2002). These small, smart nodes of low cost sensing and computing devices motivated researchers and engineers to use them to observe and monitor physical phenomenon. WSNs are used for distributed and cooperative sensing of physical phenomena and events of interest. These networks have applicability in areas like habitat monitoring, medical care, military surveillance traffic control and more system health monitoring applications. Sensor nodes communicate the occurrence of an event to a sink node that acts as a base station (Vijayalakshmi and Vanajaranjan, 2013). Sink node then transmits the data network layer to the user for online monitoring. However, data communication layer sometimes face some potential safety risks which was discussed by Villas et al (2013), Artigas (2005) et al.

Designing secure routing protocol is one of the effective methods for addressing secure data transfer issues. Data reliability, confidentiality discussed by Alwan and Agarwal (2013) and secure data transfer (Liu et al 2012) are the major issues that have attracted great amount of research, and a number of secured data transfer approaches have been proposed. Previous research works mainly concentrate on delivering packets along disjoint multipath routes, which can be generally summarized as follows: deterministic disjoint multipath routing and randomly disjoint multipath routing discussed by Villas et al (2013). Both routing protocol focuses on transmitting copies of packets along the disjoint routes. Random disjoint multipath routing does not have a fixed candidate route for selection. Therefore, it is able to ensure that adversaries cannot know the routes, even if they obtain the routing algorithms in advance. The dynamic key management based secret sharing was discussed by Lan et al. (2013). However, most previous works do not consider the network lifetime of WSNs, which may lead to a high probability of sensor node outage and cause an ending of normal operations. Reed Solomon (RS) codeword encryption strategy was discussed in Wang et al. (2012). Forward error correction (FEC) code is one of the technique to provide reliability and confidentiality in WSNs. This FEC proposed by Aggarwal et al.

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Intra-Cluster Grouping Mechanism for an Energy Efficient Beam Scanning Algorithm to Avoid Hidden Node Collision Avoidance in Wireless Sensor Networks

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Wireless Sensor Networks (WSNs) are extensively being used for remote monitoring and reporting purposes in human inaccessible areas. While transmitting the remote data to a centralized base station, a hidden node collision problem in the network that can deteriorate the functioning of a WSN. The techniques developed over the years to avoid hidden node problems consist of various grouping and scheduling strategies. However, the energy consumption is not preserved to the maximum possible level in the existing systems. In this work, two grouping strategies are proposed, Intra-Cluster Grouping Mechanism (I-CGM) and Beam Scanning Intra-Cluster Grouping Mechanism (BSI-CGM), which aim at reducing energy consumption to the best possible level. A design limitation in I-CGM is identified and overcome by the BSI-CGM. Simulation and analysis using the Network simulator proves that the Quality of Service (QoS) is further increased by these mechanisms and provides proof of concept for their efficiency.

Keywords: Intra-Cluster Grouping, Hidden Node Collision, Energy Efficiency, Quality of Service, Robustness of the Network.

RESEARCH ARTICLE

1. INTRODUCTION

In today's world automation is the rapidly growing wireless sensor networks are in extensive use for remote monitoring. This is mainly performed in Industries and factories that are limited by human access are monitored by wireless sensor nodes deployed and maintained ceaselessly. Some of the major application areas are Process Control, Real-time monitoring of machinery's health, Detection of liquid/gas leakage, Remote monitoring of contaminated areas, Real time inventory management and factory automation activities. All wireless nodes are limited by the heterogeneity, asymmetry and wireless transmission range. In a WSN, collisions may happen when a receiver is within the transmission range of two transmitters that are transmitting simultaneously so that the receiver captures neither frame.[1]

Every collision activity is characterized by excessive energy dissipation, such collisions need to be avoided and mitigated in order to preserve the energy from draining through collisions. This problem greatly impacts the network throughput, energy-efficiency and message transfer delays, and the problem dramatically increases with the number of nodes. Many research works have addressed solutions for eliminating or reducing the impact of the hidden-node problem in wireless networks, broadly categorized into proactive and reactive mechanisms to show the efficiency of proactive mechanisms.

Grouping mechanisms are effective compared to the non-grouping mechanisms.[3] In this work, two grouping strategies are proposed, Intra-Cluster Grouping Mechanism (I-CGM) and Beam Scanning Intra-Cluster Grouping Mechanism (BSI-CGM), which aim at reducing energy consumption to the best possible level. I-CGM is a grouping scheme where the energy during the communication process of a new node joining the WSN is greatly reduced. This allows collision free communication and also the new node joining process is efficient and achieved with lesser delay. The BSI-CGM uses directional antennas to scan the area around by a fixed angle at every fixed interval as it rotates, to see if the new node can join the groups functioning inside the WSN. The main contributions of this paper can be summarized to: overcoming the

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DESIGN OF LOW POWER FFT PROCESSORS USING MULTIPLIER LESS ARCHITECTURE

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ABSTRACT

In this paper, we present a novel restructured coefficient ordering based 16 point pipelined FFT processor. The projected novel FFT has been designed with the use of fixed radix-4 and single path pipelined architecture. Higher throughput rate is gained from this pipelined architecture when compared to ordinary pipelined architecture. The power consumption issue is fixed by reducing the switching activity with the use of least transition in Hamming distance. Through this, the switching activity of twiddle computation is reduced from 192 to 78 which is consisting 59% of reduction. Introduced multiplier less architecture cuts down the number of computations to realize complex multiplication. The 16-point FFT implementation is done with Verilog HDL and synthesized using 0.18um Cadence RTL compiler. The power evaluation of FFT has been obtained from the circuit net list using a clock frequency of 100MHz.

Keywords: fast fourier transform (FFT), radix-4, parallel architectures, OFDM, Verilog HDL.

1. INTRODUCTION

The FFT processor is a critical block in orthogonal frequency division multiplexing (OFDM) technology. Due to the nature of uncontrollable processing on the same clock frequency of sampling data, most preference is given to pipeline FFT especially for a low power solution or high throughput. The commutator and the complex multiplier blocks at each stage contribute a dominating part of the entire power consumption in the pipelined architecture. This paper proposes an optimal design to minimize one of the significant power consuming factors known as the switching activity. The coefficient ordering method is followed to reduce the amount of switching activity between successive coefficients which are used by complex multipliers. The coefficient ordering requires a consistent data sequence as per new ordering OF coefficients. Thus, we can attain the less hardware complexity and maximum efficiency.

The architecture of digital processing based MC-CDMA receiver consists of FFT block, combiner and Viterbi decoder. In which the logic block FFT is consuming more power compared to other logic blocks. The total power used for the receiver can be reduced significantly by reducing the power consumption of these blocks particularly in FFT block. The logic structure of Multiplier-less based parallel-pipelined FFT architectures for applications of wireless communication is proposed in [7] by Han, Arslan *et al.* In this paper, the logic block of multiplier is replaced by adders and shift registers. The logic blocks introduced instead of complex multiplier are reducing the total switching activities of FFT and minimizing the count of computations. Through these advancements, it reduced the total power consumption of FFT considerably. Senthil Sivakumar M, *et al.* introduced the parallel-pipelined FFT architecture for reducing the power consumption of the FFT. The complex logic blocks, i.e., commutator, multiplier, butterfly architectures are modified and introduced for low power consumption. So as to reduce the switching activity, the low power IDR commutator is introduced [1], [2], [3] and [5]. To reduce the power consumption [1], [2] and [5], multiplier less architecture has been implemented. The butterfly architecture is replaced with 2's complement operation and simple adders which diminish the power consumption of FFT notably [1], [2] and [5]. Besides that, these low power architectures are proposed in [4], [6] and [8] with various FFT architectures. The Simulation, design and analysis of low power MIMO-OFDM system and its implementation on FPGA is performed by Bhattacharjee *et al.* The low power FFT processor's FPGA implementation is suggested in [10] and [11] with an orthogonal frequency division multiplexing method that increase the data transfer rate of transceivers on parallel sub-carriers. This can be used in the multicarrier transceivers to increase the throughput of the device.

In this paper, FFT algorithm is described in Sec II. Next section III describes implementation of coefficient reordered pipelined FFT. Reordering of coefficients and accordingly the reordering of input information are explained in detail with the reference of flow graph of FFT. Sec IV presents the proposed minimum switching activity design and multiplier less approach with the reference of coefficient reordering. The FFT processor has been implemented with 16 bit complex data and is presented in Sec V.

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IMPROVING THE PERFORMANCE OF QOSTBC FOR MULTIPLE TRANSMIT ANTENNAS

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Abstract— **This paper presents a novel Quasi-Orthogonal Space-Time Block Codes (QOSTBC) for using in multiple transmit antennas systems. We show that with the aid of multiplying the entries of QOSTBC code words by the appropriate phase factors which depend on the channel information, the proposed scheme can improve its transmit diversity with one bit feedback. The performances of the proposed scenario extended from Jafarkhani's QOSTBC as well as its optimal constellation rotated scheme are analyzed. By using zero forcing decoding algorithm, simulation results show that zero-forcing algorithm has better bit error rate performance as compared to the existing typical codes and can reduce the computational complexity at receiver.**

Index Terms—QOSTBC, feedback, closed loop, space–time coding, transmit diversity, wireless communications

I. INTRODUCTION

Orthogonal Space-Time Block Codes (OSTBCs), of which the Alamouti Code is the best known, allow parallel maximum-likelihood (ML) decoding and full diversity. Yet rate-one, orthogonal designs for complex-valued constellations only exist for two-antenna transmitters. Quasi-Orthogonal Space-Time Block Codes overcome this limitation. These codes allow more than two transmit antennas, provide rate-one codes, and can produce full diversity. QOSTBCs are therefore suitable for multi-antenna base-stations serving single-antenna mobile terminals. Jafarkhani designed full Rate Quasi-Orthogonal Space Time Block Code (QOSTBC) that provides half of the maximum possible diversity for four transmit antennas. Recently, a lot of researches have been put into designing the STBC with full rate and full diversity for four transmit antennas. For open-loop communication systems, the optimum constellation rotation proposed for QOSTBC with different modulation schemes is the one of good diversity improvement approaches. Although a lot of partial feedback methods can be adopted to improve the closed-loop system performance, the major problems of such systems are high cost and high complexity due to the more feedback information. For practical interests of the design of the closed-loop transmission schemes, it is desirable to have features such as a limited amount of feedback information, low decoding delay, low cost and simple decoding processing.

In this paper, Section II provides system model operation, Section III the proposed scheme. Section IV shows simulation results.

II. SYSTEM MODEL

Encoding of QOSTBC

The encoding using N transmits antennas and a space–time block code is described t. Let s denote a signal constellation of size $2b$. At time one; Kb bits arrive at the encoder, where K is the number of the variables in the transmission matrix. These Kb bits choose K constellation symbols $s1, s2,...sk$. The encoder replaces sk everywhere for xk in the transmission matrix for all $1 £ k £ K$. Let us denote the resulting matrix C. Then at time t, $t = 1,2,...N$ the nth element of the tth row C of Ctn, is transmitted using antennas $n = 1, 2, ...N$. We emphasize that all these transmissions are simultaneous and that all the transmitted signals have the same time duration. Since elements of . are linear combinations of $x1, x2,...xk$ and their conjugates, the encoding only requires linear processing.

In this section, a quasi-static flat fading channel with four transmit antennas and one receive antenna is considered. With this assumption, Jafarkhani's QOSTBC is first described in order to facilitate the introduction of the new scheme. The (4 × 4) QOSTBC is given by

$$S_J=\begin{bmatrix} S_{12} & S_{34} \\ -S_{34}^* & S_{12}^* \end{bmatrix} \quad (1)$$

where $S12$ and $S34$ are the two (2 × 2) building blocks based on the Alamouti scheme of two transmit antennas,

$S_{12}=\begin{bmatrix} S_1 & S_2 \\ -S_2^* & S_1^* \end{bmatrix}$ and $S_{34}=\begin{bmatrix} S_3 & S_4 \\ -S_4^* & S_3^* \end{bmatrix}$ thus,

$$S_J=\begin{bmatrix} S_1 & S_2 & S_3 & S_4 \\ -S_2^* & S_1^* & -S_4^* & S_3^* \\ -S_3^* & -S_4^* & S_1^* & S_2^* \\ S_4 & -S_3 & -S_2 & S_1 \end{bmatrix}.$$

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NOVEL APPROACH BASED ON SELF-ORGANIZING MAP AND NEURAL NETWORK FOR MR BRAIN IMAGE SEGMENTATION

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ABSTRACT

Image segmentation is an important process to extract information from complex medical images. Segmentation has wide application in medical field. The main objective of image segmentation is to partition an image into mutually exclusive and exhausted regions such that each region of interest is spatially contiguous and the pixels within the region are homogeneous with respect to a predefined criterion. The main objective of our project is to develop various segmentation algorithms such as Self organizing map and Neural Network to detect the various tissues like white matter, gray matter and cerebral spinal fluid for a given magnetic resonance image data set and also provide satisfactory results compared to other algorithm in terms of misclassification rate, specificity, sensitivity and correlation.

Keywords: Self-organizing map, Neural Network

I.INTRODUCTION

The brain is the anterior most part of the central nervous system.. Along with the spinal cord, it formsthe Central Nervous System (CNS). The Cranium, a bony box in the skull protects it. The structure andfunction of the brain can be studied noninvasively by doctors and researchers using MagneticResonance Imaging (MRI).Magnetic Resonance Imaging (MRI), strongly depends on computertechnology to generate or display digital images. Segmentation is an important process in most medicalimage analysis. It is very difficult to conduct surgery without using image processing techniques.Performance Analysis of Clustering Algorithms in Brain Tumor Detection of MR Images 322Complex medical processes cannot be done without image processing techniques. Structures liketumor, brain tissue and skull cannot be identified without image segmentation.Image Segmentation is needed to extract complex information from images. It takes along time for diagnosis without using image processing techniques.Clustering to Magnetic Resonance (MR) brain tumors maintains efficiency. Clustering issuitable for biomedical image segmentation as the number of clusters is usually known for images ofparticular regions of the human anatomy. This system uses color-based segmentation method. Thissystem analyses various clustering techniques to track tumor objects in Magnetic Resonance (MR)brain images. The Clustering algorithms used are K-means, SOM, Hierarchical Clustering and FuzzyC-Means Clustering.A given gray-level MR image is converted into a color space image and clustering algorithmsare applied. The position of tumor objects is separated from other items of an MR image by usingclustering algorithms and histogram-clustering. In this system we combine, various clusteringalgorithms one by one and apply Histogram Clustering. After the clustering process, the cluster containing the tumor is selected as the primary segment. To eliminate the pixels which are not relatedto the tumor pixels, Histogram clustering is applied.The performance analysis is conducted by taking a MRI Brain Tumor image as the input andapplying all the four clustering algorithms to the image. The performance of the above four clusteringalgorithms are found based on the execution time and the number of tumor pixels. A tumor or tumor is the name for a neoplasm or a solid lesion formed by an abnormal growth of cells (termed neoplastic) which looks like a swelling.Tumor is not synonymous with cancer. A tumor can be benign, pre-malignant or malignant, whereas cancer is by definition malignant.types of tumors are benign tumor is a tumor that lacks all three of the malignant properties of a cancer. Thus, by definition, a benign tumor does not grow in an unlimited, aggressive manner, does not invade

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RESEARCH ARTICLE

Repetitive Controller Based Active Neutral Point Clamped DSTATCOM for Compensating Unbalanced Non Linear Loads

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This paper presents three-level Active Neutral Point Clamped (ANPC) inverter based DSTATCOM for compensating harmonics in three phase three wire distribution system. ANPC topology is proposed as Voltage Source Converter (VSC) for DSTATCOM, which combines the feature of traditional diode clamped inverter and a full converter. To compensate harmonics of non linear loads, a digital Repetitive Controller (RC) is proposed in the inner loop and Proportional-Integral control (PI) is used for dc capacitor voltage balancing of ANPC in the outer loop. By using the RC controller, higher order harmonics of selected frequencies can be eliminated even if the DSTATCOM is having limited bandwidth at Point of Common Coupling (PCC). The reference currents are generated using synchronous reference frame theory and a sine PWM technique is used to generate the pulses for the ANPC. The simulation is performed in MATLAB and the experimental results are presented to study the overall viability of the system.

Keywords: DSTATCOM, Repetitive Controller, Harmonic, ANPC, Power Quality.

1. INTRODUCTION

Widespread use of power electronic devices and other non linear loads inject harmonics currents into the distribution systems.[1–3] These harmonic currents cause a poor power factor, creates torque pulsation in motors, over heating of transformer, and affects other sensitive loads connected at the Point of Common Coupling (PCC).[4,5] The collection of controllers used in the distribution system to compensate power quality issues is the Custom Power Devices (CPDs). DSTATCOM is one of the CPDs used for providing the required compensation at PCC. Various topologies of DSTATCOM are discussed in literatures[2–5] using conventional and multilevel inverters. One popular topology used is the conventional Neutral Point Clamped (NPC) inverter.[6] The drawbacks of the conventional NPC are unequal distribution of switching losses in the devices, indirect clamping of inner devices, blocking voltages of clamping diodes and impractical use of large clamping diodes due to diode reverse recovery.[7] A new topology based on Active NPC (ANPC), which has the flexibility of conventional NPC and the flexibility of a full converter is proposed.[7] This configuration allows new switching states without clamping diodes and hence proper switching losses balancing is achieved.[8,9] For the ANPC, the PWM pulses are generated by comparing the actual currents at PCC with the reference signals generated using synchronous reference frame theory, which gives good performance under non sinusoidal voltage conditions.

To supply a sinusoidal output voltage at PCC, many control techniques are developed. A simple PI controller in synchronous reference frame is sufficient to obtain a sinusoidal output if the load is linear.[10] When the load is an unbalanced non linear load, the PI controller is not sufficient to maintain a sinusoidal output due to its limited bandwidth.[11] In this paper, a discrete-time plug-in Repetitive Controller (RC)[12] is applied to the DSTATCOM. The RC is used as a widespread method of compensating the unknown harmonics of a nonlinear load. The RC algorithm is able to compensate harmonics of any order, when it deals with a unbalanced non linear load. In this paper the RC technique is used to design a high gain digital control loop for the control of ANPC based DSTATCOM. The switching sequence for the ANPC is generated using sine PWM technique. The feasibility of the proposed control strategy is verified through simulations by

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G. Murugananth,[1] K. Samidurai,[2] S. Muthukrishnan,[3] and S. Vijayan[4]

Experimental Validation of Fuzzy-Tuned AWPI Controller-Based Chopper Driven PMDC Motor

Reference

Murugananth, G., Samidurai, K., Muthukrishnan, S., and Vijayan, S., "Experimental Validation of Fuzzy-Tuned AWPI Controller-Based Chopper Driven PMDC Motor," *Journal of Testing and Evaluation*, Vol. 43, No. 6, 2014, pp. 1–12, doi:10.1520/JTE20130284, ISSN 0090-3973

ABSTRACT

Chopper driven Permanent magnet DC (PMDC) motors are used to drill bone and fix the screws in orthopaedic surgeries. The drive of the motor employs a traditional or modern controller that has an inner current control loop and an outer speed control loop. As an alternative to traditional proportional integral (PI) controller-based chopper drives, this paper proposes a fuzzy-tuned anti-windup PI (AWPI) controller-based chopper for the speed control of PMDC motors used in orthopaedic surgeries. The proposed scheme was simulated using Matlab/Simulink and physically realized for validation. It is ascertained from the performance analysis that the proposed fuzzy-tuned AWPI based scheme exhibits better steady-state and transient-state responses when compared with traditional PI and AWPI controllers.

Keywords

chopper, fuzzy tuned AWPI, orthopaedic surgery, osteosynthesis, peak overshoot, PIC microcontroller, PMDC motor, steady state error

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AQ1

Introduction

The branch of surgery dealing with the study of bone fracture is called orthopaedics. The surgical practice of reducing and stabilizing fractured bones using mech nical connectors, such as metal plates, rods, wires or screws, is termed as osteosynthesis. In osteosynthesis, low power electric motors, such as permanent magnet DC (PMDC) motors, are used to make repairs in the fractured bones. Depending on the nature of the fracture, a metal plat or screws will be attached with the fractured bone. Generally, novice surgeons used to practice osteosynthesis phenomenon using synthetic bone on cadavers rather than live patients. This was because if such practices were

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Photo Voltaic (PV) fed Three Phase Induction Motor Drive for Rural Pumping Applications based on Single Stage Power Conversion

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Abstract

This paper emphasizes on proposing a cost effective photovoltaic (PV) fed 3 phase Induction motor drive which serves for rural pumping applications. Generally in a standalone system, the solar panels generate direct current energy which is then stored in rechargeable batteries and the battery set up in turn will serve as a source for the inverter. But here in this proposed work a new single stage battery-less power conversion is employed by designing a maximum power point tracker (MPPT) embedded boost converter which revolutionizes the present tradition and makes the overall cost of the setup to go down considerably. The proposed work is realized as a prototype consisting PV array of 500watts, MPPT aided boost converter, three phase inverter and a three phase squirrel cage induction drive of 357 watts. An efficient and low cost micro controller dspic4011 is used as the platforms to code and implement the prominent perturb and observe MPPT technique. Sinusoidal pulse width modulation (SPWM) is the control technique employed for the three phase inverter. To validate the experimental results simulation of the whole set up is carried out in Matlab/Simulink environment. Simulation and hardware results reveal that the system is versatile.

Keywords: *Photo Voltaic (PV), Maximum power point tracking (MPPT), Perturb and Observe (P&O), Sinusoidal pulse width modulation (SPWM), Micro controller, Squirrel Cage Induction Motor (SCIM)*

1. Introduction

In a world of increasing energy demand, fossil fuels will eventually become depleted and renewable energy would then remain as the best alternative to satisfy world's hunger for energy. This alarming situation thereby has made people all over the globe concerned for depleting fossil fuels and this has resulted in increased inclination towards the alternate energy sources like the wind energy, solar energy, tidal and biomass etc [1-2]and amongst which solar and wind are on a high penetrations [3-4]. The fact that solar energy is renewable and also cleaner than any other energy produced from fossil fuels makes this resource of sustainable energy very important for the planet future. Developing countries like India, find it very difficult to realize the power produced by the renewable sources through the primary grids to load centers [5-7]. Primarily because it will affect the already existing setup and efficient synchronization would be required her by. Therefore distributed power sources have dragged more attention over the years [8-10].

This particular work played utmost importance in designing a standalone PV system which can serve rural masses by employing irrigation facilities. There has been a lot of research around the world on employing PV systems as standalone power sources. Predominantly the researches paid their attention in PV powered water pumping system in desert well [11-12]. The fundamental research on PV for drives initiated in the late 90's

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Tapped Inductor Quasi-Z-source Inverter With High Inversion Gain

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Abstract*—This paper proposes a high inversion gain single stage boost inverter, which introduces a tapped inductor network into the traditional quasi-Z-source inverter (qZSI), called tapped inductor quasi-Z-source inverter (TL-qZSI). The tapped inductor network including one tapped inductor and two diodes and is used to replace one inductor of the traditional qZSI. Similar to the tapped inductor Z-source inverter (TL-ZSI), the proposed inverter can provide high inversion gain. TL-qZSI has all the merits of TL-ZSI except that it also features with continuous input current, common ground with the dc source, and reduced capacitor voltage stress. This paper analyses the circuit operation principle, boost inversion features and its control strategy. Simulation and Experimental results are provided to verify its effectiveness and demonstrate the real features of the proposed circuit.

Keywords*— Pulse Width Modulation; Switched Inductor Quasi z Source Inverter; Unipolar PWM.

I. INTRODUCTION

Traditional voltage-source PWM inverter (VSI) is generally a buck-type converter. One of its characteristics is that the instantaneous output voltage is always lower than the dc input. In applications with wide input voltages, such as distributed power generation (DG) systems, a boost type DCDC converter is often added in front of the VSI to step up the dc input voltage [1]-[3] in case of a low level dc input. However, the traditional boost converter may not be able to provide enough dc voltage gain even for an extreme duty cycle. Large duty cycle operation may result in serious reverse-recovery problem and increase the rating of power devices. And also this two stage operation solution will inevitably increase the overall cost and system complexity, and deteriorate system efficiency. On the other hand, the upper and lower devices of the same phase leg cannot be gated on simultaneously in the traditional VSI. Otherwise, shoot through problem would occur and destroy the switching devices. Dead time is always used in case of shoot-through events in bridge-type converters, but it will cause waveform distortion. Though dead-time compensation technology [4]-[5] has been developed, it increases the control complexity. So it is desirable to have a single-stage boost inverter featuring with no shoot through issues. Z-source inverter (ZSI) [6] was proposed to overcome the issues of the traditional inverters, shown in Fig. 1(a). It is a single-stage inverter topology to demonstrate both buck and boost power conversion ability by gating on the two switches in the same phase leg simultaneously. Due to shooting through the phase legs becomes a normal operation mode, the bridge shoot-through is no longer an issue, but utilized as a control variable and is defined as "shoot-through zero state". So the reliability can be improved. Boost factor B of Z-source inverter can be expressed as:

$$B = \frac{\hat{v}_b}{V_i} = \frac{1}{1-2D_0}, \quad (1)$$

where Vi is the dc input voltage, b v ˆ is the amplitude of bus voltage, and D0 is the shoot-through duty cycle. It is clear that D0 is confined between 0 and 0.5 when B varies between 1 and ∞. The upper extreme is unachievable in practice, which would push down the voltage gain of whole converter to a much lower value [7]-[9]. Fig. 1(b) shows one of the voltage-fed quasi-Z-source inverter [10] with continuous input current. It also features with a common ground with the dc input source, and lower capacitor voltage stress. Boost factor of qZSI is the same with that of ZSI.

Traditional ZSI and qZSI can only regulate the shoot through zero state to maintain the set bus voltage amplitude. For applications requiring a large boost factor, a large value of shoot-through zero state should be taken to provide a high boost conversion relation between bus voltage and the low input dc-source voltage. However, by taking the traditional SPWM control method, the modulation index is inverse proportional to shoot-through zero state. Widening shoot through zero state will inevitably decrease modulation index and in turn reduce the output voltage amplitude, and will also increase device voltage stress [7] and output voltage THD

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Improved Noise Reduction Scheme for Smart Grid Applications

J.Rajesh, J.Pranesh Jonathan, K.Somasekar

Abstract— **In this paper, we propose clipping scheme and equalizer as methods to reduce the effects of impulsive noise and channel attenuation in power line communication (PLC) system. Clipping is cutting off the amplitude of the received signal over threshold level without its phase change in order to reduce noise effects. The equalizer compensates for effects of PLC channel. The performance is evaluated in terms of bit error rate (BER). From simulation results, it is confirmed that the proposed clipping scheme has slightly better performance than conventional PLC system. The results of the paper can be applied to PLC systems for smart grid.**

Index Terms— **Power line communication, Noise reduction, smart grid, bit error rate.**

I. INTRODUCTION

Over the past few years, the electric power industry, state and federal regulators, government agencies, and universities have been considering with how to best update the aging electric power infrastructure. The general consensus is that the updated power grid not only must secure the future reliability of the power system in light of the increasing demand for electricity, but it also must operate with greater efficiency overall. From these considerations, the smart grid technology has attracted public attention. The goal of the smart grid is to use advanced, information-based technologies to increase power grid efficiency, reliability, and flexibility and reduce the rate at which additional electric utility infrastructure needs to be built [1], [2]. Besides this, explosive increase of demands for high quality of multimedia and convenient access has led to research a variety of communications technologies. To support the smart grid and meet the customer's desire, communication technologies should be considered fast data rate, reliable reception and access in anywhere.

As one of the promising candidates for smart grid, power line communication (PLC) is a leading technique because of its advantages. The most striking point is using the existing power line infrastructure, so installation cost is lower than other communication system. Besides this, communication service can be available everywhere outlets exist [1]. Since power line, however, have been made for electricity distribution purpose, its channel characteristic is very hostile for data transmission. There are lots of devices with variety impedance in PLC network, so this cause multipath environment. Also, impulsive noise is generated by random joint of each device, which sometimes exceeds power spectral density (PSD) of background noise by 50dB [2]. Because these are critical to the system performance, it needs
In this paper, we propose clipping scheme and equalizer as a method to overcome above issues. Clipping is cutting off amplitude of the received signal over threshold level and the equalizer compensates effects of PLC channel.

This paper is organized as follows. In Section II, we describe the PLC system and the channel model of PLC system is presented in Section III. The proposed PLC system model considered in this paper is described in Section IV. The performance of the proposed interference cancellation scheme is analyzed in Section V. Simulation results are shown in Section VI. Finally, applications and concluding remarks are given in Section VII and Section VIII.

II. POWER LINE COMMUNICATION SYSTEM

PLC is one of the promising communication technologies. This technology literally transmits data on electric power from a small number of sources (the generators) to a large number of sinks (the consumers) in the frequency range of 50-60Hz [3]. PLC technology begins to receive explosive attention in the smart grid and the home networking industry because of its several attractive advantages. The most useful advantage of them is a national-wide power line infrastructure. It is very robust and can be utilized anywhere using electricity. This point approaches low installation cost since it uses existing line as communication path [4], [5].

These days, PLC technology is mainly employed for access network and in-home communications networks. It also receives high attention in smart grid industry because other technologies typically spend the high cost about 50% of the investments making network infrastructure [4]. This type of PLC technologies is called, "last-inch" access. The development of the "last inch" by Home networking companies in the form wireless network adapters and power-line adapters is gradually leading to widespread home networking; i.e., a wide array of devices connected inside the home in an intra-home network.
Broadband PLC systems are applied to the telecommunications access area represent and alternative communications technology for the realization of the so-called "last-mile" access. This concept is the use of PLC technology to provide broadband Internet access through ordinary power lines. PLC subscribers are connected to the network by plugging PLC modems that ensure data transfer over low-voltage supply grids into any outlet in an equipped building high speed Internet access [3], [4].

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Simulation of a New Quasi Resonant DC Link Inverter to Reduce Switching Losses

J.Pranesh Jonathan, K.Somasekar, J.Rajesh

Abstract— **In this paper a new three phase DC link soft switching inverter is introduced. The auxiliary circuit of the proposed inverter is composed of two switches beside the DC link switch. All switches in the proposed inverter are soft switched. The proposed auxiliary circuit provides zero voltage switching condition for the main inverter switches independent of the link current direction. An analysis of this inverter topology is presented and various operating modes are explained in details. The inverter simulation is performed to validate the analysis.**

Index Terms— **Soft switching; zero voltage switching; zero current switching; quasi resonant DC link.**

I. INTRODUCTION

Inverters are found in several industrial applications such as uninterruptible power supplies (UPS), motor drives, induction heating, etc. The frequency of hard switching inverters is limited due to: (1) switching losses, (2) severe di/dt or dv/dt which causes Electromagnetic Interference (EMI), and (3) switching stresses (high voltage and current peaks) on the power devices during the turn on and/or turn off transients [1]. By applying soft switching techniques, the switching frequency can be increased [2]-[6].
Soft switching techniques can reduce EMI as well as switching losses and switching stresses.

Therefore, higher switching frequencies can be obtained using soft switching techniques. At high switching frequencies, harmonic filtering is easier and audible noise can be eliminated. In order to provide soft switching condition, a high frequency resonant circuit is added to the conventional hard switching inverter. The resonant circuit can be composed of passive elements, diodes and switches. Depending on the position of the auxiliary circuit, soft switching inverters are defined. In DC link inverters, the auxiliary circuit is between the DC source and inverter main switches. When the state of inverter switches should change, the auxiliary circuit is turned on and the inverter DC link voltage is reduces to zero and thus, the state of inverter switches can be changed under zero voltage switching (ZVS) condition.

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The resonant DC link (RDCL) concept was first proposed in [7]. This inverter had many drawbacks such as high voltage stress of the switches, high DC link voltage ripple and it could only operate with discrete pulse modulation (DPM) control that is hard to achieve while resulting in sub-harmonics. Furthermore the inductor power losses were considerable as the inductor always conducts. To overcome RDCL drawbacks, actively clamped resonant DC link (ACRDC) technique was introduced in [8]. The ACRDL technique reduces the switch voltage stress to 1.2-1.4 times the source voltage. However, it is difficult to control current balance of clamp capacitor.
In [9] a new ACRDC is introduced. The clamping circuit has a small DC source which itself is a problem.
Another problem is that the energy of DC link capacitor is not recovered and is dissipated. In order to provide ZVS condition for inverter switches, several quasi resonant schemes are introduced [10]-[15]. The circuit proposed in [10], consists of four switches which three of them are turned off under hard switching condition. The topology introduced in [11] has three switches but two switches are turned off under hard switching condition. This paper introduces a new quasi resonant DC link inverter which provides ZVS condition for the main inverter switches at transition instants. The auxiliary circuit has three switches which all of them are soft switched. The proposed inverter is analyzed and the operating modes are discussed. Finally the inverter is simulated using PSPICE software to justify the analysis.

II. CIRCUIT DESCRIPTION AND OPERATION

The proposed inverter is shown in Fig. 1. This inverter is composed of a conventional three phase inverter and the auxiliary circuit. The auxiliary circuit consists of three auxiliary switches, two diodes, two resonant capacitors, one resonant inductor and two coupled inductors

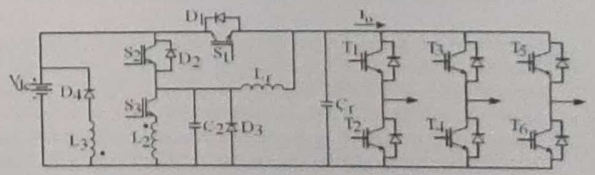

Figure 1. Power circuit configuration of the proposed inverter

Since the inductors of the auxiliary circuit are much smaller than the load inductors, the inverter switches and three phase load can be replaced by a constant current load during one switching cycle. The equivalent circuit of the inverter is shown in Fig. 2. The inverter has 12 operating modes in a switching cycle. The corresponding waveforms of the auxiliary switches, gate signals, capacitors voltages, inductors currents and the currents of diodes are shown in Fig. 3. The

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On-Line Monitoring of AC Induction Motors Using ARM and CAN Bus System

K.Anand, P.Manikandan, A.G.Karthikeyan

Abstract— **This paper presents an on-line distributed induction motor monitoring system based-on the ARM (Advanced RISC Machines), which is integrated with the embedded and CAN (Controller Area Network) bus technologies. The hardware structure of the system with the ARM microprocessor S3C2410X and CAN bus controller MCP2510 is introduced; the accomplishment of software of motor on-line monitoring system is also described. Compared to the complicated construction and low integration of traditional motor testing systems, this system has a reasonable structure with less external expansion units, and can carry out data transmission in real time, effectively, and with lower power cost and more reliability.**

Index Terms— ARM; CAN bus; distributed; monitoring system.

I. Introduction

As one of the important electric equipments, induction motors are widely used in various areas from commercial manufacture to agricultural industry. However, some unpredictable reasons, such as the thermal, electrical and mechanical stress, mechanical failures, may cause the induction motors damage. It is necessary to monitor motors real-time and effectively so as to insure their continuous and safety operation without expensive failures [1-5].

With the rapid development of computer technology, communication technology, and integrated electric circuit technology, more advanced methods have been arising in the motor detecting and monitoring.

There are many researchers who put forward some integrated motor protection systems for induction motor monitoring [2-4]. Some researchers develop protection systems for monitoring electrical faults in induction motor by analyzing the motor currents. On the other hand, as in [2-3], the authors show from experimental results that faults in bearings make unpredictable and broadband changes in the motor currents, and they find that the bearing failures, because of their precise nature, have a clear indicator for diagnosing motor faults.

By using ARM embedded and CAN bus technologies, this paper puts forward an on-line distributed induction motor monitoring system based-on ARM and CAN bus.

With its characteristics of simple construction, cost-effective, flexible extension, and so forth, this system can be used widely in different environment and fields.

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II. Hardware Architecture of On-Line Distributed Induction Motor Monitoring System

The distributed system is an application that executes a collection of protocols to coordinate the actions of multiple processes on a network, such that all components cooperate together to perform a single or small set of related tasks. At the recent years, the distributed system has been increasingly applied in many safety-critical systems, such as the low-level applications in the industrial plants, the high-level in the military and nuclear systems, etc.

The embedded system is devices used to control, monitor, or assist the operation of equipment, machinery or plants. It makes the application as the center and computer as its foundation. Its hardware and software can be tailored. It can be applied in the dedicated cosmputer system, which has strict requirements for the function, reliability, cost, size, and power.

The CAN bus is an effective serial communication network, which can support the distributed and real-time control. Its bus standard has been formulated as international standard by the International Organization for Standardization (ISO) and is regarded as one of the most promising field buses [6-7].

The on-line distributed induction motor monitoring system can be used to monitor a set of motors that work together in the field, such as an industrial plant. In this system, there are many nodes (up to 110 nodes) that are connected each other with the CAN bus. At each node, one hardware subsystem is responsible to monitor one motor and transmit the data of the tested motor to the center of the system, which is also one node in the distributed network.

In this monitoring system, the embedded ARM microprocessor S3C2410X is responsible for monitoring each node of the entire system [8]. On-site motor parameters at each node can be acquired via the CAN bus.

After filtered and amplified by the front-end signal conditioning circuit, the parameters can be transmitted directly to the A/D Conversion circuit of S3C2410X. The data exchange between the S3C2410X and CAN transceiver can be realized via the CAN bus. The S3C2410X is applied to analysis, process, and store the detected motor data from the sensors so as to complete the on-line system monitoring [9-10].

The hardware architecture of each node of on-line distributed motor monitoring system mainly includes the ARM microcontroller, CAN bus controller, signal acquisition and regulation circuit, A/D conversion circuit, system monitoring and protection, real-time clock, and power. The hardware architecture of each node of on-line distributed induction motor monitoring system is shown as Fig.1.

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Implementation of Hybrid Switching Scheme for series-Resonant DC-DC Converter

A.G.karthikeyan, K.Anand, P.Manikandan

Abstract— **This project presents a hybrid switching scheme for LLC series-resonant half-bridge (SRHB) dc-dc converter. The concept proposed hybrid switching scheme is changing the switching mode to improve power efficiency in a wide load range. The SRHB converter operates in three different switching modes depending on the output load condition. This three switching schemes provides efficient operation of system at different load condition. The simulation and Digital control of the system facilitates the implementation of the proposed hybrid switching. Hence high efficiency is achieved with a constant output voltage over wide load range.**

I. INTRODUCTION

Although in existence for many years, only recently has the LLC resonant converter, in particular in its half-bridge implementation, gained in the popularity it certainly deserves. In many applications, such as flat panel TVs, 85+ ATX PCs or small form factor PCs, where the requirements on efficiency and power density of their SMPS are getting tougher and tougher, the LLC resonant half-bridge with its many benefits and very few drawbacks is an excellent solution. Resonant conversion is a topic that is at least thirty years old and where much effort has been spent in research in universities and industry because of its attractive features: smooth waveforms, high efficiency and high power density. Yet the use of this technique in off-line powered equipment has been confined for a long time to niche applications: high-voltage power supplies or audio systems, to name a few. Quite recently, emerging applications such as flat panel TVs on one hand, and the introduction of new regulations, both voluntary and mandatory, concerning an efficient use of energy on the other hand, are pushing power designers to find more and more efficient AC-DC conversion systems. This has revamped and broadened the interest in resonant conversion. Generally speaking, resonant converters are switching converters that include a tank circuit actively participating in determining input-to-output power flow. The family of resonant converters is extremely vast and it is not an easy task to provide a comprehensive picture. To help find one's way, it is possible to refer to a property shared by most, if not all, of the members of the family. They are based on a "resonant inverter", i.e. a system that converts a DC voltage into a sinusoidal voltage (more generally, into a low harmonic content ac voltage), and provides ac power to a load. To do so, a switch network typically produces a square-wave voltage that is applied to a resonant tank tuned to the fundamental component of the square wave. In this way, the tank will respond primarily to this component and negligibly to the higher order harmonics, so that its voltage and/or current, as well as those of the load, will be essentially sinusoidal or piecewise sinusoidal

High efficiency dc-dc converter for wide load ranges is necessary for the applications which are battery-powered and have energy consumption constrains. For a high efficiency dc-dc converter, the LLC series-resonant half-bridge (SRHB) converter is gaining its popularity. Output voltage regulation is achieved by switching-frequency modulation .However, switching frequency increases as the output load decreases.

In order to achieve high power densities, there is a trend to operate power supplies at higher switching frequencies. As the switching frequencies increase, the switching losses associated with the turn on and turn off of the devices in the power supplies also increase. In switch-mode power supplies, these losses are so significant that the operation of the power supplies at very high frequencies are prohibitive because of low efficiencies. In resonant mode power supplies, however, the switching losses are low, which allows the operation of resonant Converters at very high frequencies. A number of full, quasi-, multi resonant dc/dc converter topologies have been reported in the literature. These converter topologies have reduced or near-zero switching losses; however, their output voltage is controlled and/or changed by varying the operating switching frequency. These converters are, therefore, unsuitable for the application where system synchronization is required.

The series-resonant asymmetrical-pulse width-modulated (SR-APWM) dc–dc converter is a half-bridge resonant converter that operates at constant frequency and uses duty cycle control to regulate its output. It is capable of high frequency operation and maintains efficiency greater than 80% for the entire load range. Further, the voltage stress of the switches is limited to the input voltage, which allows the use of low-voltage low ON-resistance switches. However, the SR-APWM suffers the main drawback of losing ZVS outside of a limited input-voltage range. To reap the benefits of the resonant converters while operating at a constant frequency, the asymmetrical pulse width modulation (APWM) is applied to the SRHB converter .The APWM SRHB converter features high efficiency by zero voltage switching (ZVS) operation. However, the disadvantage of the APWM SRHB converter is low efficiency at light loads. The switching losses constitute a major portion of the total power losses when lightly loaded. The key to achieve high efficiency under light load condition is reducing the load independent power losses. Variable-frequency APWM method reduces switching losses by lowering the switching frequency. However, it results in a higher peak current flowing through the power switches,

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Cascaded Multilevel Inverters Design and Its Furtherance

R.Karthika, T.jothi, M.Preetha, M.Yuvallela

Abstract— **The multilevel inverter collectively converters the several levels of dc voltage to a desired ac voltage. Multilevel inverter incorporates various pulse-width modulation Strategies.The unique structure of multilevel inverters allows them to reach nearer to sinusoidal i.e. with low harmonics. As the number of voltage levels increases, the harmonic content of the output voltage waveform decreases. The increase of voltage levels with low ratings of individual devices can increase the power rating. To produce a high-power, high-voltage inverter with multilevel structure is easy, as the device voltage stresses are controlled in the structure. The use of a high-voltage inverter makes possible. For the direct connection to the high-voltage distribution system, eliminating the distribution Transformers. An inverter can produce a controlled reactive current and operates as a Static VAR Compensation in steady state operation. The most common applications of multilevel inverters include Reactive power compensation, Back-to-Back inter-tie &Variable speed drives. The multilevel inverters are classified as Diode clamped, flying capacitor & cascaded multilevel inverters. These topologies of multilevel inverters are discussed and new topology, proposed from cascaded multilevel inverter has been introduced. The Simulated results have been obtained for Cascaded multilevel inverter &Proposed modified cascaded multilevel inverter using continuous and SPWM techniques**

Index Terms—**About four key words or phrases in alphabetical order, separated by commas.**

I. INTRODUCTION

In general, increasing the switching frequency in voltage source inverters (VSI) leads to the better output voltage / current waveforms. Harmonic reduction in controlling a VSI with variable amplitude and frequency of the output voltage is of importance and thus the conventional inverters which are referred to as two-level inverters have required increased switching frequency along with various PWM switching strategies. In the case of high power high voltage applications, however, the two-level inverters have some limitations to operate at high frequency mainly due to switching losses and constriction of device rating itself. Moreover, the semiconductor switching devices should be used in such a manner as problematic series / parallel combinations to obtain capability of handling high power. Nowadays the use of multilevel approach is believed to be promising alternative in such a very high power conversion processing system. Advantages of this multilevel approach include good power quality, good electromagnetic compatibility (EMC), low switching losses, and high voltage capability. Recent advances in power electronics have made the multilevel concept practical. In fact, the concept is so advantageous that several major drives manufacturers have obtained recent patents on multilevel power converters and associated switching techniques. It is evident that the multilevel concept will be a prominent choice for power electronic systems in future years, especially for medium-voltage operation.

Multi-level inverters are the modification of basic bridge inverters.They are normally connected in series to form stacks of level In general multilevel inverter can be viewed as voltage synthesizers, in which the high output voltage is synthesized from many discrete smaller voltage levels. The main advantages of this approach are summarized as follows:

It should have less switching devices as far as possible.

It should be capable of enduring very high input voltage such as HVDC transmission for high powerApplications.

Each switching device should have lower switching frequency owing to multilevel approach.

II. CASCADED MULTILEVEL INVERTER

Multilevel power conversion technology is a very rapidly growing area of power electronics with good potential for further development. The most attractive applications of this technology are in the medium- to high-voltage range (2-13 kV), and include motor drives, power distribution, power quality and power conditioning applications. There are different types of multi level circuits involved. The first topology introduced was the series H-bridge design. This was followed by the diode clamped converter, which utilized a bank of series capacitors. A later invention detailed the flying capacitor design in which the capacitors were floating rather than series-connected[2].Another multilevel design involves parallel connection of inverter phases through inter-phase reactors. In this design, the semiconductors block the entire dc voltage, but share the load current. Several combinational designs have also emerged some involving cascading the fundamental topologies. These designs can create higher power quality for a given number of semiconductor devices than the fundamental topologies alone due to a multiplying effect of the number of levels

The modularity of this structure allows easier maintenance and provides a very convenient way to add redundancy into the system. The multilevel inverter using cascaded-inverter with separate DC sources synthesizes a desired voltage from several independent sources of dc voltages, which may be obtained from batteries, fuel cells, or solar cells. This

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Photovoltaic Fed Boost H6 Inverter for Standalone Application

A.Malliga, S.Subalakshmi, V.Suvitha, S.Shanthini Merlin

Abstract— **This paper presents the design and implementation of Photovoltaic fed high performance boost H6 inverters using hybrid modulation method. In this configuration without the input split capacitors, multiple DC sources, common-mode voltage and leakage current issues can be eliminated in standalone PV system . The main objective of this system is to achieve high efficient system with the elimination of common-mode voltage and leakage current. The hybrid modulation topology is the combination of unipolar and bipolar pulse width modulation schemes. The performance of the proposed system is analyzed by comparing the level of reduction of common mode error as a parameter and the working of existing H4 inverter.**

Index Terms— **H4 inverter, H6 inverter, Hybrid Modulation, Common mode voltage, Leakage Current**

I. INTRODUCTION

In recent years, photovoltaic (PV) systems have become more and more widespread in private and commercial applications. Nonisolated inverters with decreased number of components, low cost, and high efficiency are preferred choices for these applications, where power density, cost, weight, and reliability are critical issues. However, these inverters suffer from some safety and power quality drawbacks, such as common-mode voltage or ground leakage current issue between load and PV systems and dc current injection into the load.

The elimination of the output transformer from grid-connected photovoltaic (PV) systems not only reduces the cost, size, and weight of the conversion stage but also increases the system overall efficiency. However, if the transformer is removed, the galvanic isolation between the PV generator and the grid is lost. This may cause safety hazards in the event of ground faults. In addition, the circulation of leakage currents (common-mode currents) through the stray capacitance between the PV array and the ground would be enabled. Furthermore, when no transformer is used, the inverter could inject direct current (dc) to the grid, causing the saturation of the transformers along the distribution network. While safety requirements in transformerless systems can be met by means of external elements, leakage currents and the injection of dc into the grid must be guaranteed topologically or by the inverter's control system

The traditional full-bridge inverter with four active switches (H4 topology) is simple and has a good tradeoff between efficiency, complexity, and price. Its efficiency can reach 96%–97% with unipolar switching method. However, it generates a common-mode (CM) voltage with an amplitude of half input voltage at the switching frequency, which needs a big CM choke. This problem could be eliminated by the same H4 topology with bipolar switching method, but the efficiency is limited to 95.3% and requires a bigger output differential filter than that with unipolar modulation strategy.

The parasitic capacitor between the PV array and the ground also plays an important role in a CM voltage or ground leakage current issue. The CM voltage across the capacitor generates a ground leakage current, which may cause severe electromagnetic interference (EMI) problem, load current distortion, and additional losses in the system, etc.

The stray capacitor depends on many factors, such as the PV panel and the frame structure, the surface of cells, the distance between cells, the module frame, the weather conditions, the humidity and the dust covering the PV pane, etc. For the crystalline silicon cells, 50- to 150-nF/kWp capacitance is expected, whereas for the thin-film cells, the capacitance up to 1 μF/kWp is observed. Some standards, such as DIN VDE 0126-1-1, impose the disconnection of the inverter if the ground leakage current exceeds prefixed limits, as given in Table 1.

By grounding the PV array, the parasitic capacitance and the associated hazardous current are reduced. Additionally, the type of transformerless topology and the applied switching scheme influence the magnitude and type of voltage fluctuation at the PV array with respect to the ground. Inverter topologies that are intrinsically s ie from leakage currents are the half bridge (HB) and neutral-point-clamped ones. However, the need of twice input voltage than H4 topology and its input split capacitors are main drawbacks. Some efforts are also made to improve H4 topology and its corresponding PWM schemes.

TABLE 1.1 Leakage current RMS levels and corresponding disconnection times

Leakage current RMS values (mA)	Disconnect Time (s)
30	0.3
60	0.15
150	0.04

High performance inverters with H6-type configuration with hybrid modulation method is proposed and evaluated. The CM voltage and ground leakage current analysis based on the

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Optimization of Cutting Parameters in Turning of AA6351 Using Response Surface Methodology and Genetic Algorithm

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Abstract

In the present study, response surface methodology has been applied to determine the optimum cutting conditions leading to minimum surface roughness (R_a), minimum machining force (F_m), minimum cutting power (P_c) and maximum material removal rate (MRR) in turning operation on AA6351. The second order mathematical models in terms of machining parameters were developed for surface roughness, machining force cutting power and MRR prediction using response surface methodology (RSM) on the basis of experimental results. The experimentation was carried out with uncoated carbide tool for machining of AA6351. The model selected for optimization has been validated with F-test. The adequacy of the models on all responses has been established with Analysis of variance (ANOVA). An attempt has also been made to optimize the surface roughness (Ra), machining force (Fm), cutting power (Pc) and material removal rate (MRR) prediction models using Genetic algorithm to find optimum cutting parameters.

Keywords: Turning, Orthogonal array, Response Surface Methodology, Genetic Algorithm, Optimization

Introduction

In the manufacturing industries, the surface finish is the vital quality characteristic which affects the performance of mechanical parts as well as manufacturing cost. Manufacturing industries are adopting different methods to remove the material from the work piece for the better product. Out of these, turning is the first most widespread method for metal cutting, because it's ability to remove materials faster with a reasonable good surface quality. In actual practice, there are many factors which affect the surface roughness i.e: cutting conditions, tool variables and work-piece variables. Cutting conditions include speed, feed and depth of cut where as tool variables include tool material, nose radius, rake angle, cutting edge geometry, tool vibration, tool overhang, tool point angle etc. and work-piece variable include material hardness and other mechanical properties. It is highly complicated to consider all the parameters that control the surface roughness for a particular production process. Generally, the desired cutting parameters are selected based on experience or by using the hand book. But, the modeling of the surface roughness and optimization of cutting parameters gives a better result in turning operations.

Several mathematical models based on statistical regression or neural network techniques have been developed to establish the relationship between the machining performance and machining parameters. A brief review of literature on roughness modeling in turning operation is presented here. K. Palanikumar et al. [1] performed an experiment and concluded that feed rate is the factor which has higher influence on surface roughness (R_a), followed by cutting speed and % volume fraction of SiC in machining of Al/SiC particulate composites using response surface methodology. Noordin et al. [2] described the performance of coated carbide tools using response surface methodology while turning AISI 1045 mild steel. They concluded that feed rate is the most significant parameter affecting the surface roughness Ra and tangential force. Choudhury and El Baradie [3] had predicted surface roughness parameter Ra using RSM when turning high strength steel. C.L. Lin [4] used grey relational analysis to optimize turning operations with multiple performance characteristics. He has studied the effect of cutting parameters on surface roughness (R_a), tool life and cutting force in turning operations. Palanikumar [5] showed that combining the Taguchi method with RSM allows for minimizing the surface roughness in machining Glass Fiber Reinforced Plastics (GFRPs) with a PCD tool. Issam Hanafi et al. [6] have developed fuzzy rule based predictive model for cutting force in turning of reinforced PEEK composite and determined that predictions made by the response surface based models were found to be influenced with relatively large errors, while fuzzy based models have succeeded in giving always accurate evaluation of experimental results. Ilhan Asilturk et al. [7] has done extensive work on multi output optimization of CNC turning parameters via Taguchi method-based response surface analysis and they came out

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Taguchi-Fuzzy Multi Output Optimization (MOO) in Turning of AA6351

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Abstract

This paper presents the application of Taguchi method with logical fuzzy reasoning for multiple output optimization of turning of AA6351 aluminium alloy using uncoated tungsten carbide tool. The machining parameters (cutting speed, feed rate and depth of cut) are optimized with the considerations of the multiple performance characteristics namely surface roughness (R_a), material removal rate (MRR), machining force (F_m) and cutting power (P_c). Taguchi's concepts of orthogonal arrays, signal to noise (S/N) ratio, ANOVA have been fuzzified to optimize the turning process parameters through a single comprehensive output measure (COM). The result analysis shows that cutting speed of 75.39 m/min, feed rate of 0.05 mm/rev, depth of cut of 1 mm are the most preferable machining parameters for dry turning of AA6351, while considering all the above mentioned output characteristics together.

Keywords: Turning, Orthogonal array, Taguchi-Fuzzy hybrid approach, ANOVA, Multi output optimization (MOO), Comprehensive output measure (COM)

Introduction

Today's rapid changing manufacturing environment requires the application of optimization techniques in metal cutting processes to effectively respond to extreme competitiveness and to meet the increasing demand of customizable quality product (lesser cost, quickly deliverable, superior quality) in the market. Taguchi's method is one of the most effective and robust systems of off-line quality control where the quality is in-built at the product design stage instead of controlling it at the production stage or through the inspection of final finished products. Aggarwal et. al. [1] comparatively used response surface methodology and Taguchi method to conclude that the low temperature cutting conditions significantly reduces the power consumption as compared to dry and wet cutting conditions.

Most of the engineering processes comprise of multiple responses. Generally, single response optimization can be used to model only the simplest systems and bulk of the processes are too intricate to be classified into individual responses. However analyzing and solving a multiple performance characteristics is a demanding research problem as against the most analyzed Taguchi applications in the area of optimization of a single performance characteristic which is time consuming and exorbitant in cost. Statistical design of experiments (DOE) refers to the effective process of planning the experiment in such a manner so that the proper data can be analyzed by statistical methods, resulting in valid and objective conclusions [2]. Zadeh [3] instigated the theory of fuzzy logics to deal with uncertain and unclear information. His definition of performance characteristics such as smaller-the-better (SB), larger-the-better (LB), and nominal-the-best (NB) contains a certain degree of uncertainty and vagueness. Therefore, optimization of the complicated multiple performance characteristics with fuzzy logic have been considered in this study by transforming it into the optimization of a single comprehensive output measure (COM) for a turning process.

In turning of aluminium alloy, machining parameter selection for achieving optimal performance like a good surface finish, high material removal rate, close tolerance-dimensional accuracy, high strength and lesser cutting force are important and essential. Most of the optimization techniques do have certain constraints, assumptions and limitations for implementation in real life machining process problems. The optimum setting of parameters for various responses is usually a conflicting task and the weightage of responses is a matter of researcher's decision. Still the researchers continually struggle to find still better optimized cutting conditions in order to economize the machining problem at hand. Lin et al. [4] optimized the electrode wear rate and material removal rate of an electrical discharge machine by determining the optimum machine parameter setting of work-piece polarity, pulse on time, duty factor, voltage, current and dielectric fluid using Taguchi method with fuzzy logics. Hasan Gokkaya et al. [5] have put their effort to study the effect of cutting speed and feed rate on BUE-BUL formation, cutting forces and surface roughness when machining AA6351 alloy. They came out with a conclusion that the only significant factor for the cutting force Fc, is feed rate. They have also found out that cutting force is lesser at higher cutting speed and higher feed rates are root cause for higher cutting forces. The surface

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Multi-response Optimization in Turning of AA6061 T6 Using Desirability Function Analysis

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Keywords: Turning, Orthogonal array, Desirability Function Analysis, ANOVA, Optimization.

Abstract: This paper presents an ideal approach for the optimization of machining parameters on turning of AA6061 T6 aluminium alloy with multiple responses based on orthogonal array with desirability function analysis. In this study, turning parameters namely cutting speed, feed rate and depth of cut are optimized with the considerations of multiple responses such as surface roughness (R_a), roundness (Ø) and material removal rate (MRR). Multi response optimization of machining parameters was done through desirability function analysis. The optimum machining parameters have been identified by a composite desirability value obtained from desirability function analysis. The performance index and significant contribution of process parameters were determined by analysis of variance.

1. Introduction

Aman Aggarwal et al., have used desirability function analysis to optimize the multiple quality characteristics for CNC turning under cryogenic cutting environment [1]. They have concluded that highest desirability could be obtained at low level of cutting speed, feed rate, depth of cut and high nose radius. Shiv Sharma et al. [2] have attempted multi objective optimization of processes parameters using Desirability Function Analysis (DFA) in turning GFRP composite. They came out with the conclusion that depth of cut is the most significant parameter followed by feed and cutting speed. Sharad Kumar Pradhan et al.[3] have conducted experiments for simultaneous optimization of responses such as MRR and surface roughness in turning of Brass C36000 alloy and they have concluded that feed is the most significant machining parameter for surface roughness while depth of cut has high influence on material removal rate followed by spindle speed during CNC turning of Brass C36000 alloy. An attempt was made by Santosh Tamanget al.[4] to optimize multiple performance characteristics using Desirability fuzzy approach by considering surface roughness (R_a), Material removal rate (MRR) and tool wear (V_B) as multiple responses. They have determined that cutting speed is the most influencing factor, followed by feed and depth of cut. T.S.Mahesh Babu et al.[5] have explored the work on Optimization of Machining Parameters on Turning of Hybrid Metal Matrix Composite and it is found that the vital parameter affecting surface roughness is feed followed by cutting speed and then by depth of cut.

2. Material Testing and Specifications

The composition of AA 6061 T6 is 0.607 wt.% Si, 0.12 wt.% Fe, 0.183 wt.% Cu, 0.084 wt.% Mn, 0.972 wt.% Mg, 0.077 wt.% Cr, 0.004 wt.% Zn, 0.029 wt.% Ti, 97.924 wt.% Al. CNC lathe was used for machining. The tool used is uncoated carbide insert tool.

3. Experimental Work

Taguchi's L9 orthogonal array was used to design the experiments with three factors and three levels. The advantage of Taguchi method is that it uses a special design of orthogonal arrays to study the entire parameter space with only a small number of experiments. Compared to the