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Applicational Achievement of K-Means Algorithm among Apache Spark and Map Reduce

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Abstract
Tremendous data all around the globe have been an enthusiastic subject in computer science to explore and analyze that has raised the prominence of information. Blast incoming data through online networking,explorationin big organizations to get more access to intelligent research has become a great demand.MapReduce and its discrepancy have been very worthwhile in accomplishingenormouscalibratereports with robust applications on specialty groups. Therefore, a substantial quantity of the particular schemes is assembled over a non-cyclic intelligence flow and is not suitable to demonstrate for some other influential applications. An unbending architecture design was exclusively introduced using MapReduce that evaluates each job in a straightforward approach. Major steps in MapReduce such as a map, shuffle and reduce are allowed to change, synchronize and combine the outputs that are collected from every node cluster. Subsequently,to overwhelm the system to manual and recede, this paper proposes Apache Spark a manipulating form to split the tremendous information. The prime adversary for "successor to MapReduce" is Apache Spark. Similar to a broadly significant engine MapReduce, Spark has been designed to run distinctadditional workloads and to perform in that space witha greatlyaccelerated speedadapted framework. In this paper conflict between these two systems altogetherutilized with execution exploration by considering its information computation in a specified machine. Clustering process (K-Means) and asserting different criteria essentially, speed up the system, energy consumption of the system,scheduling delay of the jobthan the current systems.

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Keywords: Spark, MapReduce, Hadoop, BigData

1. INTRODUCTION

Well, known cluster computing has broadly directed its process to data-parallel computations. These clusters are executed with uncertainty in systems that accordinglyproduce locality-receptiveprogram, detection of faults in components or any failures during execution, and distribution of loads through load balancing in clustering. MapReduceprompts this design, during machines like Dryad and data streams, are sorted after merging by MapReduce. The facilitator of Big Data [5] cloud computing[6] granted cloud storage in disturbed systems [9].

These systems accomplish their scalability and fault tolerance by giving a programming model where the client makes non-cyclic data stream graphs to go input data through an arrangement of operators. This permits the hidden framework to oversee scheduling and to respond to faults without client mediation. While this data flow-programming model is useful for a large class of applications, there are applications that cannot

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A Classification Model using improved Hybrid Genetic Particle Swarm Optimization Algorithm based on Separability-Correlation Measure

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Abstract
The unpredictable growth in information and data samples has engendered a crucial requirement for novel methodologies and mechanisms which can intellectually and spontaneously transform the processed information into valuable data and knowledge. Thus, it is very essential to carefully obtain the relevant information from the huge databases. Numerous techniques are already available in literature for mining of data. However, the Evolutionary Algorithm and Swarm Intelligent Approaches are playing a vital role in the form of extracting the relevant features from the database and supporting in constructing the classification Models. So as to further highlight the importance of both the approaches, in this paper, a methodology is presented that hybridized the Genetic Algorithm and Particle Swarm optimization for feature Selection by means of Separability-Correlation Measure. The experiment results shows that the proposed novel Feature Selection approach has a high global convergence possibility and a scarce average convergence iterations

Keywords: *Classification, Genetic Algorithm, Particle Swarm Optimization, Hybrid approach, Separability-Correlation Measure, Feature Selection*

I. INTRODUCTION

The growth in database applications and storage capabilities have enabled large amount of data to be accumulated over years. With the expansion of multimedia devices, Internet technologies, Storage capacities of computers, application of computers and day-to-day problems, the size of databases has increased voluminously. With large amount of available data it becomes a common and essential requirement to analyse databases frequently. Data mining is the procedure of determining expressive novel associations, designs and tendencies by moving through enormous amounts of information stored in data warehouses, employing pattern recognition procedures along with statistical and scientific approaches. It is an interdisciplinary area fetching together the methodologies from machine learning, pattern recognition, statistics, data samples and visualization, to state the subject of data mining tasks from enormous sized databases[4].

Classification is an important stage of data mining which is possibly the most general data mining approachClassification has become the emphasis of extensive investigation in the domain of application for which data samples with hundreds or thousands of attributes are accessible. The classification is required for an extensive variety of human action. At the widest, the time period can shield any perspective where certain judgment or prediction are performed on the source of presently accessible data and a classification procedure for recurrently constructing such decisions in novel circumstances [2] Classification is an important process

Eeg Signal Preprocessing Using Dwt And Reconustruction By Phase Space Trejectory

Mr.V.Lakshmana Rao, Dr.K.V.Ramana, Dr.P. Krishna Subba Rao

Abstract: In the society most of the cases exclusively in children age group of 0-9 years are suffering from seizures. In many of these cases, there is some family history of seizures. The remaining causes include infections such as meningitis, developmental problems include cerebral palsy, head trauma .So the early detection of seizures leads to the speed recovery from the chronical disorders of human body. A sudden change in the high frequencies in Electroencephalogram (EEG) indicates that the EEG signal characteristics have changed rapidly. This information can be used to detect seizure-like activity in childrens. Recently, seizures are identified through video-EEG analysis, EEGs are used to visualize and analyze brain activity. While reading EEG signals, redundancy is highly visible in a single channel between different time segments. The electroencephalogram (EEG) signals play prominent role in identifying the complexities of brain activities. It provides a monitoring method to record the electrical activity of the brain. One of the generally faced problems in EEG recordings is the presence of artifacts that come from sources other than brain and contaminate the acquired signals significantly. Therefore, Artifact removal involves canceling or correcting the arti- facts without distorting the signal of interest. This is primarily done in two ways: either by filtering and regres- sion or by separating/decomposing the EEG data into other domains. In order to extract the individual EEG subbands, a wavelet filter is employed. Wavelet transform has the advantages of time–frequency localization, multirate filtering, and scale-space analysis [2]. The decomposition of the original EEG into its five constituent subbands helps better identification of the dynamical system of EEG signal. Reconstructions of these five components using the inverse wavelet transform approximately correspond to the five physiological EEG subbands delta, theta, alpha, beta, and gamma.

Index Terms: Electroencephalogram (EEG) Signal, Artifacts, Epilepsy, Discrete Wavelet Transformation, Phase Space Reconstruction and preprocessing.

1 INTRODUCTION

Epilepsy

Epilepsy is a group of neurological disorders characterized by epileptic seizures, commonly referred to as fits[14]. Epileptic seizures are episodes that can vary from brief and nearly undetectable to long periods of vigorous shaking. In epilepsy, seizures tend to recur, and have no immediate underlying cause while seizures that occur due to a specific cause are not deemed to represent epilepsy. The cause of most cases of epilepsy is unknown, although some people develop epilepsy as the result of brain injury, stroke, brain tumor, and drug and alcohol misuse. Genetic mutations are linked to a small proportion of the disease. Epileptic seizures are the result of excessive and abnormal cortical nerve cell activity in the brain. The diagnosis typically involves ruling out other conditions that might cause similar symptoms such as syncope. Additionally, it involves determining if any other cause of seizures is present such as alcohol withdrawal or electrolyte problems. This may be done by doing imaging of the brain and blood tests.

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Epilepsy can often be confirmed with an electroencephalogram (EEG) but a normal test does not rule out the disease. EEG signal is an electric activity of the brain measured by electrodes (channels), which placed on the scalp is a superposition of electric signals which are produced by a synchronous activity of numerous neurons.[1] The common procedure adopted by the various research groups on EEG-based biometric involves data collection, preprocessing feature extraction, and patternrecognition.[7]. Therefore, Artifact removal which was studied in the recent years is considered as the pre-processing step for EEG based measurements. While doing experiments using EEG signals, it is found that the signal is mainly contaminated by i) internal artifacts (like muscle movement, eye-blink etc.) and ii) system artifacts (like power supply interference, impedance fluctuations, spurious noise due to Bluetooth connectivity etc.). For most of the applications related to cognitive load and BCI, the EEG signals are analysed using delta (< 4Hz), theta (4-7.5 Hz), alpha (7.5-12.5) and beta (12.5-30 Hz) frequency bands. Among all the internal artifacts, the muscle related movements affects a lot to the gamma frequency band (> 30 Hz) and is easily removed by a low pass filter with cut-off frequency at 30 Hz. However, the eye blink related artifacts (< 7 Hz) fall mostly in delta and partly in theta band [9]. In this paper, a novel approach called the EEG Signal Preprocessing using Wavelet Decomposition followed by the Reconustruction with Phase space Trejectory has been proposed. This paper is organized as follows. Section describes the Introduction to EEG and Artifacts. Section provides the Existing artifact removal methods.Section illustrates the Artifacts removal by Wavelet Decomposition. Section elaborates the phase space reconstruction technique followed by Conclusion.

2 INTRODUCTION TO EEG AND ARTIFACTS

2.1 EEG:

EEG's are the observations pertaining to electrical activities from the exteriors of brain which are illustrated as rhythms and transients. A rhythmic activity of EEG can be segregated into

Epileptic Seizure Detection and Classification based on RQA Features

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Abstract— To examine the dynamical systems, a non linear method of data analysis called Recurrence quantification analysis (RQA) was observed. It evaluates the amount and span of recurrences of a dynamical framework introduced by its phase space trajectory. The recurrence evaluation analysis was created so as to measure distinctively showing recurrence plots (RPs) in the view of the little scope structures that are involved. Recurrence plots are mechanisms which envision the repeated conduct of the phase space trajectory of dynamical systems. Generally, these plots contain single dots and lines which are corresponding to the mean diagonal or which are vertical/horizontal. Lines corresponding to the LOI are alluded to as diagonal lines and the vertical structures as vertical lines. The lines compare to the regular behaviour of the stage space trajectory: while the diagonal lines depicts such segments of the stage space trajectory which run equal for quite a while, the vertical lines depicts to portions which remain in the same phase space region for quite a while. RQA on EEG accounts and their sub groups: delta, theta, alpha, beta, and gamma for epileptic seizure detection. RQA was acquired since it doesn't require suspicions about stationarity, length of signal, and commotion. In this we prepared the EEG signal in both time and recurrence spaces and applied a Chebyschev filter for preprocessing the signal, at that point, by utilizing DWT to decay of the intial EEG into its five constituent sub groups enables better distinguishing proof for the dynamical system of EEG signal. This prompts better categorization of the database into three groups: Healthy disciplines, epileptic disciplines during a no-seizure interval (Interictal) and epileptic subjects during a seizure course (Ictal). In our work we will Analyze EEG signal by RQA techniques, which comprise of the procedure of Wavelet decomposition, Reconstruction and analysis. At that point the fature values are grouped utilizing ECOC classifier, which is mode of nearest neighbor Classification procedure.

Keywords--- Electroencephalogram (EEG) Signal, Artifacts, Epilepsy, Discrete Wavelet Transformation, Phase Space Reconstruction, Preprocessing, Recurrence Quantification Analysis (RQA) and Error Correction Output Codes-Nearest Neighbors (ECOC).

I. Introduction

1.1 Epilepsy

Epilepsy is concerned with a group of neurological diseases categorized by repeated seizures.It is a disorder which occurs due to atleast one of incessant states of the body in which they causes uneven nerve cell action in the cerebrum, It prompts recurrent seizures in persons.

Epilepsy is a condition which happens unnecessary and uncontrolled neuronal movement in the human brain, This uncontrolled neuronal action can be summed up or restricted to one territory of the brain.

1.2 Seizures

Seizures occur because of an abrupt flood in the mind's electrical actions, contingent upon which some portion of the brain is influenced, a seizure may show as loss of mindfulness, bizarre practices or sensations, wild developments or loss of consciousness.

Even though there are different types of epileptic seizures, most of them results due to electrical fluctuations in brain, some of the children may have just one type whereas the others could have a combination of epileptic seizures. It is of prior importance to identify the type of seizure in order to deliver appropriate treatment andfurther the

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Noise reduction in ECG signals for bio-telemetry

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ABSTRACT

In Biotelemetry, Biomedical signal such as ECG is extremely important in the diagnosis of patients in remote location and is recorded commonly with noise. Considered attention is required for analysis of ECG signal to find the patho-physiology and status of patient. In this paper, LMS and RLS algorithm are implemented on adaptive FIR filter for reducing power line interference (50Hz) and (AWGN) noise on ECG signals .The ECG signals are randomly chosen from MIT_BIH data base and de-noising using algorithms. The peaks and heart rate of the ECG signal are estimated. The measurements are taken in terms of Signal Power, Noise Power and Mean Square Error.

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1. INTRODUCTION

The Electro Cardiogram (ECG) produces electrical signals of the each cardiac cycle. In the cardiac cycle each event has its own significance to study the behaviour of patient cardiac pathophysiology, Generally ECG signals are Bio electrical signal which gives the electrical activity of heart versus time. Therefore it is very important to diagnose for analysing heart function [1]. The Bio electrodes are placed on the skin of the patient to acquire ECG signals. The pacemakers are located in the upper part of the right atrium. It fires electrical pulses to the nerves to stimulate the contraction phase. These pulses extend over the atrial walls and activate cardiac muscles to contract. The ECG and power-line signal's frequency range is typically 0.05 to 100Hz and 50Hz so, ECG signals sensitive to the power line signals in the range around 50Hz which are causing interference [2]. 50Hz PLIN will interrupt the P and Q waves of the ECG signal. Most of Asian regions, Domestic and hospital power line are in the range of 50 Hz. So the frequency components associated in ECG that is 50 Hz are effected by the power line signals causing interference in ECG. But lack of power line quality the power signals are swings between the 47 to 53 Hz so the interference also effects from this range of power line signal. To mitigate this dynamic interference from power line we need use adaptive filter to suppress this random noise causing from power line [3]. An adaptive noise elimination filter has been used to evade this impending loss of information. Four different waves can be observed while recording ECG signal those are PQRST. The depolarization of right atria represents P wave. While the rapid depolarization of right and left ventricles represents QRS wave. The repolarization of the ventricles represents T wave [4], [5]. Any deviation in the said parameters leads abnormalities in the heart. The wave form related to QRS complex represent the contraction of left and right ventricles, which is more powerful than that of atria .It comprises muscle mass and causing a more ECG deflection. The Q wave signifies the signal horizontal (i.e. left to right) current as a potential travel through the inter-ventricular system.The Q wave is not having a septal origin shows myocardial violation which involves the full depth of

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A novel estimation algorithm for torpedo tracking in undersea environment

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Abstract: A novel estimation algorithm is introduced to handle the popular undersea problem called torpedo tracking with angle-only measurements with a better approach compared to the existing filters. The new algorithm produces a better estimate from the outputs produced by the traditional nonlinear approaches with the assistance of simple noise minimizers like maximum likelihood filter or any other algorithm which belongs to their family. The introduced method is extended to the higher version in two ways. The first approach extracts a better estimate and covariance by enhancing the count of the intermediate filters, while the second approach accepts more inputs so as to attain improved performance without enhancement of the intermediate filter count. The ideal choice of the placement of towed array sensors to improve the performance of the proposed method further is suggested as the one where the line of sight and the towed array are perpendicular. The results could get even better by moving the ownship in the direction of reducing range. All the results are verified in the MATLAB environment.

Key words: estimation algorithm; torpedo tracking; angle-only measurements; line of sight; maximum likelihood filter

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1 Introduction

Tracking is a process of computing the present position of the target. It also involves estimation or anticipation of the future position of the target as close to the true position as possible with the help of the available noisy measurements. The tracking is done with the help of the radar and sonar. Radar stands for radio detection and ranging and it is used to track targets in the air and on land, while the sonar stands for sound navigation and ranging and it is used to track targets in the underwater scenarios. In our paper we are dealing with underwater torpedo tracking so, we are concerned with only the sonar measurements. The sonar can again operate in two modes namely active and passive modes. In active mode of operation of sonar, the principle of operation is that a sound signal will be transmitted towards the target and after some time an echo is heard. Based on the time taken by the signal to travel toward the target and back to us we can find the range of the target and based on the direction from which the echo is received we can find the azimuth at which the target is present. So in active mode of operation of sonar we get both the range and bearing information of the target. The alternate approach is the passive tracking [1, 2] where no signal will be released by us and we will only collect the information from the enemy which is produced by the propellers of the enemy vehicle. Because of this advantage we are concerned only

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SRAM based Look Up Table Design Using Multiple Valued Logic

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Abstract--- Look-Up Tables LUTs) are quick recollections that implement logic operation in line with their choice mode. A novel quaternary look up table (QLUT) is proposed by using SRAM for realizing high performance VLSI systems. The main core elements are Quaternary-inverter, Quaternary SRAM cell, Quaternary-multiplexer. A lot of logic levels are measured per line as compared to standard binary logic. The performance is evaluated by using mentor-graphics software.

Keywords--- Quaternary Logic, Look-up Table.

I. Introduction and Previous Work

Look up Tables (LUTs) are acts as primary functioning part of Programmable Logic Block (PLB).LUTs follows the similar circuit concept which relates the primary input signal value to primary out –put signal value. LUT contains Memory Cells to implement little logic functions. FPGAs which are implemented by using SRAMs are constructed by using LUTs which follows specific design methodology. Every individual LUT contains a bunch of single bit memory cells storing individual bit values in each of the cells. Initially configuration values are hold on within the Look up Table Structure, after applying input values, the logic value worth within the SRAM associated is allotted to the output. This paper presents the design of quaternary LUT operates on basis of the management sign parenthetically the management input values might be like logic 0,logic 1,logic 2,logic 3 which is suitable for high performance VLSI systems.

The logic electronic equipment that deals with over 2 logic levels is termed as multiple valued logic. In a typical binary VLSI circuit, interconnect accounts for seventieth of the chip's space whereas the process transistors occupy solely ten of the chip[5]. A lot of value effective method of providing interconnections might so be of nice profit. One in all the foremost promising approaches to unravel these interconnection issues is that the use of ambiguous logic likes Multiple Valued Logic within the VLSI chip. Multiple valued logic system or Quaternary Logic System is one in among the foremost promising approaches to appreciate future beyond binary system. Multiple valued logic will give improved circuit interconnections, reduction in chip space and magnified bus potency. MVL circuits are implemented in two modes namely voltage mode and current mode. Multi valued logic circuits requires reduced number of bits than binary system, e.g. the decimal number 142 is represented as 10001110 in binary and it is represented as 2032 in quaternary logic system[5].

In Quaternary logic the applications are implemented by using available circuit elements and need not require any additional special components for realizing complex applications. The major advantage of Quaternary logic is to increase the functional complexity per unit silicon area, producing circuits that have performance comparable to the equivalent binary circuits.

Performance of a Quaternary Logic implementation concentrates on basic quaternary logic principle and design hierarchy follows required no of sub-components. The logic circuit consists of basic driver circuits which are operated on quaternary mode and these driver circuits are plays crucial role for realizing quaternary digital applications [1].

For realizing low power and high speed quaternary applications a new quaternary D Flip-Flop is used. The implementation of Quaternary Flip-Flop is relies on the principle of Dynamic Source –Coupled Logic [2]. Design of Novel encoders and Decoders concentrates on realization process and implementation of MVL based complex encoder and decoder [3]. The next section focuses on proposed quaternary LUT design and its required sub modules.

II. Proposed Quaternary LUT Design

To illustrate the proposed design a 2 input quaternary LUT is presented, as shown in fig. 1. The input count can also be extended to six, which is prevailing in current mainstream FPGA products [4]. The overall architecture of quaternary LUT consists of quaternary SRAM slices and quaternary multiplexers.

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Super Resolution Sub-space based ROOT-MUSIC technique for Direction Of Arrival Evaluation in MIMO Radar

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Abstract: ***In this paper, subspace based on DOA evaluation with high resolution ROOT-Multiple Signal Classification (MUSIC) method is proposed for MIMO radar. In order to achieve a desired transmitting power distribution, the main component is the fundamental vector was made such that the transmitted power is focuses on power to be transmitted inside the required sectors eliminating the power of off-sector. Using the designed algorithm, population in associate weight-vectors is created which has almost equal size division. These associate vectors utilized in forming multiple transmitting ways, over which an orthogonal waveform is transmitted. Match filtering is done for the collected information and perpendicular transmitted waves. Many of the information vectors similar to the perpendicular waves are generated. Now, carefully taking these waves, virtual information output covariance matrix that enhances the use in super resolution direction of arrival prediction methods. This technique decomposes the eigenvectors in correlation. Signal estimation is performed by taking the maximum values in the signal, corresponding to base in the polynomial. The software output display ROOT MUSIC technique giving best DOA prediction presentation compared to existing techniques that have been used for comparison.***

Index Terms: Beamforming, beam pattern design, MIMO radio detection and ranging, side lobes, Spatial filtering.

I. INTRODUCTION

Estimating DOA of multiple targets has uses in most wide fields of applications, like radio detection and ranging, communication and sonar [1]. Variable and non-variable techniques are the direction of arrival prediction methods, of which the non-variable direction of arrival methods are MUSIC, ESPRIT, and Capon beamformer whereas the parametric DOA estimation techniques are the likelihood methods. The parametric techniques suffer from large auxiliary lobes and less resolution levels while the non-parametric techniques give excellent DOA estimation performance with higher computation complexity for different levels. So, it is indeed beneficial to inspect advantages in multiple input and multiple output radio detection and ranging using less computing difficulty. Majority of the DOA estimation methods had expanded in SIMO, where the presentation in estimation methods had extensively evaluated depending on the eventual belief.

These performances tend in decline when fewer numbers of data previews[10]-[12] or [10]-[13] is available in the direction of arrival prediction. Indeed the high resolution DOA estimation techniques that invert the covariance matrix are valid for a full-rank matrix.

For a past two decades extensive research [7]-[9] has been done on MIMO radio detection and ranging and has been proven that multiple input multiple output radio detection and ranging from collocated antennas enables detection of maximum targets and angular resolution. Most of the DOA estimation algorithms that do not employ proper transmit beam forming suffer from loss of coherent processing gain. Therefore, the signals with weak power are received at the receiver end array which affects the direction of arrival prediction presentation.

When transmit beam forming MIMO radar is not properly designed, it suffers from coherent sending losses which yields less powerful signal at the receiving array, that completely affects the DOA estimation performance. Here we propose a new method where we take into consideration the issue in direction of arrival prediction in various goals in multiple input multiple output radio detection and ranging utilizing the received snapshot data. Thus, this technique was introduced for individual DOA estimation calculation where transmit beam-forming is used to accomplish coherent processing gain. The weight-vectors of the transmitters were perfectly organized to such a degree, to the point that the perfect transmit control scattering configuration concentrates the power within the spatial region while minimizing the power outside the spatial region(s). We refer to this weight-vectors as "principal" weight-vector. These principle weight-vectors deliver a set of weight-vectors with similar dimensions along with equal transfer control like the principle weight-vector. Some of these huge transmitters are picked at the same time to transfer a great deal of symmetrical wave-forms, where the amount of symmetrical wave-forms equals the amount of weight-vectors. The received single snapshot data is matched-filtered with the symmetrical transmit wave-forms for getting practical information equal to the symmetrical wave-forms.

The above process involves constructing a covariance matrix with

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Subthreshold Region based Linear Feedback Shift Register

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Abstract: ***Growing demand for portable devices and fast increases in complexity of chip cause power dissipation is an important parameter. Power consumption and dissipation or generations of more heat possess a restriction in the direction of the integration of more transistors. Several methods have been proposed to reduce power dissipation from system level to device level. Subthreshold circuits are widely used in more advanced applications due to ultra low-power consumption. The present work targets on construction of linear feedback shift registers (LFSR) in weak inversion region and their performance observed in terms of parameters like power delay product (PDP). In CMOS circuits subthreshold region of operation allows a low-power for ample utilizations but this advantage get with the penalty of flat speed. For the entrenched and high speed applications, improving the speed of subthreshold designs is essential. To enhance this, operate the devices at maximum current over capacitance. LFSR architectures build with various types of D flip flop and XOR gate circuits are analyzed. Circuit level Simulation is carried out using 130 nm technologies.***

Keywords: subthreshold region, superthreshold region LFSR; Low Power, DIBL, INWE

I. INTRODUCTION

Now a days, the most prominent developing field is low power based digital integrated circuits implementation and the objective is to attain high chip density and throughput. These requirements are used to achieve various movable applications like pacemakers, cell phones etc.The shorter battery life time enforces a challenge on the power consumption of the portable system, so there is a necessity to cut down the power utilization. The most frequently used methods to diminish the power dissipation viz constant voltage scaling, switched capacitance minimization approaches, interconnect and logic optimization.

The increasing significance of the deep submicron technology devices leads designers to concentrate on minority carriers that are exists under the gate when the gate voltage is smaller than threshold value. These carriers take crucial part in device and circuit performance.

In the beginning, these carriers are neglected as they cause "leakage" current and thus limiting the circuit performance. That current is called as subthreshold current. This current present in a circuit can be utilized for its operation which is termed as sub threshold logic. In this logic the circuit operated (supply) voltage is below the threshold voltage ($V_{dd} < \Phi_t$) nearly few hundred milli volts.

As the complete logic of chip operates in subthreshold region, power dissipation (P_D) can be reduced immensely. However the penalty of speed degradation is also obvious. One favorable method to obtain high speed subthreshold logic design is found by the maximum current over-capacitance ratio of a transistor [1].

Increase in integration density of VLSI Designs, associated components in the structure is inaccessible and examine the chip becomes major challenging task. Different issues like raise in test cost are being experienced by the test industry, when external Automatic Test Equipment (ATE) is used for testing. To solve this problem, on chip built in self test (BIST) architectures are introduced. A building block which is used to generate random test pattern is very crucial in BIST construction. Many test pattern generators are employed in BIST, out of those, LFSR is broadly used due to its capability to generate huge random sequences [2].

II. MOS TRANSISTOR OPERATION IN SUBTHRESHOLD REGION

In general, drain current of a MOSFET is said to be zero when $V_{gs} < \phi_t$, but practically it is not possible. This subthreshold current can be utilized for operating current for a variety of analog and digital circuits in weak inversion region (or subthreshold region). The main advantage working at this region is that the output current is related exponentially with input voltage somewhat than quadratic relationship to the input voltage in saturation region. This increases transconductance of the MOSFET and so getting high gain. The action of the MOS transistor in weak inversion region is similar to the bipolar junction transistor [3]. Different parameters of nMOS and pMOS transistors in weak inversion region are analyzed here.

A. Drain Current

The current conduction in weak inversion region (I_{DSub}) is possible due to diffusion. It can be formulated as [4]:

$$I_{DSub} = I_0 e^{\left(\frac{V_{gs}-\Phi_t}{nV_T}\right)}\left(1 - e^{-\frac{V_{ds}}{V_T}}\right), V_{ds} < 3V_T$$

$$I_{DSub} = I_0 e^{\left(\frac{V_{gs}-\Phi_t}{nV_T}\right)}, V_{ds} > 3V_T \quad (2)$$

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GPS Receiver Position Interpretation using Single Point PVT Estimation Algorithm

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Abstract: ***In our day-to-day lives, we need to get the correct GPS location information. GPS is based on the calculation of the pseudo-range and four unspecified parameters, but the formula is not linear in navigation observation. A single point position algorithm can solve the nonlinear equation; the algorithm is based on Taylor linearization. This paper provides an overview of the single point PVT algorithm and presents the GPS satellite pseudo-range observation equations, typically over-determined as there are only four unknown satellites, but generally, more than four are monitored and thus more than four pseudo-range observation equations. Single point PVT estimation algorithm is used to solve pseudo range observation equations in order to find position and clock bias solutions are described in detail. In this article, the position of GPS receiver is estimated w.r.t. to X, Y, Z Coordinates, in addition to that clock bias also estimated.***

Keywords: ***clock bias, GPS, Pseudo-Range, Single point PVT.***

I. INTRODUCTION

GPS is an all-weather navigation positioning system; it can provide three-dimensional positioning, velocity and timing services to worldwide users anywhere. To obtain location information from the GPS positioning system, we usually adopt the pseudo-range measurement method, however, the observation equation is nonlinear, and the pseudo-range equations can be linearized with Taylor's series expansion at the approximate point. So this paper studies a single point position algorithm and simulates the positioning error by true GPS data.

GPS is a weather-friendly navigation system that can offer worldwide users three-dimensional positioning, speed, and time services. We usually use the pseudo-range measurement method to obtain location information using the GPS positioning system but the observing formula is not linear; the pseudo-range formulas will linearize on the estimated point with Taylor's series expansion. This paper, therefore, studies the algorithm for single point's position and simulates the position error with true GPS data.

This paper elaborates on an efficient navigational algorithm over IISc, Bangalore (South Zone of Indian Subcontinent) data to increase the efficiency of the GPS receiver position estimation.

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II. SINGLE POINT-PVT ESTIMATION ALGORITHM

Fundamental equations will be presented to calculate the user position. Suppose the calculated range is correct and three satellites probably be sufficient under this condition.

$$S_{r1} = \sqrt{(p_1 - p_u)^2 + (q_1 - q_u)^2 + (r_1 - r_u)^2} \quad (1)$$

$$S_{r2} = \sqrt{(p_2 - p_u)^2 + (q_2 - q_u)^2 + (r_2 - r_u)^2} \quad (2)$$

$$S_{r3} = \sqrt{(p_3 - p_u)^2 + (q_3 - q_u)^2 + (r_3 - r_u)^2} \quad (3)$$

Where, (p_1,p_2,p_3),(q_1,q_2,q_3), (r_1,r_2,r_3) are known locations, (p_u, q_u, r_u) are unknown locations and S_{r1}, S_{r2} and S_{r3} are the pseudo ranges of the three satellites respectively. Since three unknowns and three equations exist, from these equations p_u, q_u, r_u values can be obtained. Solutions of two sets, since they are equations of order 2, should be theoretically available. Because these equations are not linear, they are hard to solve. But linearization and an iterative approach can solve these equations easily.

A. MEASUREMENT OF PSEUDO-RANGE:

The time of the satellite clock(t'sat) and the current time of the user clock (t'rx) are related to the estimated time of the satellite is given by

$$t'_{sat} = t_{sat} + \Delta t$$

$$t'_{rx} = t_{rx} + \Delta T$$

Where Δt =Satellite clock offset
ΔT=Receiver clock offset
The pseudo range Sr will therefore be evaluated as an equation

$$S_R = S_r + c(\Delta t - \Delta T) + \Delta_{ion} + \Delta_{trop} + M \quad (4)$$

Here
S_R= Measured Pseudo Range
S_r= True Range
Δt=Receiver Clock Offset
ΔT=Satellite Clock Offset
Δ_{ion}= Ionospheric Error
Δ_{trop}=Tropospheric Error
M= Multipath Error

The errors cause the user's location to be inaccurate. The clock bias cannot so that it will

Multiuser Detection using Noma Technique in FD-MC-CDMA System in Fading Channels

Guntu Nooka Raju, Muddapu V Tirupathamma, K Srinivasa Rao

Abstract:- ***Non-Orthogonal Multiple Access which is an emerging technique which performs good in any aspects. Multiple users can share the resources that are available and also user can be identified, which adopts successive interference cancelation (SIC). The power domain is considered for detection of power allocation for the base stations. The performance of errors in selective channels like frequency channels is demonstrated with the help of code division multiple access which is a multi carrier (MC-CDMA), in which the frequency diversity can be resolved quickly. Due to high range of multiple access interferences the performance of MC-CDMA is been restricted. To overcome the problems in MC-CDMA, a new technique is proposed i.e frequency division multi carrier code division multiple access by which the multiple access interferences can be reduced by exploiting the available range of frequencies. NOMA is one of the emerging technique used as an answer to boost the spectral potency whereas permitting some extent of accessibility for multiple interferences at receiver end. By using NOMA-FD-MC-CDMA the range of spectrum can be increased and reduced the interferences. Bit error rate(BER) is evaluated and compared with other existing technique. The experimental results are performed using Mat lab tool.***

Keywords: NOMA, FD-MC-CDMA, Fading Channels

I. INTRODUCTION

Wireless science is an emerging style in every issue of present lives. The frequencies tuned in the networks want to be used for many ties by way of considering exclusive kind of customers as the number of units extended gradually. Now a day Internet of Things(IOT) has been emerged as an important method to get in touch with every individual and every corner of objects, demand is been increased [1]. Inorder to meet the demands of present scenario the communication systems which are been utilized have pros and cons, restrictions, number of changes to be made, and develop the system to meet the requirements. Research have been started to meet the demands of upcoming generation in wireless communications. some of the requirements need to satisfy is to improve the spectral efficiency, speed, providing low latency. The data rate need to provide should be high, service quality improvement, consumption of energy need to be reduced, cost is one among the major issue which need to be reduced[2]. Most of the industries and institutions are working to provide the requirements which satisfy the next generation users.

Among the development MM wave is one of the technology which is used to increase the range of transmission by increasing the bandwidth range, by which the speed of communication increases[3].

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Hence the reachability for more number of users can be achieved, by which the concept of Multi Input Multi Output(MIMO) is introduced. By using MIMO system the energy is utilized efficiently and the capacity have been increased[4]. Network with more dense condition also introduced to reduce the consumption of energy by using more number of cells that are smaller in size [5].

II. RELATED WORK

As we viewed in general, NOMA plans can be grouped into two kinds: Power based multiplexing and code-area multiplexing. In power-space multiplexing, quite a number consumers are allotted numerous energy coefficients as indicated by way of their divert stipulations so as to accomplish a high framework execution. Specifically, a variety of clients' records signal are superimposed at the transmitter side. At the beneficiary aspect the successive interference cancellation(SIC) is utilized for translating the sign personally until the perfect client's signal is gotten [8], giving a decent tradeoff between the throughput of the framework and the purchaser reasonableness. In code-area multiplexing, a number purchasers are dispensed more than a few codes and multiplexed over a similar time-recurrence assets, for example, multiuser shared get admission to (MUSA) [9], scanty code multiple get right of entry to (SCMA) [10], and lower density spreading (LDS) [11]. Notwithstanding power-space multiplexing and code-area multiplexing, there are other NOMA plans, for example, sample division a couple of access (PDMA) [12] and bit division multiplexing (BDM) [13]. Despite the reality that code-space multiplexing can per chance improve ghostly proficiency, it requires a excessive transmission records transfer potential and is not efficiently relevant to the existing frameworks. Then again, manipulate region multiplexing has a fundamental utilization as giant changes are no longer required on the current systems. Likewise, it doesn't require more data transfer ability so as to enhance ghostly effectiveness [14]. In this audit/instructional workout paper, we will pay attention on the power-area NOMA.

FD-MC-CDMA [15] is a recurrence primarily based a number get entry to engineering that consolidates the quality portions of Frequency division a couple of get right of entry to (FDMA) and multi-carrier code division more than one get entry to (MC-CDMA) [16] to at the same time abuse recurrence respectable range and restriction numerous entrance obstruction referred to as as a couple of get admission to interference (MAI). It is incredible that MC-CDMA can accomplish excessive respectable variety reap in recurrence unique blurring channels by using at the same time transmitting over N severa subcarriers, and separating the signal into subcarriers at the recipient accommodating dazzling BER execution. The done exhibition enlarge

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Experimental implementation of Flower Pollination Algorithm for speed controller of a BLDC motor

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ABSTRACT

The design of a good PID controller for speed control of Brushless dc (BLDC) motor is essential for its successful operation. This paper presents a design and implementation of recently developed nature inspired Flower Pollination Algorithm for speed control of BLDC motor with optimal PID tuning. In the present work, optimization based approach is applied for tuning of PID speed controller by considering an integral square error as the objective function. The effectiveness of the presented work is compared with the conventional Ziegler-Nichols method and other existing nature inspired optimization methods such as PSO and Firefly algorithms, and the same is validated through real-time implementation with dSPACE DS1103 controller board.

1. Introduction

Electrical motor is an essential element for most of the real-life applications. Widespread use of electric motor drives of various sizes is operational throughout the world, and they have significant impact on the energy saving when energy efficient electric drives [1] are being developed. In the recent past, the conditions have been changed in adjustable speed drives due to the availability of power semiconductor devices with ratings up to 6000 V and 3000 A without even connecting a series or paralleling the devices [2–4]. The three phase BLDC motors have been rapidly emerging in many industrial, household, commercial and automotive applications over the past several years because of its advantages like control flexibility, high torque capability, noiseless operation, more efficiency, lesser size and volume as compared to the conventional motors. Hence it is reducing fuel emissions and consumption.

There are basically two types of Brushless DC (BLDC) motors, viz. Permanent Magnet Synchronous Motor (PMSM) and BLDC motors depending on their flux distribution. The motor which has a trapezoidal wave shape is called as a BLDC motor, whereas the PMSM has a sinusoidal back-EMF wave shape. The control of BLDC motor can be classified as sensor-based control and sensorless control. In sensor-based control, the stator winding is excited based on rotor position which is measured using hall sensors [5].

PID controllers are commonly used in speed control of BLDC motor. However, the performance of a speed controller mainly depends on tuning of PID gains. Tuning is nothing but finding appropriate proportional, integral, and derivative gains of PID controller to meet the desired performance. Tuning of the PID controller is a complex task which is mainly done by either trial and error or rule based methods. The Ziegler-Nichols tuning method is the most well-known tuning method based on thumb rules. However, the manual tuning approach will take more time and may damage the hardware involved in the process of control. Further, rule based approaches sometimes may not support to certain higher order plants and systems with no time delay or little time delay. Recently, researchers have proposed several optimization based approaches for many applications by selecting an integral square error (ISE) as the objective function for PID tuning. A new metaheuristic optimization Bat algorithm for Power System Stabilizer based on PID controller is designed in [6]. A Bacterial Foraging Optimization (BFO) technique is employed for PI controller of Permanent Magnet Synchronous Generator (PMSG) to extract the maximum power from the wind in [7]. A classical Hill Climb Searching technique using ANN is applied for Switched reluctance

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Implementation of grasshopper optimisation algorithm for closed loop speed control a BLDC motor drive

Devendra Potnuru and Ayyarao S.L.V. Tummala

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Abstract

This paper presents a recently proposed grasshopper algorithm for speed control of BLDC motor drive in closed loop. The main objective of this paper is to obtain optimal PID gains of speed controller at different operating conditions. The efficient PID tuning is based on minimisation of integral square error which is the objective function of this optimisation problem. The PID controller is used for speed control of the BLDC motor drive. The drive has been simulated in MATLAB/Simulink environment and is tested at different reference speeds.

Keywords

brushless DC motor, BLDC, grasshopper optimisation, PID tuning, speed controller

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Automatic Document Clustering and Indexing of Multiple Documents Using KNMF for Feature Extraction through HADOOP and LUCENE on Big Data

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Abstract

The existence of unlabeledtext data in documents has become larger and excavating such datasets is a provocative task. The objective of Big Data is to store, retrieve and analyse multipletext documents. *Problem Statement:*The retrieval of the identical data over large databases is of major concern. *Existing Solution:*Existing problem is solved by Full-Text Search (FTS) which means pattern matching technique that allows searching of multiple keywords at specific time.*Proposed Solution:* In this paper, we consider multiple text documents as input and processed using text mining pre-processing algorithms like Key Phrase extraction, Porters stemming for tokenizing and TF_IDF toobtain all non-negative values. These values further processed to get matrix data throughNonnegative matrix factorization (NMF). On performing NMF, K-means algorithmis upgraded with NMF to obtain quality clusters of data sets.Performances of the algorithms

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Image Classification using Deep Neural Networks for Malaria Disease Detection

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ABSTRACT: Since the 19th century, Malaria has become a terrifying life-threating disease in most of the countries. Its been identified that five countries namely Nigeria with 25%, Congo with a ratio of 11%, Mozambique with ratio of 5%, India with ratio of 4% and Uganda with ratio of 4%. World Health Organization stated that above 90% of malaria death cases were recorded every year. Most of the Indian states like Odisha, Madhya Pradesh, Maharastra, northern countries, Chhattisgarh got affected by Malaria. India spotted death cases of malaria from millions to thousands that have reduced in recent years. Directorate of National vector Bore disease control program has started malaria control strategies using early case detection and treatments, vector control, protective measures against mosquito bites and management of Environment. The major challenge was to identify the disease at early stage. The key contributions avoid malaria disease is to provide antimalaria drugs, using indoor spray with residual insecticides, mosquito nets. For the treatment, medical technologies, deep learning architectures related to Convolutional Neural Networks to train and test performing different combinations for image classification using ResNet34 which helps patient go through prior examination for microscopic diagnosis. For patients examination, this paper considers Malaria Cell Images dataset with Parasitized and uninfected images. Thus, this clearly shows that one can easily identify person's condition whether he is infected or uninfected by enabling open-source Artificial Intelligence. It shows the start-of-the-art accuracy by checking individual details.

Keywords: Malaria, ResNet34, Convolution Neural Network, Image Classification, convolutional, neural network.

I. INTRODUCTION

Millions of people all over the world were affected by malaria. The major different Parasites that led to malaria are p.knowlesi, p.ovale, p.malariae, p.vivax and p.falciparium. These parasites are like small insects that grow through stages inside the human body and transforms into harmful bacteria, which leads to malaria. They change in their morphological behavior, size, color at each level of their stage. The main cause of malaria is due to climatic conditions in tropical region areas. Mosquitoes causing malaria, it is a parasite which gets transmitted into human blood through mosquito bites. Millions of people are getting sick from high fever to deadly states. It is a transmission process from mosquito to the human body, human body to liver, liver to red blood cells. The three different modes of malaria transmission are from mother to child (in womb, who are unborn), one to another person blood transfusions, giving similarly injected needles too other persons.

Existing approaches for malaria diseases, implemented methodologies such as automatic detection through RBC count, applying Log filters to identify unique cells, use of model variance, minimizing the variance provide solutions but not with optimal results. An automated detection system to recognize and distinguish malaria parasites in human blood varies from different stages like trophozoites; schizonts analyze blood slides through a microscope.Detection of RBC count and segmentation of cell images uses multiscale Laplacian of Gaussian, another contour-based segmentation for the detection of morphologies that detects both annular and disk-like structures among cells.Microfluidic devices used to track the red blood cells in videos to control the concentration levels of oxygen. Due to large number of varying characteristic features, the video of blood flow of RBC cells process cell classification for accurate segmentation [19]. In real-time data processing [31], implemented and performed an iterative voting-based detection of cells. To identify the local extreme and approximate centroids, multiscale LoG filter implies to know the individual cells, which help in speed up the processing and accuracy. This will result in the extraction of offline features of color and texture for further evaluation of classification and reduction of dimensionality. Some of the techniques like normalized red green blue for the extraction of color feature information and joint adaptive median binary pattern for extracting texture feature information [29]. Classifiers such as artificial neural networks result in classifying infected and uninfected cells.

The aim of the work is to provide the construction of models using neural networks by detecting the images and by decrease the model variance. This will enhance the robustness and analysis for detection. The efficiency of the CNN classifies the thin-blood smear images [22] by allowing cross-validation. Some of the performance metric calculation on finding classification accuracy is receiver-operating characteristic, mean squared error, precision, and Matthews Correlation Coefficient.

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Analysing the Performance of Classification Algorithms on Diseases Datasets

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ABSTRACT: Change in regular food habits and physical activities of the human body, some of the genetic diseases were inherited from generation to generation. The most common hereditary diseases that stay lifetime are thyroid, diabetics, cancer. Predicting cancer-like diseases consumes time; cure for such hereditary diseases can be identified at an early stage. Medical technology has been improved for the prognosis of healthcare. Healthcare using prediction analysis enhances medical technology. Researchers have advanced Prediction modelling under three phases. In the first state, they define the issue, collection of data and progress the data. In the second state, they choose a model and perform training and testing and in the third state, they apply the model in real-world. This has become a crucial task in the medical field for immediate disease diagnosis. To advance such automatic healthcare prediction system, modern Artificial Intelligent technology has been developed an easy way to identify the existence of the diseases. The proposed research papers examine the diseases through the disease parameters and classify them using various developed intense classification algorithms such as Support Vector Machine, Decision tree, Logistic Regression, K-nearest neighbor, Naive Bayes. The proposed classification algorithms measure the diseases using the disease datasets which estimates the accurate prediction. The experimental analyses have been carried out over three disease datasets namely Thyroid dataset, diabetics data set, cancer dataset.

Keywords: Classification techniques, Disease Datasets, Healthcare, Support Vector Machine, Prediction accuracy.

I. INTRODUCTION

Healthcare using prediction analysis enhances medical technology. Researchers have developed Prediction modelling under three phases. In the first phase, they define the problem, collection of data and process the data. In the second phase, they choose a model and perform training and testing. And In the third Phase, they apply the model in the real-world.

Diabetes is a disease that is deep-rooted (continual) into the human body. It mainly occurs due to the changes obtained inside the blood such as a change in insulin levels and an increase of the sugar levels in the blood. Nowadays diabetes has very advanced that young people without any perceptive knowledge getting diabetes [19]. In general, diabetes is classified as type1 diabetes, type 2 diabetes, and gestation diabetes. Diabetic patients under these type1 are known as Insulin Diabetes Dependent Patients, types 2 are known as Non-Insulin Dependent patients [21], gestation diabetes occurs during pregnancy period. Diabetes instances are fatigue, hungry, excess thirst, and urinary, weight gain or loss, blurry vision, change in BP high pressure or Low pressure, smoking and Body Mass Index. Based on the different parameters of the body selects optimal features like BMI, sugar levels, blood pressure is used to predict thyroid disease.

Thyroid disease is the most commonly affected worldwide disease in humans. It disturbs the major functioning parts of the body and led to many other disorders like diabetes, heart problems, depressions, hormonal imbalance so on. Thyroid disease is classified into two categories such as Hypothyroidism and Hyperthyroidism. This occurs mostly due to the thyroid gland that exists over our neck part in a butterfly shape. This gland generates hormones to all parts of the body. Hormones that are released by the thyroid gland are T3 and T4. The pituitary gland releases TSH hormones. A person who has hypothyroidism shows that the thyroid gland produces fewer hormones required for the human body, which leads to muscle weakness, infertility, puffy eyes, etc. Simply it is described as the deficiency of hormones. A person who has hyperthyroidism indicates that the thyroid gland is generating an excessive number of hormones into the body, which causes weight loss, increase in heart rate, nerves weakness, etc. Based on the different parameters of the body selects optimal features like T3, T4, TSH, blood pressure are used to predict thyroid disease [17].

Breast cancer disease is caused by cancer tissues/cells inside the body. Cancer cells gradually increase inside body causing damage to the organ. This can be diagnosed in many different stages. Once effected in body, hard to be cured completely. People with cancer need to undergo a biopsy to get clarification of any tumors. The early stage of predicting cancer is very advantageous for a person's life [20, 23].

Algorithms like Support vector machine classification is used to operate on continuous and categorical values. Any classification process divides the input dataset into two sets, i.e., training data and testing data, Decision tree find out regression as well as classification problems. It follows a tree structure, Logistic Regression identifies the relation between the dependent and independent variables, K-nearest neighbour algorithm provides fast training phase and slow testing phase, Naive Bayes is a statistical approach. More detail

An Enhanced Artificial Neural Network based Optical Character Recognition Mechanism for Business Information Extraction and Classification

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Abstract--- Automated text processing and information extraction have gained attention of many researchers as it plays a vital role in the context of business information processing and extraction. With the advent of various artificial intelligence technologies using neural networks which can certainly overcome this problem. This paper proposes a neural networks and natural language processing based approach for hand written and optical character recognition. The proposed methodology is based on a combination of Optical Character Recognition (OCR) and a Named Entity Recognition (NER) model for classification. The OCR produces text for a given image (business-card) with is further classified by a well trained NLP-NER model to extract names and other details such as emails phone numbers, websites. Furthermore, the obtained results indicate that the proposed method provides high efficiency of text classification inspite of unstructured text and lack of sentence formation in text extracted from business cards. The results obtained were further improved by the Scikit-Learn Classifier and achieved 97.5% accuracy on a significantly large dataset

Keywords--- Optical Character Recognition, Named Entity Recognition, Natural Language Processing, Neural Networks.

I. Introduction

Optical Character Recognition (OCR) helps to recognize message inside a digital picture. It is regularly used to recognize message in scanned documents, but it serves numerous different needs too. In this work, OCR has been used to extract text from business cards images either by a real time camera or by a stored image. For optical character recognition, Google ML Kit's text recognition API has been used as it is highly efficient and is cloud based. Google text recognition can automate tedious data entry for credit cards, receipts, and business cards.

The cloud- based API can also extract text from documents which can be used to increase accessibility or to translate documents. Name entity recognition is an important subtask in natural language processing (NLP). The results of recognition and classification of proper nouns in a text document are highly used information retrieval. Depending on the requirements of tasks, the types to be recognized can be person, location, organization and date. In this paper we have used the person and organization attributes for predicting names from the text fetched from OCR

Modern era has observed technological advancements in every aspect. Everything is moving towards digitization. On the other hand, majority of people have paper visiting cards and are exchanged between professionals frequently. A survey found that professionals on an average have 40-50 business cards and most of them are not saved digitally as its tedious to store each and every detail of numerous contacts manually.

This provided the motivation to create an easy way to save contacts via business cards using natural language processing. The primary contribution of this paper is to propose a neural network for name entity recognition (NER) which is trained, and custom made specially to classify human names form text samples. This paper provides a well-structured use of NLTK chunking, NER-tagger, IOB tagging to generate NLTK trees and further training a classification model for near perfect accuracies. In general context the handwritten character recognition systems evaluate the text contained in scanned images and process the digital text. The main contribution of this article is to develop a neural network model that is trained with different alphabetical and word images from IAM dataset. In the proposed model as it is considered that the small input layer to process the alphabetical and word images, the neural network could be process using CPU rather than the requirement of GPU. The remaining paper is organized as follows.

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An Integrated Way for Teaching Hadoop & BigData Analytics Course

E. Laxmi Lydia, N. Sharmili, T. V. Madhusudhanarao, Madhu BabuChevuru, K. Vijaya Kumar

Abstract: ***Hadoop & BigData Analytics course has occupied a ubiquitous role in present software technologies. Educational institutes are fond of this course as it's been trending course most of the placements in software companies are based on. As per the traditional teaching mechanisms, the educational systems are not much up- to- mark where the students are not assisted with the course resulting in atrocious placements. Therefore to enhance this placements, institutions has to adopt a new integrated teaching- learning proceedings which help in drastic change of academic results discussed in this paper. Here the result analysis of course attainments are compared to show the eye-catching improvements as occurred in VIIT College.***

Keywords: Hadoop, Big Data, Analytics, technologies, academic, attainments

I. INTRODUCTION

In most of the educational institutes, traditional teaching practices are been carried that impacts the result analysis along with practical knowledge of students. Although the institutes appoint well knowledge teachers, they can't concentrate on each of the students in the class whole day. They can maximum concentrate on 10 to 15 students in the class. We know that the learning capabilities of students vary in class irrespective of same teaching practice followed by the teachers. This shows that teacher as to spend time on slow seekers when compared to fast learners which leads to disturbances in syllabus completion or makes class boring to others. Therefore leading to instinct downfall. To avoid these fluctuations, we have approached you with four innovative teaching learning mechanisms.

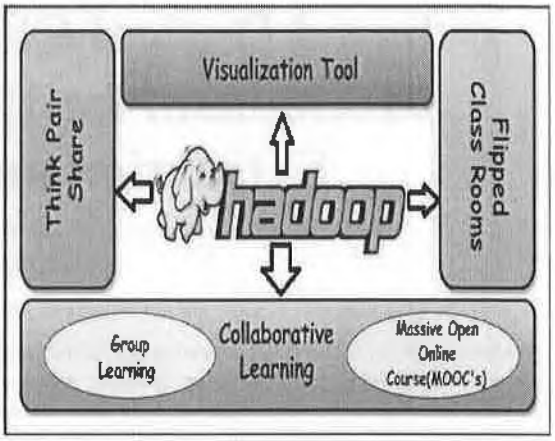

Figure. 1: Innovative Teaching-Learning Mechanisms

Figure 1 shows the different innovative teaching-learning mechanisms that are discussed in this paper. They are: Think Pair Share, Flipped Classrooms, Visualization Tool and Collaborative Learning. These mechanisms are been well fledged used in college VIIT for Hadoop &Big DataAnalytics course. The outcomes of these mechanisms are shown in figure7 with course attainments outcomes achieved in the last two years. Table1 demonstrating the teaching-learning modes with the detailed role of teacher, student and outcome of the learning activity.

Mechanism 1: Think Pair Share

Think Pair Share mechanism helps students to elevate themselves with new approaches when compared with traditional teaching techniques. This makes student to understand critical topics easily with discussions held in the classroom. According to this mechanism, a troubleshooting question is been given by the teacher to the students. He asks them to resolve the question and find out the solution individually. After solving the question, he asks each student to compare their results with neighboring student (making a pair) and discuss their approaches to find the appropriate solution. Lastly, one of the pairs in class come-up with a solution and explains it to whole class.

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MULTIPLE POSITIVE SOLUTIONS FOR A SYSTEM OF FRACTIONAL HIGHER-ORDER INFINITE-POINT BOUNDARY VALUE PROBLEMS

A. KAMESWARA RAO[1], §

ABSTRACT. In this article, we establish some results on the existence of multiple positive solutions for a system of nonlinear fractional order infinite-point boundary value problems. The main tool is a fixed point theorem of the cone expansion and compression of functional type due to Avery, Anderson and O'Regan for at least one positive solution. We also prove that the boundary value problems has at least three positive solutions by applying the five functional fixed point theorem. And then, we establish the existence of at least $2k-1$ positive solutions to the fractional order boundary value problems for any arbitrary positive integer k.

Keywords: Fractional differential equations, infinite-point boundary value problem, multiple positive solutions, five functional fixed point theorem, Green's function, cone.

AMS Subject Classification: 26A33, 34B15, 34B18.

1. Introduction

In this paper, we study the existence of multiple positive solutions for the following coupled of nonlinear fractional order differential equations

$$\begin{aligned} D_{0+}^{\nu_1}u(t)+f_1(t,u(t),v(t))=0,\ t\in(0,1),\\ D_{0+}^{\nu_2}v(t)+f_2(t,u(t),v(t))=0,\ t\in(0,1), \end{aligned} \tag{1}$$

with infinite-point boundary conditions

$$\begin{aligned} u(0)=u'(0)=\cdots=u^{(n-2)}(0)=0,\ u^{(i)}(1)=\sum_{j=1}^{\infty}\alpha_j u(\xi_j)\\ v(0)=v'(0)=\cdots=v^{(n-2)}(0)=0,\ v^{(i)}(1)=\sum_{j=1}^{\infty}\alpha_j v(\xi_j) \end{aligned} \tag{2}$$

where $\nu_1,\nu_2>2$, $\nu_1,\nu_2\in(n-1,n]$, $i\in[1,n-2]$ is a fixed integer, $\alpha_j\geq 0$, $0<\xi_1<\xi_2<\cdots<\xi_{j-1}<\xi_j<\cdots<1 (j=1,2,\cdots)$, $D_{0+}^{\nu_1}$, $D_{0+}^{\nu_2}$ are the standard Riemann-Liouville fractional derivatives of order ν_1 and ν_2 respectively and the function $f_j:[0,1]\times[0,\infty)\times[0,\infty)\to[0,\infty)$ are continuous, for $j=1,2$.

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PAPER

Dielectric properties of superparamagnetic titanium doped nanophased Mn–Zn ferrites for high frequency applications

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Keywords: nanophased ferrites, dopant concentration, hydrothermal synthesis, dielectric properties, superparamagnetism

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Abstract

Effect of Ti^{4+} ions on Structural, Dielectric and Magnetic properties of nanophased $Mn_{0.5}Zn_{0.5}Ti_xFe_{2-4x/3}$($x = 0.0, 0.01, 0.02, 0.03, 0.04$ and 0.05) ferrites synthesized by hydrothermal method is studied. XRD peaks reveal pure spinel phase without extra peaks. Lattice parameter (**a**) is found to vary non-linearly with dopant concentration (x). An overall decrease in Crystallite Size (**D**) (varying from 78 nm–41 nm) with x is witnessed. Values of dielectric constant (ε') and loss factor ($\tan\delta$) of Ti^{4+} doped Mn–Zn ferrites are lower than that of the undoped sample. Increase of AC resistivity (ρ) by an order of 10 in Ti^{4+} doped Mn–Zn ferrites is ensued due to locking of Ti^{4+}–Fe^{2+} pairs. Lowered values of M_s is attributed to spin canting due to growth of nanosized grains, weakening of exchange interactions by non-magnetic Ti^{4+} doping and lower values of x-ray density. Transition from single to multi- domain region of Mn–Zn–Ti ferrites is clearly evinced from the plot of Coercivity (H_c) with D. Reduced value of coercivity to zero upto a critical size of ~49 nm indicates the existence of superparamagnetism in these ferrites. Superparamagnetismis first ever reported in the present caseof Ti^{4+} doped Mn–Zn ferritessynthesized by hydrothermal method. Relatively lowered values of ε' (29–18), $\tan\delta$ (of the order of 10^{-2}–10^{-3}), higher values of ρ (10^6 Ω—cm) and lowered values of H_c obtained with Ti^{4+} doping improve the eddy current losses and direct these materials for high frequency applications.

1. Introduction

Mn–Zn ferrites are an important class of soft ceramic magnetic materials, with relatively low cost, lower core losses, high electrical resistivity and high initial permeability and have a wide range of applications [1] in electronic or electrical peripherals. Rapid development in power electronic devices towards miniaturization tends to increase the operating frequency of the Mn–Zn ferrites to relatively higher values resulting in dramatic increase in power losses. One of the key strategies to improve the electromagnetic properties is to synthesize [2] the nanoferrites from their bulk counterparts. Occurrence of new physical phenomena like quantum confinement and larger surface to volume ratio in the nano regime along with improved power losses and enhanced electrical resistivity are reported [3, 4] in nanophased Mn–Zn ferrites. Owing to these phenomena, they have enormous technological and biomedical applications in ferrofluids, magnetocaloric refrigeration, Magnetic Resonance Imaging (MRI)and guided drug delivery. Although nanoparticles of pure metals like Fe, Co and Ni are found [5, 6] to exhibit superparamagnetism, they have limited applications due to their chemical unstability and relatively lower sizes of few nanometers. On the other hand, magnetic metal oxides such as spinel ferrites have a great potential for applications as they are relatively inert and their properties can be improved [7] by addition of dopants. Single domain particles are formed for critical size varying from 10–40 nm resulting in an increase of coercivity with increase in crystallite size. In this single domain region, reduced coercivity to nearly

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Study of the Structural, Optical, Dielectric and Magnetic Properties of Copper-Doped SnO_2 Nanoparticles

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This work explores the structural, optical and dielectric properties and the magnetic behaviour of copper (Cu) (0–4%)-doped tin dioxide (SnO_2) nanoparticles, synthesized by the sol–gel method using methanol as solvent. X-ray diffraction (XRD) analysis confirmed the tetragonal structure of SnO_2. The inclusion of Cu in the SnO_2 lattice enhanced the crystallite size of the Cu-doped SnO_2 nanoparticles, as determined by the Scherrer method, and crystallite sizes were found to be consistent with the Williamson–Hall method. The morphology, observed by field emission scanning electron microscopy (FESEM) and transmission electron microscopy (TEM), revealed the formation of uniformly distributed nanoparticles of spherical shape. The formation of a characteristic peak in the range of 480–750 cm^{-1} was associated with an antisymmetric O-Sn-O bridge functional group of SnO_2. The reduced band gap is in accordance with the quantum confinement effect in synthesized samples. Strain-influenced dielectric studies conducted at room temperature within a frequency range of 1 Hz to 7 MHz revealed a relatively high dielectric constant, AC conductivity and low dielectric loss. Here, for the first time, electric modulus formalism is adapted to analyse the relaxation mechanism in Cu-doped SnO_2 nanoparticles. The relaxation peak shift towards lower frequency ($\approx$ 1 kHz) in the investigated samples indicates the short-range mobility of ions and longer relaxation times. The transition from a diamagnetic to a paramagnetic state is confirmed by the addition of Cu content in the SnO_2 lattice. The observed paramagnetism of the Cu-doped SnO_2 nanoparticles is correlated with lattice strain. Cu doping led to an increase in magnetic moment on the order of 10^{-1} emu/g. The synthesized samples with high dielectric constant, low dielectric loss and paramagnetic behaviour are found to be efficient candidates for high-frequency devices and biomedical applications. The longer relaxation times may make them suitable for future memory materials.

Key words: Lattice parameter, nanoparticles, sol–gel, porosity, dielectric constant, coercivity

INTRODUCTION

Wide-band-gap transparent conducting oxides (TCOs) have been enriching the class of nanomaterials for decades. Researchers of the twenty-first century have shown an intense interest in nano-

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Enhanced humidity sensing and magnetic properties of bismuth doped copper ferrites for humidity sensor applications

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ABSTRACT

In present investigation, the $CuFe_{(2-x)}Bi_xO_4$ (where, x = 0.00, 0.01, 0.02, 0.03) nanoparticles synthesized by solution combustion technique using mixture of fuels as glucose and carbamide. The refined XRD (X-ray diffraction) patterns of the samples confirms the spinel cubic structure having space group *Fd3m*. The average crystallite size was found to be in nanometer. The lattice parameter, volume, strain and hopping lengths were estimated. TEM (Transmission Electron Microscopy) micrographs confirm the particles are agglomeration. SAED (Selected Area Electron Diffraction) pattern reveals the polycrystalline nature of the material. The magnetic nature of spinel ferrite can be explained by Neel's two sub-lattice model. In the present work, the observed decrease in magnetization can be ascribed to occupancy and migration of cations at/from B sites by the substitution of Bi^{3+} ions. The magnetic parameters such as saturation magnetization, remanent magnetization (M_r), coercivity field (H_c), remanence (S), uniaxial anisotropy (K_u) and cubic anisotropy (K_c) were estimated. The resistance and humidity sensing responses increases with increase of the Bi^{3+} concentration. The hysteresis curves reveal the desorption process is somewhat slower than the adsorption process. The sensing response time 73 s was recorded when sample was moved from 11% RH to 97% RH and the recovery time 36 s was recorded when sample was moved from 97% RH to 11% RH. The humidity sample shows exceptionally stable response at relative humidity 99% RH and 33% RH.

1. Introduction

Copper ferrite nanoparticles have pulled in significant consideration due to their specific properties [1–4]. Thus, copper ferrite nanoparticles are intensively studied and developed for industry application such as transformer, information storage, ferrofluid and high frequency devices [1,5].The difference in the properties of the nanoparticles are mainly ascribed to crystallite size because of the fraction of atoms on the surface compared to the bulk [6]. The $CuFe_2O_4$ (copper ferrite) nanoparticles having the inverse spinel cubic structure [7,8]. The $CuFe_2O_4$ is in the form of AB_2O_4 structure where, Cu^{2+} ions occupying tetrahedral site (A-site) and Fe^{3+} ions occupying octahedral site [6]. In recent years, Spinel ferrites are attention turned towards their use in biomedical applications as drug carriers [9], contrast agents [10] and in cancer treatment by magnetic hyperthermia [11,12]. Now a days, the science and technology mainly depend on sensing materials and devices. Humidity sensor devices could be used in great potential applications such as chemical gas purification, food packaging, textile for industries field, and also in agriculture and medical fields [13,14]. The humidity sensor materials can be fabricate based on ceramics, polymers and organic compounds. The humidity sensing materials are improving their sensing response, response and recovery time with

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Image integrity verification using blockchain

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ABSTRACT

Digital image processing today has become simple thanks to powerful computers, advanced tech services for photo-editing and equipment for high resolution photography. Verifying the credibility of photographs and identifying tampering traces without requiring additional and significant prior understanding of the image material or any embedded watermarks is Scope of Science. An effort is made to research the new trends in the world of digital identification of picture forgery and also full bibliography on blind approaches for detection in Forgery. No clear prior data is required for blind or passive approaches about a N image. In this paper a novel Image Integrity verification method is proposed by combining RSA and Hash Based Message Authentication. In the proposed method images are key-hashed and stored in chronological chained fashion The verification process is done in same manner by generating hash values which are compared with hashes stored on blockchain. This research is significant in establishing the trust between any two parties.

Selection and peer-review under responsibility of the scientific committee of the Emerging Trends in Materials Science, Technology and Engineering.

1. Introduction

The fast development in applications for image recognition and large-scale developments in digital cameras have given rise to quantities of doctored photographs with no visible signs, generating a strong market for the identification of automated forgery algorithms to assess the reliability of a applicant graphic. The validity of photos has an significant position as these images are widely used as supporting facts and historical documents in a growing phase shown in Fig. 1. The number and large range of forensic applications Investigation, news photography, criminal investigation, insurance premiums and medical allegations, law enforcement. Detection of Digital Image Forgery the area has received great interest [1] from the science community. Owing to the technological progress in recent years, legislation it was important for law enforcement to keep up to date with emerging technological advances and their use in science about violence.

SWGIT offers information about the appropriate usage of multiple imaging tools in the criminal justice system and employee usage. By releasing documents such as the best SWGIT Documents on procedures

2. Forgery detection approaches

Different methods of identification of image forgery are classified in Fig. 2. The object of image forgery detection is to verify authenticity of a visual picture. The solution for image authentication is divided into two groups. (1) Responsive and (2) Passive or blind. An recognised authentication uses aggressive forgery identification methods, such as digital watermarking or digital signatures. Code inserted before the images in the picture material they're sent via an insecure public platform. Through testing ifsuch an authentication code is available, authentication can be shown through contrasting it with the original inserted code. How-ever, in order to inject the authentication code into the image before the image is transmitted, this approach involves specific hardware or software. The technique of passive or blind forgery detection utilises the image collected for determining its validity through Integrity, without any signature or watermark from the sender of the original picture. It is built on the premise that although digital forgeries-not leave any contextual hints, they will most definitely be disrupted after being tampered with.

The property of the underlying statistics or picture accuracy of a image of a natural scene that adds new objects this leads in multiple types of contradictions. One may use these inconsistencies to classify the forgery. This technique is popular because no prior

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A Note on Detection of Communities in Social Networks

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Abstract:
The modern Science of Social Networks has brought significant advances to our understanding of theStructure, dynamics and evolution of the Network. One of the important features of graphs representing the Social Networks is community structure. The communities can be considered as fairly independent components of the social graph that helps identify groups of users with similar interests, locations, friends, or occupations. The community structure is closely tied to triangles and their count forms the basis of community detection algorithms. The present work takes into consideration, a triangle instead of the edge as the basic indicator of a strong relation in the social graph. A simple triangle counting algorithm is then used toevaluate different metrics that are employed to detect strong communities. The methodology is applied to Zachary Social network and discussed. The results bring out the usefulness of counting triangles in a network to detect strong communities in a Social Network.

Keywords: Strong, communities, Triangle counting, Social Networks, Clustering Coefficient.

1. Introduction

In recent years, there is a growing interest in understanding the structure, dynamics and evolution of complex Networks such as World Wide Web (www), Biological Networks, Technological Networks, Social Networks etc., [1].A network is basically a set of items called the vertices or nodes with connections between them called edges. As graphs are a ubiquitous data representation that can be used to model complex relations in a wide variety of applications ranging from Social Sciences to Information Systems [2], graph theory can be used to study the complex networks modeled as graphs. The social network provides a record of global human interactions at a scale that is hitherto unprecedented and these are aninvaluable resource for analyzing social allegiances, discovering entities with shared interests and identifying the key players in the social media [3]. It is observed that the size ofsocial networks such as Facebook, Twitter, Instagram etc. with hundreds of millions of users and billions of social connections are growing day by day and an analysis of such networks is highly difficult. However, Graph theory provides techniques for fruitful analysis of these networks. Social network analysis can be used to identify important social actors, highly or sparselyconnected communities and interactions among the various entities in the underlying network [4]. The Social networks differ from most other types of networks in two important ways namely network transitivity and assortative mixing or positive correlations [5]. Social networks are often seen as emerging from various social processes or mechanisms and the pattern of network ties in themtend to reveal the processes that have given rise to them [6]. Furthermore, in a social network, thedistribution of edges is not only globally, but also locally inhomogeneous

With high concentration of edges within special groups of vertices and low concentration between these groups leading to the concept of community structure [7]. The community structure plays a significant role in the analysis of social networks and intense studies on this, is bound to reveal important patterns in the network aiding theanalysis of the dynamics and structure of the system. The community structure is closely related

Multiuser Detection and Channel Estimation for CDMA System under Flat Fading Channels

Guntu Nooka Raju, Srinivasa Rao K, Bethapudi Ratnakanth

Abstract: ***For a level blurring code-division multiple access (CDMA), the numerous entrance framework is done by speech signal, and it shows the real framework by different conditions like comprising of state condition, multiplicative commotion condition , the nonlinear estimation condition, and an ideal separating calculation and these are used for joint recursive channel estimation and multi users separation. It ought to be focused on that the new calculation is pertinent to issues with a similar sort of nonlinear framework which shows that related commotions. Recreations process demonstrates that the new calculation performs are superior to the expanded Kalman channel estimation in faster merging rate and lower in bit mistake rate.***

Keywords: **Channel Estimation, Fading Channels, CDMA**

I. INTRODUCTION

Over the recent decade we have found substantial increase in the usage of wireless spread technology where we could find that the transition from second to fourth generation. This have also captivated an enormous amount of customers Right now the hike in customers requires proper pre setup requisition in network establishment which should be followed by planned connection .

Technology / Feature	1G	2G	3G	4G	5G
Start/ Deployment	1970 – 1980	1990 – 2004	2004-2010	Now	Soon (probably2020)
Data Bandwidth	2Kbps	64kbps	2Mbps	1 Gbps	Higher than 1Gbps
Technology	Analog Cellular Technology	Digital Cellular Technology	CDMA 2000 (1xRTT, EVDO) UMTS EDGE	Wi-Max LTE Wi-Fi	WWWW (coming soon)
Service	Mobile Telephony (Voice)	Digital voice, SMS, Higher capacity packetized data	Integrated high quality audio, video and data	Dynamic Information access, Wearable devices	Dynamic Information access, Wearable devices with AI Capabilities
Multiplexing	FDMA	TDMA, CDMA	CDMA	OFDMA	OFDMA

Fig.1 Comparative account of all generations

II. MULTIPLE- ACCESS TECHNIQUES & CHANNELS

When the focus falls on transmission of data in air mode pipelining of data to the base station (BS) is a mandatory feature. Everyone knows that independent area to be partitioned into sub cells to have connection with a BS. To increase the capacity of the channel there are few multiple access methods.

a) Frequency division multiple-access (FDMA)
b) Time division multiple-access (TDMA)
c) Code division multiple-access (CDMA)

AWGN and Racian channel will face the same trouble when traces of original signal found at the receiver. In Rx the signal appears in multipath ate different directions. This fading occurs when LOS is higher that others. But in case of Rayleigh fading there should not be any LOS whatever the environment may be.

III. MULTI USER DETECTION (MUD)

To reduce the near far effect in ireless all single users are combined to form MUD. Here we have mentioned the reverse method of tx between BS and MS.

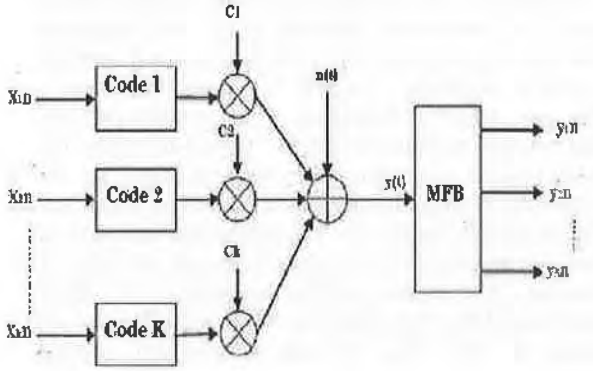

Fig.2 MUD Model

Baseband signal for the kth user is:

$$u_k(t)=\sum_{i=0}^{\infty} x_k(i)*c_k(i)*s_k(t-i*T-\tau_k)$$

$u_k(t)$=Base band signal of the kth user.
$c_i(t)$=real positive gain.
$s_k(t)$=signature waveform containing PN sequence.
k = transmission delay

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Contrast Enhancement Of Satellite Images Based On Lifting Haar Wavelet Transform And Singular Value Decomposition

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ABSTRACT

For human visual system, contrast is one of the most important quality factors.. The existing contrast enhancement techniques such as contrast stretching, Histogram equalization can not only enhance the local contrast and global contrast of high contrast images, also enhances the edge and contour information of image, highlight the internal details of image and improve the visual effect. But, these methods are failed for low contrast images. The proposed method enhances the low contrast satellite images using Lifting Haar wavelet Transform and Singular Value Decomposition method. The input image decomposed in to four subbands with lifting discrete wavelet transform scheme. Then, the singular value matrix of the low-low subband image will be estimated and by applying inverse lifting wavelet transform to reconstruct enhanced image. The proposed method also compared with the existing traditional methods like contrast stretching, General Histogram Equalization (GHE), and Adaptive Histogram Equalization(AHE).The method is tested on different images. The results show that proposed method is superior to existing methods. So, for preventing the possible degradation in image and enhancing the illumination of image the lifting wavelet transform is applied. The reconstructed image is enhanced in terms of illumination. The various performance metrics like Mean Square Error(MSE), Peak Signal to Noise Ratio(PSNR), are compared for both the proposed method and existing methods. .

Key words : Contrast, Histogram Equalization, satellite image, wavelet transform

1. INTRODUCTION

Contrast enhancement plays an important role in many applications such as satellite image processing, medical image processing and astronomy etc. Satellite images are widely used in applications such as geosciences studies, and geographical information systems. Satellite images are usually low contrast images which has information, but it is not visible. Contrast is the most important quality factors in in human visual system. Contrast is the difference in luminance In visual perception, contrast is determined by the difference in the color and brightness of an object with other objects. The range of brightness values present on an image is referred to as contrast.. The satellite images are corrupted by noise during imaging procedures. Such as applications like enhancement of low contrast satellite images. The contrast enhancement techniques improves the visual quality of image by enhancing edge and contour information along with local, global contrast [1]. There are various contrast enhancement techniques such as contrast stretching[2], General Histogram Equalization (GHE)[3], Adaptive Histogram Equalization (AHE), Discrete Wavelet Transform. These contrast enhancement techniques are used for high contrast images only. But the proposed Lifting Haar Wavelet Transform with Singular Value Decomposition (SVD) is used for enhancement of low contrast images. The proposed method can preserve the probability distribution function of the image. In first step, discrete lifting Haar wavelet is applied which decomposes the low contrast satellite image in four sub bands LL, LH, HL, and HH. Then, the singular value matrix of the low-low sub band image is estimated and inverse lifting haar wavelet transform is applied to reconstruct enhanced image. The proposed method is compared with the existing methods and the results of the proposed method are superior when compared with the existing methods.

2. CONTRAST ENHANCEMENT TECHNIQUES

The most common problem in satellite imaging is that the range of reflectance values collected by a sensor may not match the capabilities of the film or color display monitor. The principal objective is to bring out details that are hidden in an image and to increase the contrast of an image. It sharpens image features such as edges, boundaries, or contrast to make a graphic display more helpful for display and anaiysis. Low contrast images can resuit from poor

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Sparse recovery based compressive sensing algorithms for diffuse optical tomography

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HIGHLIGHTS

- The DOT reconstruction problem using CS framework.
- The compressive sensing algorithms have studied.
- Experimental validation of CS algorithms.
- Different metrics such as SSIM, MSE have studied.

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Keywords:
Diffuse optical tomography (DOT)
Single measurement vector (SMV)
Greedy algorithms

ABSTRACT

The optical parameters of a tissue such as a highly turbid medium can be reconstructed by the diffuse optical tomography. It is well known that the inverse problem of DOT is nonlinear, unstable and ill posed due to the propagation of photons through the tissue in a zig-zag manner. Though conventional iterative methods have been employed to solve this problem, they seem to be unsuccessful, considering the complex geometries for study. Recently, the compressive sensing (CS) technique has emerged as recent trend in DOT because of its sparse reconstructions for biomedical applications. The main goal of this paper is to formulate the inverse problem as a single measurement vector (SMV) problem by employing the given CS framework. The greedy algorithms such as compressive sampling matching pursuit (CoSaMP), regularized orthogonal matching pursuit (ROMP), stagewise orthogonal matching pursuit (StOMP), and orthogonal matching pursuit (OMP) are extensively studied to reconstruct the 2D map of the absorption parameter change from the tissue boundary data. The conventional method such as least square technique is studied for comparison. The experimental validation of the greedy algorithms is done on a wax circular phantom through a DOT experimental setup. The performance metrics such as mean square error (MSE), structural similarity index (SSIM), and normalized mean square error (NMSE), are used to assess the performance of the DOT imaging in this paper. The extensive study of the simulation results confirm that the greedy algorithms specially, CoSaMP outperform the conventional methods in DOT.

1. Introduction

The diffuse optical tomography (DOT) has been considered as the prominent imaging modality [1–3] by the various research imaging groups in the recent years. In DOT, the tissue to be illuminated by the near infrared light from the various light sources and the boundary data is to be measured at the tissue boundary by the various detectors [4].

It is evident from the DOT imaging methods that the inverse problem of DOT is ill-posed, unstable, and nonlinear [5] because of the light propagated through the tissue follows a zig-zag path. The main focus in DOT is to solve this problem.

The optical parameters of DOT are absorption and scattering coefficients [6]. The reconstruction of the absorption coefficient is the main goal in the inverse problem of DOT. Here, the aim is to image the absorption parameter map by assuming that the scattering parameter is constant in the entire tissue [7].

Generally, the propagation of photons within the tissue undergoes a significant scattering and it is being modelled by using either diffusion

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Carrier Frequency offset (CFO) Estimation in MC-CDMA System

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Abstract

Wireless communications is a broad, dynamic and the fastest growing sector of communication industry for the past several years. In this regime, numerous research efforts are underway to improve the performance efficiency and effectiveness of several multiple carriers multiple access model at various phases. Multicarrier code division multiple access (MC-CDMA) model is one such approach, defined as the frequency dependent multiple access architecture that merges the features of FDMA and CDMA to concurrently exploit frequency assortment and diminish carrier frequency offset (CFO) at MC-CDMA receiver model.In this regards, this paper proposed novel schemes to enhance the performance of both MC-CDMA transmitter and receiver model. In addition, the effect carrier frequency offset (CFO) on Multi-Carrier systems has degraded the performance of the system; therefore, it is essential to estimate of CFO and minimize its influence on multiple carrier modulations systems using different estimation techniques.

Keywords: Carrier frequency offset, MC-CDMA system, MSE. Cyclic Prefix (CP).Symbol. Pilot tone estimation.

1. INTRODUCTION

Modern Communications Networks demand high to very high Data Rates because of Multimedia applications. In place of Single Carrier systems, this demand calls for a multiple carrier approach [9]. It is employed in European digital transmission radio system [10] and in wireless applications like digital broadcasting television [16] and mobile systems [8]. Improvement and investigation in the domain of digital signal processing and communication system have caused in wireless communication systems like MC-CDMA.

The frequency spectrum for wireless system is limited that needs to exploit the accessible spectrum and use it efficiently for all existing applications with future requirements. Therefore, innovative wireless

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DOA Estimation of Wideband Cyclic MUSIC Algorithm under Rayleigh Fading Environment in MIMO Systems

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Abstract- Direction of arrival (DOA) estimation has, for quite some time been a challenging situation in most of the wireless communication applications, radar and sonar. The resolution of the direction of arrival estimation can be increased using the help of array signal processing. The performance of the direction of arrival estimation for multiple input multiple output(MIMO) radar systems has been reviewed for cyclic Multiple Signal Classification(MUSIC), extended cyclic MUSIC and Wideband cyclic MUSIC under Rayleigh fading environment. MUSIC and its variants have been taken into consideration for the analysis as these have been a very good parameter estimation technique due its low cost, high resolution and stability. Direction of Arrival estimation clubbed with cyclostationarity has been included into the new algorithm because of its immunity to noise and interference. The new algorithm along with cyclic correlations when applied to these signals, improves the performance of the entire system substantially. The performance of this wideband cyclic MUSIC high resolution direction of arrival estimation algorithm over the Rayleigh fading is analyzed in this paper. The simulation results citing the three methods show the performance of these methods in presence of the fading environments.

Index Terms - Direction of arrival, Multiple Input Multiple Output(MIMO) radar, cyclostationarity, cyclic MUSIC, extended cyclic MUSIC, Wideband Cyclic MUSIC, Rayleigh fading.

I. INTRODUCTION

Radar signal processing has been an area where the direction of arrival estimation has been of prime importance that estimates the angle of the signal to be imposed on the antenna array[1]. Direction of arrival refers to the direction in which the beampattern focuses on a particular point called the beamforming[2-3]. With the advancement of technology many high resolution beamforming techniques are available like the Cyclic MUSIC, Extended mode of cyclic MUSIC and the Wideband cyclic MUSIC [4-8] are being investigated for the exact evaluation of the direction of arrival which is useful for the target detection. There is always a mismatch between the direction of the signal and the inbound steering vector. So, with proper selection of antenna array algorithm the beampattern can be analyzed. The challenge faced by these direction of arrival estimation algorithms is that many signals are received simultaneously with different amplitudes and orientations. Noise also plays a vital role at the receiving end. So, it is very important to have an efficient estimation algorithm with high resolution and accuracy, like the various MUSIC algorithms.

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MUSIC is a very high resolution direction of arrival estimation approach that is optimized for antenna array signal processing [9-14]. The Eigen Vector Decomposition(EVD) is done for the covariance matrix which extracts the original signal and the noise subspaces that are orthogonal to each other. Various high resolution variants of cyclic MUSIC have been proposed which are very effective in direction of arrival estimation that use cyclostationarity in signals due to their immunity to noise and interference. Using this method that uses cyclostationarity, the signals' evaluation of the direction of arrival[15-16] can be improved accordingly, under low SNR and also subsequently reduces the number of computations.
Most of the wireless communications channels have a predominantly significant multipath propagation which cause the signal to fade at the receiver. A fading channel parameter is applied to the cyclic MUSIC methods. Rayleigh fading model[17-18] is introduced into the model here to analyze and enhance the performance of the direction of arrival estimation.

II. CYCLIC MUSIC

The algorithms used here for the analysis are the different variants of Cyclic MUSIC direction of arrival algorithms.
For the Cyclic MUSIC method, consider n_α sources are emitting cyclostationary signals[12] bearing a cyclic frequency of α, where $n_\alpha \leq n$. For preliminary assumption consider f(t) consists of the n_α signals which indicate the cyclic frequency α, excluding the $n - n_\alpha$ signals that do not have the cycle frequency α. Any sort of noise signals taken into consideration are summed up into a vector n(t). The Cyclic autocorrelation and the conjugate autocorrelation function at the cycle frequency α with a delay τ are non zero and can be determined by

$$R_{xx}^{\alpha}(\tau) = \frac{1}{M}\sum_{m=1}^{M}[x(t_m + \tau/2)x^H(t_m - \tau/2)]e^{-i2\pi\alpha t_m} \quad (1)$$

$$R_{xx}^{\alpha *}(\tau) = \frac{1}{M}\sum_{m=1}^{M}[x(t_m + \tau/2)x^T(t_m - \tau/2)]e^{-i2\pi\alpha t_m} \quad (2)$$

where M is the total number of samples.
Variants of the Cyclic MUSIC method use the Singular Value Decomposition(SVD) for deriving the correlation matrix rather than the Eigen Value Decomposition(EVD) used by MUSIC algorithm for deriving the covariance matrix.

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Implementation of new navigation algorithm based on cross-correntropy for precise positioning in low latitude regions of South India

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Abstract
The objective of this article is to develop a new positioning algorithm to estimate the position accurately in low latitude region and assess the algorithm's performance in terms of accuracy and precision. The Kalman Filter (KF) has been widely recognized as one of the most powerful state estimation techniques in estimating system state variables and suppressing measurement noise. The Kalman Filter is desirable because the uncertainty in the Minimum Mean Square Error (MMSE) estimation can be minimized. In this article, we implemented a new algorithm called as Cross-Correntropy Kalman Filter (CCKF) to enhance the position accuracy and performance of the GPS receiver. Primarily the improvement depends on the Cross-Correntropy criterion which is a measure of local similarity, and a novel Fixed-Point algorithm for updating subsequent estimates. In this work, we present a thorough derivation of the method suggested, how to accurately measure the estimate of the GPS receiver position. Furthermore, in tabular forms, we provide a comparison of receiver position error (X, Y, Z coordinates) and performance metrics (2-D & 3-D) together with graphical representations for both algorithms (KF & CCKF).

Keywords Cross-correntropy · Kalman filter · Cross-correntropy Kalman filter · Fixed-point algorithm · GPS

Abbreviations

Symbol	
$N(n)$	Kalman gain
$\hat{s}(n\|n-1)/\hat{s}(n-1\|n-1)$	State estimates: previous/updated
$C/C(n\|n-1)/C(n\|n)$	Covariance matrices: sate error/previous/updated
$s(n)/\hat{s}(n\|n)_t/m(n)$	Vectors: state/updated state/measurement
$D(n)$	Cholesky decomposition matrix
Q/P	Noise covariance matrices: measurement/process
A/B	Matrices: state transition/observation
σ/ε	Bandwidth of the Kernel/small positive number

1 Introduction

The introduction of Global Positioning System (GPS) has brought a revolution in the field of positioning and leads to the development of many sophisticated positioning systems in the fields of defence and civil sectors for guiding of troops in the battlefield, navigation of ships, the landing of aircraft, etc. (Rao 2010). Even when operated to their full capacity, these systems provide limited accuracy for these applications and hence need to be improved. The three primary functions on which most of today's defence systems work are Navigation, Tracking and Guiding and it is unimaginable to find a system that doesn't have any relation with these functions. These systems require determining the two or three dimensional (3D)

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Modified VLSI Architecture for Energy Detector in Spectrum Sensing

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Abstract: Network usage and Wireless Communication has been increased in today's world, and wireless devices are dominating the market. As a result we might have shortage of spectrum. In order to overcome the spectrum scarcity problem, a technology called Cognitive Radio (CR) is used which provides intelligence to sense empty spectrum slots or spectrum holes.

One of the methods to sense the spectrum holes is the Energy Detection Spectrum Sensing. The major problems in this method are energy detection, and sensing time. The existing architecture of energy detector is implemented using blind detection process and energy is sensed which reduces the computational and implementation complexity, but there is a delay in sensing. The modified work uses adder and Hybrid multiplier in its architecture resulting in reduced time delay of the energy detector. This work is carried out in Xilinx Software using Verilog Coding.

Keywords: Cognitive Radio, Carry Select Adder, Energy Detector, Hybrid Multiplier.

I. INTRODUCTION

According to the FCC's spectrum policy task report (2002) [1], only 15% to 85% in the frequency band below 3 GHz of the radio spectrum is utilized, which means that most of the spectrum is not utilized. The report also suggests allowing secondary users to share the spectrum with primary users for more efficient utilization of the spectrum. The primary users have license and assigned with fixed spectrum bands whereas secondary users are unlicensed users who can access spectrum of primary users without causing any harmful interference.

Cognitive Radio (CR) is one of the most promising solutions that address the spectrum under-utilization problem. A essential requirement of CR is that they must rapidly make use of spectrum holes (portions of the licensed spectrum that are not being used by PUs) without causing harmful interference to PUs. CR technology is based on software defined radio which has the ability to sense its surroundings and change its operating parameters.

II. CHARACTERISTICS OF CR

A. Cognitive Capability

The cognitive capability of a CR is a process of

observing the surroundings in order to find unused radio spectrum and change the suitable communication parameters to adapt to the ever changing radio environment.[2]

B. Reconfigurability

CR has the capability to be programmed to work on a wide range of frequencies. Re- configurability means ability to adapt the change in operating parameters. [2]

Functions of Cognitive Radio:

- **Spectrum mobility:** It is the Process by which a cognitive radio user changes its frequency of operation.
- **Spectrum sharing:** Spectrum sharing CR networks allows users to share the spectrum bands of the licensed band users.

Spectrum sensing: A CR user can allocate only an unused portion of the spectrum. Therefore, a CR user

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A novel kinematic positioning algorithm for GPS applications in urban canyons

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ABSTRACT

Evolve a new kinematic positioning algorithm to estimate the position accurately in low latitude region and assess the algorithm's performance in terms of accuracy and precision is the objective of this research paper. The Extended Kalman Filter (EKF) has been widely recognized as one of the most powerful state estimation techniques in estimating system of state variables and deteriorating measurement noise. The Extended Kalman Filter is required because the uncertainty in the Minimum Mean Square Error (MMSE) estimation can be minimized. In this article, the researcher carried out a new kinematic positioning algorithm named as Cross-Correntropy Kalman Filter (CCKF) to enhance the position accuracy and performance of the Global Positioning System (GPS) receiver. Primarily, the augmentation depends on the Cross-Correntropy criterion which is a measure of local similarity index, and a novel Fixed-Point algorithm for updating subsequent estimates. In this work, the researcher presents a thorough derivation of the method is suggested, and how to estimate the Global Positioning System receiver position in low latitudes of the Indian geographical area accurately. Furthermore, in this research paper, a comparison between estimated receiver positions, measured error and performance metrics (2-Dimensional & 3-Dimensional) together with graphical illustrations for both the algorithms (EKF & CCKF) are presented. Performance of the two algorithms (EKF and CCKF) are evaluated by considering the data of a dual frequency GPS receiver located at IGS station: IISc Bangalore (lat/lon: 13.01° N/77.56° E). The re-enactment outcomes of the proposed algorithm show that the estimated receiver position is much closer to the receiver true position. In this article, batch processing data of IGS station, IISc Bangalore, obtained from IGS network of Scrips Orbit Permanent Array Center (SOPAC) is given as input and output yields in East, North and Up directions of the receiver position.

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1. Introduction

Global Positioning System (GPS) is a three dimensional positioning system using many artificial satellites and has been used extensively in navigation systems, surveying, target tracking, etc., [1]. Specifically, it is so widely used in navigation systems that it has become an essential system nowadays. Nevertheless, there are various problems with GPS. For example, the positioning estimation cannot occur if the GPS receiver cannot receive the signals from more than three satellites [2]. Further, where barriers such as tall buildings block the radio wave, it is not possible to receive the signals from the satellite because of the straight path of the radio wave used in the GPS and the reflected wave. However, there is still a positioning error even if the GPS receiver can receive signals from more than three satellites. Nonetheless, as the above-mentioned difficulties cannot be overcome entirely with these solutions, many are aimed at improving the GPS itself. Such problems [3] should be addressed by introducing an effective positioning algorithm to reliably estimate receiver position [4] while enhancing the system itself, such as increasing the number of satellites, which is impractical. Therefore, we concentrate in this paper on the implementation of a new positioning algorithm called the Cross-Correntropy Kalman Filter (CCKF), based mainly on the

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Performance evaluation of suitable navigation algorithm using raw measurements taken from stationary GPS receiver

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ABSTRACT

The Global Positioning system prevalently known as GPS is a range based positioning scheme that gives a 3D position of an obscure object on top of the earth. Object location accuracy commonly depends on the satellite clock error, atmospheric delays, multipath, poor satellite geometry, and receiver measurement noise, etc. Mostly, none of the above parameters do have constant behavior throughout the world and should be inspected territorially to give an exact solution. The objective of this article is to estimate the receiver position accurately in low latitude regions and assess the algorithm's performance in terms of accuracy and precision. In this work, we implemented three navigational algorithms Least Squares method (LS), Kalman filter (KF), and Extended Kalman Filter (EKF) to estimate the position accurately. Furthermore, in this research paper, a comparison of the estimated receiver position, measured error and mean squared error (RMS) together with graphical illustrations for three algorithms (LS, KF & EKF) is presented. The performance of the implemented algorithms (LS, KF, and EKF) is evaluated by considering the data of a dual-frequency GPS receiver located at IGS station: IISc Bangalore (lat/lon: 13.010 N/77.56 0 E). The re-enactment outcomes show that the estimated receiver position with EKF is much closer to the receiver's true position. To evaluate the algorithms, batch processing data of IGS station, IISc Bangalore, obtained from IGS network of Scrips Orbit Permanent Array Center (SOPAC) is given as input and output yields coordinates (X, Y, Z) of the receiver position.

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1. Introduction

Global Positioning System has been utilized widely as of late as a guidance receiver and as a route application that shows where we are and how we move between locations. GPS permits the users to identify their current location, velocity and momentum 24 h a day in all atmospheric conditions, globally. A unit distinction between coordinates speaks to a steady physical separation is necessary to represent a coordinate system which is very helpful in numerical computations [1]. A group of such coordinate systems can be formed by situating a set of vertical axes bisecting at an origin that is firmly connected to the earth. These kinds of the coordinate system are termed as "Conventional-Terrestrial-System (CTS)". These coordinate systems function admirably to express the position of a user on top of the earth as they pivot with the earth and the position of a static user on the earth surface is steady. WGS 84 is the most popular Conventional-Terrestrial-System implemented by the Department of Defence. By taking advantage of GPS, the estimation of user position is based on the principle of Triangulation. If the user's distance from three or more satellites is known, then triangulation [2,3] can be used to compute the 3D position. This is shown in Fig. 1.

2. Position determination using least squares approach

Fig. 2 shows the signal transmission from satellite to receiver. To ascertain the receiver's position [1,4] we carry out formulae as shown below.

$$d = \sqrt{(x^r - x^s)^2 + (y^r - y^s)^2 + (z^r - z^s)^2} + T \quad (1)$$

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PARAMETRIC ANALYSIS OF FULL ADDER USING PASS TRANSISTOR LOGIC AND GATE DIFFUSION INPUT LOGIC

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Abstract— According to Geordan Moore's Law. It is anticipated that the number of transistors on a chip doubles every two years.However, traditional CMOS technology is facing a variety of challenges, which paved to introduce manylogic design whose major intention of this hybrid logic design is to shrink transistor count and the nodes of the design having power dissipation and poor driving capability. The main objective is to implement a low power full adder using PTL and GDI. The explored technique of realization achieves a low power high speed design for a widely used subcomponent full adder. They are also utilized in other parts of the processors. It is the basic building block of on-chip libraries. This project focuses on the performance evaluation of full adder for low power in CMOS technology using three different topologies as static or conventional CMOS, Gate Diffusion Input (GDI), Pass Transistor Logic(PTL) techniques. This project describes comparison of these three topologies of full adder based on area, delay, power consumption and transistor count.

Keywords— Gate Diffusion Input, PTL (Pass transistor logic), CMOS,FullAdder, transistor

I. INTRODUCTION

The most prerequisite of any mathematical operation is addition. The basic computations results include addition, subtraction, multiplication. For a logic design to develop an adder plays a vital role. Earlier, there were many adders like half adder, full adder. The half adder is only responsible for adding individual bits. Whereas, Full adder also adds individual bits but allows its carry to the next bit operation. Full Adder circuit is functional building block of microprocessors, digital signal processing or any ALU's. In this project leakage power is reduced by using less number of transistors with the techniques like GDI (Gate Diffusion Input), PTL (Pass Transistor Logic) and CMOS (Complementary Metal Oxide Semiconductor) techniques. In this project three designs have been designed o flow power full adder circuit different number of transistors for all the three techniques CMOS, PTL and GDI. These circuits consume less power with maximum of 73% power saving compared to 28 transistor CMOS logic with compared to PTL and GDI. The circuit exploits the advantage of GDI technique and Pass Transistor Logic, and sum is generated by tri state inverter logic in all designs. The entire simulations have been done in mentor graphics at frequency of 100 Hz. An adder is a digital circuit that performs addition of numbers and it plays an important role in today's digital world.

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Protection and Control of Modern Power Systems

ORIGINAL RESEARCH Open Access

Design of a robust PID-PSS for an uncertain power system with simplified stability conditions

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Abstract

In a deregulated power system uncertainty exists and lack of sufficient damping can lead to Low Frequency Oscillations (LFO). The problem can be addressed using robust Power System Stabilizers (PSS). In this paper, an optimal procedure to design a robust PID-PSS using interval arithmetic for the Single Machine Infinite Bus (SMIB) power system is proposed. The interval modelling captures the wide variations of operating conditions in bounds of system coefficients. In the proposed design procedure, simple and new closed loop stability conditions for an SMIB interval system are developed and are used to design an optimum PID-PSS for improving the performance of an SMIB system. The optimum PID-PSS is attained by tuning the parameters using the FMINCON tool provided in MATLAB. The robustness of the proposed PID-PSS design is validated and compared to other notable methods in the literature when the system is subjected to different uncertainties. The simulation results and performance error values show the effectiveness of the proposed robust PID-PSS controller.

Keywords: Low frequency oscillations, Uncertainty, Power system stabilizer, Robust controller, Interval systems

1 Introduction

Synchronous generators are equipped with high gain AVRs to enhance stability margins. However, although high gain AVRs improves the synchronizing torque they have a negative effect on the damping torque. This could result in low frequency oscillation. Transmission networks connected by weak lines are also susceptible to low frequency oscillation. To overcome these problems, synchronous generators are equipped with PSS to provide auxiliary signals to the excitation system [1–7]. The design of conventional PSS parameters is usually based on a fixed operating condition, and hence variation in the operating condition may cause poor performance of PSS and sometimes lead to system instability.

Much research has been carried out in PSS parameter tuning for a wide range of operating conditions that include application of modern tools like ANN and Fuzzy Logic, optimization techniques, FACTS, adaptive controllers and robust controllers etc. A power system is highly nonlinear and therefore PSS design using ANN [8, 9] assures good dynamic stability. However, it requires a good training data set covering all types of uncertainties in the system. This is difficult to realize in practice. On the other hand, extensive previous knowledge of system behavior is required for Fuzzy Logic application [10, 11]. Metaheuristic methods [12–18] like PSO, GA, Harmony Search, Fire-fly and Whale Optimization are also used for tuning PSS parameters. In [19] SVC provided with a supplementary damping controller (SDC) is developed for suppression of inter area oscillations, and a PI controller is designed using Kharitonov's theorem by stabilizing sixteen transfer functions. Various techniques have been proposed for the coordination control of PSS and FACTS devices [20–22]. The MRACs proposed in [23] require continuous measurements to determine the error between

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Analysis of active power load dispatch in economic and environmental aspects with pseudo power flow

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ABSTRACT:
In this paper a methodology with Pseudo power load flow implementation has been presented to remove extra burden on slack bus in both economic and environmental aspects. Using this methodology, the effect of nature of power plant (Thermal/Gas) has been analyzed on the generation cost, emission and power loss distribution. This work can be applied to any system as it is not dependent on type as well as the nature of system. The complete methodology has been tested on IEEE-30 bus test system with supporting numerical and graphical results.

Index Terms: *economic, emission, slack bus, power flow, economic dispatch.*

1.INTRODUCTION:

In the past few decades, the demand for electricity has been increasing drastically day-by-day. This needs to operate and control the power system effectively. The conventional load flow solution methods such as Gauss Siedal, Newton-Raphson, Decoupled, Fast decoupled, etc suffers from solving the realistic system conditions such as wide angle voltage profiles. Similarly, the total power losses are allocated to slack bus which increases the burden on slack generator. These methods work independent of the system objectives hence it is very difficult to obtain optimized cost and emission values. By considering all these aspects, in this work, a Pseudo load flow solution technique based on approximated power flow equations are formulated using truncated taylor series expansion. Similarly, loss distribution algorithm based on participation factors is developed to distribute losses to all generators to minimize burden on slack generator.

The literature highlights, power flow analysis is one of the most essential part of analysis of power system [1-6]. In conventional power flow analysis main drawbacks are one is unrealistic allocation of losses to slack bus only but practically it is not feasible in the power system operation [7]. Other one is violation of equal incremental cost criteria for slack bus. Such case arises due to slack generation which is obtained after the power flow solution. Thus researchers have concentrated in removing the burden on slack bus by distributing loss to all the remaining generators while satisfying equal incremental cost criteria in economic load dispatch problems. Economic and environmental dispatch problems are solved using different methods.

The literature [8,9] presents a methodology to distribution of generation based on the frequency deviation. This method works based on automatic generation control using frequency characteristics. In [10], another technique based on NR load flow method is presented. In this method, loss term is introduced. In [11-13], the slack burden is removed in consideration with losses in economic aspect is presented.

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Highly Dense MANET Architecture Using An Energy-Efficient Cluster-Based Routing Protocol

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Abstract— People are using more and more mobile ad-hoc networks to talk to each other. This means that more research needs to be done on better and more efficient routing protocols. How well routing protocols work depends on how quickly packets are sent. It's also important to think about how much power each routing protocol uses because of how many battery-powered devices there are in a MANET or a WSN. When people were evaluating how well a job was done, they started looking at how well the energy efficiency was used. Thus, this study looks at how well routing algorithms work in a very dense MANET architecture. The main goal of this work is to come up with a new Cluster-based algorithm that doesn't use a lot of energy and see how it compares to other systems.
Keywords— MANET, Cluster Head, OLSR, FSR, OOMRP.

I. Introduction

The goal in the Mobile Ad-Hoc Networks is to come up with an efficient routing algorithm [1] [2]. The efficiency of MANET isn't just about how well the packets get delivered, but also how well the algorithm knows how much power it needs. A lot of research has been done in the field of MANET routing algorithms [4]. The existing space of routing algorithms has been broken down into three groups [5]. The classifications are based on how the algorithms go about finding the routes. They are proactive, reactive, and hierarchical based on this. They use the routing table that each node in the network has, and they make their decisions about where to go based on the table. In order to keep the routing information table up to date as the network topologies or routing needs change, information is sent to all the nodes. In the next parts of this research, this'll look into some of the existing algorithms in more detail.

Randomness in the network makes it hard to figure out how to make routing algorithms work as well as possible. When you try to set up a new routing algorithm, the load balancing of the network routing algorithm adds to the work.

The communication benefits of MANET are looked at and tried out in a lot of research projects. The results of these new studies have different topologies. These proposed topologies, on the other hand, make the network more difficult to understand and use a new type of routing algorithm.

That's why this work helps improve the energy efficiency of the algorithm for a dense MANET architecture, but it doesn't negate the benefits of higher congestion control and shorter routing algorithms.

II. Recent Research Outcomes

NDN is one of the most important examples of Information-Centric Networking. When you add NDN to a network like MANET, you need to look into new ways of routing. The LSAs flooding is a

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CLOUD BASED PREDICTION FOR EPILIPTIC SEIZURE USING MACHINE LEARNING

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Abstract-
We can bring in ease and comfort in the life of a patient suffering from epileptic seizure by developing a potential and efficient Brain-Computer Interface (BCI), but this is a challenging task due to the fluctuating nature of ElectroEncephaloGram (EEG) signals that vary with a great deviation among different patients, due to which identification of manually extracted features for prediction becomes impractical, further the use of implanted electrodes for brain signal recordings generate huge amount of data that brings in the need for the use of big data framework and cloud based approach for efficient storage and real time processing. Due to this a cloud oriented Brain-Computer Interface (BCI) system for analysis of EEG data is proposed in this paper which demonstrates a seizure prediction system on real-time data analysis of EEG. The proposed system also uses a machine learning methods for seizure prediction with the capability of pervasive data collection and analysis that could lead to high sensitivity and specificity in prediction which has been a challenging task for years. In order to evaluate the performance of the proposed system it is compared with existing standard epilepsy dataset.

I. INTRODUCTION

Epilepsy is a problem related to neurological syndrome where a patient is identified with frequent seizures that could often become life threatning. It is assessed that over 1% of the total populace is influenced by this sickness [1]. There exist both surgical as well as medical methods of treatment for this disease. However around 30% of the patient's ensuing seizures can't be controlled with these strategies for medicines. Hence early prediction of seizures would help in providing better treatment. To accomplish this Electroencephalogram (EEG) signals are recorded at standard stretches to screen the electrical movement inside the cerebrum by setting EEG cathodes on the scalp of patients which is known as scalp EEG or, by implantation of anodes inside the mind tissues called intracranial EEG (iEEG) signals[10,11].These methods help in observing unforeseen change of electrical signals inside the brain.

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Efficient and Short-Range Forecasting Model for COVID-19 Time Series Parameters - Daily Confirmed Cases, Deaths, Recoveries

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Abstract

Coronavirus cases maintain to sore up to 16.2 Million worldwide. Human beings globally had been pronounced to be intensified by the virus as almost 6.5 Lakh human beings have misplaced their lives. Researchers throughout the arena are making attempts to forecast the movement of this pandemic, using Artificial Intelligence (AI). In this paper, we are using Prophet Model to forecast the daily number of new cases, new deaths, and new recoveries that would be brought about by COVID-19 in India. A dataset of 179 (30 January 2020 to 24 July 2020) days is used for training the proposed model, and we forecasted values for the next 15 days, i.e. till 08 August 2020. The forecasted data obtained by the proposed method is accurate within a certain range and will be very beneficial in promoting the understanding of the spreading pattern of COVID-19 across the nation.

Keywords

COVID-19, India, Prophet, Machine Learning, Forecasting

I. Introduction

COVID-19 is highly infectious and it shows the impact on the respiratory system of the body, and it is caused due to a virus named coronavirus-2. The primary medium is droplets from our mouths, which use air to travel. Fever, tiredness, and dry cough are the most common symptoms identified in a COVID-19 infected person. Alongside these side effects, a patient additionally encounters breathing issues, general aches, and sore throat. Not many individuals have encountered diarrhea, queasiness, or a runny nose. People having high fever, consistent cough, or inconvenience in breathing should search for clinical help immediately. Human to human transmission is exponentially expanding the tallies of the contaminated individuals. The incubation period of COVID-19 is 1-14 days or considerably more [1]. At the point when the COVID-19 began to spread at a remarkable rate; preventive measures were worked out. These measures incorporated a total lockdown of the vigorously contaminated zones, prohibition on global travels, suspending schools, and other unimportant everyday exercises. The primary points of these measures were to confine relational contact, thinking about the infectious idea of the disease. As the incubation time of the infection is longer than different infections it is hard to break down the ideal time required watching a time limit. On the off chance that the time limit is lifted too early, the circumstance can get more dangerous. The individuals who get attacked by COVID-19 fall under three classifications. First in the class are the older, who are exceptionally susceptible to the infection. Measurements show that due to the feeble insusceptible framework the older surrender to the infection without any problem. The subsequent class is that of the youngsters. As the invulnerable frameworks of little youngsters are as yet being worked on, the kids are at higher hazard. The third order is that of the people who already have

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COVID-19 Lockdown Devastated Livelihood - Safe Back to Normality with Smart Jacket Prototype

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Abstract

We see a worrying rise of COVID-19 cases globally, every day. Many countries imposed nationwide lockdown, ordering their people to stay home with nearly all services suspended. On other hand, due to this strict lockdown, COVID-19 poses severe economic challenges in securing the necessities of life, for the majority of the population. Many countries are now facing the threat of high inflation and increasing unemployment. Not only employees are suffering, but it is also very important to note that, more than 150 crore students, globally, are seriously affected by the sudden shutdown of educational institutions, UNESCO said. Undoubtedly Lockdown is one of the best weapons to stand against this pandemic by it costs an economic downturn. Presenting various thought-provoking facts that explain the dire need for human beings to get out of the home for survival, in this work, we proposed a smart wearable jacket (prototype), which is a technological combination of hardware and software that can be used to sense and respond, ensuring a safe physical distancing to restart the normal life, by safely being a part of unavoidable crowded situations like, during the utilization of public transportation facilities while commuting to workplace, educational institutes and various essential needs.

Keywords - COVID-19, Livelihood, Financial Disaster, Physical Distancing, Raspberry-Pi, Smart Jacket

1. Introduction

A total of 8,993,659 confirmed cases of COVID-19, including 469,587 deaths, reported to WHO globally, as of 23 June 2020 (as of 3:58 pm CEST); Americas - 4,437,946, Europe - 2,562,642, Eastern Mediterranean - 933,052, South-East Asia - 620,115, Africa - 232,215, Western Pacific - 206,948. This alarming situation changed the work-life of most of us, creating the impact being felt at multiple levels resulting in financial slowdown, personally and globally. Every part of the world is currently in some degree of lockdown. How far our basic livelihood survives lockdown? For this question, undoubtedly we can say that livelihood cannot survive the lockdown anymore. The situation arises, where we have to unlock ourselves and continue our normal life, more safely. Along with various measures we have already cooperated into our daily life, Social Distancing is the best tool to slow down the virus spread locally and globally.

1.1 Understanding the Global Problem with Case Study: INDIA

Elaborating most recent United Nations information as of Tuesday, June 23, 2020, the current population of India is 1,379,743,435, sharing 17.7% of the total world population with 28.4 years median age [1]. Figure 1 indicates the workforce distribution of this country; the graph is drawn based on the data from trusted sources [2].

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Case Based Reasoning for Tuberculosis Diagnosis

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Abstract

Tuberculosis (TB) is a chronic infectious disease caused by Mycobacterium tuberculosis. TB could cause serious health problems to the community if it remains undiagnosed or misdiagnosed and untreated. When regular TB is inadequately diagnosed and treated, which causes bacteria to develop resistance to the drugs used called MDR-TB and XDR-TB. For this reason, measures are needed to control the transmission of the disease. The best method to control TB transmission is to establish a diagnosis as early as possible and particularly to ensure complete cure. Early diagnosis of TB is the most effective tool available to reduce transmission. But in middle and low income countries like Ethiopia face a severe lack of medical doctors and medical specialists for early diagnosis of PTB, lymph node and DR-TB. KBS have become increasingly popular in a wide variety of medical applications. A number of problem solving methodologies are available for the development of knowledge based system. Case based reasoning (CBR) is one of the important approaches for the development of knowledge based systems (KBS), which emphasizes the role of prior experience during future problem solving. This study makes an attempt to design and develop prototype knowledge based system using CBR approach that can support domain experts' decision in order to facilitate the diagnosis and treatment of TB patients. In order to achieve the objective of this study, knowledge is acquired using both structured and unstructured interview with domain experts followed by relevant document analysis. The performance of the prototype system is measured using statistical analysis and end user acceptance testing. Consequently, the prototype system performance measures a recall of 74%, precision of 83%, and 86% domain experts accepted the prototype system for diagnosis of TB. Thus, the prototype system achieves the objectives of the research and has a good performance.

Keywords
Knowledge Based System, Case Based Reasoning, Tuberculosis.

I. Introduction

Tuberculosis (TB) is still the most known infectious disease in the world, caused by the airborne bacteria Mycobacterium tuberculosis that most often affect the lungs [1]. Tuberculosis which usually occurs in the lung is called pulmonary TB (PTB) [2]. TB can also occur in other organs other than lung, which is called extrapulmonary TB [2]. Tuberculosis is a major cause of morbidity and mortality in Ethiopia. Ethiopia is among the 22 High TB

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Simple Forecasting Model for COVID-19 Cases in India - Multilevel Model Evaluation with R^2, MSE, and MAE

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Abstract

All-inclusive, more than 20 million individuals have been infected with the COVID-19, with the most number of cases from the United States, trailed by Brazil and India. In perspective on this developing extent of the number of cases, forecasting models are exceptionally useful to be prepared to confront the pandemic circumstance. In this work, we have used an efficient time series based Machine Learning (ML) algorithm to forecast the COVID-19 cases in India. We have trained the system with data from 3 March 2020 to 7 August 2020 and we have forecasted the values from 8 August 2020 to 9 September 2020. We have seen that the total no. of cases will get doubled, i.e. reaches 40 Lakhs by the end of the forecasted period. Along with this forecast we have done the multi-level validation of our work using metrics, r-squared error (R^2), mean squared error (MSE), mean absolute error (MAE).

Keywords

COVID-19, Machine Learning (ML), Time Series, Forecasting, Model Evaluation

1. Introduction

Coronavirus disease (COVID-19) is an irresistible sickness brought about by a newfound coronavirus. A great many people who fall sick with COVID-19 will encounter symptoms ranging from gentle to moderate and may come out of this infection without special clinical attention. [1]. With a record single-day increment of 66,999 cases, India's COVID-19 count mounted to 23,96,637 today, i.e. August 13, 2020, while the number of patients who have recouped from the illness flooded to 16,95,982, pushing the recuperation rate to 70.77 percent in the nation, as per the Union health ministry [2]. The loss of life due to COVID-19 moved to 47,033 with 942 individuals surrendering to the infection over the most recent 24 hours, as per health ministry information refreshed at 13 August 8 am [3,4]. India crossed the 20-lakh mark as far as COVID-19 cases on August 7 [4].

WHO has recognized that the hard work and caring assistance gave by India's health laborers, including medical caretakers, have contributed a lot to the nation's noteworthy recovery rate [5]. In a progression of profiles, medical attendants depicted their difficulties in protecting their charges and themselves on a COVID-19 repatriation flight, in clinics and ICUs, giving antenatal consideration, older consideration and psychosocial support with regards to COVID-19, and, for one medical attendant, of being isolated for about fourteen days in the wake of thinking about patients who tried positive for the infection. Medical caretakers are being prepared to manage COVID-19 patients, guarantee that conventions are followed, use PPE appropriately, and practice hand cleanliness, in addition to other things. On other hand Trained Nurses Association of India, the biggest nursing

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Blockchain Based Healthcare System DApp

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Abstract:

In recent years, the emerging block chain technology has introduced various opportunities and challenges in different areas like finance, agriculture and healthcare. One of the applications where blockchain promises authentication, transparency and security is health care system. The "Blockchain Based HealthCare System" mainly focuses on development of the distributed ledger based healthcare application to keep important medical data safe and secure. The block chain can keep the patients data as incorruptible, decentralized and transparent. The block chain based electronic medical data is shared between stakeholders such as patients, doctors and researchers which can prompt more effective medical treatment collaboratively. The sensitive and private data can only be accessed by authorized users. Besides accessing the data, doctors can update and propagate the medical data to other doctors or researchers (sharing peers) so that all peers can keep identical data after updating.

Keywords:*Blockchain,Proof of Work,Smart contracts,Dapps, Injected Web3*

1 Introduction:

In Healthcare sector, patients leave their medical history scattered across different doctors as different diseases take them to different doctors in their lifetime. In the present scenario, health systems are not centralized and inefficient to share and distribute the desired patient's data among hospitals with patients consent to provide proper healthcare to the patient [1]. In the present scenario, healthcare systems are centralized and are not secure as they are prone to attacks by intruders. Healthcare data are the most valuable asset of any healthcare system. For example, a patient could visit different doctors in different medical networks for different symptoms or diseases, and it would be beneficial for each doctor to see the patient's entire medical history. On the other hand patients complain that their time is wasted due to the poor organization of Health care system [2]. Beyond the time delay, secure and consistent medical record maintenance is a quite challenging job to review the patient records by either patient, doctor or researcher. Patient health records contain private information which needs to be frequently distributed and shared among peers such as Healthcare providers, pharmacies, researchers and patient families with patient's permission. This poses a major challenge in keeping patient's medical history up-to-date. Sharing the stored data between multiple peers through email or any other method with patient's permission will be a time consuming and complicated process and also poses security threat. Interoperability challenges between different health providers and hospital systems pose additional barriers to effective data sharing.

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ASSESSMENT OF DIVERSE TECHNIQUES FOR CYBER BULLYING DETECTION ON TWITTER USING SENTIMENT ANALYSIS

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Real time human action recognition using triggered frame extraction and a typical CNN heuristic

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ABSTRACT

Recognition of human actions with optimum accuracy and with less computational overhead has always been a challenging task. A suitable framework towards this problem can provide a robust solution for numerous domains of expertise that demands automatic surveillance. In this paper, a two-fold framework has been proposed for the frame extraction and recognition of human action therein from a video input. A Fuzzy inferencing technique has been suitably used for the purpose of video frame extraction in a smarter way. Frames are extracted from a video only when an event of action is initiated and about to commit. By this the additional computational load of continuous frame extraction is eased efficiently. Subsequent to this process, we also introduce a typical convolutional neural network (CNN) that is used for the purpose of human action recognition. This typical CNN has been designed so as to suit the nature of input that is supplied to it. Experimental evaluation has been performed on the standard HMDB51 database. A total of eight distinct and prominent actions which are mostly common in daily routine of human life are considered for the purpose. Performance comparison of the proposed scheme with other state of the art schemes is also performed with three different measures. Evaluation results for the proposed scheme indicates overall rate of accuracies of 96.5% and 98% for frame extraction and action recognition respectively. The proposed scheme outperformed the others in most of the measuring aspects.

1. Introduction

Human action recognition in video is an interesting and challenging problem so far. An ideal solution for this can be helpful in numerous scenario where the use of intelligent camera is inevitable. These scenarios may include strategic war situation, medical surveillance, toddler surveillance in absentia of guides, premises of financial institutions, government and private organizations, semi-automatic old-aged and parenting care, and many more. In the modern era of computing equipped with artificial intelligence mechanisms, researchers are already catering solutions to this problems with continuous efforts.

There are many a processing involved for action recognition in a video stream. Among these, the most important phase is the suitable frame extraction which is highly desirable as wrong frames may lead to misclassification of the actions in later phases. The second most important task is the recognition of actions. This generally involves the implementation of feature extraction techniques with a proper classifier. However, the modern algorithms are combining both of these processes into one module due to the discovery of deep learning tools.

Deep learning techniques are playing vital role in the domain of action recognition in video. Among these techniques, the CNN (convolutional neural networks) is most widely used for action recognition. Starting from the classical CNN, various modified and task specific customized versions of it have been presented and utilized successfully. The CNN tools are efficient and their success rate is very high, although not the peak. As of now, still there has been a demand for a real time and robust framework that can provide an complete end-to-end solution starting from a smart approach of frame extraction up to a robust classification with a specific and dedicated deep learning heuristic. The proposed work attempts to realize this framework with a two-fold approach.

The rest of this paper is organized as follows. Suitable literature review has been presented in Section 2. Related works are discussed therein that acts as a motivation for the proposed con-

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Disruptive Technologies for Smart Healthcare Systems using Artificial Intelligence for Hospital Management System

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Abstract

An effective way of communication between machines and humans got advanced using Artificial Intelligence. Technologies using Artificial Intelligence brought tremendous growth in automatic processing instead of manual processing in healthcare. Necessity and demand for healthcare system from past to current decades took many transformations with the design and implementation of autonomous devices. Due to high computational power, Artificial Intelligence has reached the top level for the best technologies. This paper analyzes the top technologies using Artificial Intelligence for a range of firmness in the area of healthcare in the hospital management system. Artificial Intelligence applied in different areas like decision making, Data Management of patient records, disease diagnosis. Artificial Intelligence emerging with innovative disruptive technologies increases the quick status report of patient health and effective treatment of the disease.

Keywords: *Healthcare, Electronic Health records, Disruptive technologies, Clinical Systems, Artificial Intelligence.*

I INTRODUCTION

Healthcare in India is facing 15% of disease burden globally with highly experienced doctors and nursing staff. To fill the gap disruptive technologies have taken place by innovating e-health, m-Health, and Information and communication technologies. New Delhi is India's top tourism place for Patients because they have equipped medical technologies. People from different places who can afford highly travel to New Delhi to get cured. For all critical illness, disruptive technology uses robotics for surgeries like open-surgeries, X-rays through CT-Scanner technologies.

AI using smart algorithms for the prediction of health issues has now in a stage to replace the place of doctors. The top enumerating tools of AI in healthcare evolved into developing main streams of natural language processing. AI algorithms have spotted different regions are:

- Algorithm identifying DNA mutations in tumors by using genetic changes in cancerous tissues.
- Deep learning algorithms to classify heart problems through echocardiograms images.
- Algorithms for predicting Heart Strokes
- Detections of skin cancer diagnoses using Artificial Intelligence
- Detection of cancer, metastatic breast cancer risks
- Prediction of suicide risks during psychiatry sessions for mental illness using AI systems.

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A Comparative Study on Student Academic Performance Prediction Using ID3 and C4.5 Classification Algorithms

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Abstract: The ability to predict a student's performance on a given concept is an important tool for the education institutions, as it allows them to understand the ability of students and derive important methods to enhance their knowledge levels. It is the responsibility of educational institutions to have an approximate prior knowledge of their students to predict their performance in future academics and to train them in various activities. It is used to identify bright students and also provides them an opportunity to pay attention to and improve the slow learners. For predicting the student academic performance a data mining technique under classification is used. I have analyzed the data set containing information about students, such as full name, Roll number, scores in board examinations of classes X and XII, Rank in Eamcet examinations, branch and admission type. ID3 and C4.5 classification algorithms are applied to predict the performance of newly admitted students in their future examinations. In this paper, the performance of ID3 and C4.5 algorithms are compared in terms of parameters like accuracy, error rate and the execution time and the experimental Results shown that C4.5 was found to be best in terms of execution time.

Keywords: *ID3, Classification, Prediction.*

I. INTRODUCTION

Data mining has been attracting a significant amount of research, industry. Data mining (sometimes called data or knowledge discovery) is the process of analyzing data from different perspectives and summarizing it into useful information that can be used to increase revenue, cut costs, or both. Data mining software is one of a number of analytical tools for analyzing data. It allows users to analyze data from many different dimensions or angles, categorize it, and summarize the relationships identified.

Classification is a data mining technique that maps data into predefined groups or classes. It is a supervised learning method which requires labelled training data to generate rules for classifying test data into predetermined groups or classes. It is a two phase process. The first phase is the learning phase, where the training data is analysed and classification rules are generated. The next phase is the classification phase, where test data is classified into classes according to the generated rules. Since classification algorithms require the classes to be defined based on data attribute values, we had created an attribute "class" for every student, which can have a value of either "Pass" or "Fail".

A Decision Tree is a classification scheme which generates a tree and a set of rules, representing the model of different classes, from a given dataset. It is a flowchart like tree structure, where each internal node denotes a test on an attribute, each branch represents an outcome of the test, and leaf nodes represent the classes or class distributions. The topmost node in a tree is the root node. We can easily derive the rules corresponding to the tree by traversing each leaf of the tree starting from the node. It may be noted that many different leaves of the tree may refer to the same class labels, but each leaf corresponds to a different rule.

Over the past decade there has been a rapid growth in higher education system. A lot of new institutions have come up both from public and private sector offering variety of courses for under graduating and post graduating students. The rates of enrollments for higher education has also increased but not as much as the number of higher institutions are increasing. It is a concern for today's education system and this gap has to be identified and properly addressed to the learning community. Hence it has become important to understand the requirement of students and their academic progression. Educational Data Mining helps in a big way to answer the issues of predictions and profiling of not only students but other stake holders of education sectors.

Prediction of student academic performance using ID3 and C4.5 Decision Tree Algorithm is a software application which predicts the student's performance based on their past performance which includes their marks scored in the board
examinations of classes X and XII, Eamcet rank, admission type and branch classifies the student's performance as pass or fail in his/her first semester examinations as precisely as possible and also brings out the accuracy, error rate and execution time taken by the

Adaptive Frame Extraction and Action Recognition Using Deep Learning

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Abstract

Human Activity Recognition aims to recognize human action in a video, separated as a series of frames. Human activities have an inherent hierarchical structure that indicates the different levels of it, which can be considered as a three-level categorization. First, these are action primitives which constitute more complex human activities. After the action primitive level, the action/activity comes as the second level. Finally, the human activities that involve more than two persons and objects. This paper mainly discusses 51 different types of primitive actions. The videos have been analyzed to produce unique dynamic image using key frame extraction method. The obtained frames are dynamic images, utilized to build a Convolutional Neural Network. CNN is a type of Artificial Neural Network used in image recognition and processing which is specifically designed to process pixel data by using max pooling and classifiers. The pixels in the dynamic image focus on identity and motion of actors. As every sector needs automation, this network trains itself to recognize human action. The video provided to test has been split into dynamic images and classified against the model that has been built using training data.

Keywords: *Dynamic images, Deep learning, Convolutional Neural Networks, Key Frame extraction, Max pooling, Activation Function, Fully connected layers, OpenCV, Stride.*

1. Introduction

To recognize activity from a video, the video should be represented as a series of still images. In order to categorize an action in an efficient and accurate manner, features that provide meaningful information must be gathered from images and encoded for classification. Ideally, the representation model should be robust to variation in appearance of the actor(s), background, viewpoint while preserving sufficient information to accurately classify the action. A total of 51

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Fused Kalman Filter for a Constant Turn Radar

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Abstract - **Estimating the target path with Radar and Sonar, when it is in a motion is a nonlinear state estimation problem. The target parameters are measured with sensors. This sensor gives us the polar coordinates values like range, range rate, and about two angles. To avoid nonlinear filters, the polar coordinate values are converted to Cartesian coordinates gives better performance in estimating the target path. This conversion of polar to Cartesian is referred as converted measurement Kalman filtering (CMKF). Here two contributions are taken for conversion of parameters. One is converted Doppler measurement Kalman filter (CDMKF) for exploiting range rate measurements and other is converted position measurement Kalman filter (CPMKF). Taking these two methods parallel tends to new state estimator called Fused Kalman filter (FKF). The resulting states of CDMKF and CPMKF are combined by static minimum mean squared error estimator results final state estimates. This work refers to conversion of dynamic nonlinear estimation problem to dynamic linear estimation followed by static nonlinear fusion. In this work, we derive the discrete temporal evolution equation of the pseudo state vector, defined by the converted Doppler (the productive of target true range and range rate) and its first derivative, for the constant turn (CT) motion. The resulted linear state equation allows using of linear Kalman filter to extract information from the pseudo state of a target moves with constant speed and constant turn rate. The method is referred to as FKF. This proposed CT model is demonstrated by assessing the performance of the CDMKF and FKF. Comparative results show the superior performance of the proposed method especially in challenging scenario with large position measurement errors.**

I. Introduction

The radar gives us the polar values like range, range rate, and angles of a particular target. These parameters are taken during its motion. Estimating with these measurements is somewhat complicated. So these parameters are converted as polar to Cartesian. During this conversion, we get some errors. Then the Cartesian components errors in the converted measurements are correlated with each other are explored in [4, 5, 9, 11, 13, and 14]. In this approach we have to consider the measurements of the target state estimation in a nonlinear fashion, which results the mixed coordinate filter [7], [8].

These measured terms results are considered to compare with the first two moment approximations which are presented here. The new converted measurement Kalman filter (CMKF) [14], is having estimation errors, which are compatible with the calculated covariance of the measured terms. The EKF is different from this method, because it is consistent only for small errors. So that the CMKF is having the correct covariance, it processes all the target measurements with a gain, which is nearly optimal and gives smaller errors compared with the EKF [3]. In the moderately accurate sensors, the EKF performs very poorly in tracking the target at long range for RMS azimuth error of 1.5degrees or more [10]. But the CMKF [12] is consistent for 10° RMS azimuth error also.

In this paper to rectify these shortcomings, a new method is proposed. In the proposed method, the use of the nonlinear recursive filtering methods is avoided during the processing of Doppler measurements [6]. In the first one, a pseudo state vector is considered, which is the existing converted Doppler measurements of the target are linear functions and then they are constructed. These pseudo state vectors consist of the converted Doppler measurements and its derivatives [7], [8]. The pseudo state equations are derived from the measurements and proven to be linear in two commonly used target motion models. The other one is done by using extended Kalman filter (EKF) presented in [3, 6, 8, 10, 12, and 13]. One model is the constant velocity (CV) and the other one is constant acceleration (CA) models. Now adding the constant turn rate (CT) method to these converted Doppler measurement Kalman filter (CDMKF), is proposed to estimate the pseudo states [7]. This is also used for filter the noise in the converted Doppler measurements kalman filter. Finally, the CDMKF is combined with that constant rate method [14, 13] to construct a new filter which gives a new state estimator called as Fused Kalman Filter (FKF).

II. Problem Description

In Cartesian coordinates target's parameters are considered by depending on the conversion measurements of the target from polar coordinates to Cartesian. It is modeled as:

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Integrated Unscented Kalman filter for underwater passive target tracking with towed array measurements

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ABSTRACT

Under water moving target is usually tracked using the Traditional non-linear estimators such as Extended Kalman filter (EKF) and Unscented Kalman filter (UKF) with the help of noisy measurements given by a SONAR operating in passive mode. Here in this paper an Integration Technique based approach which works on the principle "Collective Opinion is better than individual" is proposed to improve the performance of the existing algorithms. In this novel method multiple UKFs accept measurements from towed array and the estimates of these different UKFs are integrated using least squares estimator, and hence the algorithm is named as Integrated Unscented Kalman filter (IUKF). Monte Carlo simulation in MATLAB R2009a is carried out to compare the performance of the proposed IUKF with the existing traditional nonlinear estimators EKF and UKF for two different scenarios to show the superiority of the proposed method.

1. Introduction

Tracking is a sophisticated process of estimating the state (i.e. position and velocity) of a moving target as close to the true state as possible using the available noisy measurements. This is essential in the war environment for two main reasons, One to escape ourself from being attached, and second to demolish the enemy. The noise corrupted measurements can be received from SONAR in active or passive mode. Active mode involves a process of intentional release of signal, Reception of echo and getting an idea of Range and Azimuth of the target while passive mode SONAR is restricted only to listen and hence it gives only Azimuth measurements of the target. The drawback associated with active SONAR is, the concept of releasing the signal at enemy can cause us to be detected prior to the enemy being detected. This setback is not associated with passive SONAR due to the absence of signal transmission. The advantage of using active measurements over passive measurements is that, the tracking with former can be done easily due to the availability of range measurement along with the bearing measurement which is not the case with the later. The pros and cons are associated with both the measurements. So an intensive research is going on in the field of Target Tracking using both types of measurements with an edge of passive over active tracking.

The Traditional Kalman Filter (KF) Eqs. (5.17), (5.18) and (5.19) of [1] can be used to track an underwater Moving Target with active SONAR measurements where the state and measurement equations are linear with the simple assumption that the measurement Gaussian noise mean is zero even after conversion of measurements from polar to Cartesian systems as shown in [7]. The improved performance is achieved by applying (KF) after proper calculation of actual mean and covariance of the measurement noise in Cartesian system and subtracting this mean from the measurements to make the mean of measurement noise zero. The resulted (KF) with debiasing is applied for active tracking in [7].

Tracking a target with passive measurements cannot be done by traditional (KF) due to the incapability of (KF) to deal with nonlinear measurement equation associated with passive measurements. A nonlinear version of (KF) named as extended kalman filter (EKF) does this job by approximating the non-linear measurement equation to a linear one with the help of Taylor Series Expansion. Application of (EKF) in modified polar coordinates to BOT is available in [5]. The performance of Bearings-only Tracking (BOT) using passive measurements with EKF is brought to a new-level by introducing a modified gain function in a covariance matrix of state vector which prevents the occasional divergence and estimator instability. The resulted estimator is called as Modified Gain Bearings-Only extended Kalman filter (MGBEKF) [6].

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A novel stochastic estimator using pre-processing technique for long range target tracking in heavy noise environment

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ABSTRACT

A novel stochastic algorithm using pre-processing technique is proposed in this paper to deal with the problem of underwater target tracking using passive Sonar. Pre-processing is a concept of reducing the variance of noise present in the measurements given by sensors. This key step is performed ahead of conventional estimation algorithms. Pre-processed measurements are obtained by taking weighted average of present measurements and projected previous measurements. The method is expected to bring down the variance of noise to a great deal based on the fact that the sensor errors are unbiased by nature. The most attractive feature of this algorithm is the capability to track long range targets in heavy noise environments. The algorithm is tested by running Monte Carlo simulations in Matlab R2009a environment. There, it is shown that the estimation error and the time of convergence of the pre-processing technique based algorithms like pre-processed Unscented Kalman Filter (PP-UKF) and Integrated Unscented Kalman filter (PP-IUKF) are much less compared to their non-pre-processing counterparts namely UKF and IUKF, thus indicating the importance of the proposed novel method.

1. Introduction

Tracking is the most essential signal processing task performed at the time of wars. It is the concept of estimating the position of a moving target using noise corrupted sensor measurements. This important task is performed with the help of a Radar when dealing with the targets which are on or above the ground and Sonar while dealing with underwater targets. Sonar primarily operates in two different modes namely active and passive. Active mode Sonar operation normally involves active transmission of signal and echo reception to find the position of a moving target while Passive mode operation is concerned with the reception of the noise generated by the propeller of the enemy's vehicle to get an idea of the targets location. The target tracking is possible with a single moving sensor as shown by Aidala [9] or by a set of stationary sensors using a concept of triangulation. This paper deals with tracking underwater targets using Towed array measurements given by a passive Sonar.

Modern era of the underwater tracking started by using the celebrated work of Kalman [1,11]. The problem with this filter when dealing with the active tracking is, the generation of undesired bias during the conversion of measurements from the available polar to the Cartesian form. This bias is properly computed and eliminated by Lerro and Bar-Shalom [7] to get considerable improvement in the results. Suchomski [16] have extended the work to make Kalman filter useful for tracking in three dimensional case. Lerro et al. [7] tried to apply Kalman filter in a different way by keeping the state and measurement equations in different coordinate systems. By doing so the measurement equation is turned to a non-linear one which creates problem to apply (KF) directly. The problem is tackled by converting the non-linear measurement equation to a linear one by Taylor series expansion. This way of implementing Kalman filter is called the Extended Kalman filter (EKF). The same procedure is followed for passive target tracking by Aidala et al. [5] and named the algorithm as Cartesian coordinate EKF. The stability problem developed by the ill conditioning of the covariance matrix is also solved in the same paper by the proper choice of the elements of the state vector. This algorithm is named as the modified polar coordinate EKF [5]. Song and Speyer [6] has introduced a time varying gain function in the EKF to get improved results in terms of stability. This filter is called Modified gain Bearings-only EKF (MGBEKF). A much simpler version of MGBEKF is derived by Galkowski and Islam [10]. Nardone et al. have applied two batch processing algorithms namely Pseudo Linear estimator (PLE) and Maximum Likelihood Estimator (MLE) to solve the problem of Bearings-only tracking

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Structural and Magnetic Properties of Cu^{2+} Substituted Co–Zn Ferrite Nanoparticles, Synthesized by Sol–Gel Combustion Method

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Abstract In this work, the effect of Cu content on structural and magnetic properties of Cobalt–Zinc Ferrite nanoparticles synthesized by sol–gel combustion method have been investigated. All the samples exhibit cubic spinel structure and the lattice constant decreases linearly with increasing Cu-content. Average crystallite sizes calculated from Debye–Scherrer formula are in the range of 51–100 nm. The broadening of X-ray diffraction peaks decrease with increasing Cu content 'x' suggest that crystallite size increases with increasing 'x'. Cation distribution estimated form X-ray line intensity calculations show that Cu ions simultaneously occupy tetrahedral (A) and octahedral (B) sites with different ratio and Zn and Co ions occupies A and B sites respectively. With increasing Cu content a fraction of Co ions migrate to A site when $x > 0.2$. Grain sizes estimated from SEM are found to be increase with increasing Cu content. Particle size calculated using TEM for the undoped Co–Zn ferrites is about 55 nm. Saturation magnetization (Ms), Coercivity (Hc) and remanent magnetization (Mr) that varies significantly with Cu-Content. Saturation magnetization decreases from 90.7 emu/g ($x = 0.0$) to 51 emu/g ($x = 0.4$). The proposed cation distribution supports the variation in saturation magnetization and Coercivity with increasing Cu content.

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Keywords Spinel ferrite · Co–Zn ferrite · Sol–gel combustion · XRD · TEM

1 Introduction

Spinel ferrites are the promising ceramic magnetic materials, which have wide range of applications in various fields like electric, magnetic, electronics, microwave devices, catalysts, transformers cores, power conversions, high frequency applications in telecommunications, magnetically control drug delivery system, multilayer inductor applications. Recently tremendous importance has been given to nanoferrite particles due to their potential for elucidating fundamental nanomagnetism and technological applications in diverse fields. Moreover, they exhibit novel physical properties due to their finite size, surface structure and interparticle interactions- including magnetic dipole–dipole or exchange coupling between the surface atoms of the adjacent particles. The properties of nanoferrite can be easily adjustable, controllable to a great extent by choosing proper preparation method and suitable dopant. The general chemical formula for cubic spinel ferrites is MFe_2O_4, where M is a divalent transition metal ion and Fe is a trivalent iron ion. The spinel lattice is composed of a closed packed arrangement of 32 oxygen ions leaving two kinds of interstitial sites: tetrahedral (A) and octahedral (B) site. The physical properties of these ferrites are very sensitive to the chemical composition, method of preparation, particle size, and micro structure and in particular density of cations in A and B sites [1]. Among the spinel ferrites, Cobalt and Zinc ferrites have attracted considerable interest because of their wide range of applications [2–5]. In case of bulk Co ferrite, Co^{2+} ions occupy mainly B-sites and Fe^{3+} ions are distributed equally in to both A and B sites, whereas Zn^{2+}

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EXISTENCE AND MULTIPLE POSITIVE SOLUTIONS TO SYSTEMS OF DIFFERENTIAL EQUATIONS OF FRACTIONAL ORDER

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ABSTRACT. We show under some conditions the existence and multiplicity of positive solutions for a system of differential equations of fractional order, subject to two-point boundary conditions by applying the fixed point index theory in cones.

Keywords: systems of differential equations of fractional order, the fixed point index theory, positive solutions, Greens' function, cone.

AMS Subject Classification: 26A33, 34B15, 34B18.

1. INTRODUCTION

Fractional calculus is a very old concept dating back to 17th century; it involves fractional integration and fractional differentiation. At the first stage, fractional calculus theory is mainly focused on pure mathematical fields. In the last few decades, fractional differential equations and fractional integration equations have found many applications in various fields, such as science and engineering, physics, chemistry, biology, economics, and signal and image processing. In recent years, fractional differential equations have attracted increasing interests for their extensive applications, which leads to intensive development of the theory of fractional calculus.

Recently, much interest has been created in establishing positive solutions and multiple positive solutions for two-point and multi-point boundary value problems (BVPs) associated with ordinary and fractional order differential equations by using different methods such as fixed point theorems in cones, the Leray-Schauder continuation theorem and its nonlinear alternatives and the coincidence degree theory. To mention the related papers along these lines, we refer to Agarwal and O'regan [2], Henderson and Luca [12, 14, 15], Henderson and Ntouyas [16], Henderson, Ntouyas and Purnaras [17], Prasasd, Kameswararao and Nageswararao [18], Zhou and Xu [27] for ordinary differential equations. Agarwal, Zhou snd He [3], Ahmad and Ntouyas [4], Bai [5], Bai and Lu [6], Henderson and Luca [13], Khan, Rehman and Henderson [18], Kauffman and Mboumi [20], Liang and Zhang [22] for fcational order differential equations.

In this paper, we consider the existence and multiplicity of positive solutions to system of nonlinear differential equations of fractional order having the form

$$\begin{aligned} D_{0^+}^{\nu_1} u(t) + f(t, v(t)) &= 0, \\ D_{0^+}^{\nu_2} v(t) + g(t, u(t)) &= 0, \end{aligned} \tag{1}$$

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ORIGINAL PAPER

Role of Synthesis on Physical Properties of $Ni_{0.5}Zn_{0.5}Fe_2O_4$Nanoferrite: A Comparative Study

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Abstract In this work, $Ni_{0.5}Zn_{0.5}Fe_2O_4$ nanoparticles have been synthesized by coprecipitation, sol-gel and citrate-gel auto combustion wet chemical methods. The as-synthesized samples were sintered at 1073 K and characterized by X-ray diffraction (XRD), Scanning electron microscope (SEM), Fourier transform infrared spectroscope (FTIR), Vibrational sample magnetometer (VSM), and DC electrical resistivity. Analysis of x-ray diffraction patterns confirm the formation of single-phase cubic spinel structure for all the sintered samples under study. IR measurements also support the formation of spinel phase of the synthesized samples. Saturation magnetization has been found to be increased after sintering. Results showed that Ni–Zn ferrite prepared through Citrate-gel auto combustion method has maximum saturation magnetization, stable permeability, and high electrical resistivity.

Keywords Ni–Zn nanoferrite · Citrate-gel auto combustion · XRD · IR spectra · Saturation magnetization

1 Introduction

More than half of the century, spinel ferrites have been extensively investigated due to their remarkable magnetic and electrical properties. High-saturation magnetization, electrical resistivity, low electric loss, and chemical stability make them useful for wide range of applications. Among the spinel ferrites, Ni–Zn ferrite is an excellent core material for power transformers in electronic and telecommunication applications. Current developments in the field of power electronic devices are leading to miniaturization. A size reduction is usually possible by increasing the operating frequency and the initial permeability. The frequency of operation of these ferrites is directly proportional to square of saturation magnetization, electrical resistivity and inversely related to the grain size [1].

The structural, magnetic, and electrical properties of spinel ferrites are sensitive to microstructure, which in turn significantly depends on synthesizing method. In earlier days, Ni–Zn ferrites are prepared by conventional ceramic method. In this process, high temperature and long sintering times are required for better atomic mobility. However, this prolonged heating at elevated temperatures favorable for volatilization of some of the elements, leading to composition gradient, produce low surface area and undesirable crystal growth [2, 3]. Thus, the obtained final products are non-reproducible with coarser grain size, which limits their performance to megahertz frequency. For this reason, several researchers developed different preparation routes to produce stoichiometric spinel ferrites with desired properties.

Recently, spinel ferrites are synthesized at nanoscale, which opens a new and exciting research filed, with numerous applications in electronic technology [4]. The pertinent reason is due to the drastic changes in the electrical and magnetic properties when the size of the particle is reduced to nanoscale. Several authors reported on the synthesis of nano-sized spinel ferrites using a variety of wet chemical methods like auto combustion synthesis [5],

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Cu^{2+} - modified physical properties of Cobalt-Nickel ferrite

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Abstract

The present study focused on structural, magnetic and electric properties of Cu substituted Co-Ni ferrite nanoparticles synthesized by sol-gel combustion method. X-ray diffraction, Fourier Transform (FTIR), Magnetization, magnetic permeability and resistivity measurements were carried out to study the structural, magnetic and electrical properties. X-ray diffraction pattern confirms single phase spinel formation. Crystallite size determined from Scherer's method increases with Cu concentration. Distribution of cations was estimated from X-ray line intensity calculations, suggest that the majority of Cu^{2+} ions occupy octahedral (B) site. Saturation magnetization exhibit increasing trend from 40 emu/g (x=0.0) to 60 emu/g (x=0.4) with Cu concentration, though higher magnetic moment Ni ions are replaced by lower magnetic moment Cu ions. Magnetic permeability increases with increasing Cu concentration and show a flat profile within the frequency range 1M-50MHz. Significant enhancement in DC electrical resistivity and activation energy are explained on the basis of hopping mechanism.

Keywords: Spinel ferrite; Sol-gel combustion; XRD;TEM; Magnetization;

1. Introduction

In recent years synthesis and study on spinel ferrites at nano regime have been paid much attention due to their unique electrical and magnetic properties like high electrical resistivity, low eddy current losses coupled with moderate and stable permeability over wide frequency range

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Cu^{2+} - modified physical properties of Cobalt-Nickel ferrite

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ON A CLASS OF PARA KENMOTSU MANIFOLDS

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Abstract: The object of this paper is to investigate Weyl-pseudosymmetric para-Kenmotsu manifolds and para-Kenmotsu manifolds satisfying the condition $C(X,Y).S = 0$ where $C(X,Y)$ is the Weyl conformal curvature tensor and S is the Ricci tensor of the manifold.

AMS Subject Classification: 53C15, 53C25

Key Words: Para Kenmotsu manifolds, pseudosymmetric manifold, conformal curvature tensor, Ricci tensor, scalar curvature.

1. Introduction

Sato [9] defined the notions of an almost para contact Riemannian manifold. After that, Adati and Matsumoto [1] defined and studied p-Sasakian and sp-Sasakian manifolds which are regarded as a special kind of an almost contact

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ORIGINAL PAPER

Effect of Cu and Cation Redistribution on Structural and Magnetic Properties of Co-Mg Nanoferrite

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Abstract The structural and magnetic properties of Cu-substituted, Co-Mg mixed nanoferrite synthesized by a sol-gel auto-combustion method are presented. Significant modifications in crystallite size, density, and grain size are observed with increasing Cu concentration. Comparable values of theoretical and experimental lattice parameters were obtained for all the Cu-substituted samples. Cation distribution estimated from X-ray intensity calculations shows that Cu influences the preferential site occupancy of Mg ions. It is found that Cu and Mg simultaneously occupy tetrahedral (A) and octahedral (B) sites with different ratios. The particle size calculated using TEM for undoped Co-Mg ferrite is about 80 nm. Saturation magnetization and permeability increase initially and reach a maximum value ($x = 0.3$) and then decrease. The observed variation is explained on the basis of redistribution of cations (Cu^{2+} and Mg^{2+}) among the tetrahedral (A) and octahedral (B) sites. The initial permeability shows a good stability with increasing frequency.

Keywords Co-Mg ferrite · Cu substitution · Combustion method · Permeability

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1 Introduction

Current research on the synthesis of nanoferrites is increased in recent years because of their useful magnetic properties and applications in information storage systems, magnetic bulk cores, sensors/actuators, magnetic fluids, microwave absorbers, and medical diagnostics. The general formula for spinel ferrite is described as AB_2O_4, where A and B correspond to tetrahedral site and octahedral site, respectively. The substitution of different cations with different ratios into A and B sites improves the electromagnetic properties of the spinel ferrite. In addition, the physical and chemical properties have been enhanced due to the changes in their surface-to-volume ratio, when the size of the particle is reduced to nanoregime.

Among the spinel ferrites, magnesium ferrite ($MgFe_2O_4$) is one of the most versatile ferrite system and used in high-frequency applications due to its high electrical resistivity and low eddy currents [1]. These properties are strongly depending on the distribution of cations among tetrahedral (A) and octahedral (B) sites. Numerous authors studied and reported the effects of the method of preparation, sintering temperature, cation distribution, and partial substitution of dopant in Mg ferrite. The substitution of cobalt in Mg ferrite enhances the magnetic properties and decreases the dielectric losses [2–5]. MJ Iqbal et al. reported that both saturation magnetization and anisotropy coefficient achieved the maximum value at $x = 0.3$ and $x = 0.2$, respectively, when Co and Cr are substituted in Mg ferrite. The initial permeability, saturation magnetization, dielectric constant, and dielectric loss were found to increase and AC-resistivity was decreased with Zn substitution for Mg [6]. The saturation magnetization and magnetic moment were found to decrease with the increase in and Co and Cr contents [7]. The room temperature dielectric constant and dielectric loss

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Evaluation of Optimised Apriori Algorithm on HDFS using MapReduce in Hadoop Distributed Mode

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Abstract — **With a revolutionary change in data analytics it requires techniques that can equally extend with the trending data processing methods. To keep in pace with this elated progress in information evaluation, calibration and storage patterns, development and implementation of large scale algorithms for data processing is gaining importance. In datamining, association rule mining and classification is a wellutilised methodology for identifying overwhelming relations from data in large scale analytics. Apriori algorithm is one such crucial algorithm to mine the frequent item sets which form the basis for finding association rules among the data. Analyzing frequent item sets is a crucial step to find rules and association between them. This stands as a primary foundation for crucial decision making. With the advent of Hadoop Map-Reduce, parallel processing and efficient memory utilisation has come into order. This paper aims to identify the potential of Apriori Algorithm which is implemented as one-phase and k-phase Apriori algorithms in MapReduce framework and further an Optimised Apriori Algorithms(OAA) has been implemented which has a full-fledged MapReduce benefits and it has been identified that Optimised Apriori Algorithm has yielded better efficiency and reduced time complexity.**

Index Terms: Apriori Algorithm Optimised Apriori Algorithm, MapReduce.

INTRODUCTION

Recent technical trends in storage, processing and networking technologies lead to rapid growth of huge volumes of data in both scientific as well as commercial domains. Organizations are more inclined to make better use of this data and the data processing techniques to efficient decision making. Since the data is voluminous it requires appropriate and potential computing environments and framework to increase the precision that directly influence the decision making in real time scenario. Hadoop Framework is one such large-scale distributed batch processing infrastructure for parallel processing of voluminous data which is otherwise called as BIG DATA that flows over huge cluster of commodity computers. Hadoop is an open source project of Apache that implemented Google's File System as Hadoop Distributed File System (HDFS) and Google's processing framework as Hadoop MapReduce programming model. All the algorithms in this paper were implemented on Hadoop using MapReduce paradigm. MapReduce is a parallel programming model designed for parallel processing of large volumes of data by breaking the job into independent tasks across a large number of machines. MapReduce programming is inherited form the list processing languages e.g. LISP, that consists of two functions *Mapper* and *Reducer* which runs on all machines in a Hadoop cluster. The input output of these functions will be in form of <*key, value*> pairs. The Mapper reads the input <k_1, v_1>, from HDFS and produces a list of intermediate values <k_2, v_2>. An additional *Combiner* function which is optional is applied to reduce communication complexity in transferring intermediate outputs from mappers to reducers. Generally the output pairs of mapper are sorted locally and grouped on same key and applied as input to the combiner to make local sum.

With its efficient and rapid processing capabilities Hadoop has become a predominant tool for Data mining and knowledge discovery to extract useful, hidden and unknown patterns and knowledge from large database. There are many areas in datamining that generally considered for decision making. Association Rule mining is one such concept where Apriori is the basic and most popular algorithm for association rule mining proposed by R. Agrawal and R. Srikanth for finding frequent itemsets based on candidate generation. Candidates are itemsets containing all frequent itemsets. The name of the algorithm Apriori is based on the Apriori property which states that all nonempty subsets of a frequent itemset must also be frequent. The core step of the algorithm is generation of candidate k-itemsets C_k from frequent $(k-1)$-itemsets L_{k-1}.[1][2][3]There has been a wide variations in the implementation of Apriori Algorithms. In this paper we have implemented an Optimised Apriori Algorithm (OAA) and evaluated its performance against the One-Phase Apriori and K-Phase Apriori algorithm where the results have evidently proven that the performance of OAA is much better when compared to the other two algorithms.[4][5][6]

Related Work

Apriori Algorithm: One-phase and K-Phase

As the outline of the paper discussed earlier, since the Apriori lacks in efficiency while dealing with the voluminous data sets and even most of the optimized techniques of Apriori using MapReduce has elated its

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note on formulas for the Rayleigh wave speed in elastic solids

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ABSTRACT

In the present paper, new analytical, numerical and approximate methods have been presented for the determination of Rayleigh wave speed in isotropic and anisotropic media. The Lagrange's method is used to provide exact expression for the roots of the secular equation for Rayleigh waves in isotropic media. Then, a simple non-iterative type quadrature method is used to numerically determine the Rayleigh wave speed in isotropic and anisotropic media. Further, an approximate method is presented to determine the velocity of Rayleigh waves. The discrete least square approximation on Chebyshev - Gauss - Lobatto nodes is suggested to transform secular equations to quadratic equations, thereby, providing improved approximations to the Rayleigh wave speed. The analysis is complemented with numerical examples.

Introduction

Elastic surface waves in isotropic solids, discovered by Lord ...leigh [1], has been studied extensively in recent years, due to ...wide range of applications in seismology, acoustics, geophysics, ...communications and material science to name a few [2]. The ...hnological applications of Rayleigh waves in electronic devices ...h as filters, resonators, delay lines etc. [3] has had far-...ching effects on many modern gadgets. The propagation condi-...s for the existence of Rayleigh waves in an elastic half-space ...ults in the secular equation for Rayleigh waves (Rayleigh equa-...) and its solution gives the Rayleigh wave speed [4]. Since the ...en's function for many elastodynamic problems for a half-space ...uires the solution of the Rayleigh equation, formulas for the ...leigh wave speed in various elastic media is of great theoretical ... practical interest [5]. The Rayleigh wave equation is a cubic ...ation in the squared wave speed and its significance has ...acted researchers to find exact, approximate analytical expres-...n for the Rayleigh wave speed.

Rahman and Barber [6] first provided an exact expression for ... roots of the Rayleigh equation in isotropic solids using the the-... of cubic equations (Cardano's method). Since that time, a num-... of authors have sought to develop alternative expressions for ... Rayleigh wave speed [7]. Nkemzi [4] provided an alternative exact expression for the Rayleigh wave speed using the theory of Cauchy integrals, but Malischewsky [8] observed some misprints in [4] and obtained a formula for the wave speed using the advantages of computer algebra and Cardano's formula. Vinh and Ogden [9] obtained a formula solely based on the theory of cubic equations and have explained the Malischewsky formula [8]. Malischewsky Auning [10] obtained a formula for the Rayleigh wave velocity without the signum function but with an irrational term in the denominator and has shown its equivalence with the formula in [8]. Royer [11], used the root locus to provide a simple means for investigating the behaviour of the roots of the secular equation. Nkemzi [12], used a factorization technique based on the Reimann problem to derive a simple formula for the speed of Rayleigh waves. More recently, Liu and Fan [13] utilized a form of Cardano's formula (referred to in [13] as Shejun's formula) to obtained a new formula for the wave speed.

Considering anisotropic elastic solids, we note that Stoneley [14] studied the propagation of surface waves in an elastic medium with orthorhombic symmetry. The Rayleigh waves propagating in principal directions on free surfaces that are principal planes were studied. Royer and Dieulesaint [15] established that the secular equation for surface waves in orthorhombic crystals derived by Sveklo [16] could account for 16 different crystal configurations. Destrade [17] derived an explicit secular equation for surface acoustic waves in monoclinic elastic crystals using the method of first integrals. The speed of subsonic surface waves was then computed for 12 specific monoclinic crystals. Later Destrade [18]

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Estimate-Merge-Technique-based algorithms to track an underwater moving target using towed array bearing-only measurements

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Abstract. Bearing-only passive target tracking is a well-known underwater defence issue dealt in the recent past with the conventional nonlinear estimators like extended Kalman filter (EKF) and unscented Kalman filter (UKF). It is being treated now-a-days with the derivatives of EKF, UKF and a highly sophisticated particle filter (PF). In this paper, two novel methods based on the Estimate Merge Technique are proposed. The Estimate Merge Technique involves a process of getting a final estimate by the fusion of a posteriori estimates given by different nonlinear estimates, which are in turn driven by the towed array bearing-only measurements. The fusion of the estimates is done with the weighted least squares estimator (WLSE). The two novel methods, one named as Pre-Merge UKF and the other Post-Merge UKF, differ in the way the feedback to the individual UKFs is applied. These novel methods have an advantage of less root mean square estimation error in position and velocity compared with the EKF and UKF and at the same time require much lesser number of computations than that of the PF, showing that these filters can serve as an optimal estimator. A testimony of the aforementioned advantages of the proposed novel methods is shown by carrying out Monte Carlo simulation in MATLAB R2009a for a typical war time scenario.

Keywords. Extended Kalman filter; unscented Kalman filter; particle filter; towed array; weighted least squares estimator.

1. Introduction

Under-water target tracking is a complex process, involving estimation of the position of a target and anticipation of its location at the future instants with minute errors. The essential ingredient of the tracking process is the measurements provided by a SONAR. They can be broadly classified into two types, namely active and passive measurements. In case of tracking with active measurements, the surveillance platform radiates emissions and captures the echo to get the information of range and bearing of the target. The process cannot be considered as a preferable one as it gives the information of the location and dynamics of the ownship to the enemy before the ownship gets the information of the foe. This problem is not associated with the SONAR passive measurements. Here no emissions will be made by the ownship's SONAR. It gets only the azimuth (bearing) information from the emissions generated by the propellers of the enemies' vehicle. The measurements received by the SONAR are corrupted by the noise. This noisy information cannot be used for missile guidance. A tracking algorithm processes one of the two types of measurements or both to estimate the target motion parameters, namely range, bearing, course and velocity.

A lot of research was done and is being done in this area with an aim of developing an optimal tracking algorithm. Satisfactory results started after the famous work of Kalman [1] was published. Initially the conventional Kalman filter was applied for active tracking process with many assumptions, which led to the limitations for its usage in the real war environment. The most difficult feature that is assumed is as follows. The measurements are available in polar coordinates, which are converted to Cartesian form; thereafter the Kalman filter is applied. In this process the Gaussian noise with zero mean in polar coordinates is assumed to maintain the same statistics when converted to a Cartesian frame. This assumption is not considered by Lerro and Bar-Shalom [2], to make the Kalman filter suit the real time applications where the actual mean and covariance of noise in Cartesian frame are computed and

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PERFORMANCE EVALUATION OF A NOVEL HYBRID STOCHASTIC ALGORITHM WHILE TRACKING AN UNDERWATER MOVING TARGET

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ABSTRACT: In this paper a higher order hybrid stochastic algorithm is proposed to solve the problem of the underwater target tracking using bearing-only readings.The principle of operation is to fuse the estimates given by an ample number of conventional Extended Kalman Filters(EKF) using linear stochastic estimators. The bunch of EKFs inturn run with the help of the bearing–only measurements provided by a sensor array. The performance of the hybrid method is evaluated in MATLAB by carring out Montecarlo simulation for a real scenario. The results show that, the higher order versions of the proposed techniques can produce much better results than their lower order counterparts.

Keywords: Extended kalman filters, stochastic estimators, sensor array, Montecarlo simulation

1. Introduction

Tracking is a critical issue in the war environment to remain safe from the enemies attack or to blast the enemy. It mainly deals with the estimation of the position and the velocity of a moving target with the help of the poor quality sensor measurements. The measurements can be classified as active or passive. In case of active tracking, a sound signal is released by the SONAR and receives an echo from the target. Based on the time delay, the range of the target is measured and based on the angle of reception, the azimuth or the bearing corresponding to the target is measured. The main issue with the active tracking process is, the enemy can identify our position by sensing the signal released by us. This happens before we identify the enemy's position. So this approach is less preferred one. The alternate solution is to track the target without sending a signal. This happen, if SONAR only listen to the signals (unintentional sounds developed by the propellers) of the enemies vehicle. Here the azimuth information is only available and the range information cannot be obtained. This approach is called the passive tracking. The literature shows that the tracking can be done with a single sensor or with multiple sensors. The tracking with a single sensor is only possible if the lone sensor is maneuvering. On the otherhand, tracking with the multiple sensors (Towed array) is possible with the help of the concept called triangulation. This paper deals with tracking an underwater moving target with the Towed array measurements provided by a SONAR operating in a passive mode.

A new generation of the stochastic estimators started with the famous work of kalman [6].This filter was initially applied to Tracking problem with many assumptions. In real war environment those assumptions never exist and hence the kalman filter is not used directly. The hard thing which is assumed is that the measurement noise has the same statistical behavior in Cartesian system as in the available polar form. This assumption is truncated later on by proper computation of the mean and covariance in the rectangular frame for 2D tracking. There after the bias is subtracted from the measurements. The pertinent expressions for the mean and the covariance of the measurements in Cartesian frame for the 3D case is shown in [15]. The kalman filter (KF) can only be applied for a system with linear state and the measurement equations. But the measurement equation in case of the BOT is a non-linear one which acts as a hurdle to apply the KF directly for BOT. This limitation is truncated by approximating the non-linear measurement equation to linear equation with the taylor series expansion. This algorithm is called the Extended kalman filter (EKF) in the literature. The EKF is applied for the active tracking process initially and later on for the passive tracking process as shown in [1].The algorithm showed occasional divergence and premature covariance collapse due to the coupling of the observable and the unobservable components of the state vector. This problem was solved in [1] itself ,where the state vector is composed of the bearing rate, range rate to range ratio, bearing and reciprocal of range instead of the traditional way of choosing the range and the velocity components there by decoupling the observable and the unobservable components. The results obtained with EKF are improved

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Reduction of Side Lobes of Radar signals for Complementary Code using Particle Swarm Optimization

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ABSTRACT

Doppler resolution is the ability to determine the relative speed of the target along the line of sight from the radar whereastheR-ange resolution is the ability of the radar receiver to discriminate nearby targets. The performance of range and Doppler resolutions of radar would be optimal, if the coded waveform has impulsive autocorrelation function (ACF).Complementary codes waveforms provide better resolutions compared to other pulses. A desirable property of the compressed pulse is that it should have low side lobes in order to prevent a weaker target from being masked in the side lobes of a nearby stronger target. When the side lobes are relatively lower than the main lobe peak, the main peak can be distinguished in a better way and hence the corresponding code will be much better. In this we have proposed the PSO algorithm to design the complementary code for better performance measures like peak sidelobe ratio(PSLR) and integrated sidelobe ratio(ISLR) and compared with matched filter values. The performance measures influence in discriminating the target in the noise environment.

Key Words: ACF, PSO, PSLR and ISLR

INTRODUCTION

Complementary sequences, which have the property that the sum of their autocorrelation functions vanishes at all delays other than zero [1]. In the existing system of radar communication, the electromagnetic wave is being used for detection of targets in the radar receivers by extracting the received echo signal with the help of codes like Barker, Walsh and Golay codes to find the location and range of the target. But problem occurred i.e., high side lobes are here one occurred in some cases where they dominate the main lobe it causing False Alarm. In proposed system to avoid the side lobes or False alarm by using the new technique i.e., complementary codes are used instead of Barker, Walsh and Golay codes to to get nearer to zero side lobes which eases to find the target location and range of radar[2].

Generation of Complementary Code Pairs

The generation of complementary codes is presented with a concept that sum of autocorrelation functions is double the length of the sequence for zero shifts and zero for other shifts. The energy efficiency of the sequences is found as unity or 100% [4]. The choice of the selection of the sequence in the case of complementary sequences is restricted to a few numbers of sequences.

The radar ambiguity function is the output of the matched filter which provides the information about how different waveforms may be suitable for various radar applications. The behavior of complementary sequences is studied in ambiguity domain[5]-[10].

Let

$$S = (x_0, x_1, x_2, \ldots\ldots\ldots, x_{n-1}) \quad \text{I}$$

be a real sequence of length N.

$$\begin{bmatrix} A \\ B \end{bmatrix} \rightarrow \begin{bmatrix} A & O & B \\ A & O & \overline{B} \end{bmatrix}$$

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Maximum Power Point Tracking Of Photovoltaic Module Using Golden Section Search Method

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Abstract— **The photovoltaic (PV) module has been the interface of electrical energy generation from the solar irradiation. The solar radiation, ambient temperature and solar cell temperature are not constant throughout the day. So, the maximum power condition varies all the time due to which the efficiency of PV cell decreases. To increase the efficiency of PV cell maximum power point tracking is used. Maximum Power Point Tracking (MPPT) is an algorithm that includes charge controller that is used for extracting maximum power available power from PV module under certain conditions. In addition to the above conditions, the irradiance on PV module is non-uniform due to shading of trees, clouds etc., called partial shading. Using conventional MPPT technique such as Perturb and Observe, Incremental conductance, Hill climbing it is not possible to track maximum power condition in partial shading condition. The main objective of the present work is to consider MPPT even during partial shading conditions such that the overall efficiency of the system is improved.**

In this paper, a non-linear optimization technique called Golden Section Search (GSS) is used to track maximum power. The GSS method has the advantage of converging fast to extremum conditions even under partial shaded conditions.

A tool has been developed using MATLAB modelling the PV module operation under partial shading conditions and the result obtained is validated with existing work in the literature.

Keywords: Golden Section Search, Maximum Power Point Tracking, Partial shading

I. INTRODUCTION

Major sources for generating electricity are non-renewable energy sources such as coal, gas, nuclear etc. are extracted in large amount so their availability is reducing continuously. It takes more time to replenish these sources. So, it is necessary to choose the alternative sources called Renewable energy sources like sun, wind, biomass, tide, geothermal etc. which are always available in nature. The power generation from these sources is intermittent.

Solar power generation involves clean, noise less operation. The main component which generates electricity from the solar is the PV cell. The PV cell converts visible light into Direct current (DC) based on photovoltaic effect.

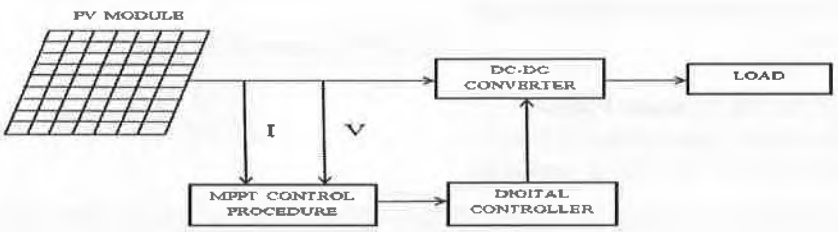

Figure1. Block diagram of PV system.

The main objective in designing the PV panel is to absorb the sunlight and convert it into required form of energy. To convert the obtained voltage from PV panel to the load voltage a DC-DC converter is used. For the system to operate at maximum efficiency, The MPPT charge controller takes the voltage from the PV panel and maximizes the amount of current flowing through the battery.

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Robust Design of Multi-Machine Power System Stabilizers using Clonal Selection Algorithm

G. Naresh, M. Ramalinga Raju, M. Krishna

Abstract: ***Optimal design of multi-machine Power System Stabilizers (PSSs) using Artificial Immune-based optimization technique, Clonal Selection Algorithm (CSA), is presented in this paper. The proposed approach employs CSA to search for optimal parameter settings of a widely used conventional fixed-structure lead-lag PSS (CPSS). The parameters of PSS are tuned using the proposed clonal selection algorithm to simultaneously shift the undamped and lightly damped electromechanical modes of all plants to a prescribed zone in the s-plane. A multi-objective problem is formulated to optimize a composite set of objective functions comprising the damping factor and the damping ratio of lightly damped electromechanical modes. Incorporation of CSA as a derivative-free optimization technique in PSS design significantly reduces the computational burden. The main advantage of the proposed approach is its robustness to the initial parameter settings. In addition, the quality of the optimal solution does not rely on the initial guess. The performance of the proposed CSAPSSs under different loading conditions and system configurations is investigated on New England New York 16-machine 68-bus power system. The eigenvalue analysis and the nonlinear simulation results show the effectiveness of the proposed CSAPSSs over conventional power system stabilizer (CPSS) to damp out the local as well as the inter area modes of oscillations under different operating conditions.***

Index Terms: ***Clonal selection algorithm, Damping, Electromechanical oscillations, Power system stabilizer***

I. INTRODUCTION

The low-frequency oscillations in a disturbed power system grow to make the system separate and become unstable, if they are not sufficiently damped out. Modern power system utilities use, conventional power system stabilizers (PSS) as an auxiliary excitation control. PSS enhances system damping by providing supplementary stabilizing feedback signal in the excitation system [1, 2]. Larsen and Swann [3] have systematically explained the application of conventional lead–lag PSS in power systems. The conventional PSS (CPSS) is usually designed with a fixed gain, with an aim to stabilize at the nominal operating condition. However, the inherent non-linearity and multiple operating points of a power system degrade the performance of such a fixed gains CPSS. Adaptive and variable structure control schemes are also applied [4, 5] for the design of PSS. Looking at the complexity of these designs and also at the fact that these techniques does not assure robust power system stability with varying operating conditions, Kundur et al. [6] have proposed an approach for the design of PSS for a large generating stations, wherein enhancement of overall system stability was the main criterion for the selection of PSS and automatic voltage regulator (AVR) parameters. Using conventional methods, PSS can be designed sequentially taking one electromechanical mode into consideration at a time [7]. However, the limitation of such a design is that the stabilizer designed to damp out one mode may destabilize other modes of the system. In another scheme, a gradient-based optimization method is adopted [8]. Unfortunately, the problem of PSS design is a multi-modal problem and the gradient techniques might fail by getting trapped in one of the local optima.

Recently, global optimization technique like genetic algorithm (GA), and other heuristic techniques like tabu search and simulated annealing have attracted the attention in the field of PSS parameter optimization. Unlike other techniques, GA has the ability to arrive at the global solution point swiftly, as it can handle the search space from different directions simultaneously. Crossover and mutation operators between chromosomes, makes the GA far less sensitive of being trapped in local optima. However, when the system has a highly epistatic objective function (i.e. where parameters being optimized are highly correlated), and number of parameters to be optimized is large, then GA has been reported [9] to exhibit degraded efficiency.

To overcome the drawbacks of conventional and GA based PSS design, a new Artificial Immune-based optimization technique known as Clonal Selection Algorithm is used for the PSS design. In this paper, an eigenvalue based objective function reflecting the combination of damping factor and damping ratio, are optimized for different operating conditions of the power system. It is also seen that some simple adaptive feature incorporated in the main algorithm makes its convergence even faster. It was found that the proposed technique not only optimizes the parameters faster, but also with the optimized gains the CSAPSS shows better damping performance when the system is perturbed.

Results obtained from eigenvalues analysis and nonlinear time domain simulation is compared with results obtained by CPSS. In section (II) statement of the problem and structure of PSS are described. In section (III) Objective function used is presented. In section (IV) an overview of Clonal selection algorithm is presented.

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Composition dependence of structural, magnetic and electrical properties of Co substituted Magnesium ferrite

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Abstract

In this work cobalt substituted magnesium spinel ferrite having general formula $Mg_{1-x}Co_xFe_2O_4$ (where x =0.0, 0.1, 0.15,0.2,0.25 and 0.3) was synthesized by solid state reaction method. All the sample are characterized by X-ray diffraction (XRD), Fourier transform infrared spectroscopy (FTIR), Vibrating sample magnetometer (VSM) and dc resistivity measurements. XRD analysis confirms the formation of single phase spinel and the calculated lattice constant 'a_{exp}' from XRD decreases as substitution of Co (x) is increased. The FTIR spectra reveled two prominent frequency bands in the wave number range 400-600 cm^{-1}, which confirm the cubic spinel structure. Magnetic studies revealed that the saturation magnetization attains a maximum value when x=0.2, and then decreases for higher concentration of (x). This non-linear trend in magnetization has been explained on the basis of redistribution of magnetic and non-magnetic cations among A and B sites of the spinel lattice. A significant influence of cation distribution observed on DC electrical resistivity and activation energy.

Keywords: Mg-Co ferrite; Solid state reaction; XRD; VSM;FE-SEM;

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Composition dependence of structural, magnetic and electrical properties of Co substituted magnesium ferrite

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MULTIPLE POSITIVE SOLUTIONS TO NONLINEAR BOUNDARY VALUE PROBLEMS OF A SYSTEM FOR GENERALIZED p-LAPLACIAN FRACTIONAL DIFFERENTIAL EQUATIONS

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Abstract: In this article we study the existence of positive solutions for a coupled system of generalized p-Laplacian fractional order boundary value problems. We prove that the boundary value problem has at least three positive solutions by apply the five functionals fixed-point theorem. An example demonstrates the main results.

AMS Subject Classification: 34B15, 34B18
Key Words: fractional boundary value problems, positive solutions, generalized p-laplacian operator, fixed point, cone

1. Introduction

The purpose of this paper is to consider the existence of multiple positive solutions for a coupled system of generalized p-Laplacian fractional order boundary value problems:

$$D_{0^+}^{\beta_1}(\phi(D_{0^+}^{\alpha_1}u(t))) = f_1(t, u(t), v(t)), \tag{1}$$

$$D_{0^+}^{\beta_2}(\phi(D_{0^+}^{\alpha_2}v(t))) = f_2(t, u(t), v(t)), \tag{2}$$

$$u(0) = u'(0) = u'(1) = 0, \phi(D_{0^+}^{\alpha_1}u(0)) = (\phi(D_{0^+}^{\alpha_1}u(1)))' = 0 \tag{3}$$

$$v(0) = v'(0) = v'(1) = 0, \phi(D_{0^+}^{\alpha_2}v(0)) = (\phi(D_{0^+}^{\alpha_2}v(1)))' = 0, \tag{4}$$

where $t \in (0,1)$, $2 < \alpha_i \leq 3$, $1 < \beta_i \leq 2$ are real numbers, $f_i : [0,1] \times \mathbb{R}^2 \to \mathbb{R}^+$

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On Ricci pseudo-symmetric para-Kenmotsu manifolds

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Abstract: Considered a para-Kenmotsu manifold with the curvature condition $S(X,Y).R = 0$ and shown that it is an Einstein manifold. Further, we consider para-Kenmotsu manifolds with the conditions $R(X,Y).S = fQ(g,S)$ and $R(X,Y).R = fQ(S,R)$, known as the *Ricci* and *generalised Ricci* pseudo-symmetric manifolds respectively, and obtained the necessary conditions for these manifolds to be non-Einstein. The notations $S(X,Y)$ and $R(X,Y)$ denote the Ricci and Riemannian curvature tensors respectively.

Keywords: Para Kenmotsu manifold, Ricci pseudo-symmetric manifold, Einstein manifold, Ricci tensor.

1 Introduction

Sato [10] defined the notions of an almost para contact Riemannian manifold. After that, Adati and Matsumoto [1] defined and studied p-Sasakian and sp-Sasakian manifolds which are regarded as a special kind of an almost contact Riemannian manifolds. Before Sato, Kenmotsu [9] defined a class of almost contact Riemannian manifolds. In 1995, Sinha and Sai Prasad [14] defined a class of almost para contact metric manifolds namely para Kenmotsu (briefly p-Kenmotsu) and special para Kenmotsu (briefly sp -Kenmotsu) manifolds.

As a generalization of locally symmetric spaces, many geometers have considered semi-symmetric spaces and in turn their generalizations. Locally symmetric, semisymmetric and pseudosymmetric para-Sasakian manifolds are widely studied by many geometers [2, 5, 6].

Motivated by these studies, Satyanarayana and Sai Prasad [12] studied Weyl semisymmetric para-Kenmotsu manifolds, and they prove that such a manifold is conformally flat and hence is an sp-Kenmotsu manifold. Further, they studied [13] Weyl-pseudosymmetric para-Kenmotsu manifolds which are the extended classes of Weyl-semisymmetric para-Kenmotsu manifolds. They showed that every n-dimensional, $n \geq 4$, para-Kenmotsu manifold is a Weyl-pesudosymmetric manifold of the form $R.C = -Q(g,C)$. Also, they studied para-Kenmotsu manifolds satisfying the condition $C(X,Y).S = 0$ where $C(X,Y)$ is the Weyl conformal curvature tensor and S is the Ricci tensor of the manifold [13].

In this study, our aim is to obtain the characterisations of Ricci-pseudosymmetric para-Kenmotsu manifolds and also the para-Kenmotsu manifold satisfying the curvature condition $S(X,Y).R = 0$ where $R(X,Y)$ is the curvature tensor and $S(X,Y)$ is the Ricci tensor of the manifold.

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Elastic Properties and Antistructural modeling for Nickel-Zinc Ferrite-Aluminates

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Abstract

In this study, elastic properties of nanocrystalline Ni-Zn-Al ferrite synthesized by citrate-gel autocombustion method has been presented. X-ray diffraction and Infrared spectroscopy confirms the formation of spinel phase. Elastic properties are estimated from force constants and lattice constant determined from FTIR and XRD respectively. The observed variation of elastic constants has been interpreted in terms of strength of interatomic bonding and electronic configuration of the cations involved in the system. The average grain size has been observed to decrease with Al^{3+} substitution. A new antistructural modeling for describing of active surface centers is discussed. With this new antistructural modeling the changes in concentration of donor's active centers Ni'_B and acceptor's active centers $Fe^{\bullet}_A$ and $Al^{\bullet}_A$ was explained.

Keywords: nickel-zinc ferrites; spinel; FTIR; elastic properties; modeling; active center.

1. Introduction

Nickel-Zinc ferrite is promising magnetic material for high frequency applications due to its high electrical resistivity, low magnetic coercivity and low eddy current losses. It is crystallized in to mixed spinel structure (General chemical formula AB_2O_4)in which, Zn^{2+} and

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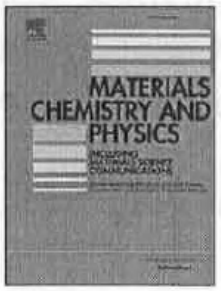

Elastic properties and antistructural modeling for Nickel-Zinc Ferrite-Aluminates

B. Rajesh Babu, Tetiana Tatarchuk

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ORIGINAL PAPER

Structural, Magnetic, and Dielectric Properties of Conventional- and Microwave-Sintered $Ni_{0.6}Zn_{0.4-x}Cu_xFe_2O_4$

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Abstract In the present work, structural, magnetic, and dielectric properties of conventional- and microwave-sintered $Ni_{0.6}Zn_{0.4-x}Cu_xFe_2O_4$ ($x = 0.0$ to 0.4 in steps of 0.1) are studied. X-ray diffraction measurements confirm the formation of a single spinel phase. Crystallite size estimated from Scherrer's method found between 30–41 nm and 36–28.5 nm in conventional- and microwave-sintered samples respectively. The lattice constant decreases with Cu substitution, suggesting the incorporation of Cu into the spinel lattice. SEM images reveal that microwave sintering results in larger grains with intragranular pores. Saturation magnetization was found to decrease with Cu content. Cation distribution estimated from the magnetization data supports the observed changes in magnetic parameters. A significant influence on microstructure and cation redistribution on dielectric properties are observed for microwave-sintered samples.

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Keywords Spinel ferrites · Ni-Cu-Zn · Microwave sintering · Solid-state reaction · VSM

1 Introduction

Ni-Zn ferrites are one of the most versatile magnetic materials for general use, which have many applications in both low- and high-frequency devices and play a useful role in many technological applications such as microwave devices, power transformers in electronics, rod antennas, read/write heads for high-speed digital tape, etc. because of their high resistivity, low dielectric losses, mechanical hardness, high Curie temperature, and chemical stability [1]. The Ni-Cu-Zn ferrite system is widely used ferrite material in various electromagnetic devices due to their excellent electromagnetic properties like high resistivity, high permeability, and comparatively low magnetic losses [2]. Several authors reported Cu-substituted Ni-Zn ferrite prepared by the solid-state reaction method [3–9]. These samples require high sintering temperature to achieve better densification. However, volatilization of Zn takes place due to high temperature and prolonged sintering time, which leads to the formation of chemically inhomogeneous material [10].

The microwave sintering process has unique advantages over the conventional sintering process. The fundamental difference is in the heating mechanism. In conventional heating, heat is generated by heating elements (resistive heating) and then transferred to the sample via radiation, conduction, and convection and require long duration for sintering the materials which may cause some of the constituents to evaporate, thereby modifying the desired stoichiometry and allow undesired grain growth. Unlike conventional heating, in microwave heating, the materials themselves absorb microwave energy and then transform it

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Influence of Zn Substitution on Structural, Magnetic and Electrical Properties of $MgFe_2O_4$

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Polycrystalline spinel ferrites $Zn_xMg_{1-x}Fe_2O_4$ (where x = 0.0, 0.1, 0.15, 0.2, 0.25 and 0.3) were prepared by standard ceramic method and characterized by x-ray diffraction, Fourier transform infrared spectroscopy (FTIR), and vibrating sample magnetometer. Structural, electric and magnetic properties have been discussed in detail on the basis of Zn composition. The composition shows formation of a single-phase cubic spinel structure and the lattice constant 'a' increases with increasing Zn concentration. FTIR spectra show two prominent frequency bands in the wave number range 400–600 cm^{-1}, which further confirms the cubic spinel structure and completion of chemical reaction. Magnetic studies revealed that the saturation magnetization increases with increasing the substitution of Zn. Cation distribution for the present system was estimated by comparing observed and calculated x-ray line intensities. From this it is observed that Zn^{2+} ions prefer to occupy A sites, and Mg^{2+} and Fe^{3+} ions distributed into both A and B sites. The observed variation in magnetization has been explained on the basis of distribution of cations among A and B sites of the spinel lattice. A significant influence of cation distribution is observed on DC electrical resistivity and activation energy.

Key words: Mg-Zn ferrite, solid-state reaction, XRD, VSM, FE-SEM

INTRODUCTION

Spinel ferrites are promising ceramic magnetic materials due to their potential applications in microelectronics, microwave devices and as a core material in telecommunications at higher frequencies. The general formula of spinel ferrites can be written as AFe_2O_4 (where A is a divalent metal ion). The unit cell of spinel ferrite comprises 32 oxygen ion forming a cubic, closed-pack arrangement in which 8 are tetrahedral sites (A) and 16 are octahedral sites [B]. Studies have revealed that cations occupying A and B sites are significantly changes the electromagnetic properties of the ferrite.

Among the spinel ferrites, numerous works have been carried out on Mg–Zn ferrites due to their potential applications at high frequencies. Magnesium ferrite ($MgFe_2O_4$) is a soft magnet suitable for microwave devices, satellite communication, transformers, audio–video in digital recording, and as ferrite core due to the low coercivity and high resistivity.[1] Several authors studied the influence of cation distribution on the physical properties of magnesium ferrite and the distribution of cations

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An Interpretation on Soft Skills Approach for Human Excellence and Professional growth in LPG Era

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Abstract: *In the Liberalisation, Privatisation and Globalisation Era (LPG Era) employability is a critical factor which threatens the sustainability of humans. All the world organisations are in search of individuals with miraculous potentialities. One such human efficiency is Soft skill. All companies tend to expect their employees to know how to behave on the job. They often presume that every individual has a reasonable understanding of how important it is to be on time, working as a team, taking initiatives and bring out excellent quality work. Soft skills are important for everyone to have a successful professional life. This paper intends to study various approaches of Soft skills to enhance human excellence.*

IndexTerms*: Liberalisation, Privatisation, Globalisation, Soft skills, Human excellence and Profession.*

INTRODUCTION

Soft skills are the Predominant skills which can turn a Person to a Personality. Acquisition of such skills is the demand of this Liberalisation, Privatisation and Globalisation Era (LPG Era) for human Excellency. The present scenario focuses less on ordinary capacities, strives to see Excellencies in every individual. As of now Soft skills are adored but are neglected, there is no sort of proven situation which can be well seen practically about soft skills leading majority of humans towards Success but it is to be understood that these are the driven factors which present the individual as incredible. People who are said as eminent and great are not born great but they turned as great. The underlying factors which widely distinguish great from the common people are their soft skills.

Human Excellence is a broader area which deals with the congregation of indigenous capabilities in an individual with adventitious factors. All human beings are not born with extraordinary capabilities but upon their focus they can excel their lives in a righteous way accommodating with the living community.

Soft skills are the category of skills which enhance human excellence, growth and development in their professional and personal relationships. These can be endeavoured by the individuals to have a successful, smooth and cordial bondage with the living community.

> *"What people get admired and appreciated for in a community are their soft skills:*
> *their ability to listen their courage and honesty their capacity for empathy"*
>
> *M.Scott Peck*

In the Liberalisation, Privatisation and Globalisation Era (LPG Era) employability is a critical factor which threatens the sustainability of humans. All the world organisations are in search of individuals with miraculous potentialities. One such human efficiency is Soft skill. All companies tend to expect their employees to know how to behave on the job. They often presume that every individual has a reasonable understanding of how important it is to be on time, working as a team, taking initiatives and bring out excellent quality work.

Soft skills are important for everyone to have a successful professional life. We need to understand the significance of soft skills as they enable us to:

- Communicate well with the people around us
- Bolster Leadership qualities
- Builds confidence
- Pursue employment
- Maintain healthy Personal and Professional relations
- Experience success
- Nurture ours personality
- Work effectively in a team
- Adapt new environment
- Develop the feeling of togetherness
- Handle stress
- Display good body language

Physical Education and Psychological well-being of Tribal Students in India

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Abstract : Tribal people in India are called *adivasi*. Adivasi is an umbrella term for a heterogeneous set of ethnic and tribal groups considered the aboriginal population of India. Generally the tribal habitats are vulnerable and people are easily prone to dreadful diseases. They lack in Physical fitness, health and hygiene. They are unaware of their physical conditions and stamina. Tribal people maintain poor physical fitness which turns as the dominant reason for their poor growth and development in all directions. This has even become the root cause for genetic disorders and inherited diseases and psychological illness in their off-springs. This paper attempts to research on the wellness of tribal society and necessity of inducing Physical exercises and activities for psychological well-being.

IndexTerms *–Adivasi, Physical education, Government Initiatives, NGO's, Health and psychological well-being.*

I. Introduction

Tribal people constitute 8.6 percent of India's total population, about 104 million people according to the 2011 census (68 million people according to the 1991 census). This is the largest population of the tribal people in the world. One category lives in a belt along the Himalayas stretching through Jammu and Kashmir, Himachal Pradesh, and Uttar Pradesh in the west, to Assam, Meghalaya, Tripura, Arunachal Pradesh, Mizoram, Manipur, and Nagaland in the northeast. Another category lives in the hilly areas of central India (Madhya Pradesh, Orissa, and, to a lesser extent, Andhra Pradesh); in this belt, which is bounded by the Narmada River to the north and the Godavari River to the southeast, tribal peoples occupy the slopes of the region's mountains. Other tribals, the Santals, live in Bihar and West Bengal. There are smaller numbers of tribal people in Karnataka, Tamil Nadu, and Kerala, in western India in Gujarat and Rajasthan, and in the union territories of Lakshadweep and the Andaman and Nicobar Islands. The extent to which a state's population is tribal varies considerably. In the north-eastern states of Arunachal Pradesh, Meghalaya, Mizoram, and Nagaland, upward of 90 percent of the population are tribal.

Tribal people in India are called *adivasi*. Adivasi is an umbrella term for a heterogeneous set of ethnic and tribal groups considered the aboriginal population of India. Generally the tribal habitats are vulnerable and people are easily prone to dreadful diseases. They lack in Physical fitness, health and hygiene. They are unaware of their physical conditions and stamina. Tribal people maintain poor physical fitness which turns as the dominant reason for their poor growth and development in all directions. This has even become the root cause for genetic disorders and inherited diseases in their off-springs. So, the government of India and the NGO's are working together for the wellness of tribal society by bringing awareness on the need and necessity of inducing Physical exercises and activities.

Physical exercise is any bodily activity that enhances or maintains physical fitness and overall health and wellness. Physical fitness comprises two related concepts: general fitness (a state of health and well-being), and specific fitness (a task-oriented definition based on the ability to perform specific aspects of sports or occupations). Physical fitness is generally achieved through correct nutrition, exercise, hygiene and rest. Physical fitness has been defined as a set of attributes or characteristics that people have or achieve that relates to the ability to perform physical activity. It is performed for various reasons including strengthening muscles and the cardiovascular system, honing athletic skills, weight loss or maintenance, as well as for the purpose of enjoyment. Frequent and regular physical exercise boosts the immune system, and helps prevent the "diseases of affluence" such as heart, cardiovascular disease, Type 2 diabetes and obesity. It also improves mental health, helps prevent depression, and helps to promote or maintain positive self-esteem. Childhood obesity is a growing global concern and physical exercise may help decrease some of the effects of childhood and adult obesity.

II.Khelo India proposal

Under the revamped Khelo India proposal, there is an exclusive component called "Promotion of Rural, Indigenous and Tribal Games" for promotion and development of traditional sports. The importance of sports and fitness in one's life is invaluable. Playing sports inculcates team spirit, develops strategic & analytical thinking, leadership skills, goal setting and risk taking.

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Enhancement in magnetic and electrical properties of Ni substituted Mg ferrite

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In this work, Ni substituted magnesium spinel ferrites having general formula $Mg_{1-x}Ni_xFe_2O_4$ (where x = 0.0, 0.1, 0.15, 0.2, 0.25 and 0.3) were synthesized by standard solid state reaction method. All the samples were characterized by X-ray diffraction (XRD), Fourier transform infrared spectroscopy (FT-IR), vibrating sample magnetometer (VSM), DC resistivity measurements. X-ray diffraction analysis confirmed the single spinel phase. The lattice constant decreased with increasing Ni content due to the difference in the ionic radii of Mg^{2+} and Ni^{2+} ions. The FT-IR spectra reveled two prominent frequency bands in the wave number range of 400 cm^{-1} to 600 cm^{-1}, which confirmed the cubic spinel structure of obtained compound and completion of chemical reaction. Magnetic studies revealed that the saturation magnetization increased with the substitution of Ni. The increase in magnetization was explained on the basis of distribution of magnetic and non-magnetic cations among A and B sites of the spinel lattice. A significant influence of cation distribution on DC electrical resistivity and activation energy was observed.

Keywords: *Mg-Ni ferrite; solid state reaction; XRD; VSM; FE-SEM*

1. Introduction

Spinel ferrites are promising ceramic magnetic materials and are a subject of intense theoretical and experimental investigations due to their remarkable electrical and magnetic properties. The spinel ferrites are widely used in the fields of magnetic resonance imaging (MRI), magnetic high-density information storage, etc. Among the spinel ferrites, Mg^{2+} and Ni^{2+} ferrites are soft magnetic n-type semiconducting materials, and are used in heterogeneous catalysis, adsorption, sensors, magnetic storage systems, magnetic resonance imaging, spintronics, LPG sensors, etc. [1].

A spinel unit cell is a face centered cubic structure, formed by 32 O^{2-} ions, which contains 64 tetrahedral (A) and 32 octahedral (B) interstitial sites. Among these, 8 tetrahedral A-sites and 16 octahedral B-sites are occupied by metal ions. Therefore, substitution of different ions with different valence states in spinel ferrite, alters the cation distribution, which in turn, enhances or reduces its electromagnetic properties [2, 3].

Several authors reported the influence of various cations on Mg ferrites [4–8].To the best of the authors' knowledge, there is no detailed report correlating structural modifications (microstructure) with the electromagnetic properties of Mg-Ni ferrites in the literature. Therefore, the present study is focused on the influence of Ni substitution in B-site and corresponding modifications in electrical and magnetic properties of $Mg_{1-x}Ni_xFe_2O_4$ (where x = 0.0, 0.1, 0.15, 0.2, 0.25 and 0.3) prepared by solid state reaction method.

2. Experimental

Samples of Ni substituted magnesium ferrite having various compositions $Mg_{1-x}Ni_xFe_2O_4$ with x = 0.0, 0.1, 0.15, 0.2, 0.25, 0.3 have been

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Free longitudinal vibrations of functionally graded tapered axial bars by pseudospectral method

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Abstract. In this work, the problem of free longitudinal vibration of rods with variable cross-sectional area and material properties is investigated using the pseudospectral method. With the gradation of material properties like modulus of elasticity and mass density in the axial direction, the results corresponding to a functionally graded axial bar are obtained using the proposed pseudospectral formulation. The pseudospectral formulation used is relatively easy to implement and powerful in analyzing vibration problems. With the help of several numerical examples, the non-dimensional natural frequencies of rods obtained using the pseudospectral method are compared with those obtained by the analytical solution, generalized finite element method, the discrete singular convolution method and differential transformation method. The numerical results obtained show that the proposed technique allows boundary conditions to be incorporated easily and yields results with good accuracy and faster convergence rates than other methods.

Keywords: vibrations, inhomogeneous rod, graded axial bar, numerical, pseudospectral.

1. Introduction

Functionally graded (FG) material structures find extensive use in modern engineering as their material properties can be tailored to meet the requirements of different applications [1]. The FG axial bars are a class of inhomogeneous rods/bars with material properties varying continuously in desired spatial directions. The inhomogeneous rods are known to provide a suitable distribution of strength and weight for engineering structures [2]. A study of the vibration characteristics of these rods is a subject of considerable scientific interest that has wide applications in aerospace, civil and mechanical engineering [3-5].

The governing differential equations of motion for longitudinal vibration of non-uniform rods have variable coefficients introduced by variable cross-sectional area. In addition, for functionally graded tapered axial bars, the varying material properties add up to the previous variable coefficients in the governing equation increasing the complexity in vibration analysis of these bars/rods. In general, methods of vibration analysis are classified as analytical and numerical methods while some are semi-analytical that use a combination of both the approaches. It is generally agreed that obtaining analytical/closed-form solutions of this vibration problem is possible only for some specific geometric and material functions and are often cumbersome. Application of numerical methods becomes essential to obtain the solution of the problem for general cases. There are many different methods for the numerical solution of differential equations which include Finite Element Method (FEM), Differential Quadrature Method (DQM), Differential Transformation Method (DTM), Discrete Singular Convolution (DSC) method and Spectral/Pseudo Spectral methods. Several studies have been dedicated to the problem of exact/analytic solutions for longitudinal vibrations of non-uniform rods [6-13] while some researchers [3, 14-17] have developed numerical methods.

Eisenberger [6] obtained the exact longitudinal vibration of a rod with polynomial variation in

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BER Estimation in UFMC System for Wireless Communications

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Abstract--- Orthogonal Frequency Division Multiplexing (OFDM), a multi Carrier transmission technique that has been used in implementing the majority of wireless applications like Wireless Network Protocol Standards (like IEEE 802.11a, IEEE 802.11n), in telecommunications (like LTE, LTE-Advanced) and also in Digital Audio & Video Broadcast standards. In OFDM to reduce the Inter-symbol interference (ISI) cyclic prefix is used which introduces Guard cells between each orthogonal subcarrier and the available bandwidth of OFDM uses some part of the bandwidth for cyclic prefix which eventually reduces the spectrum efficiency. The latest research and development in the area of orthogonal frequency division multiplexing for wideband wireless communications, Universal Filtered Multi Carrier (UFMC) has attracted lots of attention. In this paper UFMC system is implemented and comparative analysis are carried out in terms of M-ary QAM modulation scheme, side lobe attenuations of the Dolph-chebyshev filter and Bit Error Rate (BER) over fading channels.

I. Introduction

UFMC is a multi carrier transmission technique and it is based on the principle of Frequency Division Multiplexing (FDM). In FDM the input data stream is subdivided into a large number of sub bands with narrow bandwidth. The single carrier transmission system uses a single carrier signal for the entire bandwidth, whereas in a multi carrier transmission available bandwidth is made into few sub bands and uses multiple sub carriers and hence, the data rates will be increased in multi carrier systems[1]. In UFMC the entire bandwidth is divided into sub bands and provides multiple sub carriers. Generally, the input signal and the carrier signal are given to the product modulators and that generates the modulated signal. But the implementation of these product modulators is very complex. So instead of using a large number of product modulators i.e. (one product modulator for one sub band) we use a single block that does the same operation like product modulators and thereby reduces the amount of hardware at both receiver and transmitter. Both in OFDM and FBMC the modulated signal is filtered at once and for that it requires filter of larger length. Whereas in UFMC each sub band will have a separate filter and as a result requires a filter of smaller length when compared with OFDM and FBMC. Since the filtering operation is applied to set of consecutive sub carriers in each sub band as a result, it lowers the out of band side lobe levels and thereby reduces the Inter symbol interference and also Inter carrier interference to a greater extent when compared with OFDM. Filtering approach is also used in Filter Bank Multi-Carrier (FBMC) systems. In FBMC systems, each subcarrier is individually filtered, strongly enhancing robustness against Inter Carrier Interference (ICI) effects. However, typical FBMC systems utilize filters, whose length is multiple times of the number of total subcarriers. Hence, its drawback is its long filter length, making it disadvantageous for communication in short uplink bursts, as required in potential application scenarios of 5G systems, like low latency communication or energy-efficient Machine Type Communication (MTC)[2]. UFMC can be seen as a generalization of filtered OFDM and FBMC (in its Filtered Multi Tone (FMT) variant). While the former filters the entire band and the latter filters each subcarrier individually, UFMC filters subband-blocks, thus groups of subcarriers. This allows reducing the filter length considerably, compared to FBMC. Furthermore, QAM is still efficient (in contrast to the FBMC case), making UFMC compatible to all kinds of Multiple Input Multiple Output (MIMO). UFMC can also rely on FFT-based receive processing with per-subcarrier equalization. As UFMC is very close in nature to OFDM, it is also known as Universal Filtered OFDM (UF-OFDM) [3].

II. System Model

The system model of UFMC is shown in Fig 1.The overall bandwidth is divided into B sub-bands. Each sub-band can be allocated with N_B consecutive subcarriers and the subband may correspond to Physical Resource Block (PRB) in LTE. The total number of subcarriers is N. The input data is taken in Binary format and it is mapped using M-ary QAM modulation mapping schemes.

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A Nonlinear Load Frequency Controller for Hydropower plants

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ABSTRACT
An efficient way to generate power is the key requirement for hydropower plants. One can improve the overall efficiency of hydropower plants by using advanced turbine models, appropriate design of tunnel and water storage areas, by designing efficient control systems, etc. The ultimate aim of the governor or control systems is to maintain the load frequency at the desired or reference value during the nominal as well as uncertain conditions. Most of the present hydraulic-electrical control systems for hydropower plants are based on linearized models; wherein tedious tuning process is required to achieve the desired response. Further, the linear control design may not work for wide range of operating points. In this paper, we propose a nonlinear controller and observer scheme using State Dependent Riccati Equation (SDRE) methodology for hydropower plant to achieve the desired frequency in nominal and uncertain conditions. The proposed SDRE scheme is directly based on nonlinear hydropower plant models, wherein linearization is not required. The effectiveness of the proposed SDRE scheme is validated on a nonlinear hydropower plant model and is compared with the conventional controller in the presence of noises and parametric uncertainties.

KEYWORDS
Renewable energy, Load-frequency control, nonlinear control, state estimation, state-dependent Riccati equation.

1. Introduction

Hydropower plants play a crucial contribution in the over-all power generation, and is perhaps one of the mature renewable energy resources Wilson (2015), Pandey, Mohanty, and Kishor (2013), Abbas and Kumar (2017). The global hydro power capacity is 1064 GW Zervos and Lins (2016) and is expected that there will be a significant increase in hydro-power generation in the coming years. In the recent years several advancements have been carried out to improve the efficiency, reliability and sustainability of the hydro-power plants. This include, optimized design of turbine blades, tunnel and storage areas, speed governors, etc.

The dynamics of hydropower power plant is highly nonlinear. Two control mechanisms are basically employed for hydropower plants; voltage control and load fre-

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Analysis of Multi Area Load Frequency Control System With Hybrid Fruit Fly Algorithm

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Abstract: This paper presents automatic load frequency control of multi area power system. The aim of automatic load frequency control is to reduce the changes in frequency and tie line power according to the changes in load demand. The changes in load frequently may cause unpredictable drifts in voltage and frequency of generated voltage in power system. The deviation of frequency can be made to zero by introducing a secondary integral control loop. A hybrid method is proposed based on living nature of fruit fly insects known as Hybrid fruit fly optimization method used for fine tuning of ALFC parameters such as integrator gain, regulation of governor and frequency biasing factors. This method gives fine tuning of all parameters of ALFC simultaneously and giving better transient and steady state response of three area interconnected system. In this paper simulation study is carried out to analyze the response of three area system. The proposed HFFA is applied to three area interconnected system Simulation scheme with supporting and graphical results.

Keywords: Load frequency control, multi area, hybrid fruit fly algorithm, speed governor, turbine, and generator

1. Introduction:

Electrical power systems is very large and complex network which consisting of generation, transmission and distribution networks [1]. Now a day, demand for electricity continuously growing day by day.It is necessary to design proper controllers to regulate system abnormal changes in order to maintain system stability and reliability. Complexity of power system has been increased due to rapid growth of industries. As the frequency and voltage depends on active power and reactive power respectively over all control of power system is divided into two such as controlling active power along with frequency and controlling reactive power along with the control of voltage [2].Such control of active and reactive power in power system is known as Automatic load frequency control (ALFC).

Load frequency control process which regulates the generator output and its frequency of generated voltage which is related to the speed of the generator. This scheme consists of two loops such as primary and secondary loops, former one which reacts to the changes in frequency through the speed governor in order to control the steam flow across the turbine according to the changes in real power generation. This primary loop is much faster than secondary to react for the changes in frequency occurs in one to few seconds. The secondary loop maintain excellent frequency regulation, more over it maintains real power exchange between areas interconnected together. Secondary loop is not much sensitive to the load changes occurred quickly.
Usually, the frequent changes in load demand with smaller values create much problem for ALFC. This change in real power demand may cause the power flow through tie lines from interconnected areas there by changing the system frequency leading to system instability. So it is necessary to take care of these frequent load variations and their consequent frequency changes to keep up system stability. Stability of the system is maintained by minimizing transient disturbances in frequency in addition to tie line power exchange [3].

A scheme for load frequency control of multi area with multi source power generation is proposed using oppositional krill herd algorithm. The PID controller performance was controlled for the proposed AGC system and the gain of the controllers and parameters are tuned by DE algorithm [4]. A decentralized variable structure

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Sentiment Analysis on GST Using Naive Bayes and Score Based Approaches on Twitter Data

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Abstract— Sentiment Analysis (SA) extracts and analyses people's opinion about an entity. SA in twitter tackles the problem of analyzing the tweets. Twitter is one of the popular micro blogging platform in which users can publish their thoughts and opinions. It has been used as a forum to understand the opinions of public towards recently launched Goods and Services Tax (GST) by Indian Government. The tweets originated have been analyzed using supervised learning. This type of learning uses unlabelled data to complement the information provided by the labeled data in the training process. SA agrees with the human judgment and determines at sentence level whether the opinions arrives at a decision and perform classification on emotion and polarity using naive bayes and score based algorithms to find the effect of GST on public.

Keywords— Sentiment analysis, Sentiment Polarity, Emotion detection, Twitter, GST

I. INTRODUCTION

A. Problem Definition

Implementing how sentiment analysis can help to improve the user experience over:

The recent availability of huge amounts of "user-generated content" called "tweets" on the web, produce a need to mine user's opinion on GST.

Familiarize with classification and emotion that enable to apply processing and machine learning with textual data using Naive Bayes and score based algorithm.

B. Motivation

In the past decade, new forms of communication, such as micro blogging and text messaging have emerged and become ubiquitous. While there is no limit to the range of information conveyed by tweets and texts, often these short messages are used to share opinions and sentiments that people have about what is going on in the world around them.

Another aspect of social media data such as Twitter messages is that it includes rich structured information about the individuals involved in the communication. For example, Twitter maintains information of who follows whom and re-tweets and tags inside of tweets provide discourse information.

C. What is GST?

Goods and services tax (GST) is a comprehensive indirect tax, which to be implemented in India from April 2016. It is an indirect tax on sales, manufactures, services, and consumption of goods throughout India. Previously there were different types of tax levied by both central government and state government. It was bit complicated and very difficult to understand. GST is a step to replace those complicated taxes and now it would be only one tax throughout all over India at each stage of sale or purchase of goods or services based on input tax credit system.

D. When GST started?

Actually this proposal was given in the time of our former Prime Minister Atal Bihari Vajpayee Govt. In 2000 government set up a committee to design an appropriate model for GST and it was headed by the Union Finance minister of West Bengal Mr Asim Dasgupta.

E. What would be the Tax rate?

Under the proposed GST the tax rate would be less but the number of assesses would be increased by 5 to 7 times. Tax collection would be also go up due to tax buoyancy.

F. What is the reaction of People towards GST?

People's reaction plays a very important role in implementing this amendment. Thus we tried to find out the sentiment of public. Now day's social media is the primary and important medium of sharing thoughts and opinions.

II. GST SENTIMENT ANALYSIS

The mounting habit of social media has elevated the prospect of exploring and tracking the response of new reforms and policies in India. Social media has been used profoundly all over the world for analysis of political campaigns, stock

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A HYBRID MODEL FOR RAINFALL PREDICTION USING BOTH PARAMETRIZED AND TIME SERIES MODELS

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Abstract

Prediction models of climate and rainfall are considered to be highly nonlinear and complicated, which requires classical, moderate and detailed models to obtain accurate prediction. Accurate and appropriate, area specific forecast of precipitation is very important for the countries thriving on agro based economy. Weather forecasting is an application to predict the atmospheric changes on a specific location, but sudden changes in the weather condition is a major threat for the predictions. Many tools and techniques have been introduced, still there is a need to predict accurate weather forecasting to avoid destruction of property and loss of lives. Multilayered Artificial Neural Network learning algorithm is commonly used in training. In this work, Long Short Term Memory(LSTM) Deep learning model is used to predict the forth coming rainfall in mm. In this paper, data collected during Hud-Hud from coastal Andhra Pradesh, severe cyclonic storm affected area. It also includes a hybrid model which takes time series model to predict weather Parameters like Temperature Max, Temperature Min, and Visibility etc... , and predicted parameters are tested with Parameterized prediction model which predicts next month rainfall. The results are enumerated in this paper.

Keywords: Natural Disasters, Rainfall Prediction, Deep Learning, LSTM, Time Series Prediction, Parameterized Prediction.

1. Introduction

Weather is the state of the atmosphere. Most weather occurs in the troposphere, or the lowest layer of the atmosphere. Weather is made up of multiple parameters, including air Temperature, atmospheric pressure, humidity, precipitation, solar radiation and wind. These factors can be measured to define typical weather patterns and to determine the quality of local atmospheric conditions. The aim of measuring weather is to find out the environmental conditions produced by different weather parameters has an impact on the quality of the surrounding ecosystem. Can temperature, pressure and humidity interact to form clouds and these clouds, in turn can reduce the solar radiation for plants, or increase precipitation, which can runoff into a body of water. High Temperature can increase the heat transfer to local bodies of water in addition to heating the air. Lack of precipitation affects not only the weather conditions, but also the soil moisture and water levels due to evaporation. Wind speed and direction can be indicative of a front moving into the area, or it can create waves and encourage a stratified water column to mix. Hence, Weather Forecasting is important. The implementation of Artificial Neural Network is initiated in 1964, an importance is given to Soft Computing methodology in weather forecasting [KumarAbhishek, 2012]. Both Feed-Forward Neural Networks and Recurrent Neural Networks can be used for Accurate Prediction. In the actual complex system, there are multiple variables evolving together and influencing each other, therefore multivariate prediction is more important [KumarAbhishek, 2012]. A Time Series model can be actually an integration of random and deterministic components [Pucheta, J, 2009]. If random components are eliminated then the deterministic components can then be easily modeled. Rainfall is an end product of number of complex atmospheric process which varies both in space and time. Hence time series Prediction is also important.

Most challenging part of flood forecasting is the lack of meteorological observations, particularly precipitation [Liu, J., 2012]. Precipitation Forecasts uses Numerical Weather Prediction models which still faces difficulties at

An Analysis on Contemporary Issues and Concerns of Scheduled Tribes in Global Frame work

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Abstract: Tribal societies in India by and large characterized as egalitarian societies especially in relation to the hierarchical character of caste society. In general, tribal families socialize their children through gender specified status and gender related roles, according to kinship, sexuality, work, marriage and age. Tribal women enjoy lot of liberty before and after marriage unlike plain women, they can even walkout from the husband's house with or without husband's permission or intimation. They have a lot of liberty/freedom to choose their life partner and break the marital relation and marry another person of her interest. Thus tribal women enjoy equal status with men, except in the sphere of rituals. It is imperative that the status of tribal women usually depends on the economic roles rather than social and political they play. In that way they are far better than the non-tribal and plain resident women in many respects. In this paper an attempt is made to analyse the role of the tribal women and her status compared to the non-tribal in providing food security.

Key words : Adivasis, Critical issues, Food security and Economy

I.INTRODUCTION

The Adivasis women (original inhabitants) especially women the collective term used for many tribal people of India. Officially they are termed "Scheduled Tribes" but this is legal constitutional term which differs from state to state and area to area therefore excludes some groups who might be considered tribal. Adivasis women are not homogeneous groups – with over 200 tribes speaking over 100 languages, which vary greatly in ethnicity, culture and language, however there are similarities in their way of life and generally perceived inferior within in Indian society. They constitute 8.6% of the Indian population thus making it largest tribal population in the world. Tribal women have relatively high status in their society. The tribal female child is almost treated on par with male child. Female children are the asset to tribal households, as they work both at household and at farm. Birth of girl is not looked down unlike urban societies, because they are considered as economic asset.

Adivasis women are found throughout India, but are primarily on the mountain and hill areas, away from the fertile plains. The greatest concentration is in the central states of India, notably Madhya Pradesh, Orissa, Southern Bihar, Western Ghats of Gujarat and Maharashtra and northern Andhra Pradesh, where over 85% of the tribal population is found. However in no peninsula state does the Tribal population reach more than one quarter of the population. There are smaller groups on the mountain areas of the south, notably in Kerala, Tamil Nadu and Karnataka. The other concentration is found in the north-eastern states, the "Seven Sisters"(Assam, Manipur, Nagaland, Mizoram, Tripura, Meghalaya and Arunachal Pradesh) but here the situation is significantly different as in most of these states (the exceptions are Assam and Tripura) Adivasis women are majority and are likely to remain so since regulations restrict settlement by outsiders.

Pandit Jawaharlal Nehru, the first prime minister of India was very much in favour of the integration of tribal with the main stream of the Nation. The tribal people are the earliest settlers in India, who are called "son of the soil"

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Adsorptive removal of toxic Methylene Blue and Acid Orange 7 dyes from aqueous medium using cobalt-zinc ferrite nanoadsorbents

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ABSTRACT

Cobalt-zinc ferrite nanoparticles of general formula $Co_{1-x}Zn_xFe_2O_4$ ($0.0 \leqslant x \leqslant 1.0$) were synthesized by means of chemical co-precipitation method. Impedance analysis was used to study the grain and inter-grain conductivities. The changing of complex conductivity with composition confirmed the semiconducting behavior. A significant influence of Zn concentration on dielectric properties was observed. The obtained Co-Zn ferrites were examined as magnetic adsorbents using both cationic and anionic dyes as model pollutants. Substitution of zinc ions with cobalt ones resulted in changes in sorption characteristics. The efficiency of Methylene Blue (MB) dye removal was increased with increasing Co content. On contrary, efficiency of Acid Orange 7 dye removal was increased with increasing Zn content. The adsorption of the both anionic and cationic dyes onto ferrite nanoparticles agreed well with the Langmuir isotherms. The maximum adsorption capacity for the Acid Orange 7 dye was reached up to 31 mg/g using $ZnFe_2O_4$, while the maximum adsorption capacity for the cationic Methylene Blue dye was found to be 3.4 mg/g on $Co_{0.9}Zn_{0.1}Fe_2O_4$. The relation of adsorption efficiency with ionic-covalent and acid-basic parameters of the ferrite surface was also discussed.

Keywords: Ferrite nanoparticles; Magnetic sorbents; Dyes; Surface

1. Introduction

Adsorption is well known as affordable and efficient method of water purification. A huge number of sorbents based on diverse materials such as activated carbon, clay minerals, waste biomass, agricultural by-products etc. have been proposed for the removal of various types of pollutants from aqueous medium [1–4]. In the recent decades, literature reports the information about the sorbents with magnetic properties possessing the advantage of after-use separation by means of external magnetic field. Among the magnetic sorbents, the most promising materials are ferrite spinels possessing adjustable crystalline structure [5,6]. Year-to year, spinel ferrite sorbents attract ever increasing attention of

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An Analysis on Contemporary Issues and Concerns of Scheduled Tribes in Global Frame work

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Abstract: Tribal societies in India by and large characterized as egalitarian societies especially in relation to the hierarchical character of caste society. In general, tribal families socialize their children through gender specified status and gender related roles, according to kinship, sexuality, work, marriage and age. Tribal women enjoy lot of liberty before and after marriage unlike plain women, they can even walkout from the husband's house with or without husband's permission or intimation. They have a lot of liberty/freedom to choose their life partner and break the marital relation and marry another person of her interest. Thus tribal women enjoy equal status with men, except in the sphere of rituals. It is imperative that the status of tribal women usually depends on the economic roles rather than social and political they play. In that way they are far better than the non-tribal and plain resident women in many respects. In this paper an attempt is made to analyse the role of the tribal women and her status compared to the non-tribal in providing food security.

Key words : Adivasis, Critical issues, Food security and Economy

I.INTRODUCTION

The Adivasis women (original inhabitants) especially women the collective term used for many tribal people of India. Officially they are termed "Scheduled Tribes" but this is legal constitutional term which differs from state to state and area to area therefore excludes some groups who might be considered tribal. Adivasis women are not homogeneous groups – with over 200 tribes speaking over 100 languages, which vary greatly in ethnicity, culture and language, however there are similarities in their way of life and generally perceived inferior within in Indian society. They constitute 8.6% of the Indian population thus making it largest tribal population in the world. Tribal women have relatively high status in their society. The tribal female child is almost treated on par with male child. Female children are the asset to tribal households, as they work both at household and at farm. Birth of girl is not looked down unlike urban societies, because they are considered as economic asset.

Adivasis women are found throughout India, but are primarily on the mountain and hill areas, away from the fertile plains. The greatest concentration is in the central states of India, notably Madhya Pradesh, Orissa, Southern Bihar, Western Ghats of Gujarat and Maharashtra and northern Andhra Pradesh, where over 85% of the tribal population is found. However in no peninsula state does the Tribal population reach more than one quarter of the population. There are smaller groups on the mountain areas of the south, notably in Kerala, Tamil Nadu and Karnataka. The other concentration is found in the north-eastern states, the "Seven Sisters"(Assam, Manipur, Nagaland, Mizoram, Tripura, Meghalaya and Arunachal Pradesh) but here the situation is significantly different as in most of these states (the exceptions are Assam and Tripura) Adivasis women are majority and are likely to remain so since regulations restrict settlement by outsiders.

Pandit Jawaharlal Nehru, the first prime minister of India was very much in favour of the integration of tribal with the main stream of the Nation. The tribal people are the earliest settlers in India, who are called "son of the soil"

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ON A CLASS OF SP-KENMOTSU MANIFOLDS ADMITTING THE QUARTER-SYMMETRIC METRIC CONNECTION

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Abstract

We consider semisymmetric and pseudosymmetric SP-Kenmotsu manifolds admitting the quarter-symmetric metric connection and prove the non-existence of pseudosymmetric SP-Kenmotsu manifolds with respect to the quarter-symmetric metric connection. At the end, we construct an example of 3-dimensional SP-Kenmotsu manifold admitting the quarter-symmetric metric connection and show that it is semisymmetric and its scalar curvature is constant with respect to the quarter-symmetric metric connection.

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Structural, optical, magnetic and dielectric studies of SnO_2 nano particles in real time applications

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ABSTRACT

Pure and Aluminium doped (x = 0.01, 0.02, 0.03, 0.04) SnO_2 nano particles have been prepared by Sol Gel method. XRD studies confirm tetragonal structure of SnO_2 and second phase peaks are absent. The obtained crystallite size of undoped SnO_2 is 17.5 nm and with Al insertion Crystallite size reduced to 10 nm for $Sn_{0.96}Al_{0.04}O_2$. FTIR data in the range of 550 cm^{-1}–630 cm^{-1} confirms the vibration modes of Sn—O—Sn and Sn—O in SnO_2 molecules. UV spectrum shows red shift due to the trapping of exitons by oxygen vacancies. In contrast to quantum confinement energy gap decreases from 3.7 eV for undoped SnO_2 and to 2.91 eV for $Sn_{0.97}Al_{0.03}O_2$ due to the band bending, which is the result of particle size reduction and then increases to 3.19 eV. This variation has been explained based on Burstein-Moss effect for $Sn_{0.96}Al_{0.04}O_2$. Impedance studies of undoped and Al doped SnO_2 samples have been investigated at room temperature and found that $Sn_{0.97}Al_{0.03}O_2$ exhibits peculiar behaviour of having high dielectric constant, high A.C. conductivity, low dielectric loss and high theoretically calculated mobility among Al doped SnO_2 samples. The data obtained from Vibration Sample Magnetometer shows typical conversion of magnetic nature of undoped SnO_2 which is diamagnetic to paramagnetic in the case of $Sn_{0.99}Al_{0.01}O_2$ and $Sn_{0.98}Al_{0.02}O_2$ samples and to superparamagnetic nature for $Sn_{0.97}Al_{0.03}O_2$ and $Sn_{0.96}Al_{0.04}O_2$.

1. Introduction

Nano particles exhibit different properties when compared to their bulk counterparts because of high surface to volume ratio and quantum confinement effect. An extensive work his being carried out from decades to hours on the method of synthesis and characterization of nano materials prepared in the form of quantum dots, films, particles, ribbons, wires and tubes. Innumerable applications are found in various electric, electronics and biomedical fields like gas sensors, energy storage devices, solar cells, photovoltaic applications, super capacitors, spintronics, magneto optical and tissue engineering applications [1].

Stannic oxide, popularly known as Tin dioxide (SnO_2), is one of the best materials among transparent conducting oxides. High transparency in visible region and reflectivity in infrared region [2], low electrical resistivity, and high chemical, mechanical and thermal stability [3] are some of the desirable properties of SnO_2. These properties made the compound to be the most essential for many applications in spintronics [4] and magneto optic devices [5], gas sensors [6], photo catalysts [7], solar cells [8] and for lithium-ion batteries (LIBs) and super capacitors [9]. SnO_2 is an n type semiconductor possessing wide, direct band gap of energy 3.6 eV at room temperature [10]. Generally, it exists in Tetragonal (rutile) structure with lattice parameters a = b = 4.737 Å, c = 3.186 Å [11] and belongs to $P4_2/mnm$ space group. The SnO_2 unit cell consists of two Sn^{4+} and four o^{2-} ions. Each of Sn^{4+} is surrounded by six O^{2-} ions occupying the corners of regular octahedron and O^{2-} ions are surrounded by three Sn^{4+} which occupy the three corners of equilateral triangle [12]. Dual valence of Tin (+2 in SnO and +4 in SnO_2) generates compositional variation in oxygen at the surface. This has become the origin for many chemical properties of the material. In order to improve the performance of TCOs of high energy band gap and to explore the unique properties great efforts have been rendered since few decades by doping suitable elements.

Energy band gap of a semi conductor is an important factor, which affect its optical and electrical properties. Doping with an apt impurity material in the host (SnO_2) lattice modifies energy band structure of semi conductor. The various parameters such as temperature, pressure

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Structural, electrical and magnetic properties of cobalt ferrite with Nd^{3+} doping

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Abstract A systematic study on the influence of Nd^{3+} substitution on structural, magnetic and electrical properties of cobalt ferrite nanopowders obtained by sol–gel auto-combustion route was reported. The formation of spinel phase was confirmed by X-ray diffraction (XRD) data, and percolation limit of Nd^{3+} into the spinel lattice was also observed. Fourier transform infrared spectroscopy (FTIR) bands observed $\approx$ 580 and $\approx$ 390 cm^{-1} support the presence of Fe^{3+} at A and B sites in the spinel lattice. The variation in microstructure was investigated by scanning electron microscopy (SEM), and the average grain size varies from 5.3 to 3.3 μm. The substitution of Nd^{3+} significantly affects the formation of pores and grain size of cobalt ferrite. Room-temperature saturation magnetization and coercivity decrease from 60 to 30 $mA \cdot m^2 \cdot g^{-1}$ and 19.9–17.8 mT, respectively, with Nd^{3+} substitution increasing. These decreases in magnetic properties are explained based on the presence of non-magnetic nature of Nd^{3+} concentration and the dilution of super-exchange interaction in the spinel lattice. The room-temperature direct-current electrical resistivity increases with Nd^{3+} concentration increasing, which is due to the unavailability of Fe^{2+} at octahedral B sites.

Keywords Co-Nd ferrite; Saturation magnetization; DC resistivity

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1 Introduction

In recent years, among the family of spinel ferrites, cobalt ferrite has been rigorously investigated due to its tremendous applications in high-density magnetic recording media, microwave devices, high-sensitivity sensor and biomedical industries [1–4]. Apart from the promising electronic applications, they are also suitable and widely used in environmental remediation applications due to their excellent physical and chemical properties like high saturation magnetization, low cost, size- and shape-dependent and catalytic properties [5, 6].

The structural, electrical, magnetic and dielectric properties of cobalt ferrite are governed by the factors like method of preparation, sintering time and temperature, chemical composition, type and concentration of dopant. The spinel unit cell consists of cubic closed-pack arrangement of oxygen ions with 64 tetrahedral (A) and 32 octahedral interstitial sites (B). Out of these 96 interstitial

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Mn Modified Mesoporous TiO_2 Particles: Synthesis, Characterization and Photovoltaic Application

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In this work, manganese (Mn) modified mesoporous titanium dioxide (Mn-MT) particles were synthesized by a hydrothermal process using an impregnation method and cetyltrimethylammonium bromide as a template. This method enables synthesis at relatively low temperatures, with good surface modification resulting in ordered spherical particles. To verify the modifications in structural properties, x-ray diffraction (XRD) studies were carried out. A pure anatase phase was exhibited by both MT and Mn-MT particles. XRD patterns showed no evidence of secondary phase formation after surface modification with Mn. Optical studies of these particles were analysed by band gap studies. Both the optical and electron spin resonance studies revealed the presence of Mn in the 2^+ state. Finally, these particles were coated on Si solar cells and exhibited an overall increase in efficiency of 15% when compared with bare cells, which can be attributed to better surface passivation.

Key words: Mesoporous, titanium dioxide, x-ray diffraction, photovoltaic, electron spin resonance

INTRODUCTION

Since its discovery, titanium dioxide (TiO_2) has been extensively studied, and has been used for a wide range of applications. This is mainly because TiO_2 is chemically stable and environmentally friendly.[1–3] Various research groups have shown applications of titanium dioxide materials in photocatalysis and for renewable energy.[4–8] Among all the phases which TiO_2 can exhibit, the anatase phase of TiO_2 is often preferred because it offers high structural stability and high discharge voltage.[2] It is often used as a negative electrode, as in the case of Li-ion batteries. There are also reports that photo-conversion efficiency has been improved by using differently shaped TiO_2 nanoparticles (NPs) in dye-sensitized solar cells as a photo anode material.[3,9–11] TiO_2 in its anatase phase has a band gap of 3.3 eV, which indicates that under ultraviolet light it exhibits high reactivity and chemical stability. This limits the usage of the material in the visible region.[1] In order to extend the usage of this material over the visible region, many research groups have tried to reduce the band gap by doping, surface modification or by photosensitizing the surface of TiO_2.[4,5] Over the past few decades various methods have been proposed to synthesize anatase TiO_2 in various forms. Because of the readiness of chemicals and low cost with a good reproducibility, the hydrothermal process has emerged as preferred among all the methods.[6–15]

Synthesis of meso, micro and nanostructures with different morphologies has been studied extensively to observe their structural effects on photo-catalytic

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ORIGINAL PAPER

Correlation Between Structural, Magnetic and Dielectric Properties of Microwave Sintered Ni-Zn-Al Nanoferrites

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Abstract
A series of diamagnetic aluminum (Al^{3+}) substituted Ni-Zn Nanoferrites have been synthesized using sol-gel auto combustion route. Structural, magnetic, and dielectric properties were systematically studied and reported with respect to Al^{3+} substitution in host Fe^{3+} ions. X-ray diffraction (XRD) and infrared spectroscopy (IR) measurements confirm the presence of Al^{3+} ions at both A and B sites. Cation distribution proposed from XRD and IR correlates with magnetic and dielectric results. It is observed that Al^{3+} ions are distributed in to tetrahedral and octahedral sub-lattices. The saturation magnetization varies between 58.5 and 44.2 emu/g with increasing Al^{3+} substitution. This decrease in magnetization is ascribed to presence of the non-collinear spin (canted spin) structure in octahedral sub-lattice. Dielectric constant decreased and a significant improvement in AC resistivity is observed with Al^{3+} substitution. The observed variations are accounted on the basis of cation distribution in spinel ferrite.

Keywords Ni-Zn ferrite · Microwave sintering · Al^{3+} substituted ferrites · FT-IR spectra · Magnetic and dielectric properties

1 Introduction

Research in nanocrystalline ferrites has increased dramatically in recent years, due to their viability to serve in wide range of applications like sensors, phase shifters, amplitude modulators, and optical wave devices and in devices from microwave to radio frequencies [1–5]. Due to the miniaturization, devices with small size and exhibit high performance are necessary not only to reduce the cost but also to improve efficiency of the system. Among the many available ferrite systems, Ni-Zn ferrite is a promising ceramic magnetic spinel and used in low- and high-frequency transformer cores, antenna rods, and microwave devices because of its inherent properties like high resistivity high saturation magnetization, high Curie temperature, low dielectric losses, relatively high permeability, and chemical stability [6–8]. However, ionic radii, particle size, grain size, grain structure, porosity, and cation distribution among the crystallographic lattice sites play a major role to use Ni-Zn ferrite for a specific device application [9–12].

It is established that doping of various magnetic or non-magnetic elements in spinel ferrite results in cation disorder/redistribution and frustration at tetrahedral (A) and octahedral (B) sub lattice, which further tailors the electrical and magnetic properties [13–15]. In particular, when a diamagnetic Al^{3+} ions are introduced at lower proportion in the spinel ferrite, it dilutes the net magnetic nature of the system and shows a significant control over magnetic and electric properties, which further allow to tune for a specific application [16–20]. These reports infer that Al^{3+}-substituted ferrites enhance resistivity and posses low coercive field and thus good core materials for power transformers in communication applications. Apart from the dopant substitution, preparation, and sintering method, temperatures are also key factors, which dramatically influence the properties. In general, conventional ceramic method is widely used for the synthesis of ferrites, which produces non-stoichiometry product due to prolonged heating at elevated temperatures [21]. To address this wet

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Effect of Pr^{3+}-doping on the structural, elastic and magnetic properties of Mn–Zn ferrite nanoparticles prepared by solution combustion synthesis method

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ABSTRACT

Ferrite nanoparticles are currently used for important applications in the field of medical particularly, target-directed medicine and cancer treatment. Keeping this in mind, in the present work we prepared Pr^{3+} doped $Mn_{0.5}Zn_{0.5}Fe_2O_4$ nanoparticles by combustion route. The crystallinity and structure were confirmed by XRD. The Elastic properties are estimated by using FTIR data and reveals that variation of elastic constants has been interpreted in terms of strength of inter-atomic bonding and electronic configuration of the cations involved in the samples. Further variation of stiffness constants, Poison's ratio, elastic constants, longitudinal and transverse wave velocity is studied with respect to Pr^{3+} content. Significant influence is observed in elastic values due to the addition of larger ionic radii of Pr^{3+} in spinel lattice. The intensity of magnetization, remanence, and coercivity was found to be decreasing with increasing Pr^{3+} concentration. Hence these samples are potential candidates for medical applications i.e. magnetic resonance imaging.

Specifications table

Subject area	Nanomaterials, Solid state physics
Compounds	Mn–Zn ferrite nanoparticles
Data category	Synthesis and study of effect of Pr^{3+}-doping on structural, elastic and magnetic properties
Data acquisition format	XRD analysis, FTIR analysis, elastic properties and magnetic studies
Data type	Synthesized, analyzed and verified
Procedure	The series of $Mn_{0.5}Zn_{0.5}Pr_xFe_{2-x}O_4$(where $x = 0.0, 0.01, 0.03$ and 0.05) is synthesized through solution combustion method using mixture of glucose and urea as fuels. The stoichiometric molar amounts of manganese nitrate, zinc nitrate, and Iron nitrate, Praseodymium nitrate is taken as oxidizers and the mixture urea and glucose are taken as fuels. The solution is taken in a 200 ml beaker and kept in to the pre-heated muffle furnace and maintained at 450 °C. Once the process is completed a fine powder of Pr^{3+} substituted Mn–Zn ferrites is formed. For synthesized sample XRD analysis was done by using Cu-Kα radiations with the wave length of 0.154056 nm. The FTIR analysis was done by using thermo nickel Avatar 370FTIR spectrumeter. The magnetic studies were done by using Vibrating sample magnetometer.
Data accessibility	Within this manuscript.

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Collaboration of Blockchain and Machine Learning in Healthcare Industry

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Abstract: The purpose of this paper is to explore the applications of blockchain in the healthcare industry. Healthcare sector can become an application domain of blockchain as it can be used to securely store health records and maintain an immutable version of truth. Blockchain technology is originally built on Hyperledger, which is a decentralized platform to enable secure, unambiguous and swift transactions and usage of medical records for various purposes. The paper proposes to use blockchain technology to provide a common and secured platform through which medical data can be accessed by doctors, medical practitioners, pharma and insurance companies. In order to provide secured access to such sensitive data, blockchain ensures that any organization or person can only access data with consent of the patient. The Hyperledger Fabric architecture guarantees that the data is safe and private by permitting the patients to grant multi-level access to their data. Apart from blockchain technology, machine learning can be used in the healthcare sector to understand and analyze patterns and gain insights from data. As blockchain can be used to provide secured and authenticated data, machine learning can be used to analyze the provided data and establish new boundaries by applying various machine learning techniques on such real-time medical data.

Keyword: healthcare industry, Hyperledger, decentralized platform, doctors, medical practitioners, pharma and insurance companies.

I. INTRODUCTION.

The main reason blockchain technology is preferred in order to achieve quality data maintenance is due to its distributed public ledgers which secure encrypted immutable data.This technology of distributed ledgers is preferred for broad variety of use cases ranging from data storage, financial transactions to real estate and asset management. . Though blockchain technology has been under research from many years, it has become an interest to huge number of people after its applications of cryptocurrencies such as Bitcoin. Many market players have presented various applications of blockchain to the industry. One such application of blockchain is Electronic Health Records (EHR), which is explored through this paper.

Patients visit many healthcare organizations depending on their circumstances in life, thus leaving traces and bits of their medical data scattered among various organizations. In such a scenario, it is difficult if not impossible for the patient to retrieve their past medical history. The patient's medical data is scattered among various hospitals and medical organizations making it difficult for the organizations to maintain proper updated information and leaving the patient in an ambiguous state. This lack of coordinated data management leaves the data shattered. To overcome these barriers, a digital platform like EHR where the patients and medicine practitioners can access the data efficiently.

The Electronic Health Records System is a digital platform of a patient's medical history. It is maintained by the healthcare providers. These records include information on diagnosis, medical history, lab tests and other medical data. Major uses of enforcing the usage of EHR is maintenance of updates medical information, reduced errors, quick access to patients records and increased involvement of patients in their healthcare.

II. BLOCKCHAIN IN HEALTHCARE

Although EHR has many benefits, it stores data from various workflows, hence the security of data is not guaranteed. This hinders the trust environment in medical fraternity. The nature of sensitivity associated with the data along with the challenged of interoperability and health information exchanged has built opportunities for advancement of blockchain in this domain of industry. The successful deployment of the application of blockchain in healthcare allows secured transition of data in an efficient and coherent manner. The advantage of using blockchain technology is that every organization does not require to maintain a distinct database to store the records of their patients. The decentralized behavior of blockchain allows any authenticated participant to access the data. Blockchain's architecture provides patients with complete control over the access and data exchange in EHR.

III. MACHINE LEARNING IN HEALTHCARE

Machine Learning can be used to provide the doctors with insights on the secured and quality data provided using blockchain technology. With increasing number of applications of machine learning in various domains, healthcare allows is to glimpse at the future where data analytics and innovation together help people in large numbers by making smart decisions and analysis. The main application of machine learning is identification and providing treatment to a disease. Many algorithms and techniques in ML are implemented to analyze the symptoms, test results and condition of the patient to identify the disease.

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RESEARCH ARTICLE

WILEY

Robust segmentation of optic disc and optic cup using statistical Kurtosis test

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Abstract

Glaucoma is a chronic and irreversible eye disease that leads to the loss of vision. Evaluation of the Cup to Disc Ratio (CDR) plays a prominent role in the early detection of glaucoma. This paper presents a novel algorithm to compute the CDR for the fundus images. In order to calculate the CDR, the vertical diameter of Optic Disc (OD) and the vertical diameter of the Optic Cup (OC) are calculated from the segmented OD and segmented OC, respectively. This study presents OD and OC segmentation algorithms based on a new statistics-based kurtosis test. A unique OC boundary segmentation method is presented, which is the combination of partial cup extraction and the cup boundary under the Central Retinal Blood vessels (CRBV). A novel preprocessing technique is introduced to extract the CRBV from the automated Region of Interest (ROI). The experimental results confirm that the proposed algorithm outperforms the state-of-art OD and OC segmentation on the three publicly available datasets: ORIGA, DIARETDB0, and DIARETDB1. The proposed OD and OC segmentation achieve accuracies of up to 0.99 and 0.97, respectively. In addition, the proposed model achieves excellent CDR evaluation with an average error percentage reduced to up to 9.6496 for the considered datasets.

KEYWORDS

central retinal blood vessels (CRBV), cup to disc ratio (CDR), kurtosis, optic cup (OC), optic disc (OD)

1 | INTRODUCTION

The optic nerve is a part of the central nervous system and carries visual information from the eye to the brain. Glaucoma is a chronic eye disease that damages the optic nerves. Due to the death of ganglion cells in the optic nerves, the degeneration of the optic nerve head takes place, resulting in permanent loss of vision. As it is an eventual and irrevocable blindness,[1] it is necessary to detect and treat this disease at the earlier stage.[2-5] Glaucoma is also named "silent thief of sight"[6] because it leads to eventual blindness without any symptoms of occurring glaucoma.[7] Worldwide, glaucoma stands as the second leading blindness causing disease[8] after cataracts. By 2020, it is estimated that around 80 million people will suffer from glaucoma.[2,4,9] The input fundus images are shown in Figure 1.

Segmentation of OD (optic nerve head) boundary and OC boundary are the most important aspects of the evaluation of CDR. The Vertical Cup Diameter (VCD) is comparatively greater in case of a glaucoma eye rather than the normal eye, as shown in Figure 1B and Figure 1C. The OC region increases gradually, resulting in the progression of glaucoma.[2] There are mainly three methods for the detection of glaucoma.[6]

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Blockchain Based Smart Contract for Sealed--Bid Auction

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Abstract: In this growing world, Internet has changed so much to an extent that it turned into a powerful tool in every aspects of our lives.E-auction is one of those things which helps the bidders to take part in an auction online over the air. In a sealed bid third parties need to pay an extra cost to help the buyers and sellers carry out their exchange without any hassle. But there can be a breach of trust by the third parties. Owners of the auction or the company that is auctioning can have direct entry to it when the auction is run on a decentralized platform. When the users auction off something on the chain, the smart contract takes control of the auctioned asset and thereafter it manages the bids associated. In this paper, we execute a smart contract for a verifiable sealed-bid auction on the Ethereum blockchain. The type of auction used is sealed-bid in which the bidders submit their bids privately and each bidder can participate only once. As per the biddings received, the highest bidder wins and pays the highest corresponding highest submitted bid. Additionally, before the auction ends the bidder can withdraw the bid after submitting it. In such a case the bidder will have another chance to place the bid. This smart contract implementation abides by the true essence of a sealed-bid, to be precise, no information about the biddings is leaked to the bidders except for the highest bid

Index Terms: Blockchain, Ethereum, Metamask, Remix IDE, Smart Contract, Sealed-bid Auction.

I. INTRODUCTION

The principle of Blockchain [1] underlies at the integration of network techniques into the bidding system to reduce the cost of transaction. E-auction system comprises of bidders, third parties and the auctioneers. All the centralized third parties help in providing platform for the bidders and the auctioneers for advertising their products, checking the current highest bidding price etc. Companies like E-bay and Yahoo make revenues out of this kind of bidding system. However E auction has mainly two problems. Firstly, centralized third parties charge a whole lot of money which can increase the transaction cost. Moreover, the privacy of the personal data and transaction history which are supposed to be stored in the database might be at stake. Secondly, in a sealed envelope the bidders have no clue whether the lead bidder is trust worthy. This paper discusses about the application of block chain technique into the E-auction to solve the issues. This technique follows peer to peer access structure which implies each point in the structure can individually communicate, authenticate and transfer data to any other point which is a site in this case without any need for an actual centralized intermediary thereby reducing the transaction cost. On the other hand, a smart contract takes care of a treacherous lead bidder. Some rules are not supposed to be unveiled before the deadline.This paper is organized as follows. Section 2 illustrates the traditional bidding system and the blockchain. Section 3 shows how do we incorporate the blockchain technique into the bidding system. In order to justify the proposed method, we conduct the experiments in Section 4 and we draw our conclusions in Section 5.

II. E-AUCTION

A. Traditional Bidding System

E-auction [2][11][12] follows the same approach as the traditional manual auction, but as the name suggests it takes place online. So, the assets or goods that to be auctioned are sold through online competitive bidding. The e-auction starts and ends within a given time interval which is managed by the controlling person. Once the e-auction begins, participants must submit their bids within the closing time via the internet. After the e-auction ends, a report is generated and the winners with highest bid are declared. The successful bidders then deposit their bid amount, after which the auctioned item is can be collected from the seller.

E-auction can be divided into two types, namely public bid and sealed bid [3]. Public bid is that in which bidders could increase the price to bid the products. Thus, the bidding price grows continuously till no bidders are interested to pay a greater price. A bidder is declared as a winner if he bids the highest price for such a product. During public bid, bidders can bid many times. Thus, public bid is also called as a multi-bidding auction. Sealed bid is that bidders encrypts the bill and only end the bill once at a time. If there is time, the auctioneer compares the bills. The bidder who bids for the highest price is the winner of the sealed bid. Since bidders only can bid once, it is also called single-bidding auction. In the seal bid, all bidders' costs are sealed until the bid opening date is compared to the costs of all bidders.

There is a common problem in electronic seal ticket auctions i.e.; we cannot make sure if the prices of the other bidders are leaked before the deadline or not.

B. Blockchain

It is a technology [10][13] which accesses, verifies and transmits network data through distributed nodes. It utilizes a peer-to-peer network to gain a decentralized data operation and preservation platform.

The block chain is mainly based on the following technologies as the operating base:

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Effect of Pleural Membrane on the Propagation of Rayleigh Waves in Inflated Porous Lungs—A Study

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ABSTRACT In an attempt to include the effects of natural porosity of lung parenchyma into the mathematical study of lung diagnostics, a model describing the propagation of low frequency Rayleigh waves in relation to the porous architecture of the lung parenchyma is presented. The wave motion is analyzed by assuming that the lung parenchyma behaves as an isotropic elastic half-space containing a distribution of vacuous pores with the visceral pleura as a taut elastic membrane in smooth contact with the half space. The thinness of the pleural membrane in comparison with the large surface area of contact enables it to be modeled as a material surface in contact with the parenchyma. Utilizing the perturbation technique, an approximate formula for the Rayleigh wave velocity in the parenchyma with allowance for surface tension, mass density, and porosity is derived. In addition, the effect of the tension in the pleural membrane and the porosity in the parenchyma on the propagation of the low-frequency Rayleigh waves is brought out through the dispersion spectrum. It is hoped that the results of this paper would enable a better understanding of the porosity and surface-tension effects on lung parenchyma.

INDEX TERMS Pleural membrane, porous lung, low-frequency, material with voids, Rayleigh waves.

I. INTRODUCTION

The mechanical properties of biological tissues are known to provide information about their pathological condition and have been clinically used for diagnostic purposes in numerous organs [1]. Of all the internal organs, the lung has the strongest connection between physiologic function and mechanical behavior [2]. It is well realized that lung elastic recoil plays a crucial role in breathing and hence, lung mechanics, particularly elasticity during physiology, has received large attention in the literature [2], [3]. Techniques are being developed to contrast and quantify changes in the macroscopic properties of the lung that are indicative of disease and may be linked to behavioral and structural changes at the microscopic level [4].

A most common name for techniques developed to non-invasively assess the mechanical properties of biological soft tissues with application to medical diagnosis is elastography [5]. A general approach in elastography is to perturb the state of the tissue under the study using a quasi-static, harmonic or transient mechanical source and then infer the biomechanical properties from the measured mechanical response using a model [6]. Current elastographic techniques enable elasticity estimation by determining the phase speed of shear/surface waves propagating in the tissue [7]. Shear/Surface wave dispersion derived from the elastography technique can be used to estimate the elastic/viscoelastic parameters with an assumed model of the tissue. In the model, the problem of wave propagation on the surface of the tissue is generally approximated as wave propagation in a semi-infinite elastic/viscoelastic medium under harmonic excitation.

The Rayleigh surface waves [8] have proven to be applicable in many areas such as ultrasonics, seismology, material science and medical diagnostics to name a few. A better understanding of the surface wave behavior on and in soft

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Steganography Using Reversible Dynamic Texture Creation

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Abstract: *In Communication system there is less security while transmitting the information. To avoid this, we have to use technique called Steganography. The art of hiding information in order to prevent detection of hidden messages is called Steganography. A novel approach for steganography is proposed using a reversible texture creation. In contrast to existing steganography algorithm, our algorithm conceals the source texture image and embeds secret messages through the process of texture creation. Here the embedded message may be hybrid version i.e. text or image. The process of texture creation converts a smaller texture image into a new texture image with similar local appearance and an arbitrary size. To conceal secret messages in steganography, we use texture creation process. This allows us to extractthesecret messagesand the sourcetexture from a stego synthetic texture. The source image is divided into number of blocks and we have to compose new large image by randomly pastes all blocks of source texture image into some blocks of new image. Those locations are stored in index table. The remaining blocks are filled with secret message that may be text or image. For extracting message, we have to generate index table and we get back the source texture, and we have to perform texture creation, and extracting and authenticating the secret messages which is hidden in the stego synthetic texture*

Keywords: *Steganography, synthetic, texture, authenticating, extracting.*

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I. Introduction

In the last decade many advances have been made in the area of digital media, and much concern has arisen regarding steganography for digital media. Steganography is a singular method of information hiding techniques. It embeds messages into a host medium in order to conceal secret messages so as not to arouse suspicion by an eavesdropper. A typical steganographyapplication includes covert communications between two parties whose existence is unknown to a possible attacker and whose success depends on detecting the existence of this communication [1]. In general, the host medium used in steganography includes meaningful digital media such as digital image, text, audio, video, 3D model, etc. A large number of image steganography algorithms havebeen investigated with the increasing popularity and use of digital images.

Most image steganography algorithms adopt an existing image as a cover medium. The expense of embedding secret messages into this cover image is the image distortion encountered in the stego image. This leads to two drawbacks. First, since the size of the cover image is fixed, the more secret messages which are embedded allow for more image

Distortion [2]. Consequently, a compromise must be reached between the embedding capacityand theimage quality which results in the limited capacityprovided in any specific cover image. Recall that image steganalysis is an approach used to detect secret messages hidden in the stego image [3]. A stego image contains some distortion, and regardless of how minute it is, this will interfere with the natural features of the cover image. This leads to the second drawback because it is still possible that an image steganalytic algorithm can defeat the image steganography and thus reveal that a hidden message is being conveyed in a stego image.

In this paper, we propose a novel approach for steganography is proposed using a reversible texture creation. A texture creation process resamples a small texture image which synthesizes a new texture image with similar local appearance and an arbitrarysize. We weave the texture creation process into steganography concealing secret messages as well as the source texture. In particular, in contrast to using an existing cover image to hide messages, our algorithm conceals the source texture image and embeds secret messages through the process of texture creation. This allows us to extract the secret messages and the source texture from a stego synthetic texture. To the best of our knowledge, steganography taking advantage of the reversibility has ever been presented within the literature of texture creation.

Our approach offers three advantages. First, since the texture creation can synthesize an arbitrary size of texture images, the embedding capacity which our scheme offers is proportional

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WAVELET FEATURE EXTRACTION BASED HUMAN IRIS RECOGNITION

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ABSTRACT

Personal identification has become the most important factor in authentication processes in recent years. The various biometric identifiers such as face, iris, fingerprint, hand, voice, signature recognition are used for human identification. Among all these biometric identifiers, Iris recognition is the most reliable and accurate biometric identifier as iris cannot be forged. This paper project involves the acquisition of the image of an eye followed by the segmentation and localization of the image to obtain the image of iris. The Haar wavelet is used for feature extraction of an image. Hamming distance is measured between the image in the database and the detected image. Iris recognition is then performed by matching the iris pair with the minimum Hamming distance.

Keywords: personal identification, iris recognition, haar wavelet, hamming distance.

1. INTRODUCTION

Biometrics refers to metrics related to human characteristics. Biometric authentication is a form of identification and access control. It is also used to identify individuals in groups that are under surveillance. Biometrics is used for automatic human authentication based on unique physiological and behavioral characteristics. Biometric identifiers are the distinctive, measurable characteristics used to describe individuals. The selection of a particular biometric for use in a specific application involves a weighting of several factors. The selection of proper biometric identifier is based on application. Certain biometrics will be better than others based on the required levels of convenience and security. No single biometric will meet all the requirements of every possible application. When thieves cannot get access to secure properties, there is a chance that the thieves will stalk and assault the property owner to gain access. If the item is secured with a biometric device, the damage to the owner could be irreversible, and potentially cost more than the secured property. Among all the biometric identifiers such as face, iris, fingerprint, hand, voice, signature recognition, iris recognition is highly reliable and is used for personal identification. Furthermore, iris recognition systems can be non-invasive to their users [1] [2]. Iris is a part of an eye. The iris is a thin, circular structure in the eye. It controls the diameter and size of the pupils.

Iris recognition is the most accurate biometric identifier available in today's world. The iris, being found to be very stable, highly unique and easy to capture, is classified as one of the better biometric identifiers [3] [4]. Its is a process that analyses the features such as rings, furrows, and freckles that exist in the coloured tissue surrounding the pupil [5]. The human eye images are acquired from a UBIRIS database [6]. Later, segmentation is performed on the acquired image to exactly locate the iris in the entire image of the eye. The Haar wavelet transformation technique is applied on the segmented image to extract the features from the iris image [7]. The feature extraction involves the conversion of the detected image into binary form. Each iris in the database has different binary pattern. A threshold hamming distance is decided based on the images available in the database and the similarity between the detected and the reference image in the database is measured, thus enabling the determination of accuracy of the iris recognition system. An iris recognition system uses the iris to distinguish the identity of a person using the rich iris texture feature [8]. The iris has a unique pattern and texture in the human eye and cannot be transferred or faked which makes the iris more secure than other biometric systems [9]. The success of iris recognition depends mainly on image acquisition and the iris recognition algorithm [10]. Figure.1 shows the structure of the human eye and their other parts such as pupil, sclera and eyelids are present along with the iris.

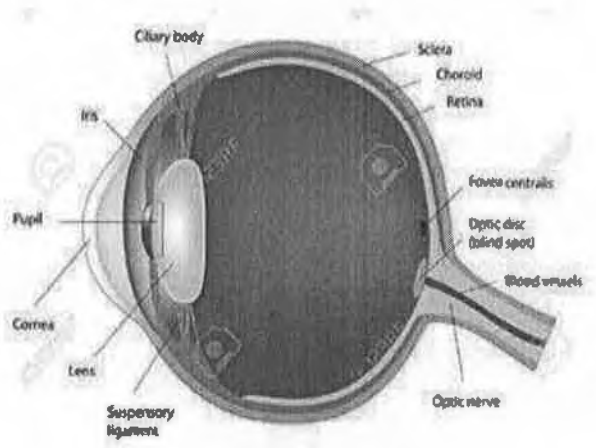

Figure-1. Structure of human eye.

Irises have approximately 266 distinctive characteristics, of which approximately 173 are used to create the iris template [11]. The iris is a thin, circular structure in the eye, responsible for controlling the diameter and size of the pupil and thus the amount of light reaching the retina [12]. Eye colour is defined by that of