3.3.1 Number of research papers published per teacher in the Journals notified on UGC CARE list during the last five years

Title of paper	Name of the author/s	Department of the teacher	Name of journal	Link to the recognition in UGC enlistment of the	
				Link to website of the Journal	Is it listed in UGC Care list
A Novel Approach for Privacy Preservation in Big data using Data Perturbation in Nested Clustering in Apache Spark	R.Vimala	CSE	Journal of Computational and Theoretical Nanoscience	http://www.aspbs.com/ctn/	Yes
Detection of anemia disease using DPSO algorithm	N.R.Shanker	ECE	ARPN Journal of Engineering and Applied Sciences	http://www.arpnjournals.org/jeas/	Yes
Geospatial Analysis of Terrain Through Optimized Feature Extraction And Regression Model With Preserved Convex Region	N.R.Shanker	ECE	Multimedia Tools and applications , Springer	http://link.springer.com/journal/11042	Yes
Data Security in Cloud Storage Using Elliptical Curve Cryptography	N.R.Shanker	ECE	International Journal of Pure And Applied Mathematics	http://ijpam.eu/	Yes
A Condition Monitoring System by Using Thermal Image	N.R.Shanker	ECE	International Journal of Pure And Applied Mathematics	http://ijpam.eu/	Yes
Detection of Anemia Disease Using PSO Algorithm and LSP Texture Analysis	N.R.Shanker	ECE	International Journal of Pure And Applied Mathematics	http://ijpam.eu/	Yes
A Review Paper on Smart Controller using Efficient Method for Reducing Energy Consumption in HVAC	R.Lavanya, Dr. N.R. Shanker	IT	Journal of Applied Science and Computations	https://j-asc.com/	Yes
A Thermodynamics Performance study of simple cooling and combined power Transcritical N2O Cycles	Anjan Kumar Sahu	Mech	International Journal for research in Engineering Application and Management/	http://www.ijream.org/	Yes
Drilling Performance and wear characteristics of coated drill bits during drilling Reinforced concrete	S.Sathish & Ramkumar	Mech	International Journal of Applied Ceramic Technology	http://onlinelibrary.wiley.com/journal/10.1111/(ISSN)1744-7402	Yes
Electronic and structural properties of ZnTe using density functional theory(DFT)	Ms.P.Ashwini	PHYSICS	International Research journal of engineering and technology	http://www.irjet.net/	Yes

A Novel Approach for Privacy Preservation in Bigdata Using Data Perturbation in Nested Clustering in Apache Spark

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Now a days with the emerging technologies the surplus amount of data and security features faces a major problem. In order to handle this problem there are many innovative research and applications are processing. It plays a vital role in todays technological world. This paper come up with a technique to handle the above problem in an adequate way. Apache Spark is a memory cluster computing platform, it is 10 to 100 times faster than map reduce in batch processing, sparks have a graph X, a distributed graph system. It supports machine learning algorithm for future prediction. There is many privacy preservation techniques are there. This paper is going to propose a technique 'Data Perturbation in Nested Clustering' (DPNC) for numerical and non-numerical data to enhance the privacy. The perturbated data will store in Hadoop through Apache Spark for third party access for research or survey purpose. In this method the data will be preserved and hasty processing of data.

Keywords: Privacy Preservation, Perturbation, DPNC, Apache Spark.

1. INTRODUCTION

In earlier days the data are stored as files and hard copy so it occupies more space to store it but now a days the people migrated to latest technology like local system storage. Even in this local system storage it requires more space to store, so they go for online storage. In this online storage rapid development of data user feels some difficulties to access the data like time delay, accuracy, and more than that these sensitive data are considered as very confidential and it will be protected from unauthorised access. These all are the issues globally faced by the current system. Some of the existing privacy preservation techniques are available in the market like Attribute based encryption, Identity based encryption, Homomorphic encryption, even though some draw backs also there. So to make sure the privacy this paper proposing a technique data perturbation in nested clustering.

There are two types of data generation process are there, first one is active data generation and the other one is passive data generation. The data owner is willing to give the data to the third party is active data generation and while the data generated by the data owner's online activity or without the owner's knowledge is passive data generation. The main challenge of data owner is to protect the data from the third party who may willing to collect them. The data owner may hide his sensitive information as it is concerned about how much data or information he could have. The risk of privacy violation during data generated may either restricting the access or minimising the falsifying data. This paper provides the data for third party access for their research and survey through Apache Spark.

In existing system they are having hadoop map reduce framework to process the data, due to the rapid development of data the map-reduce framework take more time to process the data. The Hadoop Distributed File System uses map reduce to process and analyse data. It takes a backup of all the data in a physical server, after each operation. This is done because the data is stored in the RAM is volatile as compared to that which is stored on to a physical server. Map reduce is not suitable in real time processing. In map reduce program it not easy to implement each and everything. It is not suitable when your

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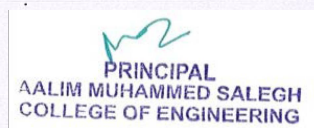
DETECTION OF ANEMIA DISEASE USING DPSO ALGORITHM

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ABSTRACT

A novel technique for segmentation of images based on Darwinian particle swarm optimisation (DPSO) algorithm is proposed to detect the anemia disease by using a palm region of the person. Images are captured using a digital microscopic camera, and pre-processing is done. The Darwinian principle is applied to improve the values of fitness function individually to all input images and results in output images. The efficiency of the proposed technique is measured on mean, standard deviation and entropy. The experimental results demonstrate that the DPSO algorithm based analysis is better than PSO algorithm based analysis.

Keywords: darwinian particle swarm optimisation (DPSO) algorithm, segmentation, images.

1. INTRODUCTION

Anemia occurs when there is a reduction of red blood cells circulating in the body. It is the general blood disorder in the world population over 1.62 billion people. The major symptoms are chest pains, headaches and pale skin. The blood requires red blood cells to function. They hold haemoglobin, is a mixture of proteins that includes ion molecules. These molecules transfer oxygen from the lungs to the different parts of the body. There are different types of anemia, and there is no single reason. Overall three major groups of anemia are 1) blood loss, 2) faulty or decreased red blood process and 3) destruction of red blood cells. Some of the existing methods have been discussed below in this research.

Finding an exact count of leukocytes normally called as WBC (white blood cells) in a blood test is vital in measuring and analysing an individual's health especially on a broad range of diseases which includes anemia, infections, leukemia etc. There are two broadly utilised techniques to calculate leukocyte count. First, is through the usage of hematology analyser and the other one is done manually. Now, with the advent of technology leukocyte counting was made better through the usage of digital image processing. In any case, the algorithm of the existing techniques includes an excessive number of steps which make more complex in image processing phase. Thus, we believed counting leukocytes by containing the HSV (Hue, Saturation, and Value) saturation part with blob examination on microscopic blood images which features the eccentricity and area highlights for counting to easier existing techniques which thus produces faster and more exact results [1].

The evaluation of blood cells is more important for the specialist to analyse different diseases such as leukaemia, anaemia etc. Similarly, classification and observation of these cells concede for the estimation and recognising of countless. By calculating white blood cells (WBCs) permits the leukaemia detection (Acute Lymphoblatic leukaemia (ALL) Acute Myloid leukaemia), be cancer which influenced on blood which can be deadly on the off chance that it can be untreated. So the exact counting and classification of blood cells have an essential

part. Moreover, the counts particularly differential tallies and shape give essential information to assess leukaemia. In current techniques, the morphological rating of haemocytes is performed physically by specialists and counting of blood cells is done utilising a device called Haemocytometer. However, these methods have several limitations, such as deviant accuracy, a different standard, slow estimation and dependence on the operator ability. For counting hardware arrangements such as the Automated Haematology counter exists, they are extremely costly, unreasonably expensive in each hospital laboratory and also utilise actual blood samples. So there reliably requires a simple, cost-effective and robust technique for analysis, counting and classification of blood cells. The proposed technique gives a complete automatic computerised technique for WBC counting, identification and classification utilising microscopic images [2].

Red blood cell count acts as a fundamental part of identifying the overall health of the patient. Grown red blood cells experience morphological changes when blood issue exists. Automated and manual methods exist in the market to check the number of RBCs (Red Blood cells). Manual counting includes the utilisation of Hemocytometer to count the blood cells. The conventional technique for setting the smear under a microscope and counting the cells manually prompts wrong results, and medical laboratory technicians are put under pressure. Automated counters neglect to distinguish abnormal cells. A computer supported system will accomplish exact results in less time. This research work introduces an image processing methods to split up the red blood cell from different segments of blood. It is objective to determine and produce the blood smear image, with a specific classification of red blood cells into 11 classes. K-Medoids algorithm which is adversity to extraneous noise is utilized to separate the WBCs from the image. The granulometric diagnosis is utilised to split up the red blood cells from white blood cells. Feature extraction is performed to get the significant features that serve for classification. The classification results aid in diagnosing the disease like iron deficiency anemia, hypochromic anemia, hereditary spherocytosis, megaloblastic anemia,

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Geospatial analysis of terrain through optimized feature extraction and regression model with preserved convex region

N. Prabhakaran[1] · S. S. Ramakrishnan[2] · N. R. Shanker[3]

Abstract In this paper, cat optimization algorithm for feature extraction in satellite image has been proposed. In cat optimization, cost function computes the pixel in the satellite image to preserve the boundary shape and avoid non-convex part of the contour of the image. However, the existing feature extraction optimization algorithm measures the distinct data framework and thematic information to insight land cover such as waterbody, urban and vegetation. The land cover is obtained from different optimized feature extraction algorithms never provide proper boundary shape and land feature. Furthermore, the proposed cat optimized algorithm distinguishes the inner, outer and extended boundary along with the land cover. The cat-optimised algorithm for low and high-resolution satellite image shows the better result of 85%, with the preserved convex region when compared with the existing feature extraction algorithm such as fuzzy and Particle Swarm Optimization (PSO).

Keywords Cat optimization algorithm · Particle swarm optimization · Fuzzy shape model · Boundary region · Regression

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DATA SECURITY IN CLOUD STORAGE USING ELLIPTICAL CURVE CRYPTOGRAPHY

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Abstract: Computational applications and data processing are increasing rapidly that large servers and data centre is required for quick processing within the specified time. A major shift in the way Information Technology (IT) and computing services is that the results are delivered and purchased results in the cloud computing development. The out of control power cost that includes personal hardware, electricity generation and data centre's limited space have promoted a specific number of enterprises to transfer many infrastructures into a third-party cloud. However, Cloud computing needs that organisations should prove that the platforms of a service provider are secured and should provide enough level of integrity for the client's data. Elliptical curve cryptography is a public key encryption method that is based on elliptical curve theory, and this method can be applied for creating faster, smaller and efficient cryptographic keys. A critical factor is the strength of the key that is the problem in key and acquiring the plain text.

Keyword: ECC, RSS, Honey Algorithms, Symmetric, Asymmetric algorithm, cloud computing.

1. Introduction

The origin of grid computing promoted the development of cloud computing, providing security for the cloud data is a major issue faced by Information Technology Community. Cloud computing is a new concept which becomes a rising technology that increasing the attentions of industrial organisations and educational institutions. The limitations in the maintenance of storage devices promote the enterprises to move to cloud computing, were the cloud storages are maintained by the third party providers. Cloud computing provides a link between the central remote servers and the network to handle data and remote services. This technology provides flexibility in handling the applications and data from the cloud without installing any additional software in their computers only need is to connect their computers with the internet. Handling the data in the cloud provides more advantages on maintaining the hardware system.

The Cloud architecture comprises of client systems which provide the data and applications to the cloud storage and the cloud components which provides the cloud computing. The elements of the cloud architecture were interfaced through the application programs. The application program was divided into two segments namely front end and back end. Providing an example for a cloud computing, the user stores the data and program in the cloud memory, the cloud agent provides the link between the data and program components in such a way that the program codes do not know the location of the stored data. The users gain profit by reducing its work of scheduling their workload, and the cloud agents provide the interfaces between different users interfaced with the cloud infrastructure. This process of providing maximum control to the cloud agents generate many security concerns in maintaining integrity and confidentiality in accessing the workload by cloud users.

The main advantage of the cloud computing is providing virtualisation. The virtualisation can be generated for hardware's, application programs and also for middlewares. A security system is required to overcome the security threat in the virtualisation environment. Many researches are taking place to improve the security in virtual environments. The research in the cloud security provides the knowledge that existing security schemes will not be perfect for securing the cloud systems. The security requirement and the threat models are unique for the cloud system. The security in the cloud system was implemented in two layers. First layer is to isolate the workloads from each user and second is to provide security for their workloads. Many solutions are provided to generate isolation of workloads were virtualisation based security mechanism is promoted for providing isolation between the users.

Securing an individual workload is a harder task were the cloud computing provides the support for grid computing which provides the link between physical and virtual servers. The network framework of the cloud computing is represented in figure 1.

A CONDITION MONITORING SYSTEM BY USING THERMAL IMAGE

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Abstract: The fast growth of digital image processing run to the development of feature extraction of thermal images which run to the growth of image decomposition. The process of reducing noise and preserving image feature is called as denoising.   Two approaches of denoising method are continuous wavelet transform and stationary wavelet transform. The continuous wavelet transform plays an important role in denoising, but it has a lack of information to produce better results. So, to overcome the drawbacks the stationary wavelet transform is introduced. This paper shows the optimal decomposition level of the continuous wavelet transform, and stationary wavelet transforms to identify the induction motor fault regarding mean, standard deviation and entropy values.

Keyword: Thermal image, denoising, continuous wavelet transform, stationary wavelet transform.

1. Introduction

Rotating machines are frequently required to work non-stop to maintain a strategic distance from costs. In this way, if non-disruptive faults happen, maintenance is not generally quickly performed. The induction motor faults are identified based on the thermal image temperature, mean, standard deviation and entropy value. By utilising preventive maintenance, which makes use of condition monitoring to identify early faults, downtime and expenses are reduced.

A novel method is to describe the fault detection in the printed circuit board (PCB) of the thermal image. In this technique, a gold thermal image is 1st produced from the thermal images of the PCB in a standard function, and then compacted into a codebook with a specific number of the codeword. All codeword individually constitute a block of image size four by four. For the board under test (BUT), all block in the thermal image is encoded similarly. By mean values, the codeword is ordered in ascending order in the codebook. Any regular functional block in BUT can be named by equating the codeword index with that of the representing block in the gold thermal image. The memory size for keeping a model for comparison is, thus, importantly decreased without diagnosis operation degradation. So, feature extraction is not necessary such as feature-based

diagnostic methods. Also, to make better the detection sensitivity of an adaptive threshold criterion is introduced. From the results, this introduced technique is established to be efficient in regular functional block recognition for PCBs founded on the thermal image. Moreover, this technique is highly standardised for hardware execution and parallel recognition to speed up the processing time [1].

At electrical installation, a new technique is introduced for automatically detecting regions of interest (ROIs) through the infrared image. These regions are more significant in analysing the thermal term of electrical equipment. Although the selecting of ROIs in the infrared image can perform manual, still the accuracy of the regions is conceivable. So we acquire the advantage of reducing local features to locate, identify, and match multiple reiterated objects and categorise look like same objects in the infrared images. Observational results have demonstrated that the introduced technique attains better operation for detecting the ROIs target with several irregular intensity variations, cluttered background and dim target equipment. The functioning of the introduced and technique is quantitativeand qualitatively evaluated [2].

Introduced a diagnostic scheme for power distribution lines established on a colour camera and a thermal imaging camera. We develop a camera calibration technique that demonstrates two images, one from the thermal camera with distinct FOVs and then another from the colour camera, on display at the same time. We utilised the stereo camera calibration technique to account for the distinct features of the two cameras. The cameras were marked with the calibration tool. From our testing, the execution and usage of the introduced distribution line diagnostic scheme can be assessed by changing the thermal images through the extrinsic matrix and intrinsic matrix [3].

Thermal infrared imaging has been demonstrated to be helpful for identifying breast cancer because it can identify small tumours and hence can extend to beginning stage diagnosis. We demonstrate a computer-aided diagnosis method for studying breast thermograms. We deduce image features that report bilateral deviations of the breast regions in the thermogram, and then give these features to a group classifier. For the classification, we introduce an elongation to the Under-sampling Balanced

DETECTION OF ANEMIA DISEASE USING PSO ALGORITHM AND LBP TEXTURE ANALYSIS

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Abstract: Nowadays, patients with anemia disease present in the world increased by around 60-70% respectively. The digital image processing technique has successfully characterised to introduce new methods for disease analysis has lead to reliable systems and more accurate for anemia disease diagnosis. This paper gives an algorithm for the automatic detection of anemia disease through palm image. For solving such issues, a PSO algorithm and LBP texture analysis are applied for classification of palm images. There are several features are consider based on statistical analysis, i.e. mean, variance and entropy have been extracted. The classification results demonstrate that these features highly import and can be utilised to identify normal and abnormal patients 98% successfully.

Keyword: Digital image processing, Anemia disease diagnosis, PSO Algorithm and LBP Texture analysis.

1. Introduction

Anemia is a disease, due to the lack of the total amount of haemoglobin or red blood cells (RBCs) in the blood, or a brought capacity of the blood down to carry oxygen.Red blood cells (are also called as erythrocytes) are the most basic type of blood cell, and the vertebrate organism's principal entails of delivering oxygen (O2) to the body tissues via the blood flow by the circulatory system. They absorb oxygen in the gills or lungs and release it while forcing by the body's capillaries. Haemoglobin (Hb) is a blood content containing protein and iron. The human beings become unhealthy while Hb ranges in their blood level are reduced to a certain fixed limit as for females is 11 mg/dL and for males is 13 mg/dL.There are different stages of this health problem and .are consequently called severe anemia, moderate anemia and mild anemia. The decrease in Hb level in blood is because of the deficiency of folic acid, vitamin B12, or iron. Nowadays, anemia occurs due to the deficiency of iron is normally very common. So, a decrease in the iron level will outcome in decreased oxygen carrying capacity of the blood, which can hurt the health of people. In blood, Hb is worthy of carrying oxygen from the lungs to different parts of the body and also to carrying maximum carbon dioxide (CO2) from different parts of the body to lungs.

Functional near-infrared spectroscopy (fNIRS) is utilised to differentiatethe patient with schizophrenia, and the healthy persons are based on the support vector machine (SVM) and principal component analysis (PCA). Firstly, PCA is utilized to select the features on oxygenated haemoglobin (oxy-Hb) signals from the different channel fNIRS data. Secondly, aextraction is based on SVM is planned to separate the schizophrenia from a healthy people. Finally, the method gives an accuracy of 93.33%, 84.62% for healthy people and 100% for schizophrenia. AfNIRSmethod hasa potential capacity and an effective aim biomarker for the analysis of schizophrenia [1].

Leukaemia patient's presents with reduced haemoglobin and the WBC count in about 60-70% of cases. Peripheral blood smear (PBS) method brings out about 40-95% of blast cells in leukaemia patients. The digital image processing method has successfully lead to developing new techniques for cell diagnosis has lead to more reliable and accurate systems for disease analysis. However, high differences in cell size, edge, shape and localisation make more complex the data extraction process. The electromagnetism-like optimisation (EMO) algorithm introduced to detect automatically white blood cells embedded into intricate smear an image that takes the total function as a circle detection problem. The EMO technique gives a result from blood cell images with a changing range of complication are admitted to formalise the efficiency concerning detection, stability and robustness[2].

Blood cell categorisation is the beginning process for finding disease; the diseases can be contained if it is detected at the starting stage. To solve problems, quantitative processing of digital images based on a fuzzy method is introduced for categorisation of red blood cells. There are different features consist of size, shape and colour based features, that based on statistical analysis (i.e. kurtosis, roundness, skewness, mean, variance, standard deviation) have been extracted. The categorisation results showed that features significance

A REVIEW PAPER ON SMART CONTROLLER USING EFFICIENT METHOD FOR REDUCING ENERGY CONSUMPTION IN HVAC

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ABSTRACT

Smart Controller reduces human intervention in controlling the HVAC systems for maintaining a comfortable indoor environment. The sensor nodes have limited intelligence due to its limited processing power and memory. In this system, a smart controller is proposed by integrating IoT with cloud computing. Cloud computing has become increasingly popular due to its technology which uses internet and central remote servers to maintain data and applications. IoT is an emerging technology and has been applied in building Energy Management systems, in which it enables us to gather data from sensors and control them in an efficient way. This smart controller incorporates Wireless Sensor and Cloud computing. The integration of Wireless sensor network in BEMS increases the computer processing and data storage requirements. This smart controller estimates the number of occupants, learns from user preferences for heating, cooling and ventilation and set point for heating and cooling. With the embedded intelligence in smart controller the power consumption of HVAC can be reduced.

I. INTRODUCTION

In this system, smart controller is proposed for estimating the number of occupants and controlling the HVAC based on the number of occupants and maintaining a comfortable indoor environment as per preferences. To provide a comfortable environment it is necessary to measure the environment parameters such as temperature, humidity, light intensity using sensors. The number of occupants is also detected using intelligent sensors. The user Preferences are to be learned and feedback from user need to be collected to maintain a environment according to the user requirements.

With the latest developments in technologies in wireless communications, sensor design and embedded systems, The traditional hard wired systems are replaced by wireless sensors. The integration of Wireless sensor Networks in BEMS increases the computer processing and data storage requirements. Cloud computing technology offers great data storage and processing power. Due to this characteristics, integration of cloud computing with wireless sensor Networks make a attractive addition to BEMS.

A Thermodynamic Performance Study of Simple Cooling and Combined Power Transcritical N₂O Cycles

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Abstract - Thermodynamic performances of transcritical N₂O simple cooling and combined power cycles have been studied under steady state condition. The effect of influential parameters like evaporator temperature, gas cooler outlet temperature, turbine inlet temperature and gas heater pressure on COP and exergetic efficiency have been carried out. It has been found that the thermodynamic performance of transcritical N₂O combined power cycle is better than simple cooling cycle under all operating conditions. It is also noticed there is optimum exergetic efficiency at a particular evaporator temperature for both the cycles. A Grassmann diagram for N₂O cooling and combined power cycles presented at a given operating condition.

Keywords - Cooling and power cycle, energy, exergy, grassmann diagram, N₂O, transcritical.

I. INTRODUCTION

Due to global warming, ozone layer depletion and atmospheric pollution problems, the halogenated refrigerants like CFCs and HCFCs need to be replaced by natural refrigerants like hydrocarbon, water, carbon dioxide, ammonia and nitrous oxide etc. In the recent years the researchers and environmentalist around the globe tried to revive carbon dioxide and nitrous oxide as promising refrigerants over hazardous halogenated refrigerants.

II. LETERATURE REVIEW

Various researchers have well reported their work on system design, cycle modification, multi stage operation, optimization of gas cooler pressure, use of different mixture of gases and comparison of thermodynamic performances in CO₂ and N₂O vapor compression cycles. A brief literature review of few researcher are presented below.

Lorenzen [1] successfully demonstrated the use of natural refrigerants like ammonia, propane and carbon dioxide over halogenated refrigerants like CFCs and HCFCs due to certain excellent thermo physical and heat transfer properties for practically all conventional refrigeration and heat pump systems.

Lorenzen [2] revived CO₂ as most preferred and attractive alternate natural refrigerant, which coupled with low cost, easily available, non-toxicity, non-flammability for energy performance heat pump systems.

Lorenzen and Patterson [3] showed carbon dioxide is an excellent refrigerant by solving the environment related problems associated with car air conditioning systems. It also provides several environmental advantages in present refrigeration and air conditioning systems.

Kim et al. [4] presented the use of CO₂ in refrigerant cycle giving more attention to the system design and cycle modification of a vapor compression refrigeration system. The attractive features like low pressure ratio and volumetric capacity of carbon dioxide also given more impotence.

Kauf [5] showed the existence of an optimum gas cooler pressure in a transcritical CO₂ vapor compression refrigeration system for maximum COP at a particular gas cooler outlet temperature.

Liao et al. [6] explained the value of optical heat rejection pressure mainly depends on gas cooler outlet temperature, evaporator temperature and performance of compressor in simple transcritical carbon dioxide cycle based on cycle simulation, correlation of optical heat rejection pressure at different operating parameters.

Sarkar et al. [7] optimized transcritical CO₂ heat pump system for simultaneous cooling and heating applications, similarly a correlation was presented to find at optimum gas cooler pressure.

Bhattacharyya et al. [8] carried out optimization study and showed the existence of optimum gas cooler pressure of CO₂-C₃H₈ cascade system for both cooling and heating applications. Agrawal et al. [9] carried out optimization studies of different two stage transcritical CO₂ heat pump systems. A correlation was prepared to find out for optimum value of inter stage and gas cooler pressure respectively.

Agrawal et al. [10] carried out thermodynamic energy analysis for steady state operating condition for combined power and refrigeration transcritical CO₂ cycles. Stegou-

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Article type   : Article

Drilling performances and wear characteristics of coated drill bits during drilling reinforced concrete

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Abstract:

This paper deals with the investigation on the microstructure and wear behavior of uncoated, Al_2O_3-13 wt% TiO_2 and WC-12 wt% Co coated drill bits intended for drilling reinforced concrete. Atmospheric plasma spraying technique was employed to fabricate the above coatings on High speed steel drill bits. The circularity measurements of the drilled holes were carried out using MATLAB. The holes drilled using WC-12 wt% Co coated drill bit showed a better circularity depicting enhanced wear resistance as compared to that of the uncoated and Al_2O_3-13wt% TiO_2 drill bits. The improvement in the wear resistance of WC-12 wt% Co coated drill bit is attributed to its higher hardness and lower porosity. Thrust force was observed to be lower for WC-12 wt% Co coated drill bit depicting less amount of wear. This study suggests that WC-12 wt% Co coated drill bits can be a potential candidate for drilling reinforced concrete.
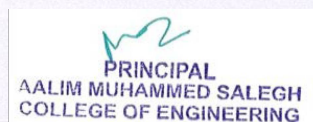
Keywords: Atmospheric plasma spraying, Microstructure, Drilling, MATLAB, Thrust force

1. Introduction

Reinforced concrete has been widely employed for construction as it is economical and highly durable with little maintenance required over its life time. Besides, it is possible to

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Electronic and Structural, properties of ZnTe using Density Functional Theory (DFT)

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Abstract - Chalcogenides like metal Telluride have been studied for many decades for solar cell application. Recently related cubic phases like **ZnTe** are attracting wide attention for many interesting applications such as thermo-electronics and sensors. Especially **ZnTe** being a narrow direct band gap (Band gap value = 1.2eV) semiconductor is recently researched a lot owing to its wide applications on electronic, optical, magnetic and thermoelectric devices. In order to understand the fundamental properties of **ZnTe** and its closely related compounds, we have performed accurate first principle calculations based on Density Functional Theory (DFT). We have used Tight bonding Linear Muff-Tin Orbital (**TB-LMTO**) program. We have performed complete structural optimization by minimizing force as well as stress. The optimized structural parameters are found to be in good agreement with experimental values. We have analyzed electronic structure by calculating band features, site and orbital projected Density of States (**DOS**). In order to reproduce the experimental band gaps we used **LDA** (Local Density Approximation) and hybrid functional to describe its correlation effects better than usual **LDA**. The nature of bonding is analyzed using **COHP** (Crystal Orbital Hamiltonian Population) and charge density plots.

Key Words: Chalcogenids, ZnTe, DFT, TB-LMTO, LDA electronic properties, DOS, COHP.

1. INTRODUCTION

In last decade with increase in computational power, several numerical simulations are being carried out which has made it possible to predict properties (structural, electronic and optical etc.) of solids with great accuracy [1,2]. Inspite of high complexity and defective forms, II-VI group of semiconducting materials remains as the major regime of research interest in condensed matter physics because of their wide band gap nature. The cubic **ZnTe** was synthesized in solid state using 900W microwave plasma method by Tawat Suriwong et al., [4]. This semiconducting materials showed a 2.6 eV wide direct band gap has a variety of applications; green-light-emitting diodes, solar cells, waveguides, modulators [3-8], and other opto-electronic and thermoelectronic devices, Young KT et al., [5]. The compound **ZnTe** is extensively studied on its well-known structure zinc blende (**ZB**) and

rocksalt (RS) and was discussed by J. Pellicer- Porres et al., [6]. In this paper, we depict various physical and electronic properties of **ZnTe** compounds by using Density Functional Theory (DFT) [7-10].

The total energy of **ZnTe** is calculated using tight binding linear muffin tin orbital method (**TB-LMTO**) [10, 11] and it has a band gap of 0.97 eV which is low when compared to experimental band gap value. So it provides a solution to minimizing the mismatch of results obtained from theoretical and experimental study. The experimental data collected from crystal open database for **ZnTe** electrical properties using DFT was discussed by Pellicer-Porres and S.K.Gupta et al., [12, 15]. From the experimental and Theoretical result it is observed that **ZnTe** exhibits **ZB** structure.

Generally zinc blende (**ZB**) structure calculation can be explained effectively with the help of available experimental data [16-18]. The elements belonging to the group of II-VI are very useful for technological applications [17, 18]. Here we have investigated the structural and electronic properties for **ZnTe** [19]. We hope that the present work will inspire the experimental group to invoke their knowledge in this particular field to analyze it experimentally [20]. The plan of the paper work is as follows section-2 gives a description about computational method followed by a result and discussion in section-3 which contains details about the structural properties, electronic band structure and **COHP** properties, finally the conclusion is given in section-4.

2. COMPUTATIONAL DETAILS

There are several methods to calculate structural, electronic and optical properties of compounds computationally. The density functional theory is one of the most accurate ways to reach acceptable results that helps us to envision the features and character of materials and nano-structure materials in particular [21]. The structural and electronic properties of (**ZnTe**) are investigated in this paper. The electronic band features of **ZnTe** in the **ZB** structure is studied using the Tight Binding Muffin Tin Orbital (**TB-LMTO**) program [22], this program calculate the Kohn-Sham eigenvalues within the framework of DFT [23]. In the calculations have been