



3.3.3 Number of books and chapters in edited volumes/books published and papers published in national/ international conference proceedings per teacher during last five years

Number of papers published in national/ international conference proceedings

INDEX SHEET

2018-2019

Sl. No.	Name of the Teacher	Title of the paper	Publication No.
1	Bindhu K Rajan	Light Field Imaging: - A Comparative Study of Plenoptic Image Compression Techniques	31
2	B. Deepanraj	Simultaneous effect of microwave heat source and convection heat source in turmeric drying process: drying kinetics, modeling, energy consumption and quality analysis	32
3	Dr. Jose P Therattil	A Novel LCC-LCL WPT Compensation for Better Performance	33
4	Prajoon P	Object detection and counting using unsupervised method	34
5	Fr. David Nettikadan	Student Monitoring System for School Bus Using Facial Recognition	35
6	Dr. Anoop V	Detection Of Waves In Ecg For Arrhythmia Classification, International Conference On Trends In Electronics And Informatics (ICOEI)	36
7	Bindhu K Rajan	Efficient Enhancement of Hepatic and Splenic Carcinoma in Canine using Image Processing	37
8	David Nettikadan	iLTI-QAT: A Model to Orchestrate Interaction Sessions in Hybrid MOOCs	38
9	Jithin K Jose	An Efficient Resonant Converter Based Charging Scheme for Electric Vehicle	39
10	B. Deepanraj	Investigation and Optimization of Machining Parameters Influence on Surface Roughness in Turning AISI 4340 Steel	40
11	B. Deepanraj	Numerical Modelling and Simulation of Anaerobic Digestion Process using De-Oiled Cakes	41



12	Cijil B John	Performance and Emission Analysis of Biofuel obtained from Rotten Potatoes	42
13	B. Deepanraj	Super Capacitor Powered Hybrid Vehicle	43
14	George Raphael	Design and Analysis of Vertical Axis Wind Turbine with Wind Deflectors	44
15	Lawrance C. A	Supercharging in Single Cylinder Engine	45
16	Melvinraj C. R	Effect of Additives on Blending of Fuels	46
17	Christy V. Vazhappilly	Design and Fabrication of Scrubber for Biogas Purification	47
18	Suneeth Sukumaran	Cooling of Heavy Vehicle Drum Brake System	48
19	Nice Menachery	Water Conservation on Integration with IoT	49
20	David K J	Wireless Braking System	50
21	Nice Menachery	Design and Analysis of Hybrid Vertical Axis Wind Turbine	51
22	Anto Zacharias	Production of Diesel from Low Density Polyethylene	52
23	Nisha Sheriff	Multi-Purpose Air Cooling System	53
24	Manoj Kumar V K	Design and Fabrication of Sea Water Purification System	54
25	Cijil B. John	Biodiesel Production from used Coffee Grounds	55
26	Deepanraj B	Thermoelectric Generator Coupled to Engine Exhaust	56
27	Jarin T	Atmospheric Water Absorption Kit	57
28	Christy V Vazhappilly	Air Brake System Using Exhaust Gas	58
29	David K.J	Automatic Ground Cleaning Device	59
30	Jithin K Kuriakose	Design and Fabrication of Refill Friction Stir Spot Welding Tool	60
31	Sukesh O.P	Analysis of Friction Stir Processed Copper with Various Tool Profiles	61
32	Suneeth Sukumaran	Design and Optimization of Solenoid Array for Braille Printing	62
33	Praveen Raj	Die Failure Analysis	63
34	Sheik Afthab	Fabrication of Dent Remover	64
35	Biju P. L	Painless Patient Mover	65
36	Manoj Kumar V K	Flaety Tube	66
37	Melvinraj C.R	U-SWaP	67
38	Praveen Raj	Pneumatic Exoskeleton Chair	68
39	Praveen Raj	Composite Material Using E-Glass and E-Waste	69



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40	David K. John	Vehicle Alert System	70
41	Nice Menachery	Low Cost Adult Diaper Waste Management Method	71
42	Suneeth Sukumaran	Automatic Pneumatic Can Crusher	72
43	Sukesh O P	Design and Fabrication of Hand Driven Electric Wheel Chair	73
44	Nice Menachery	All Terrain Wheelchair	74
45	Ponmani Raja M	PAPR Reduction in F-OFDM Modulation Scheme For 5G Cellular Networks Using Precoding Technique	75

LIGHT FIELD IMAGING: - A COMPARATIVE STUDY OF PLENOPTIC IMAGE COMPRESSION TECHNIQUES

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Abstract—Richer visual information from our world can be captured using light field imaging that has emerged as a new trend. As opposed to traditional photography which captures a 2D projection of the light in the scene integrating the angular domain, light fields collect radiance from rays in all directions demultiplexing the angular information lost in conventional photography. Compression algorithms play a vital role in the efficient storage and delivery of a plenoptic image. Several methods to compress light field images have been proposed recently. However, in-depth evaluations of compression algorithms have rarely been reported. In this report, mainly three prediction techniques are compared. Firstly, micro image composing a plenoptic image are processed by an adaptive prediction tool, aiming at reducing data correlation before entropy coding takes place. In the second coding structure, LI minimization of the residuals is proposed. The disk-shaped pixel clusters corresponding to each micro lens in the light field image are efficiently predicted on the basis of neighboring disks. The captured images contain repetitive pattern that resulted from adjacent micro lenses. A full inter-prediction scheme in video image is introduced into intra-prediction for the compression of light field image is discussed in the third technique. All the three techniques are then compared based on their bit error rate (BER) and based on that values, the last coding technique where both inter and intra prediction is incorporated provides better results than the other two techniques.

Index Terms—Plenoptic, Light field, Block prediction, Disk prediction, Intra-inter prediction

I. INTRODUCTION

The light-field (LF) image, which is also known as the plenoptic image, contains the information about the intensity as well as the direction of the light rays coming from the scene. Unlike conventional images or digital images, where only 2D projections are recorded, light fields describe the distribution of light rays in a free space, including their position, angle and

radiance. This allows to capture richer information of the world. The range of applications for light field techniques is vast varying from consumer cameras, computer gaming to 3D video medical appliances and so on. Earlier it was an idea beyond our imagination. But as time passed by, this imagination was put forth as a theory and then later, due to the advancement in the field of science and technology this theory came into practice. This was a brief description about the light field. The plenoptic cameras have incorporated this concept. This is contrary to the conventional approaches, where only the intensity of an image is measured. One of the plenoptic camera uses a main lens followed by an array of micro lens and an image sensor. The array of micro lens introduced in this camera makes it differ from the usual conventional camera. Each lens in the micro lens array captures the light intensity from all possible directions as show in Figure (1). Figure 3 illustrates the micro lens image of a single pixel in an image [1].

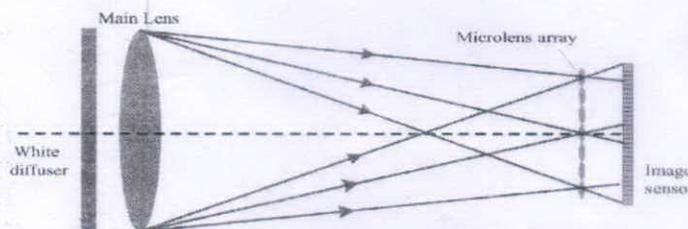


Fig 1: Capturing of light from all possible directions of a scene

One of the commercially available light field camera is the Lytro cameras which is depicted in Figure (2).



Fig 2 : Commercially available Lytro Illum plenoptic camera

Simultaneous effect of microwave heat source and convection heat source in turmeric drying process: drying kinetics, modeling, energy consumption and quality analysis

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Abstract

This work aimed to investigate the use of microwave energy along with convective heat source in a specially modified microwave convection oven to dry turmeric. Experiments were conducted for fresh and cured turmeric slices at microwave power levels of 270 W, 450 W, 720 W and 900 W along with convection heat at a constant temperature of 60oC. Results showed that curing of turmeric fingers had a very negligible effect on drying kinetics, modeling, energy consumption, FTIR spectra and microstructure of the dried samples. However, the microwave power level had a significant impact on them. The color value, curcumin content and texture of dried samples were affected by both curing and microwave power level. Midili et al. and Page model had a good agreement with the experimental data to describe the microwave-convective drying behavior of turmeric slices. Moisture diffusivity values increased as the microwave power level increased for both fresh and cured turmeric slices. Activation energy was found to be 15.23 & 19.7 (W/g) for fresh and cured turmeric slices respectively. Specific energy consumption varied from 7.4409 to 12.8998 MJ/kg. Based on the results obtained microwave-convective drying can be considered as an effective drying method to dry turmeric.

Keywords: microwave-convective drying; turmeric; drying kinetics; Modeling; energy consumption; Quality parameters

1. Introduction

Drying or dehydration of an agricultural product is one of the oldest preservation methods. Low levels of moisture content in the product restrict the microbial contamination and unwanted chemical reactions (Singh & Heldman 2009). Though drying was meant to be a simple process, a substantial amount (20-25 %) of energy was utilized during the operation. Energy consumption and quality parameters of the dried product are the keen interest in this process. Universally, no design protocol can apply to all dryers. Therefore, it is essential to analyze and understand the heat and mass transfer within the product based on material properties(Greensmith , fellows 2000). Most of the conventional dryer's exhibit a lower drying rate and longer drying time at high temperature leading to degradation of product quality. Conventional drying, energy is used for evaporating the moisture by diffusion from inside the sample to the surface and carried away by the supplied air. The case is different in microwave drying. Due to dipolar rotation of the moisture present in the material, a large amount of heat is generated volumetrically in the material. This heat stimulates the moisture diffusion resulting in faster drying(Lechtańska et al. 2015). Microwave drying was considered as an alternative drying method for various agricultural and food product in the recent years(Vadivambal & Jayas 2007). It has been a flourishing drying technique with its advantages of reduced drying time and improved quality product compared with conventional dryers(Zhang et al. 2006). But still, sole microwave drying alone has few drawbacks such as non-uniform heating, textural damage and limited penetration. Combination of other heat sources such as hot air, infrared and vacuum could overcome those drawbacks to get an improved quality product(Nawirska-Olszańska et al. 2017)(Datta & Rakesh 2013).

This research paper focuses on the combined microwave and convection heat source for drying of turmeric slices. Turmeric (*Curcuma longa*) is a rhizomatous perennial herb with primary and secondary rhizomes present in the various geometrical form, from spherical to cylindrical shapes(Balasubramanian et al. 2012). Curing and drying are

A Novel LCC-LCL Compensation WPT System for Better Performance

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Abstract— Wireless Power Transfer (WPT) is a spurting spot in the field of power transfer. It has dominance in safety, low maintenance, reliable, transmission for short distance e.t.c. Many researchers are undergoing in the field of WPT and in that compensation topology plays a central role. There are different types of compensation topology in the system. This paper compares some special compensation topologies like DS-LCL, LCL-LCC with the proposed topology LCC-LCL compensation. The different topologies are reproduced using MATLAB software and calculated the efficiency for the following system. In the projected system, it has been accomplished an efficiency of 93.98%, which is better than the conventional compensations.

Keywords— WPT, Compensation Topology, DS-LCL, LCL-LCC

I. INTRODUCTION

The world is running behind the technology. All are using electronic gadgets like mobile, laptops, tab etc. Living without these gadgets is impossible. But these gadgets should be charged for their uses. Therefore, to get the battery charged we should connect the concerned device to the wires. Carrying a charger is quite difficult but it is so sophisticatedly convenient to charge a battery without a wire. Charging without wires means the power will be transferred wirelessly. This was possible by the thought of WPT and the research was started by 19th century.

As all the fuels are getting too deprived, the vehicles are getting electrified as an alternative. Hence, the use of fuel will be reduced and there will be zero smoke emission. Therefore, in the area of electric vehicle the WPT shows a great interest. Nowadays engineers are trying to raise the power transmission efficiency without any wire and it should be commercially viable.

Fig.1 shows the WPT system and it is operated on the base of electromagnetic induction. The concept of working a WPT is, when the transmitting coil generates the magnetic field in the receiving coil, it will stimulate a current on the coil. The WPT system can be assort by distance of transmission, size, and efficiency. Classification based on transmission distance is of two types; they are far field and near field transmission. The near field transmission is said to be inside the radius of the wavelength and it is a non-radiative transmission. The distance of the field is calculated by $(D_{range}/D_{ant})^{-3}$ since the power are proportional to square off the field strength.

The far field transmission is said to be area outside the radius of two wavelengths. The range is almost multiple kilometers range. It is a radiative technique and it is acknowledged as power beaming. In this method power is transmitted by ray of electromagnetic radiations.

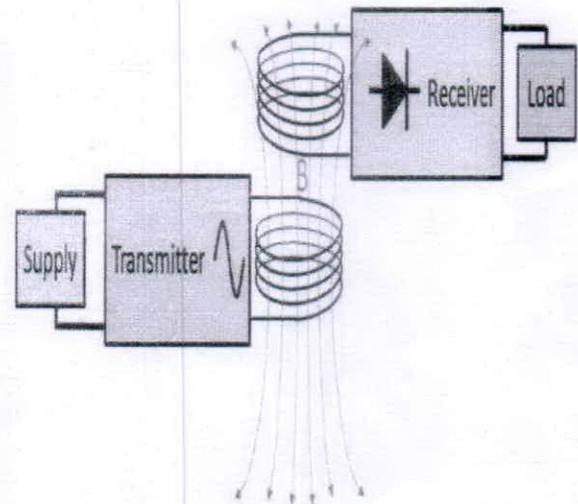


Fig. 1. WPT system

In 1981, Nicole Tesla was the foremost individual to introduce the thought of WPT. He demonstrated the concept of WPT but he was not able to complete this project since there was lack of fund. Later on William C Brown introduced great contributions to the development of microwave power conduction. He made-up the rectifying antennas, called rectenna, which can accept microwaves and alter them to DC current [3].

Control strategies, precaution perspective, optimized higher efficiency, increased coupling coefficient; methodologies of compensation and inspection of circuits are the challenging areas of wireless power transfer. Compensation technologies and circuit analysis place an in vital role in WPT due to resolution of resonant frequency, output specification, reduction of leakage inductance , power factor and output parameters and soon.

Fore mostly four centralized compensation strategies are there specifically, Parallel-Parallel, Series-Series, Parallel-Series, and Series-Parallel [2][12]. The most frequent combination of these compensational methodologies is Series-Parallel and Series-Series. This is due to square wave voltage of compensation strategy [13][6]. Due to variation in polarity, the voltage of the front or primary capacitor increases to the level of voltage of input instantaneously.

Apart from these comp techniques like inductor-capacitor-inductor, inductor-inductor primary and series parallel in sec

OBJECT DETECTION AND COUNTING USING UNSUPERVISED METHOD

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Abstract—

Differentiating and finding similar patterns of images from a video frame source emerges as the basic elemental task in image processing. In this paper, various algorithms on object identification, shape identification, color identification, object counting are analyzed and compared to obtain new unsupervised method. These methods find applications in the field of defense, security check, healthcare and Traffic monitoring. Various challenging features and applications of object Detection, identification and counting methods are elaborated with new algorithm with least set of dataset. In addition, the different steps involved in object detection and results for several steps are discussed. Moreover, the proposed algorithmic method is able to process the unstructured and structured images in multiple visual concepts. Further, these algorithms can be applied in wide area and crowded scenes with high precision identification.

Keywords— Object identification, unstructured patterns, elemental extraction.

1. INTRODUCTION

Automated visual object identification, detecting and video graphic surveillance surveys have important role in the application of home, class rooms and traffic controlling, such as security, privacy and manage mental access points. A good performance of these technologies needs a professionally costly structure, complex indexing, and the major role is for the supervisor who is deciding the counts of objects. This is done by experienced and quality proven workers. The algebra discusses which effectively uses visual object detection and identification by following the framework. The method proposes a task for object counting identification, and detection, which meets up with the necessary requirements of the user electronics, easy initialization and configuration, and unsupervised working conditions. This method is done by the help of Bayesian tracking model that can adjust multifunctional distributions without completing the association between the objects which is used for detections [1]. The presently available methods are less accurate, distrusted and missing identification and detections. The introduced algorithmatic method is compared with earlier

algorithms, focused on user electronics, proving its top performance.

The major and tough problem is finding the location of objects along with shape and size in an image as well as to count and detect the occurrence of that object in the image is challenging. Our work is to correctly and accurately calculate the geometrical location of the object for detailed counting and identifying process. Border lines or shape of the object parts is figured out using mathematical logical operations and with the known algorithm of classical geometrical approach, the methodological approach is used to locate the exact boundary details of the objects [3]. The method can discover whether these are partially occluded to each other or not.

Object identifying and detecting is a problem with versatile approaches, it is based on the redundant calculating power values and the feature of data to be functioned. Memory effectiveness, user friendly and fast calculation is typical requisites for algebras to be used in upcoming world which include divided sub systems and air interface sensing networks. Extreme use is to do basic processing of source information from the sensors in the point itself [4]. We introduce new algebra to visually check continuity, identify objects and check feature values such as area by isolating patterns and materials from data based on normal mathematical calculations. Data effectiveness, strength along with flexible features of the proposed algebra has shown [5].

The proposed algebra can finds application in identifying tumor cell classification from brain MRI data source. The changes in the algorithm have a technique regarding the dual thresholds and material identification and detecting method which increases accuracy in identifying the location of the tumor by removing other matching structural data source.

Individuating the repetitive and complex patterns from dual data of the similar images is a critical operation. For example; the nature monitors found the migrating birds or army in the borders identifying people using normal cameras, such a process is known as texton identification when the base structures to be figured out are composed by few pixels [13]. Here, we will focus on this material identification method applied in different orders: by implementing counting strategy [14]-[17] by segmentation [18], or by classification [19]. In present cases, a study of labeled source information required for learning desired type material, where the data source are

Student Monitoring System for School Bus Using Facial Recognition

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Abstract — Recent reports confirm the fact that school students are the most vulnerable to social crimes happening across the globe and our country too. Many of these cases happen during their ply from their residence to school and vice versa. In multiple cases these social crimes including sexual harassment happened in their school bus itself. Considering this serious situation, we are proposing a real time monitoring system using image processing techniques. — Identifying a student with an image has been popularized through the mass media like camera. This system monitors the images inside the vehicle and identifies the students and their movements inside the bus. The system recognizes the student faces and their count are also monitored. The system will also raise an alarm to get the attention of the public if it is so essential. Technologies are available in the Open-Computer-Vision (OpenCV) library and implement those using Python. For face detection, Haar-Cascades classifier was used and for face recognition Eigenfaces, and Local binary pattern histograms were used. Each stage of the system described by some flowcharts. And also face recognition used in automation attendance system which eliminates most of the drawbacks that the manual attendance systems pose, easy manipulation of attendance records, proxy-attendances, and insecure system.

Keywords— CV, FR, DCN, Wi-Fi, Raspberry Pi, PCA, Support Value Regression, DCT, OpenCV

I. INTRODUCTION

Face Recognition (FR) and Face Detection are the areas that have gain more importance from ancient time in the field of Computer Vision (CV). The practical applications include automatically tagging your friends' pictures, security in the biometrical area etc. Many research centers and companies have been working on it, because of it's high possibilities. The proposed system keep valid and correct student attendance record, and the student attendance record are verified, maintained and managed on a regular basis. The task of identifying an already detected object referred to a Face recognition. Often the problem of face recognition is confused with the problem of face detection. Face Recognition is used to decide if the "face" is known, or unknown. And it uses database of faces in order to detect this input face. Student attendance system is classified as automated and manual attendance system maintaining each student's record in school bus by the method of manual recording. This method seemed to be difficult in classes attended by a large number of students. Manual recording and calculating the average attendance of each enrolled student is a time consuming

process. Human face detection and recognition technique are the techniques which were used in the monitoring system. The system commonly involves the process of feature extraction from any facial image of student at the time he/she is entering the school bus. If the student is absent or not will also raise an alarm to get the attention of the parents and school. It proceeds to recognized student's attendance and count automatically, upon its successful recognition

In this proposed system implements an attendance system using face recognition which recognizes the face of each student during the entry into the bus. Image capturing and all digitals signal processing will be carried out with the processor available on board. Feature based extraction and detection scheme is planned along with image based solution for the problem of detection and identification of incidents to be reported. Neural network based intelligence that employs statistical methods will also be used in this proposed system.

Facial recognition techniques are classified as verification and identification. In the first method, it compares the given individual with who they say they are and gives a yes or no decision and second one compares the given individual with the database of all other individuals and provides a ranked list of matches[1]. Fig. 1 shows the various stages involved in face recognition.

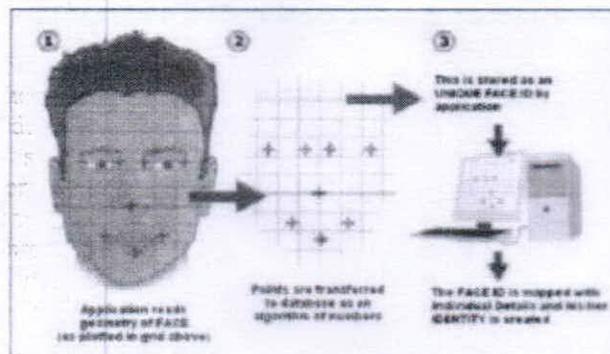


Fig.1: Face Recognition Overview

Computer vision and machine learning algorithms are the methods used by the monitoring system. Deep learning methods are used to find solutions to many possibilities. These solutions can make reducing errors in each stages of process.

There are two methods which can be used as solution to the face recognition problem: feature based and photometric

DETECTION OF WAVES IN ECG FOR ARRHYTHMIA CLASSIFICATION

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Abstract— Due to simplicity and non invasive nature, ECG is used as a reference for detecting heart diseases although it measures the electrical activity of the heart. The electrical signal of each heart beat depicts any of the abnormalities present in the heart. QRS complexes, R, P and T waves are the major characteristic in ECG signal analysis. Reliable detection of these fiducial waves is used for analysing the performance of system. There are various difficulties while detecting these waves mainly due to baseline oscillations, morphology of waveforms and the frequency overlapping. For the accurate categorization of arrhythmia, complex difference in ECG morphology seems to be a great challenge. Thus the proper detection of P wave, QRS complex, R wave and T wave are important for the accurate and reliable detection.

Keywords — ECG, Arrhythmia

I. INTRODUCTION

A large part of the biomedical process has been computerized nowadays. Information about the functioning of the body parts are recorded in the form of signals and are used for further analysis. Their characteristic shape and other morphological features can be correlated with the normal one or hence can be used as reference. Due to dynamic changes occurs in these organs they exhibit time varying responses or non stationary responses[11]. Cardiac health state is depicted by the ECG waveform or placing leads on specific locations of the body of the person, an ECG can be recorded on graph paper or on monitors. While analyzing ECG, there were some high peak part which indicate the nature of diseases affected by the heart. The non stationary nature of the Bio-signals are the main reason for random occurrence of these points. Randomly occurring these points are reason for the arrhythmia, which was mainly the disorder of the heart conditions. Mainly it is of two types; some arrhythmia are very dangerously occurring one and others occurs in everyday life of a healthy person. It could be clearly understood that ventricular arrhythmia is the cause of sudden cardiac death. Approximately 80% of sudden cardiac arrest is caused. Thus the proper and accurate detection seems to be very crucial [1].

For the accurate detection of the diseases affected to the heart requires a reliable system. Reliable system should have the capability to detect accurately the characteristic waves in ECG.

During last decades there were so many researches regarding the perfect detection of these waves have been carried out. Many nonsyntactic [2,3] methods for the detection of QRS, P and T wave are used but it is not unique changing values from one subject to other. Some other approaches like fuzzy hybrid neural network[4] has been introduced but it seems to be time consuming and have high cost. Derivative of ECG called (dECG) is used instead of ECG[5] which depicts the QRS complex and confines the P and T wave because for analysis it uses wave gradient. And this wave gradient is high in the QRS than others. Although it seemed to be very difficult and requires separate algorithm for the detection of each wave. Thus discrete wavelet transform seems to be very accurate and reliable and thus used in this work.

The paper discusses the detection of the characteristic points used for analysis of ECG in detail and chapter II discusses the related theory. Chapter III gives a general idea of the method used in ECG feature detection, and chapter IV concludes the paper.

II THEORY

Human heart comprises of four chambers mainly two atria's and two ventricles. Heartbeat begins from the Right atrium which is called as Sino Atria node(SA) depicts the healthy condition. And there were special group of cells inside these chamber which will send the signals as electrical pulses across the heart to Atrio Ventricular Node(AV). Depolarization is referred to as the contraction of the muscle which is associated with electrical pulses and can be detected by the help of electrodes placed in the body. The function of this node is to connect to group of fibres and pass these signals to lower chambers. By tracing this path of propogation one can identify that the heart is functioning

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Efficient Enhancement of Hepatic and Splenic Carcinoma in Canine using Image Processing

Pazhunkaran Sneha Pauly, Bindhu K Rajan and Sindhu K Rajan

Abstract—Image processing finds application in many fields, especially in the field of biomedical engineering for tumor and cancer detection. Research has been going since a very long time for identification of different types of cancer in humans and the research is still on its path. However, pathologic detection of hepatic and splenic cancer in canine is very costly and diagnosing becomes a tedious task in many cases. So, a cost effective and easier technique has to be developed in order to detect the cancer and start the treatment. Here image processing techniques are made use to pre-process the cancer-causing cells in dogs using ultrasonic (US) images. The proposed system frame work consists of image pre-processing stage where enhancement of the raw image is aimed. Here different image enhancement algorithms are applied, of which the best algorithm is selected based on the evaluation parameters like PSNR, SNR, MSE, RMSE

Index Terms—Canine, filtering, enhancement, hepatic, segmentation, US image.

I. INTRODUCTION

TUMOR is found to be one of the dreadful diseases in most of the living creatures. Though a great progress has been achieved in cancer detection, it is still considered as one of the challenging studies for many researchers. Cancer is referred to as cells that are abnormal in growth and has the capability to effectively invade other tissues and cells. This abnormal growth in cells become cancerous due to the invasion of defects and mutated components in DNA. Body is affected adversely when these abnormal cells form lumps or tumors due to its uncontrollable division. On growing, these tumors interfere with the normal working of circulatory, nervous and digestive systems thereby releasing hormones that cause changes in body functioning. Tumors are basically differentiated into 2 types- benign and malignant. Benign tumors are those which have restricted motion and tend to stay at one position. Such tumors are basically not harmful. However, when angiogenesis occurs or when invasion of cancerous cells occurs on other cells, tumor formed is called

malignant tumor. Unlike benign tumors, malignant tumors are very dangerous.

Of all cancers, sixth most common malignant tumours is the liver cancer and is one of the top three reasons for cancer-related deaths. Almost 20% of the world population become prey of chronic liver cancer. One of the reasons for fatal is liver cancer. It is also known as Hepatic cancer. The signs of hepatic and splenic carcinoma in dogs are decreased appetite, lethargic, weight loss, abdominal distention, vomiting, mass can be felt in stomach, extensive thirst, frequent thirst, ulcer, jaundice, bloody diarrhoea, hepatic encephalopathy. Major drawback of hepatic cancer is that the diagnosis usually occurs at later stages in the disease. However, diagnosis at these stages will be supported with very less fruitful treatments [1]. This ends up on the verge of their extinction. The expectancy of dog's life is somewhere between few months to few years, once cancer begins to spread. Surprisingly dogs can survive more than 5 years when diagnosed at early stage. Depending upon the information obtained from canine's previous records of illness, laboratory data, physical examination and different imaging techniques of the abdominal area can pave way for an accurate diagnosis of canine hepatic tumours [2]. Moreover, the other factor that helps in hepatic cancer diagnosis is based on the experience of the medical experts. Even if method like biopsy can be made applicable for detection whenever the experts, based on their experience feel the presence of cancer-causing cell, the time a dog can fight against these cells is negligible. Perhaps, all these modes of canine cancer detection are not reliable and successful way of prediction. So, the urge for a trustworthy and cost-effective method is growing at an alarming rate in case of hepatic cancer detection in canine.

In this paper, image processing technique is made use for efficient enhancement of the cancer in canines using Ultra Sonic (US) images. Automatic identification of cancer using US image is a challenging task. Efficient enhancement of canine liver carcinoma is aimed in this paper. Since there are very few works done using image processing for detecting cancer in dogs, procedures used for filtering images in humans is analyzed and made applicable in dogs here. Image pre-processing stage is involved for efficient enhancement of liver carcinoma. The following sections discuss about different pre-processing algorithms.

The rest of the paper is organized as follow: Section II gives a detailed description about the denoising techniques which further includes the subsections that gives an idea about four filtering techniques – Mean, Median, Wiener and Gaussian

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9

iLTI-QAT: A Model to Orchestrate Interaction Sessions in Hybrid MOOCs

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Abstract— Hybrid MOOCs introduce the advantages of a flipped classroom into a MOOC setting: online learning, interactive discussions and synchronous face-to-face interactions with the course instructors. During the interactions, learners are encouraged to gather at remote centres (RCs) which encourage collaboration. Hybrid MOOCs emerged as they provide the learners increased support from peers and instructor(s). The presence of instructor in synchronous interactions creates a personalized and active learning experience. The iLTI-QAT Model is proposed to increase the effectiveness of live face-to-face interactions. The model comprises of three phases: query collection, query categorization and query addressal. This model was implemented in 5-week Faculty Development Programme (FDP) course, in which 532 participants were registered. Using the iLTI-QAT model helped in effectively addressing 918 queries categorized in 5 broad themes.

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An Efficient Resonant Converter Based Charging Scheme for Electric Vehicle

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Abstract— The acceptance of electric vehicle around the world, represents a brand new paradigm for the transportation sector and for the particular and future power grids. Generally electric vehicles employ on board chargers. This paper suggests another candidate for isolated unidirectional DC/DC converter in electric vehicle on-board charger based on Full bridge- LLC resonant converter. Here a simple method is proposed to improve the charging profile. The circuit possess the inherent advantages like good voltage regulation performance at light load conditions and soft switching of power devices. The feasibility of proposed model has been verified with MATLAB/Simulink.

Keywords—electric vehicle, on board charger, charging profile, resonant converter

I. INTRODUCTION

Surviving in the epoch of increasing environmental sensitivity and the rising fuel price makes it necessary to get a generation of vehicles that are more fuel effective and environmental friendly [1]. Hybrid electric vehicles could run into these needs. Generally electric vehicles employ on board chargers [2]. The block diagram of typical electric vehicle charger can be illustrated as in fig. 1

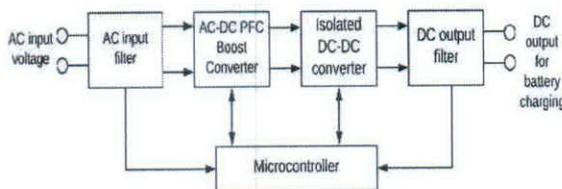


Fig. 1. Basic block diagram of on board charger

The typical electric vehicle with on board chargers require a battery pack with wide output range [3]. Usually rechargeable lithium ion battery with constant current and constant voltage charging algorithm is used as a battery due to its high energy density, long life, and high safety margin [4].

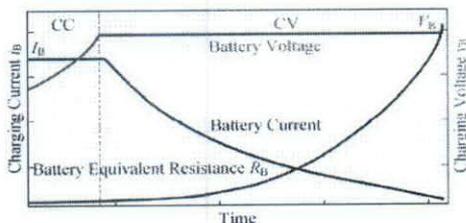


Fig. 2. Charging profile of Battery

According to the charging profile of Li ion battery given in fig. 2 a constant current (CC) charging is mandatory for a discharged battery up to the battery voltage achieves the cut off voltage at rated power. The charging continues at the cut off voltage with a constant voltage (CV) charging at a power level down to 3% of the rated power in order to fully charge the battery. Hence the accepted charging scheme is CC-CV charging method. Even though the algorithm is simple the implementation of algorithms is difficult for practical examples. This paper suggests a simple method to implement this algorithm by utilizing a Full bridge-LLC resonant converter with suitable compensation topology.

II. LITERATURE REVIEW

Resonant converters are the power electronic circuit which utilizes a resonant network to resonate at specific frequencies. An isolated resonant converter with LLC (inductor-inductor-capacitor) tank network is discussed in this paper [5]. It consist of an inverting circuit which generate square output followed by a tank network and a rectifier as given in fig 3. Usually the isolation is provided by a high frequency transformer or coupling coils [6].



Fig. 3. Block diagram of LLC resonant converter

Converter output voltage can be regulated through the switching frequency of the square wave generator. Harmonics in the output could be removed using the resonant tank network. The converter can be employed to hold a wide scope of regulated output when the input and load have much variation [7]. Hence found application in electric vehicle charging. The converter primary can operate in ZVS mode and the rectifier section can operate in ZCS mode even in the worst cases and in turn reduces the power dissipation. Reduced electromagnetic interference improves the operation and efficiency of the converter.

The compensation is generally catered to a circuit to meet certain design requirements [8]. Here the compensation is provided to achieve constant voltage and constant current mode charging. It is done by utilizing the resonant components like inductors and capacitors in a suitable topology with minimum circuit complexity. The important compensation schemes can be summarized as in Table 1.

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4

Investigation and Optimization of Machining Parameters Influence on Surface Roughness in Turning AISI 4340 Steel

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Abstract—This paper focusses on the experimental investigation of machining parameters such as cutting speed, feed rate and depth of cut influence over surface roughness parameters (R_a , R_y and R_t) during turning AISI 4340 steel. Further, in order to achieve smaller surface roughness parameter values, the machining parameters are optimized using Taguchi's technique Signal-to-Noise ratio (S/N ratio). Analysis of Variance (ANOVA) is performed to determine the most contributing factor that influences the surface roughness parameters. It is observed that the feed rate is the most significant factor contributing by 70.50%, depth of cut by 18.54% and cutting speed by 9.15%. From the optimum condition obtained, a confirmation experiment is performed and the results obtained shows that the surface roughness parameter values are reduced by 31.63% than the designed experimental values.

Keywords—Machining parameter; Surface roughness; Taguchi's Technique; ANOVA.

I. INTRODUCTION

Turning is a process of producing axisymmetric surface by removing unwanted material from the work-piece to produce a desired shape, where the tool moves in a perpendicular plane and the workpieces is hold on a spindle and rotated [1]. The interesting parameters that were associated with the process of turning were cutting speed, feed and depth of cut [2]. The cutting speed can be defined as the relative surface speed of the workpiece with respect to the tool, which is responsible for material removal. The relative motion of the tool with respect to the job in perpendicular direction to cutting speed for the purpose of reaching unmachined surface is called feed [3]. The penetration of the cutting tool into the job, that is beneath the job surface is depth of cut, which is the radial distance in turning, from the unmachined surface of the job to the tool tip [4].

In this analysis, surface roughness parameters such as R_a – Average roughness value, R_t – Maximum height of roughness profile and R_y – Average maximum height of profile are analyzed experimentally for different values of machining parameters. Fig. 1 shows the surface roughness profile of various parameters [5].

Asilturk and Akkus [6] minimized surface roughness by optimizing the turning parameter using Taguchi's technique during dry turning and found that feed rate has the most significant effect on surface roughness. Tamizharasan and Senthilkumar [7] analyzed the effect of various cutting tool geometries over surface roughness and MRR using Taguchi's technique and by ANOVA. Nalbant et al. [8] optimized the cutting parameters in turning AISI 1030 steel based on the surface roughness produced and found that insert radius and feed rate are the most contributing factors. Ramesh et al. [9] predicted the effect of cutting parameters on surface roughness during turning aerospace titanium alloy (gr5) using response surface methodology model and found that feed rate is the most influencing factor. Kopac et al. [10] determined optimal conditions to achieve desired surface roughness in turning C15 E4 steel by varying the cutting speed, tool and workpiece material, depth of cut and no. of cuts and using coated inserts.

Asilturk and Neseli [11] determined optimum machining parameters for better surface roughness during dry turning of AISI 304 steel using coated carbide insert by response surface methodology and predicted it using the developed mathematical model and found that feed rate is the most contributing factor. Bernardos and Vosniakos [12] have presented various methodologies that are to be followed in predicting the surface roughness and how to reduce it. Sahin and Motorcu [13] used response surface methodology to develop a mathematical formula to predict surface roughness and found that feed rate is the most significant parameter contributing towards surface roughness using ANOVA. Palanikumar and Karthikeyan [14] determined the factors that influence surface roughness during turning Al/SiC particulate composite using carbide tool insert and found that feed rate is the most significant factor, responsible for surface roughness. Verma et al. [15] used Taguchi's technique to optimize machining parameters in turning ASTM A242 Type-1 steel over surface roughness and found that cutting speed is the most significant parameter responsible for surface roughness.

Akhyar et al. [16] optimized the cutting parameters during turning Ti-6%Al-4%V with coated and uncoated cemented carbide tool and found that cutting speed and tool grade have a

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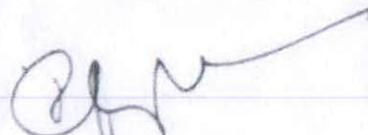


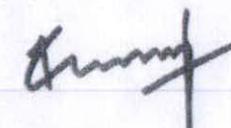
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Study on Effect of Solid Sago Waste/Rumen Ratio and Pretreatment for Biogas Production of Solid Sago Waste using SS-AD Method in Anaerobic Digester

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Abstract

Solid sago waste potentially produces renewable energy. This present study aims to investigate the effect between size solid sago waste, the addition of consortium microbial and NaOH and investigate the effect of solid sago waste and cow rumen ratio. Several variation pretreatments conducted this study include physical with milling (± 1 mm), biological with microbial consortium 5% v/v, chemical with NaOH 4% g/gTS, also ratio solid sago waste and cow rumen (1:1 and 2:1). Biogas formation process conducted over 2 months with measuring biogas volume every 2 days. The result shows, ratio solid sago waste and cow rumen 1:1, there was balance of the metabolism from biogas bacteria and makes the biogas production more than 2:1 ratio. Meanwhile the highest biogas production accumulation at 27.91 ml/grTS, produced through with milling (± 1 mm), immersion in NaOH and microbial consortium, with solid sago waste and rumen ratio 1:1.

Keywords: Biogas, Solid sago waste, Pretreatment.

Numerical Modelling and Simulation of Anaerobic Digestion Process using De-Oiled Cakes

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Abstract

Energy crisis emerging due to the depletion of fossil fuels and managing solid wastes of all categories were the problems that should be targeted at the present scenario, which is done by converting these waste material into useful energy, which reduces the dependency on fossil fuels. Conversion of solid wastes into useful biogas is performed through anaerobic digestion process. While installing newer anaerobic digestion plants for specific solid wastes, economical design and optimization is inevitable. In this work, the solid wastes considered was de-oiled cake such as rapeseed cake, neem cake and groundnut cake, obtained after removing the oil from the seeds. Simulation of anaerobic digestion process is carried out using STOAT (Sewage Treatment Operation Analysis over Time), a versatile software, specifically designed for sewage and anaerobic digestion process. Comparison of biogas produced, pH value of digest and temperature inside the digester were done. Apart from this, experimentation was also performed and compared with the simulation results, and was found that the experimental values get coincided with the simulation results.

Keywords: Anaerobic Digestion, STOAT, Numerical simulation, De-oiled cake.

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A Study of Airfoil Flap Design Optimization Using Simulation Techniques

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Abstract

With the advent of advancements in the study of liquids and gases, Computational Fluid Dynamics has found widespread applications in various fields including aerodynamics. The wing is an important aerodynamic feature that has seen modifications in recent years to suffice the growing need for a greater maximum lift coefficient (C_L). High Lift devices such as flaps and slats are enhancers of lift force and are often at large used as attachments on the main wing body. This project investigates the 4 digit NACA 2412 aerofoil improved using a 5 digit NACA 24012 Fowler Flap. Optimization of the flap deflection angle θ_{flap} , the horizontal gap and vertical depth between the flap and wing is carried out and the obtained coefficients of lift experimentally validated to determine the optimum model configurations. This new multi element wing configuration will find its applications in low speed aircrafts used for general aviation and to reduce the need for longer runways.

Keywords: CFD, Aerofoil flap, Simulation, Lift coefficient.

Performance and Emission Analysis of Biofuel obtained from Rotten Potatoes

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Abstract:

Biofuels have been investigated as alternative resources to resolve the demanding consumption of conventional fossil fuels, to minimize the economic and environmental impact, and to secure the sustainability for decades. There are two global biomass-based liquid transportation fuels that might replace gasoline and diesel fuel. These are bioethanol and biodiesel. It is assumed that biodiesel is used as a fossil diesel replacement and that bioethanol is used as a gasoline replacement. Biomass-based energy sources for heat, electricity, and transportation fuels are potentially carbon dioxide neutral and recycle the same carbon atoms. Due to wide spread availability opportunities of biomass resources, biomass-based fuel technology potentially employs more people than fossil-fuel based technology. Bioethanol is a promising engine fuel for the future. It seems to be an important bio-based fuel and it has become more attractive recently because of its environmental benefits. It is also oxygenated, thereby providing the potential to reduce particulate emissions in compression-ignition engines. Ethanol has a higher octane number (108), broader flammability limits, higher flame speeds, and higher heats of vaporization than gasoline. These properties allow for a higher compression ratio, shorter burn time, and leaner burn engine, which lead to theoretical efficiency advantages over gasoline in an internal combustion engine. Our investigation is to produce



bioethanol from the rotten potatoes. Rotten potatoes are chosen as their availability seems to be more than the present demand. Bioethanol is prepared through a series of chemical processes. The main process carried out is the yeast fermentation. The bioethanol obtained from these processes is then tested for its properties such as viscosity, density, flash point, fire point etc. Finally, bioethanol is blended with petrol in the proper ratio. Then the blended fuel is supplied to the SI engine. The performance and emission analysis of the above blend is conducted and the results are analyzed.

Keywords: Biofuel, Bioethanol, SI Engine, Biomass.

Super Capacitor Powered Hybrid Vehicle

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Abstract:

The main objective of this project is to improve the mileage (fuel consumed per Kilometer) of an automobile by incorporating the concept of a hybrid vehicle. The idea is to cross breed two existing technologies i.e., conventional car driven by an IC engine and an electric car driven by an Electric motor to achieve minimum fuel consumption per kilometer. Apart from the already existing hybrid car technology this project aims on achieving its objective by direct coupling of the conventional IC engine with an alternator. The IC engine will be rotating in a constant speed. The speed (rpm) of operation of the IC engine will be the speed (rpm) which helps to achieve lowest fuel consumption. It will be possible to downsize the Engine i.e., an automobile running with an 800cc Engine can be driven with an Engine having half its displacement volume. The Engine speed will be multiplied by using gear arrangements; an alternator will be coupled to the gear arrangement to generate Electric power. An Electronic Control Box is employed to convert the AC current into corresponding DC current and to control the Electric power generated from the alternator i.e., the vehicle's acceleration and supply of the electric power to the motors etc. The ECB (Electronic Control Box) acts as the primary control unit of the system, it is basically a Microprocessor which monitor and control all the dynamic parameters of the system e.g., speed, torque etc... A super capacitor is employed for the purpose of generating high torque whenever required, for example at the period of initial movement of the vehicle. The power supply to the super capacitor is controlled by the Electronic Control Box. Then the supply is given from the ECB to the Motor (Synchronous motor or Reluctance motor or DC series motor) which drives the vehicle. The range of operation of the vehicle will depend on the amount of fuel not on the amount of energy stored in the batter. No battery is used for the storage of the Electric power as it is not required, which results in reduction in the overall cost of the automobile.

Keywords: IC Engine, Alternator, Electronic Control Box (ECB), Synchronous motor, Reluctance motor, DC motor, Microprocessor, Super Capacitor.



initial investments. In order to boost GSCM culture amongst MSE's, awareness needs to be created on environmental management concerns. This will not only help them to reduce wastages, increase productivity but also make them more competitive and acceptable in domestic as well as global markets. This paper aims to identify, prioritize and validate the barriers in implementation of GSCM, by using Interpretive Structural Modeling (ISM) analysis.

Keywords: Green Supply Chain Management (GSCM), Interpretive Structural Modeling (ISM), Micro Small Enterprise (MSE).

Design and Analysis of Vertical Axis Wind Turbine with Wind Deflectors

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Abstract:

In the project investigation, a design modification of Vertical Axis Wind Turbine was attempted by adding wind deflectors in order to increase the torque, rpm and other characteristics of machine elements, fluid dynamics and energy technology. An optimized design of the wind deflectors is suggested, which when integrated results in improved efficiency as compared to that of a standard Vertical Axis Wind Turbine. The parameters that could be optimized have been identified in analyzing the structure as positioning of blades, shape of deflector and angle of deflector. These parameters were then analyzed using ANSYS/Fluent software package to get the results.

Keywords: Vertical Axis Wind Turbine, Wind Deflectors, ANSYS/Fluent software.

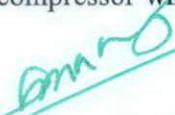
Supercharging in Single Cylinder Engine

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Abstract:

The output power and torque of an engine depends on the cubic capacity(cc) or number of cylinder. The cost of an engine increases as its 'cc' increases. An alternative way of increasing the power output and torque for smaller 'cc' engine can be achieved by supercharging. The supercharger is an air compressor which can be used to increase the pressure or density of the air. The pressurized air is given to the cylinder along with fuel. The use of supercharger will improve the power and torque of single cylinder engine. Bajaj 135cc single cylinder DTSi engine is used for applying the afore said system. The supercharger works by taking a part of power produced by the engine, in high 'cc' engines above 500cc. The power output is very low in smaller cc engine. We cannot use a part of power obtained in such cases, for the working of supercharger. In this context, a compressor which works on external power source like battery is used.

Keywords: Supercharger, Torque, Single cylinder engine.


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Effect of Additives on Blending of Fuels

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Abstract:

Most fuels such as gasoline, kerosene (jet fuel), gas oil (diesel fuel) and fuel oil have drawbacks which do not allow their long-term storage, and make difficult for transportation and use. Also automobile emissions are main source of environmental pollution today. Using of additive will combat the effects of fuel degradation, increase the cetane value of the fuel, reduces the emissions and allow engine to extract more power from diesel fuel. About 20 properties of fuels can be improved, maintained or imparted new beneficial characteristics by the adding of small amounts of certain chemicals named fuel additives. Fuel additives are added in very small concentrations: from several ppm to several thousands ppm. Fuel additives are organic substances soluble in fuels: antifoams, anti-icing additives, anti-knock additives, antioxidants, antistatic additives, anti-valve seat recession additives, biocides are some of them. Additives which improve some properties should not deteriorate other properties of fuels and its quality in general. The additives intended to improve both physical and chemical properties of fuel has been widely accepted in many fields particularly in connection with automotive application. Aim of this paper is to compare performance of fuel, when additives are added in various ratios and ratio in which they have to be blended to get the optimum performance (here, reduction of NO_x emissions) is found. The emphasis on emission reduction and fuel conservation have provided a renewed motivation to study the use of fuel additives in internal combustion engines.

Keywords: fuel additive, Emission Reduction.

Design and Fabrication of Scrubber for Biogas Purification

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Abstract:

Today large quantities of wastes are generated from human settlements. For biogas production, anaerobic digestion (AD) of the produced community waste is a suitable solution for an efficient recycling and for a mitigation of the greenhouse gas emission for a healthy environment. But the composition of substrate, the operational parameters, and the type of digesters are the factors that affect the AD. The performance of the anaerobic digesters can be enhanced by optimizing the above mentioned factors and it will help in mitigating the release of harmful and toxic gases like H₂S and CO₂. The current study have been made, in order to purify the biogas production from the anaerobic digestion of organic canteen leftover in different proportions of Food Waste, Banana Peel, Vegetable Waste, spent Tea Dust Waste, etc. with the help of a scrubber and it consists of two separate units for the removal of H₂S and CO₂. The designing of scrubber is done in software package and is then fabricated accordingly.

Keywords: Anaerobic Digestion, Food Waste, Banana Peel, Vegetable Waste, Tea Dust Waste.



Cooling Of Heavy Vehicle Drum Brake System

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Abstract

The air in the cylinder gets heated up due to continued usage of brakes in long journeys. The hot air expands in the drum cylinder which at a point of maximum pressure and temperature jams the lever, locking up the wheels. Thus, the vehicles don't move anymore. The kinetic energy of the brake drum of the rotating part of the friction pair is converted into the internal energy of the friction plate on the friction surface, which is very dangerous due to high temperature as it decays performance of the existing brakes. It is urgent to implement the cooling system of brake in the above conditions. This paper mainly aimed at the braking performance of the vehicle while thermal decline of the design by automatic control cooling device, a sensor is used to collect the car brake signal, with the opening of the cooling system working that will be normal temperature air cooling into cold air and cooling the brake parts. Complete drum brake cooling, improve the active safety performance of automobiles. The methodology adopted for determining the thermal and structural boundary conditions have been described in detail. Energy balance methodology was employed to determine the heat flux values on the drum liner. The structural boundary conditions are determined experimentally and validated with FEA. The project is based on monitoring the hot air temperature in the compressor and then using materials or methods to absorb heat formed in the drum brakes due to friction or bleed it out using any system. This reduces the chances of wheel jamming and also reduces heat acting upon wheel lining which causes wear and tear.

Keywords: Heavy vehicle, Cooling system, Brake drum.

Cryo E-Toilet

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Abstract:

Cryogenic liquids are liquefied gases that are kept in their liquid state at very low temperatures. They have boiling points below 123K. All cryo fluids are gases at normal temperature and pressure. These gases must be cooled below room temperature before an increase in pressure can liquefy them. The vapours and gases released from cryogenic liquids are also remained very cold. They often condense the moisture in the air, creating a highly visible fog. In poorly insulated containers some cryogenics actually condense the surrounding air forming a liquid air mixture. The application of cryogenic engineering in human waste treatment process in trains and long route buses is proposed in this work. The identical performance of the currently used human waste treatment process, in trains and long route buses are non-effective and are hazardous to both human health and the environment. In this system by the application of cryogenic refrigeration, the human waste is frozen using the cryogen. Later, by the application of a mechanical force the frozen waste is powdered and disposed



of as manure. The urine also can be treated in the same way. Since to avoid the wastage of water the urine can be treated in boiler and can be reused as cleaning water. In earlier stage the urine is passed through a membrane to separate ammonia and then it is heated in a boiler.

Keywords: Cryogenics, Cryogen, Human waste, Cryogenic refrigeration.

Water Conservation on Integration with IoT

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Abstract:

Water is a vital part of everyday life. Due to the global environmental situation, conservation and recycling of water is of utmost importance for the survival of the humanity. About 70% of total water used in household gets wasted every day. In the upcoming years this amount is likely to increase because of the increasing population. This paper put forwards sustainable means of water conservation and recycling based on Internet of Things (IoT). This prototype is based on IoT integrated Valves, Actuators and Sensors which monitor the flow of water for various household uses and control the flow of water whenever necessary. The collected data will available to the user on a smartphone or a computer and the user can control the usage accordingly. The system can also redirect the waste water into recycling facilities. The goal of this development is to enable the users to proactively manage their water usage and achieve higher levels of sustainability in water management.

Keywords: IoT, Sustainable water management, IoT integrated Valve.

Wireless Braking System

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Abstract:

Modern vehicles are full of complexity, and many systems working together to ensure a safe and comfortable riding experience. One of the most important parts need extreme safety is braking system. Being able to slow down or stop the vehicle on appropriate time help to avoid an accident, thereby preventing injury and loss of life. The more reliable the braking system the safer the vehicle is. The braking system of cars, trucks, motorcycles, etc. is made up of a number of parts that translate the driver's actions into physical force which brings the vehicle to a halt. The project proposed herewith describes is a braking system that works wirelessly. The system uses the principle of transferring sudden human reflex to apply the brakes. The wireless braking system consists of force sensor, electronic units, microcontroller and RF module. The project is designed to avoid the accidents caused due to sudden braking. The system has been tested and the results are included. Wireless braking can be incorporated in bigger and heavier vehicles in the future.

Keywords: Wireless Braking, Pressure System, Human Reflex.



Design and Analysis of Hybrid Vertical Axis Wind Turbine

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Abstract:

The inability of effective utilization and its alarming extraction costs are the main detrimental factors that hinder the process of wind power generation. The most common hurdle that this technology has to face is the initial investment as well as the large area requirement. The conventional wind turbine, which is a horizontal wind turbine, has many real world problems. The large structure requirement, major friction losses, low power generation etc. contribute to this method not being a widely accepted one. This means that, however the practicality, this is not the most suitable method for wind energy generation. This study aims at designing a small scale vertical axis wind turbine (VAWT), which can be used to meet the power requirement for low power application with a new blade design. A MagLev system is inculcated into the design in order to effectively reduce friction. The components of the MagLev system include rare earth permanent magnets, in which the repelling force of magnets are used to suspend the rotating part of both the turbine and generator. Also a solar panel is added in order to create a hybrid energy system, to collect the solar energy during the day. This Vertical axis wind turbine can then be placed at high wind active sources like highways, railway tracks, etc. to effectively produce energy from excessive winds that is available aplenty.

Keywords: Vertical axis wind turbine (VAWT), MagLev system, Blade design.

Production of Diesel from Low Density Polyethylene

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Abstract:

All plastics have to be disposed after their use as waste. They need to manage their waste as plastic become apparent. This leads to pyrolysis which is a way of making to become very useful to us by recycling them to produce fuel oil. In this study, plastic wastes were used for the pyrolysis to get fuel oil that has same properties as the fuel in aviation industry. Thus the problem faced by the increasing fuel crisis can be eliminated by making a system which can decrease the pollution due to plastic and increasing availability of alternating fuel. This was made by converting the plastic waste into useful alternative oil by means of pyrolysis process.

Keywords: Plastic wastes, Pyrolysis, Fuel oil.

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Application of Solar Energy n Excess Agricultural Production

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Abstract:

Thousands of tons of vegetable are produced in Algeria and this production is intended for the industry to be finally consumed by humans. The excessive production of vegetables is one of the most valuable indicators for establishing food security in a country. In the region of El Oued southeast of Algeria for example, the production of tomatoes is very wide but the period of cultivation is very short. It is, for this reason, a large percentage of production is thrown at the edge of farms. This accounts for huge economic loss for the nation. In this work, we propose a reasonable, simple and economical solution to this problem. It is solar drying. This method consists of dehydrating the products by solar energy while keeping the food value. This application is also valid for products sensitive to solar rays.

Keywords: Solar energy, Food security, Agriculture, Solar drying, Human consumption.

Multi-Purpose Air Cooling System

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Abstract:

Air conditioner has become a necessity of all households in 21st Century. In all metropolitan cities, environment degradation due to automobile & other factors is on the rise, therefore the requirement of air-conditioner has already been felt. The motivation for the project comes from rising energy demand, maintenance and running costs. The main objective is to combine the functions of a refrigerator, air cooler and a water heater into a single unit. This project aims on achieving this by using a multi evaporator with single compressor for operating air cooler and refrigerator. The waste heat from the evaporator is used to heat the water. By this method the energy and cost can be reduced when compared to the cost of running individual equipment.

Keywords: Domestic Refrigerator, Air conditioner, Affordable, Productivity, Portability, Environment Degradation.

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Design and Fabrication of Sea Water Purification System

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Abstract:

Water is a fundamental need for all living things. The goal of our project is to design, prototype and test a portable water desalination unit capable of producing drinkable water in emergency situations. We will be able to convert seawater into drinkable water with the use of this apparatus. The system is unlike others on the market because it is able to produce a higher volume of water and is personal sized and portable. The team elected to use a boiler-condenser system with a thermo-electric dehumidifying unit. Being the first apparatus of its kind, there are many possibilities for improvements. The team envisions the system to be powered by a portable source such as battery.

Keywords: Desalination unit, Boiler-condenser system, Thermo-electric Dehumidifying unit.

Studies on the Influencing Parameters in the Design Optimization of Solar Dish Reflector-Cavity Receiver Collector System

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Abstract:

The design, fabrication and erection of dish collector system have been done at Melmaruvathur (12° 30' N latitude and 79° 30' E longitude) near by the city of Chennai in India to carry out the experimental part of the research work. The dish reflector was developed through the ray tracing software SOLTRACE 2012, The point focusing reflector made by glass mirror with reflectivity of 93% and reflector area of 12 square meters was designed and fabricated with the rim angle of 50° for the determined optical efficiency of 67.65%. The rectangular beam with curved ribs are connected to base ring along the radius and they are joined by spaced rings along the circumference for robust structure to bear the weight of the reflecting material and also to maintain the focal point by avoiding the deflection of the frame structure because of the wind forces. The 3D receivers are modelled by SOLID WORKS- 2013 and analysed by commercial software ANSYS-FLUENT- 2016 through 3D high mesh quality elements, in general containing equiangular skew (Q_{EAS}) of 0.4 for the entire receiver geometry. The optimized receiver model of L/D ratio of 0.75 has been done from the performance studies of the cavity receivers of L/D ratios of 1.5, 1, 0.75 and 0.5 with different coil configurations.

Keywords: Concentrated solar power, Heat transfer fluids, Receiver geometries, Cavity receiver.



paper. Prototype of photovoltaic thermoelectric ventilation system using thermoelectric modules 12706 has been presented along with MATLAB Simulink model and code to calculate performance parameters by varying input has been presented in this paper.

Keywords: Efficiency, Modelling, Photovoltaic, Thermoelectric, Ventilation.

Biodiesel Production from used Coffee Grounds

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Abstract:

The project mainly aims on lowering the depletion of natural resources and promote the use of waste materials for maintaining sustainable development. Biodiesel is an alternative for petroleum products made from natural resources. Usage of biodiesel shows huge reduction in chemical contents such as toxic and hydrocarbon species in the air. Biodiesel can be mixed in any suitable proportion with the conventional diesel. The production of biodiesel from used coffee grounds under transesterification process is experimented. Transesterification process with methanol and NaOH as appropriate catalyst is employed for biodiesel synthesis from spent coffee oil. Primarily oil extraction from coffee grounds was done using solvent hexane. The oil will remain leftover while the solvent gets evaporated. Nearly 85% oil-to-biodiesel conversion was obtained through transesterification process. The process was maintained at 58-61°C and 1:3 oil-to-methanol molar ratio. Using ¹H NMR (Nuclear Magnetic Resonance) machine the procured biodiesel's properties were checked and resulted in high energy content biodiesel with similar properties to that of conventional diesel along with reduced pollution contents.

Keywords: Biodiesel, Coffee ground, Transesterification, Methyl esters.

The Relief of Energy Convergence of Shock Waves by Using the Concave Combustion Chamber under Severe Knock

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Abstract:

In internal combustion engines, severe knock is a destructive phenomenon that would converge the energy released by fuel burning to damage the piston so that the engine can't work anymore, which should be avoided. The destruction mechanism has been revealed in previous researches in which the focusing of shock waves is considered as a main reason to cause the energy convergence and the destruction. However, the method to alleviate such shock wave focusing hasn't been put forward yet. Based on the destruction mechanism proposed before, in this research, a concave combustion chamber has been designed to alleviate the energy convergence of shock waves under severe knock so that the destruction of the piston under severe knock can be avoided. To validate the alleviation



noise reduction is observed in the wavy trailing edged airfoil having less value of wavelength. The OASPL value increases with increase in velocity for all angles of attacks because major contribution of noise from the airfoil is due to the turbulent boundary layer at the trailing edge and blunt trailing edge.

Keywords: Airfoil, Angle of attack, Power spectrum density, Velocity.

Thermoelectric Generator Coupled to Engine Exhaust

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Abstract:

The current worldwide trend of increasing transportation is responsible for increase in the use of internal combustion engines. I.C engines, is a machine with a high energy usage and low efficiency because roughly 75 % of the energy generated during combustion is lost in the exhaust and in the coolant of the engine in the form of heat. Due to huge amount of energy loss, there is an urgent need to design a device to trap it for some useful work. This project proposes and implements a waste heat recovery system using a thermoelectric generator (TEG) designed for four stroke I.C. engine. The system converts the waste heat from the exhaust manifold into electrical energy using a TEG. The output is then boosted by a Joule Thief converter to run the required load or to charge a battery. The experimental results from the available literature demonstrate that the proposed system recovers considerable amount of waste heat which can be used to power some auxiliary automobile devices.

Keywords: IC engine, Heat energy recovery, TEG, Engine exhaust.

A Gasification Model with Groundnut Shell as Feedstock and its Experimental Validation

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Abstract:

Gasification is one of the most efficient options among the different thermochemical methods to utilize the energy potential of biomass. It increases the energy density of biomass by converting it into concentrated producer gas. In the present work, a stoichiometric equilibrium model is developed based on the assumption that the species and the reaction attain thermodynamic equilibrium. The model predicts the maximum yield and composition of the gas produced. The modeling helps in the identification of the performance variation of gasification process at different operating conditions. This in turn helps in understanding the gasification process which is very much necessary during the preliminary design and development of a gasifier. The present work models air gasification with groundnut shell as the biomass feed. The model is validated with experimental data by comparing



the composition of producer gas at different operating temperatures and an RMS error of around 7.5% has been obtained. With the validated model the gas composition at different equivalence ratios are also predicted.

Keyword: Biomass, Gasification, Groundnut shell, stoichiometric equilibrium, thermodynamic equilibrium.

Heat Transfer Enhancement and Pressure Drop in a Ceramic Heat Exchanger Analyzed Through CFD Simulations

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Abstract:

In this paper, a numerical investigation on heat transfer enhancement and pressure drop in a ceramic Double Pipe Heat Exchanger (DPHE) is the arrangement in counter flow of water and Aluminium oxide as the test fluid is presented. This work presents the results obtained with Computational fluid dynamics (CFD) package (ANSYS WORKBENCH 18.2). On account of fouling and corrosion were studied about the difference of using the existing heat exchanger and the ceramic heat exchanger. Effects of Nano particle concentration and Reynolds number, Nusselt number, heat transfer coefficient are presented. The Nusselt number and friction factor are modeled in terms of Reynolds number through the obtained data from the numerical investigation. The results show that the pressure drop is about $34.87-6,269.92 \text{ N}\cdot\text{m}^{-2}$ for hot fluid and $15.06-3,379.42 \text{ N}\cdot\text{m}^{-2}$ overall. The DPHE illustrates evidently high comprehensive performance for $Re_h = 15000$ and $Re_c = 35000$. Increase in frictions factor results increase in Reynolds number, Nusselt number and heat transfer coefficient. It is revealed that the proposed numerical model can effectively display the real physical heat transfer process in double pipe heat exchanger. Therefore, the two different correlations of the existing heat exchanger and ceramic heat exchanger are discussed; it is expected to provide useful information for the simulations of double pipe heat exchanger.

Keyword: DPHE, CFD, Ceramic Heat Exchanger, Fouling.

Atmospheric Water Absorption Kit

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Abstract:

As the water scarcity is becoming a serious problem, it's our duty to use each drop of water with care. Everyone knows that the atmosphere is rich in humidity. Thus the humidity rise, it will cause a dangerous problem of rise in temperature of that particular place. Both the problems can be avoided by the water absorption from atmosphere. For this we are using biomimicing with desert beetle,



and hydraulic performances needs to be determined for the MPHE with the nanofluid in hot side and the water in cold side. Finally, the nanofluids should be compared with standard ethylene glycol coolant.

Keywords: CD, Graphene Nanofluid, Coolant, Heat transfer coefficient.

Air Brake System Using Exhaust Gas

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Abstract:

In 'air braking system using exhaust gas', we use exhaust gas from the IC engine to operate air brake in the automobile. Air brake is most used in braking system in vehicles. In the proposed model instead of air brake, exhaust gas is used to operate brake lever. Exhaust gas from the engine is utilized to operate the turbine and thus we produce the energy run the secondary compressor. Compressor air from the compressor is utilized for the air braking system of the automobile using a solenoid valve to actuate the piston inside the cylinder. The main aim of the project is to reduce the work load of engine drive to operate the air compressor.

Keywords: Air Brake, Exhaust Gas, Compressor, Solenoid Valve, Engine.

Cross Axis Wind Turbine

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Abstract:

Harnessing of wind energy provides a new way to reduce dependencies on fossil fuel reserves. In the wind energy industry, there are two major types of wind turbines; the horizontal axis wind turbine (HAWT) and the vertical axis wind turbine (VAWT). In general, the HAWTs are better at extracting wind energy than the VAWT, but in some situations, the VAWT has superior advantages over the HAWT. Based on existing studies, the vertical axis wind turbines have been shown to perform better in skewed flow conditions compared to the horizontal axis wind turbines. However, currently there is no type of vertical axis wind turbine that is specifically designed to extract wind energy from both the vertical and horizontal components of the oncoming skewed wind. Therefore, the main aspect of this project is to offer an early insight into the development of a new type of wind turbine that can function with different components (i.e. directions) of wind flow. Consequently, the energy output of the wind rotors with similar geometrical dimensions can be improved. The proposed wind turbine is called cross axis wind turbine (CAWT) The cross axis wind turbine (CAWT) comprises three vertical blades and six horizontal blades arranged in a cross axis orientation. Initial testing using deflectors to guide the oncoming airflow upward showed that the cross axis wind turbine produced

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Abstract:

In last few decades, the plastics have created a big impact in our environment as they are not easily degradable. The air, soil, water has been polluted to greater extend due to the dumping of plastics. A proper recycling of the same is required for protecting our environment. In this research work a feasible solution for reusing of plastic is suggested. 3D printers are a new generation of machines that can produce everyday product in short time. As the modern manufacturing industries are making a paradigm shift to 3D printing technology due to its fast production with sufficient precision. They are remarkable because they can produce different kinds of objects in different materials, all from the same machine. In the current paper, the development of filament for FDM machine is carried out from waste plastics is discussed. Thermo plastic is collected is shredded in powder form. By recycling the above plastic material through drying, crushing, melting and extracting through extrusion machine, filaments for the 3D printer are made. This filament produced from waste plastics is tested in FDM machine. The research on success will surely provide a solution to the plastic pollution in the environment and will act as a revolutionary solution to the plastic pollution to the environment. The new environment friendly plastic filament produced by recycling of waste plastics will produce affordable products in FDM process.

Keywords: FDM Machine, paradigm shift.

Automatic Ground Cleaning Device

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Abstract:

The cleaning process in vast areas are normally time consuming and need more manpower. In order to overcome this difficulty a concept of "Automatic Ground Cleaning Device" is introduced. Automatic ground cleaning device is a new concept for cleaning and thus removing the unwanted waste particles left behind in the public as well as in private places. The aim is to reduce human effort in cleaning thus making the process much simpler and quicker. The accumulation of unwanted waste particles in the surrounding causes harmful effect on the environment and to the living beings. An innovative idea is put forward to rectify this problem.

Keywords: Waste, cleaning, automatic.

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Modeling of Surface Roughness in Abrasive Water Jet Machining Of Az91 Magnesium Alloy Using Fuzzy Logic and Regression Analysis

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Abstract:

This study discusses the model for determining surface roughness during machining of AZ91 magnesium alloy using Fuzzy logic. Regression equation also was used to predict the SR value. Abrasive water jet cutting has been proven to be an effective technology for processing various engineering materials. Surface irregularity of machined parts is one of the major machining characteristics that play an important role in determining the quality of engineering components. Three variable input parameters—water pressure (WP), Traverse speed (TS), and Standoff distance (SOD)—were selected to assess the roughness. The experiment was designed using response surface methodology. Maximum pressure and minimum standoff distance cause reduction in the surface roughness in AZ91 magnesium alloy. Further, the developed Fuzzy model was used to validate the results and it was found that the predicted values were in good agreement with a 95 % confidence level. It was also evident that the Fuzzy technique is helpful for better prediction of the experimental

Key words: Water jet machining, Magnesium alloy, Surface roughness, RSM, Fuzzy logic.

Design and Fabrication of Refill Friction Stir Spot Welding Tool

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Abstract

Refill Friction Stir Spot Welding (RFSSW) process, one of the variants of friction stir spot welding process is capable of joining two or more materials in a spot like lap joint configuration. The RFSSW process helps to eliminate tool exit hole, which uses a non-consumable tool consisting of three independent movable parts, the sleeve and the pin, and a stationary clamping ring. We plan to design and fabricate a simple RFSSW tool head which can be installed as an attachment to a drilling machine, as well as a clamping mechanism to hold down the arrangement in place. We have to devise a mechanism which allows us to facilitate combined vertical as well as rotary movement of the tool. The mechanism should also be capable of transmitting the load applied in a uniform manner to the objects being welded. We also focus on developing a way to unclamp the work piece after welding, without switching off the equipment so that we can reduce cycle time. The movement of the tool head helps to create the sufficient friction and thereby the heat required to weld the metal sheets together. By this project we are trying to simplify the entire mechanism and also to make an alternative to the existing equipment being used for RFSSW process.

Keywords: RFSSW, Pin, Sleeve Clamping Ring.

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Analysis of Friction Stir Processed Copper with Various Tool Profiles

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Abstract

Friction stir processing (FSP) uses the principle of Friction stir welding (FSW). In FSP, a cylindrical tool which possess a shoulder and a pin. It is rotated at a high speed. During this process, a vertical force is applied which plunges the pin into the material. Due to the frictional heat developed, the base material softens and gets processed. The process involves deformation of metal and material mixing. This work mainly focusses on the analysis and comparison of processed areas using different tool profiles. The tool profile can be conventional types or hybrid tool profiles. Conventional type tools consist of convex, cylindrical and conical tool profiles. Hybrid tool profile is a tool profile which consist of combination of different tool profile along pin. For example, a conical pin with a triangular or hexagonal shape on its tip of desired dimension. During the process, the temperature rises significantly due to the frictional heating and due to this heating, the deformation of material takes place. The process is done at different rotational speed with a different feed rates and comparison is done. The pin length of the tool and tilt angle are the main factors that has to be considered during the process. The main objective of the work is to study the effect of various tool profiles with the different process parameters of a friction stir processing on pure copper.

Keywords: Friction stir processing, Convex, Cylindrical and conical tool profiles.

Design and Optimization of Solenoid Array for Braille Printing

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Abstract

The cost of Braille printing is quite expensive in an era where we are at the peak of Technological Innovations. Our project focuses on the design and optimization of Braille printer's print head design and optimizing it for good prints and increases the overall life of the print head. We intend to make a print head using cheap commercially available solenoids and make changes in the solenoid and the print head design by studying it after certain number of usages. We are going to make use of Magnetic field Interactions, thermal cooling and circuit theory in order to design and control this print head. We aim to create a cheap print head so as to make the price of Braille printing cheap. The foreseen challenges are the machining of plunger, sockets and increasing the reliability of solenoids for continuous usage. Our array design will be aimed at first for single side Braille printing and will be upgraded for double side Braille printing.

Keywords: Braille system, Embosser head, Solenoid, Keyboard, Braille Cell.

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Die Failure Analysis

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Abstract

Die life is one of the most important factor that affects the hot forging industry, because the cost involved during the production processes are very high. The main reasons behind the reduced life of forging dies are excessive wear, thermal fatigue, plastic deformation and mechanical fatigue. Eventually the dies will fail, but these reasons may cause the dies to fail before their actual life span, which is known as the premature failure of dies. When a die fails, the process produces parts with defects and the quality is compromised. The present study is intended to select a failed die and to find the reasons behind the failure. The thermal analysis of the die was carried out using ANSYS software. The main objective of this present investigation is to find out reasons for the premature failure of a forging die.

Keywords: Die Life, Forging, Premature Failure, Industry, Wear, Fatigue, Analysis

Fabrication of Dent Remover

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Abstract:

Dents in automobile bodies are a very common problem and one to which great time and effort is spent. If the backside of dent is concealed, as on a door, more complicated methods are generally used. A common method used for removing dent is hammering. It is usually done from inside part of the dent. By hammering from inside, an uneven surface is obtained. In order to get fully finished surface, body fillers are used. In our project, we fabricate a machine to straighten dent by welding tool on the exposed side of the dent. The tool is welded on the dent area and using a sliding hammer, the dent is pulled out. Sliding hammer is mounted on the tool itself. A force is exerted on the dented part using sliding hammer for straightening the dent. Highly finished surface can be obtained using the dent remover. Even small and curved dents can be removed using this machine.

Keywords: Dent, Weld, Automobiles.

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Modeling Of Human Locomotion Using the Concept of Neural Networks

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Abstract

Artificial walking aids help the afflicted to enhance and upgrade their physical capabilities. The ability to replicate the characteristics of natural human locomotion is the most desirable feature in designing a walking aid. The human locomotion for normal walking is analyzed using high resolution video camera and the angular displacement of knee and hip is obtained. The characteristics of both legs during gait in terms of angular velocity, angular acceleration, linear velocity and linear acceleration are also computed. The response of the model corresponding to each individual can be fed as input to the driving system of the walking aid. The study aims in the development of a model based on the principle of neural networks for characterization of human locomotion parameters. To linearize the model of human gait, average value based approach is implemented in the neural network. The new model is

helpful in determining the linear displacement corresponding to the gait cycle of different subjects and it was compared with the actual displacement of healthy persons.

Painless Patient Mover

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Abstract:

The difficulty in moving patients from their beds to stretchers for various medical tests or scanning purposes, is one of the main challenges associated with modern medical practices. Transferring patients from their wards for diagnosis such as X Ray, scanning, operations etc is uncomfortable for the patient as well as the attenders. This topic is selected to find a suitable solution to overcome the difficulty in replacing the ordinary cots with modern stretchers. In this project a stretcher is designed which can transport patients from stretcher to cot and vice versa without any physical effort by the attending staff. It has three main parts; 1. the base stretcher, 2. a sliding plate which can slide over the base stretcher, and 3. a bed fixed in a metal plate which lies over the sliding plate (figure attached). This arrangement helps the sliding plate with bed to move towards the cot, with a mechanism provided in the

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is to study damping by considering: effect of materials used for damping and effect of particle shape on damping.

Keywords: Granular materials, Particle damping, Vibration reduction

Flalety Tube

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Abstract:

The tyre and tube system is the main part of a vehicle which helps to transfer power from vehicle to the contacting surface and helps to move the vehicle from one place to another. The main drawback of the existing tyre and tube design is that it can be deflated. Even though tubeless tyres are introduced the importance of tube and tyre system cannot be nullified. The improvised design "The FLALETY TYRE" has number of compartments in its tube. The compartment will prevent the total failure of the tyre when punctured. The FLALETY TYRE system will help automobiles and armed vehicles to move through any kind of harsh terrain without the fear of accidental punctures. Even if puncture occurs, we can avoid the spot maintenance and the tyre can be operated without any breakdown.

Keywords: Tyre and Tube, Flalety, Vehicle, Puncture.

"U-SWaP"

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Abstract:

Every year hundreds of thousands of people get lost in water bodies all over the world. A significant percentage of these accidents end in death and their bodies are sometimes never discovered. Although, many recent studies and efforts are being made to aid in the recovery of dead bodies from under water, no significant improvements have been made. The search and rescue operations under water are still done by humans which is both time consuming and highly tedious. Our project, U-SWaP aids in disaster management by providing an integrated approach combining an electronic body detection unit based on SONAR and visual data collection unit which helps to aid in the recovery of lost bodies under water. The U-SWaP, being a light and portable device, will be able to propagate underwater as well as through air making it more efficient in locating drowned bodies under water faster and with minimum errors.

Keywords: Disaster Management, SONAR, Body Recovery

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Pneumatic Exoskeleton Chair

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Abstract:

The project title is to design and develops a lower body exoskeleton. The proposed design is a mechanical ergonomic device that is designed around the shape and function of the human body, with segments and joints corresponding to those of the person it is externally coupled with. Exoskeleton is like a chair that isn't there, but magically appears whenever you need it. The concept of this simple chair is that when it is not activate, you can walk normally or even run and then if it is active, the structure locks into place and you can sit down on it, like a chair. The device never touches the ground, which makes it easier to wear. A belt secures it to the hips and has straps that around the thighs, specially designed and part of the mechanism. An alternate version would work with any footwear and touches the ground only when in a stationary position and the user can just move into the desired pose.

Keywords: Exoskeleton, chair.

Analysis of Mechanical and Metallurgical Properties of Ni-Cr Alloys during Brazing and Post-Brazing Processes

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Abstract:

To study the mechanical and metallurgical properties of the nickel alloys and analyses the thermal cycling effects of brazing and post-brazing processes. The nickel-chromium alloy (XH78T) is one of the main materials in injection head of the Liquid Rocket Engine (LRE). Here, considering three conditions, which are as-received (AS), Brazing condition (BC) and Post-Braze conditions (PBC). The hardness values and microscopic images were taken in each condition. Brazing thermal cycle is done from room temperature (RT) to a temperature of 910°C with preheating at 500°C, 600°C, 700°C, 850°C and soaked at 910 °C for 15 minutes, then furnace cool to 850°C, after that air cool to room temperature (RT). Post brazing thermal cycle is done at 500°C for 2hrs to achieve desired mechanical properties. Mechanical properties were analysed by tensile results of post-brazed condition specimens at different elevated temperatures -196°C, RT, 250°C, 450°C & 650°C, which is essential for design & operation of LRE. Additional FESEM (Field Emission Scanning Electron Microscope) investigations were conducted to analyse the mode of failures and to study the fractography



for fastening and assembly operations. During drilling GFRP due to the difference in densities of glass fiber and epoxy resin drill bit experience variable thrust force and torque. The main aim is to find out the optimized cutting parameter which reduces thrust force and torque during drilling. The influence of thrust force and torque during drilling GFRP is to be analyzed to arrive optimum machining condition that provides maximum tool life and enhance the quality of GFRP. This project outlines the Taguchi optimization methodology, which is applied to optimize cutting parameters in drilling of glass fiber reinforced plastics(GFRP) materials. The drilling parameters used in the experiment were spindle speed and feed. A series of experiments are conducted using CNC milling machine to relate the cutting parameters and material parameters on the cutting thrust and torque. An orthogonal array, regression analysis is employed to analyze the influence of these parameters on cutting force and torque during drilling. This study will be useful for predicting thrust and torque as a function of drilling parameters and GFRP. The data obtained from the drill dynamometer were further examined by visual recurrence analysis software. From the experiment we can infer that thrust force is minimum at the cutting condition which has the feed of 15 mm/min at a speed of 1250 rpm. similarly, minimum torque can be obtained in cutting condition which has the feed 5mm/min and speed 1250rpm. This cutting condition can be taken as the apt cutting condition for drilling of GFRP materials.

Keywords: Drill tool Dynamometer, GFRP, Visual Recurrence Analysis, Laminarity

Composite Material Using E-Glass and E-Waste

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Abstract:

Electronic waste is commonly called E-waste. The recovery of E-waste and E-glass is a major problem in the 21st century. The reverse engineering process is most suitable tool to separate the E-waste materials also provide better quality to by-products. Products made from polymer matrix have significant properties such as improved strength, hardness. Materials like plastic provide low thermal conductivity. The other polymer such as LDPE, HDPE, Poly-ethylene is also segregated from E-waste material for processing as composite. The aim of our project is to develop a composite material that have better properties like high strength, durability and long life. The separated metal parts from E-waste act as filler material that are segregated from the E-waste based on the size requirement. The composite material also consist of natural fibers of coconut and powder coconut shell as strengthening agent (filler material). These layers are sandwiched to form a multilayer which have better properties. The project also analyses the thermal conductivity and mechanical properties which it can withstand.

Keywords: E-Waste, E-Glass, Segregated, Strength, Hardness, Matrix.

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strongly emphasis on the flame retardancy mechanism and the effect of combustibility parameters with graphene nanoparticles filled polymer composites.

Keywords: Fire retardants, Heat release rate, Nanoparticles, Polymer nanocomposites

Vehicle Alert System

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Abstract:

Accidents on curved roads are a common phenomenon in our country. This project aims to create a system that could detect the presence of a vehicle on one end of the curve by means of piezoelectric strip mounted on the surface of the road. When a pressure is applied over this strip that is when a vehicle runs over the strip it produces a current. This resultantly causes an LED light to glow at the other end of the curve. Therefore a driver coming from the one end of the curve is alerted about another driver approaching from other end of the curve. Thus by keeping these strips on both ends of a curve along with led lights at opposite sides of the curve respectively we can alert drivers coming from both ends of the curve about the presence of each other ahead on their ways. This way we can reduce chances of accidents on curved roads.

Keywords: Piezoelectric strip, LED, Accident reduction.

Finite Element Analysis of a Wearable Mobile Machine Made of Composite Material

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Abstract:

There are many human beings with disabilities. Disabilities may happen right from the birth or may happen at different circumstances of a person's timeline. Biomedical devices are meant for encouraging capabilities of a person by supporting their locomotive skills or any other form of skills needed in day-to-day life. Therefore, wearable devices can have the provisions to assist the wearer to enhance his capability during the rest of his lifetime. The material that are currently in use have problems like fatigue failure, less strength to weight ratio, uneven loading etc.

A detailed study has been made about future materials, which can replace the current materials in the field of biomedical devices mainly wearable devices so that the mechanisms and design could further easily make use of the daily routines of handicapped people similar to that of normal people. The tedious task is to take a body part, do reverse engineering of products that are being consumed by the body part and make a wearable mobile machine with

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a new design considering the all constraints in the design. Analysis is one of the crucial challenges in building one wearable device to know the sum of all the forces and deformations with all the stresses formed by the material of suitable kind needed. In this study, finite element analysis of wearable mobile machine has been done and the results are presented. Forces are added and the deformation along with equivalent Von-Mises stress were found out through structural analysis. Also, comparison of the mechanical differences in using a suitable composite material with that of the existing material is made.

Keywords: Biomedical Devices, FEM, Composites.

Low Cost Adult Diaper Waste Management Method

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Abstract:

The existing position of waste disposals constantly embraces a potential danger in environmental degradation. Due to disregard of authorized, fast filling landfills is becoming a troublemaker. Diaper is creating a hefty involvement towards solid wastes without making an allowance for inadequate landfill space. The government is taking keen interest in building up proper sanitation facilities which essentially intend for a hygienic environment but dumped diapers still remain a menace. Traditional method of diaper disposal is unhygienic. In urban areas, most of them are sealed in plastic bag and moved to landfills, while in rural areas, the major prospect is to burn them. This project introduces an economic and sanitized way of adult diaper disposal. This project proposes to fabricate an economic incinerator for disposing adult diapers, this can be an assist to many houses, hospitals, old age homes, charity trusts etc.

Keywords: Diaper, solid wastes, disposal, hygienic

Automatic Pneumatic Can Crusher

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Abstract:

Aluminum cans that we use today after purpose causes a great threat to the human beings as well as surroundings. Aluminium cans occupy more space while transportation. Pneumatic can crusher is a good solution for the effective utilization of space consumed by the cans. The main problem associated with the pneumatic can crusher is the need for more manpower. 'Automatic Pneumatic Can Crusher will help to reduce the manpower since the crushing process is automatic in nature. Our project deals with the fabrication of automatic pneumatic can crusher, a device used to reduce the scrap volume. As air is used for crushing the cans the need for power can be avoided. So this project will be a great innovation for future needs.



Keywords: Aluminium cans, Pneumatics.

Design and Fabrication of Hand Driven Electric Wheel Chair

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Abstract:

In conventional wheelchairs there exist several drawbacks such as great effort is required to drive, it consumes more time and effort while taking a curve. These limitations can be reduced by a hybrid wheelchair. The hybrid wheelchair is capable of operating with manually as well as electrically. The hand operated pedal is used to drive the wheelchair and for storing charge in the battery. The battery can also be charged by using external power supply. To help the blind people an obstacle sensor is implemented. The wheel chair can be steered by varying the motor speed, that is coupled to individual driving wheels. The movement of wheelchair can be controlled manually by the joystick. The command is implemented by using joystick and then the command is sent to the Arduino board where the controller will process the command. After processing, the controller send the command in the form of digital signal to the integrated circuit which control the motor and then movement of wheelchair.

Keywords: Arduino board, Controller, Hybrid wheelchair, Integrated circuit

Optimization and Analysis of Paddy Trans Planter

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Abstract:

Paddy is the rice grain with husk. It is a wetland crop, which extensively grows all over the world. Paddy is the main crop in the majority of the Asian countries including India, China, Pakistan and Philippines etc. Cultivation practices of paddy have a cultural value in most of the communities. In Earlier days, mature seedlings are planted into the land by hands. During 20th century trans planter was invented to plant the seedlings into the land which reduces the human work and consuming less time. The drawback of the present trans planters involves the chances of damaging the seedlings and also the paddy seedlings are not placed perfectly in vertical position. So that the yield of paddy is decreased due to imperfect planting of seedlings. The transportation of trans planter is also difficult. The aim of our project is to make a trans planter with simple mechanism and increase the yield of production in small farms and to do the structural analysis of the transplanter. In our mechanism farmer can repair themselves easily, less maintenance and minimum pulling force is required for planting.

Keywords: Seedlings, Transplanter, Paddy.

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All Terrain Wheelchair

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Abstract:

Wheelchairs are used all over the world for transportation by people who are unable to walk due to illness and injuries. Push rim wheelchairs are generally used for this purpose. But push rim wheelchairs are inefficient. On average, 90% of energy of wheelchair used is wasted. To improve the efficiency of the wheelchair we are introducing a new design. All Terrain Wheelchair is an easy to push lever driven wheelchair which comes armed with rugged mountain bike wheel which can be driven through snow, mud, potholes etc. The new design uses lever-drive system which is more efficient than regular push rim wheelchair. Our aim is to provide mechanical advantage by shifting hand position on lever which enables the user to have access to the outdoor freedom, to roam off the beaten track at the same time doubling up as aerobic exercise for handicapped users.

Keywords: Lever drive mechanism, Push rim, All Terrain Wheelchair.

Design and Fabrication of Sand Mould Recycling Machine

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Abstract:

We are in search of an idea that reduces time consuming human efforts of reusing sand moulds used to cast the special copper zinc alloy. After casting process the mould is broken moulding sand is reused by grinding and adding suitable amount of binder and this material is used for the production of next mould. We intend to make a machine that handle with this process which is found to be tedious and time consuming. The process capabilities of this machine include crushing and shearing the moulding sand and grinding it into fine powder, it will also have the provisions to add water and binders simultaneously. The machine provides the operator with facilities to observe and manage the material properties during its process. It has to be economical in concern of its power consumption, compact in size as the machine may be used in places where working space availability is limited. A major problem is that the accumulation of sand on rollers and blades are eliminated in this machine using special arrangement of grinding wheels and blades. Hence complete ejection of materials is made possible. We hope the machine will be a best alternative to human efforts of handling moulding sand without sacrificing any of its properties. After brainstorming we generated a layout in the 3Ds Max and animated the mechanisms. The suggestions and opinion of our guide were considered and some changes were made in the layout the animated model was

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PAPR Reduction in F-OFDM Modulation Scheme for 5G Cellular Networks Using Precoding Technique



Sasidharan Jiji and M. Ponmani Raja

Abstract The emerging 5G system has promising advances in the near future. The 5G system will be offering many features that are not being possessed in the past generations. To meet the several requirements, orthogonal frequency division multiplexing (OFDM) is a best choice. In the existing OFDM technique, model and framework of 4G LTE, chosen mainly for mobile broadband (MBB) service, are not that sensitive to recession or authenticity. Despite the fact that OFDM provides high spectrum efficiency through orthogonal frequency multiplexing, the OOB (out-of-band emission) of OFDM is still not very satisfactory, and also, OFDM requires global synchronization which comes at the price of extra signaling. Indeed, when the user is perfectly synchronized both in time and frequency domain with the base station (BS), in terms of bit error rate (BER), the performance offered by OFDM is very good and resistance to the carrier frequency offset (CFO). These circumstances are energy costly as the user needs to exchange messages with the BS to ensure this synchronization. Therefore, if these conditions are not satisfied, the OFDM BER may be high. Nevertheless, the OFDM modulation suffers from high side lobes which decrease the spectral efficiency and create adjacent channel interferences. For these reasons, several MCM schemes have been developed these recent years as candidates for 5G systems such as filtered OFDM (F-OFDM). Filtered OFDM (F-OFDM) is an alternative to the OFDM modulation in 5G system. It offers all the advantages maintained by OFDM such as efficient performance and flexible frequency multiplexing that meets the needs of future generation. It also meets OOB requirements and thus helps in efficient spectrum utilization.

Keywords Adjacent channel interference (ACI) · Bit error rate (BER) · Complementary cumulative distribution function (CCDF) · Cyclic prefix (CP) · Fast Fourier transform (FFT) · Filtered orthogonal frequency division multiplexing (F-OFDM) · Inter-channel interference (ICI) · Inter-symbol interference (ISI) ·

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1127

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