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Mechanical Behavior of Hybrid Fiber Reinforced High Strength Concrete with Graded Fibers

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P A P E R I N F O

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Hybrid Graded Fiber Reinforced High Strength Concrete

A B S T R A C T

Brittleness, which was the inherent weakness in High Strength Concrete (HSC), can be avoided by reinforcing the concrete with discontinuous fibers. Reinforcing HSC with more than one fiber is advantageous in an overall improvement of the mechanical performance of the composite. In this experimental study, Hybrid Fiber Reinforced High Strength Concrete (HyFR-HSC) mixes were formed by blending single length glass fiber and single length steel fiber with a total volume fraction of 1.65% into the concrete and Hybrid Graded Fiber Reinforced High Strength Concrete (HyGrFR-HSC) mixes were obtained by mixing different lengths of glass fiber with different length of steel fibers at a total volume fraction of 1.65% into the concrete. A comparative study was made between HyFR-HSC and HyGrFR-HSC specimens to investigate the effect of fiber grading on strength properties and the uniaxial compressive behaviour of HSC with hybrid fibers. In both HyFRC and HyGrFRC mixes, glass fibers improved the pre-peak behaviour, and steel fibers improved the post-peak behaviour of concrete, thereby exhibiting a positive synergy in combining glass and steel fiber into the concrete. Among the two-hybrid FRC's, HyGrFRC outperformed HyFRC with substantial improvement in both strength and ductility. Among all the HyGrFRC mixes, HyGr9 mix, which contain a higher amount of long-length fibers exhibited better improvement in peak strain, ductility factor, total energy and toughness index. The replacement of single length of fibers with graded length fibers at higher volume fraction in HyFRC is useful in improving workability, thereby providing better fiber dispersion and thus enhances both the pre-peak and post-peak performance of the concrete. From this investigation, it can be inferred that grading of fibers improved the mechanical behaviour of HyFRC by exhibiting positive synergy from both fiber geometry and fiber type.

***doi**: 10.5829/ije.2020.33.08b.04*

NOMENCLATURE

PM	Plain Mix	GrFRC	Graded Fiber Reinforced Concrete
HSC	High Strength Concrete	HyFR-HSC	Hybrid Fiber Reinforced High Strength Concrete
FRC	Fiber Reinforced Concrete	HyGrFR-HSC	Hybrid Graded Fiber Reinforced High Strength Concrete (HSC)

1. INTRODUCTION

Due to the higher strength and dense microstructure of High Strength Concrete (HSC), its application in diversified structures reduces the overall dimensions of the structural element with reduced dead weight, making it technically and economically viable solution in large scale infrastructure projects. At larger stress levels, HSC materials have performed effectively [1]. Despite abundant advantages of High Strength Concrete (HSC) over normal strength concrete, HSC was considered to be brittle material due to its minor fracture process zone [2]. So there is a need to enhance the strength and ductility of HSC by adding fibers, which

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Modeling and Analysis Of Reinforced Concrete Beam Without Transverse Reinforcement And Strengthened With CFRP Lamellas: A parametric Study

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Abstract

The main objective of this paper is to study analytically, numerically modeled and analysis of reinforced concrete beam without transverse reinforcement and strengthened with cfrp lamellas by using a finite element based software Atena-Gid. A parametric study has been performed for the reinforced beam. A C25/30 grade reinforced concrete beam without transverse reinforcement is modeled and analyzed. Due to the missing of stirrups cfrp lamellas are modeled as reinforcement bars, it is sufficient to define just lines in the location where we want to use these cfrp-Sika CarboDur S[14] lamellas to reduce the deflections and increase the load-carrying capacity of the beam. Comparing the results with a reinforced beam without strengthening and with strengthening with cfrp lamellas. It is concluded that the strengthened beam with cfrp lamellas increases the load-bearing capacity, different crack patterns, delay the failure in the form of ductility, reduces the deflections and crack width. Calculating the load-bearing capacity percentage from the load-displacement diagram with lamellas and without cfrp lamellas.

Key Words: *ATENA-GID, FRP, CFRP, FE, Sika Carbodur S[14], Numerical Modelling.*

I. INTRODUCTION

ATENA-GID is a finite element based software specifically developed for the nonlinear analysis of reinforced concrete structures. ATENA stands for Advanced Tool for Engineering Nonlinear Analysis, Simulates real behavior of concrete and reinforced concrete structures. ATENA is used for the analysis itself and the program GID is used for the data preparation and finite element non-linear analysis for the mesh generation. By using the Atena studio interface the actual behavior of reinforced concrete structures such as concrete crushing, different crack patterns, stress & strain values, crack width values, and yielding of reinforcing steel bar, the load-displacement diagram can be analyzed and it is a user-friendly tool for modeling reinforced concrete elements. GID is an interactive graphical user interface program used for the preparation of input data for the geometrical model, material parameters, boundary conditions, interval-loading history, and generates the mesh.

Fiber-reinforced polymer (FRP) is also called fiber-reinforced plastic, is a composite material made of a polymer matrix reinforced with fibers. The fibers are usually glass, carbon, or aramid. Sika CarboDur S[14] are CFRP lamellas for the strengthening of concrete, timber, masonry, and steel structures. CFRP is used to allow concrete beams and floors to carry much higher loads. Sika CarboDur makes it easy to strengthen concrete beams and floors to make new design loading or take heavier loadings. Sika CarboDur S512 is taken for modeling and its thickness, width, and cross-sectional area is 1.2mm,50mm,60mm^2. It's cost-effective, so thin and it can be installed very quickly, disruption is minimum, material parameters can see in Table 1.

Parameter	FRP Lamella
Young´s modulus [MPa]	165000
Area [m^2]	0.000060
Tensile strength [MPa]	3100
Elongation at rupture	0.0188
Density [kg/m^3]	1600
Thermal expansion coefficient [c^{-1}]	0.000045

Table1:Material parameters of Sika CarboDur S512

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Effect of Accelerated Curing on Strength of Quaternary Blended Cement Concrete with Recycled Aggregate

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Keywords: Quaternary Blended Cement Concrete (QBC), Fly ash (FA), Micro silica (SF), Nano silica (NSF), Recycled Concrete Aggregate (RCA), Accelerated Curing.

Abstract. The studies carried out on accelerated curing of Quaternary Blended Cement (QBC) Concrete with and without recycled aggregate are presented and the test results are encouraging by which 90% design strength can be achieved at 100°C for a period of 3 hours for both methods of curing. In this experimental investigation cement is replaced by fly ash, micro silica and Nano silica partially to produce QBC Concrete. The variables include the grade of concrete, powder content and recycled aggregate percentage. The natural aggregates were replaced by recycled aggregate at three levels of 0%, 50% and 75%. Nano silica is varied at 2 and 3% by weight of cement while maintaining fixed percentages of fly ash and micro silica in cement. Two methods of curing were employed; boiling water method and hot air curing and two grades of concrete M-40 and M-60 were used in this investigation.

Introduction

Traditionally, the quality of concrete is expressed in terms of its compressive strength after curing for 28 days before testing. The time specification is too long, for construction control and also for applying corrective measures. If the strength of concrete can be predicted within a short duration of time, the quality can be improved. Accelerated curing is one method by which high early-age strength is achieved in concrete and also can be used for the prediction of strength in the mix design. This technique is used for achieving the high early-age strength for the removal of formwork in the prefabrication industry, to reduce the cycle time, thereby resulting in cost-saving. The need of the hour is for evaluating concrete in the field using a consistent and speedy method in which accelerated curing technique can be used [1].

An appropriate rapid curing methodology is needed for making good concrete since this method is detrimental to the long term performance of concrete. The surface permeability test was used to quantify the influence of curing conditions and heat damage effect of steam curing. The surface permeability and the long term strength of concrete were observed to be affected with increased porosity, however, the quantity of Portlandite was decreased with a subsequent water curing [2]. In the production of High-Performance Concrete (HPC), a binary blend of FA and three types of RCA at 100% was used and the development of strength was studied by using initial steam curing and standard curing method. The use of high-quality RCA from HSC had produced a similar NA concrete, however, the steam cured RCA concrete had lesser mechanical properties but with porosity [3]. The high early strength cement always gives a higher strength compared to OPC at all ages of curing, and in steam curing, though it had a detrimental effect on the strength gain, with a proper mix design the concrete can be utilized for pavement structures, flooring and slabs [4]. The utilization of micro silica (SF) in ternary blends has helped to improve the chloride penetration

Scopus

Documents

Praveen, K., Venkateswara Rao, S., Rathish Kumar, P.

Ffect of recycled aggregate on shear behavior of steel fiber reinforced self compacting concrete
(2020) *Indian Concrete Journal*, 94 (4), pp. 40-55.

Abstract
Self-Compacting Concrete (SCC) is flowable and highly viscous which does not require any external compaction during casting and placing. Use of recycled aggregates as replacement up to 50% of natural coarse and fine aggregates is been widely used by many researches in past few years. In the present study an attempt is made to study the behavior of steel fiber reinforced self-compacting concrete under shear by using 100% recycled concrete aggregates as coarse and fine aggregates. The experimental programme consisted of 32 beams of which 16 beams each were cast with 100% natural and 100% recycled aggregate. The size of the beam was fixed at 100 x 200 x 1200 mm. Due to the use of recycled concrete aggregates as coarse and fine aggregates, compressive strength is reduced by 7.8% and 8% for SCC30 (30 MPa) & SCC70 (70 MPa) Concrete. Ultimate shear strength is reduced by 14% and 12% due to use of recycled concrete aggregates for SCC30 and SCC70 beams respectively. It was observed from the experimental results that Addition of Steel fibers has increased the mechanical properties for both NASCC and RASCC and also, combination of stirrups and steel fibers has shown better performance on SCC beams. An equation to predict ultimate shear strength of NASCC and RASCC is proposed based on nonlinear regression analysis.

Index Keywords
Aggregates, Compressive strength, Concrete placing, Fiber reinforced concrete, Nonlinear equations, Recycling, Regression analysis, Reinforcement, Self compacting concrete, Steel fibers; Fiber reinforced, Fine aggregates, Non-linear regression analysis, Recycled aggregates, Recycled concrete aggregates, Shear behavior, Ultimate shear strength; Concrete aggregates

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MIX DESIGN FOR FLYASH BASED GEOPOLYMER CONCERTE

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Abstract: Geopolymer is a new development in the world of concrete in which cement is totally replaced by pozzolanic materials like fly ash and activated by highly alkaline solutions to act as a binder in the concrete mix. For the selection of suitable ingredients of geopolymer concrete to achieve desire strength at required workability, an experimental investigation has been carried out for the gradation of geopolymer concrete and a mix design procedure is proposed on the basis of quantity and fineness of fly ash, quantity of water, grading of fine aggregate, fine to total aggregate ratio. Sodium silicate solution with Na_2O = 16.37 %, SiO_2 = 34.35 % and H_2O = 49.28 % and sodium hydroxide solution having 13 M concentration were maintained constant throughout the experiment. Water-to-geopolymer binder ratio of 0.36, alkaline solution-to-fly ash ratio of 0.36 and sodium silicate-to-sodium hydroxide ratio of 1.0 by mass were fixed on the basis of workability and cube compressive strength. Workability of geopolymer concrete was measured by flow table apparatus and cubes of 150 mm side were cast and tested for compressive strength after specified period of oven heating. The temperature of oven heating was maintained at 60 °C for 24 h duration and tested 7 days after heating. It is observed that the results of workability and compressive strength are well match with the required degree of workability and compressive strength. So, proposed method is used to design normal and standard geopolymer concrete.

Keywords: Geopolymer concrete, Mix design, Fly ash, Alkaline solution,Flow Heat-cured, Compressive strength

1 Introduction

Use of concrete is globally accepted due to ease in operation, mechanical properties and low cost of production as compared to other construction materials. An important ingredient in the conventional concrete is the Portland cement. Produc-tion of Portland cement is increasing due to the increasing demand of construction industries. Therefore the rate of production of carbon dioxide released to the atmosphere during the production of Portland cement is also increasing. Generally for each ton of Portland cement production, releases a ton of carbon dioxide in the atmosphere [1]. The green house gas emission from the production of Portland cement is about 1.35 billion tons annually, which is about 7 % of the total greenhouse gas emissions [2]. Moreover, cement production also consumes significant amount of natural resources. Therefore to reduce the pollution, it is necessary to reduce or replace the cement from concrete by other cementitious materials like fly ash, blast furnace slag, rice husk ash, etc.

Fly ash is a by-product of pulverized coal blown into a fire furnace of an electricity generating thermal power plant. According to the survey, the total fly ash production in the world is about 780 million tons per year but utilization is only about 17–20 % [2, 3]. In India more than 220 million tons of Fly ash is produced annually [4]. Out of this, only 35–50 % fly ash is utilized either in the production of Portland pozzolana cement, workability improving admixture in concrete or in stabilization of soil. Most of the fly ash is disposed off as a waste material that covers several hectares of valuable land. The importance of using fly ash as a cement replacing material is beyond doubt.

[illegible] [illegible]

DRIVING CYCLE ESTIMATION AND VALIDATION FOR LUDHIANA CITY, INDIA

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[illegible]

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1. Introduction

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cement wapno beton

Zaprawa murarska z dodatkiem popiołu lotnego

A study on fly ash cement mortar as brick masonry

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Streszczenie

Zbadano wpływ popiołu lotnego zastępującego cement na wytrzymałość zaprawy murarskiej. Uzyskane wyniki wykazały, że częściowe zastąpienie cementu popiołem lotnym w zaprawie o dużej zawartości cementu jest możliwe nawet do 40%, bez niekorzystnego wpływu na właściwości zaprawy. Natomiast taki zamiennik cementu może mieć negatywny wpływ na wytrzymałość zaprawy o małej zawartości cementu, a substytucję cementu w takich zaprawach należy ograniczyć. Zatem zastępowanie cementu popiołem lotnym w tym przypadku może nie być opłacalne. Zastosowanie cegieł o dużej wytrzymałości pozwala na użycie mieszanek, w których cement można zastąpić popiołem lotnym w znacznym stopniu, zarówno w mieszankach o dużej zawartości cementu jak i mniejszej. Co najmniej 20% cementu można zastąpić popiołem lotnym. Zastosowanie cegieł o dużej wytrzymałości, w połączeniu ze spoiwem o dużej zawartości cementu sprawia, że cement można zastąpić popiołem lotnym w maksymalnym stopniu, bez negatywnego wpływu na wytrzymałość muru. W tym przypadku zawartość popiołu lotnego zastępującego cement może wynosić około 40%. Zastosowanie popiołu lotnego w zaprawie murarskiej ma bardzo korzystny wpływ na środowisko, z uwagi na ponowne wykorzystanie tego odpadu.

Słowa kluczowe: mur, popiół lotny, zaprawa cementowa, cegła, materiał odpadowy

Summary

The influence of cement replacement by fly ash in brick masonry strength was experimentally verified in the paper. The obtained results have shown that the replacement in rich in cement mortars is possible up to 40%, without unfavorable effect on mortars properties. However, this replacement can have unfavorable influence on mortar strength in the case of leaner cement mortars and the replacement in these mortars must be limited and hence the fly ash addition may not be useful. The use of high strength bricks allows the use of mortar mixes with higher level of cement replacement by fly ash as well ias n rich and lean mixes. A minimum 20% of cement can be replaced by fly ash. The use of high strength bricks in combination with rich mortar mixes the cement can be replaced with fly ash to the maximum extent, without affecting the strength of brick masonry. In this case the replacement can be about 40 %. The application of fly ash in masonry has a very favorable effect on environment because it is a useful developed of this waste.

Keywords: masonry, fly ash, cement mortar, brick, wastes

1. Wprowadzenie

Murarstwo stosuje się w różnych konstrukcjach od wieków. Uważano je za jedną z pierwotnych sztuk, którą doprowadzono do perfekcji. Wytrzymałość muru zależy od wytrzymałości poszczególnych elementów takich jak kamienie czy cegły oraz wytrzymałości zaprawy. Ponadto wytrzymałość może również zależeć od jakości wykonania, rozmieszczenia cegieł w murze oraz jakości wody zarobowej i wody stosowanej w trakcje pielęgnacji.

1. Introduction

Masonry is being used in different constructions since the ages. It was considered as one of the primitive arts which were carried to great perfection. The strength of masonry depends on strength of individual units, such as stones, bricks and strength of binding medium i.e. mortar. Further the strength also may depend on workmanship, arrangement of bricks in masonry and quality of water used for mixing and curing. Under compression, in the

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IoT Based Water Purification Process using Ultrasonic Aquatic Sound Waves.

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Abstract

In modern human life has created a lot of innovations and it has improved drastically in advance Technology . whenever lot of innovations and advancement in technology will creates a pollution to natural resources like air, water , soil etc. tradional methods such as biological process ,sand filtration ,carbon absorption ,chorine filteration will produce bi-products and creates many serious issues like cancer. In our proposed method Dust particles , micro scopic organisms such as virus bacteria waste particles by using the pre programmed IOT based microcontroller electronic timing control circuit , based on the different period time duration it will generate the different ultrasonic sound Aquatic wave frequency with respect to the time interval it generates the different vibration level inside the water. The filter water will be present in the upper part and the all the ultra sonic biological microscopic particles will settle down at the bottom layer outlet and then it will separated from the water. The proposed method of microscopic ultrasonic sound wave filter will filter all the dust particles.

I. INTRODUCTION

In day to day life every human being will consume a minimum six liters of pure drinking Water to sustain have a good life. Human beings cannot live without four primary things food, water, land and pure air. Therefore, purity of water is importance for human beings. Microscopic Pollutants and minute sand particles present in the membrane surface of the ground water pollutants will lead to a global Problem.

This problem creates a severe and dangerous health problem due to increase in industry

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IOT Based Smoke Test and Vehicle Pollution Control Montoring Using Nano Sensors

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Abstract

A motor vehicle emission produces of many air pollutants especially by internal combustion engines. And it is increasing every year. Each state has different licensing laws, continuing education requirements, training and testing requirements prior to issuing a license. So RFID is the powerful media for this Vehicle Insurance and smoke test monitoring for air Pollution related issues. Undoubtedly in modern world of urbanization, time and efficiency are matter of priority. IOT based nano sensor and frequency identification emerges together to find the solution for the Air pollution control in automobile vehicles Automatically. The IOT based RFID sensor module is placed in toll booth collection centre and traffic light signal area. When the vehicle cross any traffic light signal and toll booth area by using our proposed project module it will check the pollution exhaustion level of the vehicle. If the vehicle exhibits more exhaustion of gas it intimates to the particular police station and to the owner of the vehicle about the over exhaustion of gases in his vehicle. In our proposed project module we are using a new and latest prominent nano sensor to identify the gas exhaustion in the Vehicle. It will work well in all suitable weather conditions. In this module we are using semi passive RFID tag which gives a unique Identification of every vehicle. By using this module it can store the vehicle owner name, driving license, Registration certificate of the vehicle and insurance details etc. By using this we can store the all details of the vehicle owner with the help of common transport management system database. This paper has been carried out with a purpose to understand benefits of the RFID & IOT based Nano sensor technology in other countries and to identify readiness of India in exploiting it. Read more: In India Air Pollution realed issues are doubled every year due to increase in population. Here we tried to control the air Pollution caused by the Motor Vehicles related issues by the latest IOT based RFID technology using nano sensors. RFID reader and monitoring hardware is placed in all the traffic signals, Toll Gates and Parking areas. It reads the tag while the vehicle crossing the system and checks the date expiry of insurance and smoke test status. If any issues, it will alert the traffic moderators. Then necessary action will be taken by traffic and transport control department

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Keywords; *RFID, GSM and RFID Reader*

I. INTRODUCTION

The most important reason in worst case is air pollution in the country. It causes a serious effect on the health of individual's citizens in India. Most of the people in India is Exposure to see affected by various diseases shown in the chart for a long time, can lead to respiratory and cardiovascular diseases such as asthma, bronchitis, COPD, lung cancer, skin diseases, eye irritation, general health issues and heart attack The study report of 2017 mentioning that India's holds the fifth largest place in world

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Impact of Dyke on Hydrological and Hydrogeochemical Conditions in Nadergul Micro Watershed of Ranga Reddy District of Telangana State in India

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ABSTRACT:
Groundwater is the major source of drinking water in rural as well as in urban areas and over 94% of the drinking water demand is met by groundwater. The present work aims at finding the groundwater quality around Nadergul area and hence determining its suitability for drinking and irrigation purposes. This block has semiarid climate and people are mostly dependent on groundwater for irrigation.The groundwater quality of the area needs to be continuously monitored to get the long-term sustainability. In view of this, an attempt has been made to analyze the groundwater quality of the study area to determine the exact level of physico-chemical parameters giving emphasis on its irrigation and domestic suitability. Samples of groundwater werebrought from the vicinity of MVSR engineering college. MVSR engineering college is located to the south of the city of Hyderabad ,in a micro water shed of about 900 hectares. 10 samples of groundwater frompreferably chosen bore wells ,were examined for significantphysico-chemical parameters by adhering tostandard methods of APHA. The study focuses on the distribution of quality of groundwater in aforesaid region. The study was undertaken with the following objectives , to determine groundwater flow in the presence of a dyke and its influence on ground water quality parameters such as Chlorides (mg/l), Electrical Conductivity, Total dissolved Solids, pH, Alkalinity, hardness,Arsenic,Zinc , manganese etc., and draw various thematic maps to depict the spatial distribution of groundwater quality in the

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Cloud Computing based COVID-19 Patient Health Monitoring System to Create Safety Environment

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Abstract:-Modern medical science using latest bio-medical instruments has made dramatic progress in prolonging life by overcoming disease. This project work falls under wireless biotelemetry and is designed with micro controller (Arduino), which is able to monitor two individual patients. The health parameters monitored for the two patients are different i.e., one patient's heart beat rate (number of beats) are monitored and the second patient's temperature and humidity are monitored. To achieve this, wireless communication technology (GSM) is used in this project. Whenever any of the parameters that are monitored goes abnormal, automatically a SMS is sent to the concern authorized person's mobile through the GSM modem interfaced to the controller.The project deals with the design and development of hardware and software for temperature, humidity and heartbeat measurement of patients over GSM mobile. The patient's health is monitored by the controller through a mode switch connected to it individually. These parameter values are displayed in the LCD interfaced to the controller.

The health parameter values will be sent to the doctor when any abnormal condition exists through the GSM modem. The modem provides the communication interface. It transports device protocols transparently over the network through a serial interface. The GSM modem is a wireless modem that works with a GSM wireless network. A wireless modem behaves like a dial-up modem. The main difference between them is that a dial-up modem sends and receives data through a fixed telephone line while a wireless modem sends and receives data through radio waves.

The system also activates the alarm circuit whenever the parameters exceed the normal conditions. For measuring the heart beat rate, a sensor is used that is to be placed at the tip of the patient finger. When heart muscle contracts blood is ejected from the ventricles and a pulse of pressure is transmitted through the circulatory system of human body. This pulse of pressure can be monitored at finger tips; here for this purpose using IR sensors blood flow can be monitored.

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ABSTRACT

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FABRICATION AND PERFORMANCE ANALYSIS OF WIND CHILL REFRIGERATION SYSTEM

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Abstract *:* Refrigeration has wide range of applications ranging from domestic to industrial purposes. Conventional refrigeration systems run on electricity and refrigerants also cause Ozone layer depletion along with Global warming. Thus, there has been need for a solution that is based on the principles of nature such as bio mimicking and that do not require usage of electricity. Keeping these factors in mind a prototype has been made that works on solar energy and provides refrigeration using ambient air as refrigerant.

The wind chill refrigeration uses the principle of convection, conduction and cooling due to evaporation. There are two main stages of cooling one by conduction and convection the other by cooling due to evaporation. A working prototype was fabricated, assembled, and tested. The response parameters that were considered in the experimentation are 1) Time Vs Temperature drop, 2) mass flow rate of air (at constant velocity of wind) Vs Temperature drop and 3) wind velocity Vs Temperature drop (constant mass flow rate). The parameters that have been studied practically have also been calculated and correlated with theoretical parameters, so that required comparisons can be made for better understanding of the functioning of the wind chill refrigeration system.

After conducting experiments on the fabricated prototype under various conditions, it was observed that temperature drop is directly proportional to local wind speed, inversely proportional to mass flow rate and wind chill refrigeration can be a potential alternative for conventional refrigeration systems.

IndexTerms **– wind chill refrigeration system, bio mimicking, evaporation chamber, non-conventional refrigeration systems.**

I. INTRODUCTION

Refrigeration is defined as the process of cooling a space, substance or system and maintaining its temperature below that of ambient temperature. Refrigeration has wide range of applications from food preservation, medicines storage etc to industrial applications. Initially water and ice were used to refrigerate items. As the time passed engineers developed the existing conventional form of refrigeration using chlorofluorocarbons or better known as CFCs and they proved to be a better alternative in terms of functioning, design and in maintenance thereby making it the most widely used form of refrigeration throughout the world. But it was only in the late 20th century that environmentalists started to observe the potential threats posed by these chlorofluorocarbons in ozone layer depletion and global warming. These drawbacks in the usage of CFCs made everyone to look for other alternatives i.e. non-conventional forms of refrigeration with zero ODP (Ozone depletion potential) and zero GWP (Global warming potential). The various non-conventional refrigeration systems includes pulse Tube, Vortex Tube, Solar, Magnetic, Acoustic, and Bio- mimicking refrigeration systems

The present study "Wind Chill Refrigeration" is a novel method of non-conventional refrigeration which comes under Bio-mimicking refrigerating systems. Bio-mimicking is the process of imitating the natural phenomenon. Refrigerating a given space/substance by natural methods (i.e. evaporation, conduction, convection, and radiation) comes under bio-mimicking refrigerating systems and are generally preferred for their environmental merits when compared with the conventional methods, thereby making the system completely eco-friendly having zero ODP and GWP. Wind chill refrigeration makes ambient air to undergo cooling in two stages and will be used as a refrigerant. The first stage is cooling through convection and the second stage is cooling through evaporation. It is applicable to places where there is a scarcity of electricity and can be a potential alternative as there are no harmful refrigerants involved and moving parts like compressor.

2. LITERATURE REVIEW

Georgios Florides [1] *et al* gives an insight about the variation of temperature with depth into the earth. It was observed from their studies that though the temperature variations at depth of 25m are less but the variation of the temperature of ground at a depth of 2-3 m has been significant. Weather conditions such as rain and ground water level also have a significant impact on the local ground temperature. **J.L. Monteith [2]** discusses the various factors which affect the evaporation on the surfaces of objects and applied Penman formula to various diverse systems and obtained significant success in nearly calculating the rate of evaporation. **S.A. Tassou** [3] et al gives us brief insight on the various forms of refrigeration available in the market for refrigerating food items and explored various other forms of refrigeration like bio-mimicking refrigerating systems, thermo acoustic refrigeration, magnetic refrigeration, Stirling cycle refrigeration, thermoelectric refrigeration, tri generation, adsorption refrigeration systems, ejection cycles and mentioned each method's driving factors ,applications and limitations in providing refrigeration. **Arshad Ayub** [4] et al explains the process of wind chill refrigeration systems and also the components used in wind chill refrigeration are mentioned in detail.

Jitendra S. Pachbhai [5] et al presented the modified design of the wind chill refrigeration system using CREO software. The authors drafted the CAD model of the wind chill refrigeration for developing the system in terms of design and to ease the difficulties while manufacturing.

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SMART SECURITY LOCK SYSTEM WITH INTRUSION DETECTION AND FACIAL RECOGNITION

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ABSTRACT:

Smart security system has become indispensable in modern daily life. The proposed security system will be developed to prevent robbery in highly secure areas like home and working environment with lesser power consumption and more reliable standalone security device for both Intruder detection and for door security. The door access control is implemented by using face recognition technology, which grants access to only authorized people to enter that area. The face recognition and detection process will be implemented and instead of using sensor devices intruder detection is achieved by performing image processing on captured frames of data, and calculating the difference between the previously captured frames with the running frames in terms of pixels in the captured frames.

Keywords: face recognition, Intrusion detection, IOT Based Door Access Control Smart security system

[1].INTRODUCTION

Privacy and Security are two universal rights and, to ensure that in our daily life we are secure, a lot of research is going on in the field of home security, and IoT is the turning point for the industry, where we connect everyday objects to share data for our betterment. House security matters and people always try to make life easier at the same time.In today's world of connectivity and smart devices there is an urgent need to modify our existing day to day objects

Strut Flame Holder Performance for Supersonic Combustion using Computational Fluid Dynamics

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Abstract : The Supersonic burning process in ramjet engine is considered to be viable propulsive system for hypersonic vehicle. As the combustion is taking place at supersonic speeds, the flow has very less residence time (milliseconds) in the combustor. An attempt has been made to evaluate the fuel-air mixing and Combustion efficiency with normal and tangential fuel injection. The shocks generated and vorticity generated in the combustor acts as a flame holder and increases the residence time of flow. CFD Analysis is carried out using commercially available numerical software ANSYS FLUENT 15 where geometry and meshing is created using ICEM CFD software and analysis is carried using FLUENT. k-ε SST turbulence model and the finite-rate/eddy-dissipation reaction model have been applied to numerically simulate flow field of the hydrogen fueled scramjet combustor. Effect of number of Fuel injectors, is being studied at various Combustor inlets Mach number of 2.0 with fuel injected at sonic conditions. H2O mass fractions along the combustor domain are considered as combustion efficiency. The work concentrated on to enhance better fuel air mixture in the combustion chamber, attain maximum combustion efficiency.

IndexTerms **- Combustion, Flame, Holder, Ramjet, Engine, Strut.**

I. INTRODUCTION

A This Turbojets and ramjets are the air breathing engines which can fly within atmosphere with a speed of maximum Mach 6. But rockets have been used for many purposes ranging from missiles to lunar flights with a speed of maximum Mach 20 and above. Although rockets have served well up till now, and will remain the sole mode of interplanetary transportation for a long while, there is a disadvantage of carrying its own oxygen with fuel. When there is so much ambient oxygen available in atmosphere at no cost, why to carry massive tanks of oxygen which results in losses of payload capacity. Current studies show that typical payload weight fraction of aircraft and multistage rocket transportation systems are 15% and 4% respectively. This question has motivated researchers around globe to look for a better solution. The Scramjet engine is composed of four main sections: the inlet, isolator, combustor and exhaust nozzle. The inlet heats and slows the flow through a series of oblique shockwaves. Isolator serves to separate the combustor from the inlet of the engine, allowing further slowing of flow. Fuel is injected in the combustor and combusts with free-stream supersonic air, increases pressure and temperature of the flow. Finally the flow is expanded in nozzle which provides a mechanism by which the increase in pressure can be converted into forward thrust.

Current Scramjet Technical Challenges: The main challenges are shown as a schematic in Fig.1. In recent years, the research and development of scramjet engine has promoted the study of combustion in supersonic flows. Hydrocarbon fuel scramjet engine is still understudy and research. Mixing, ignition and flame holding in combustor, ground test facilities and numerical simulation of Scramjet engine are the critical challenges in the development of scramjet engine.

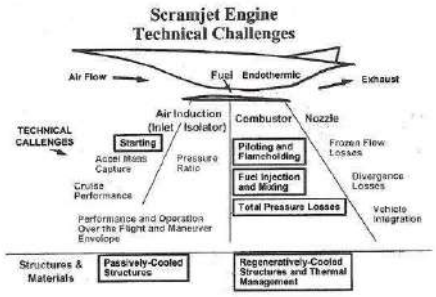

Fig.1. Schematic diagram of scramjet engine

Wei Huang[1] had used k-ε turbulence model and finite-rate/eddy-dissipation reaction model to numerically simulate the flow field of the hydrogen fueled scramjet combustor with cavity flame holder. There exists a complex shock wave/shock wave interaction of the boundary layer and the oblique shock wave. Even though the cavity acts as a flame holder for supersonic combustion yet particular design of cavity had not proposed .M.R.Gruber et al [2] had performed experimental and computational investigations of the non-reacting flow with several cavity flame holders and found a drag coefficients and shorter residence times in cavities with shallower ramp angles and also a decrease in cavity residence time in cavities with longer length and slanted rear walls. Ben –Yakar and Hanson[4] found a larger cavities (L/D=7) had significantly higher drag coefficient than the smaller cavities(L/D=3). Reduction of back wall angle below 90 degrees resulted in additional drag. Hyungseok SEO et al [5] had concluded that grater vorticity magnitude indicates stronger rotation and allows the flowfield to mix the air and fuel more effectively. Increasing cavity sizes increases vorticity and enhances fuel-air mixing.Overall shape of the pressure distribution throughout the combustor does not change inspite of different fuel injection pressure for angled injection. Thus cavity geometry has the greatest effect on pressure distribution in combustor. The cavity effect on the overall heat release is secondary to the effect of the oblique shock generated by the rear of the cavity had been observed by EunjuJeong et al [6]. Struts offer the possibility of injecting fuel directly into the core of a supersonic flow without using high fuel supply pressure. Strut designs tend to create more aerodynamic disturbances than non-intrusive mechanisms, with an inevitable increase in total pressure losses and drag. Having a fuel port

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Original Article

EFFECT OF ANGLE OF ATTACK ON AERODYNAMIC FORCES OF SYMMETRICAL AND UNSYMMETRICAL AIRFOIL USING WINDTUNNEL

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ABSTRACT

Wind tunnels are primary devices and tools that enable researchers to the study of experimental aerodynamics which includes flow of air and the forces and interactions of air over the objects of interest. Wind tunnels enable aerodynamic investigation to evaluate the influence of wind past solid objects. In the present study, a typical low speed, subsonic wind tunnel is used to find the effect of angle of attack on lift and drag forces of a symmetrical and asymmetrical airfoils. Angle of attack(AOA) is the angle between the relative velocity between air and airfoil and the chord of air foil. The wind velocity inside the test section is 28.2m/s. It was found experimentally that for an unsymmetrical airfoil, as angle of attack increases from -15^o to 15^o, co-efficient of lift, C_L, increases and reaches a maximum value of 0.74 at 15^0. Coefficient of drag,C_D, decreases with increase in angle of attack and remains constant at a value of 0.08 between 0^o to 5^0 and reaches a value of 0.11 at critical angle of attack. In case of symmetrical airfoil, critical angle of attack was found to be 10^o with maximum C_L at 0.62. C_D decreased with angle of attack upto 5^0 and showed little change of C_D between 0^0 to 5^0 and there was increase in C_D. The aerodynamic forces depend on pressure distribution over airfoil which varies with angle of attack. The upper surface of unsymmetrical airfoil experienced boundary layer separation due to adverse pressure gradient while lower surface experienced favourable pressure gradient and hence no boundary layer separation at -10^o,-5^o AOA. As AOA is increased to +10^o, favourable pressure gradient occurred at upper surface while lower surface met with adverse pressure gradient at +10^o. In case of symmetrical airfoil, at -5^o,-10^o adverse pressure gradient occurred at upper surface while lower suface met with favourable pressure gradient. As AOA is increased, there is no boundary layer separation on both sufaces due to favourable pressure gradient. At +10^o, lower surface of symmetrical air foil met with adverse pressure gradient.

KEYWORDS: Windtunnel, Aerodynamic forces, Lift, Drag, Angle of attack, Critical angle, Adverse pressure gradient, Favourable pressure gradient

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INTRODUCTION

The test section of wind tunnel replicate the environmental relative velocity between the object to be tested and wind. Air is blown around the object to be tested. Flow of air over terrestrial, aerial vehicles, bridges, buildings, flow over cyclists, design of volley ball, bsaet ball, fluid dynamics over simple and complex geometries are studied by wind tunnels. NASA uses wind tunnels to test scale models of aircraft and spacecraft. Wind tunnels can be as large as to accommodate full size version of vehicles to be tested in test section. Though advances in CFD modeling is a more attractive option, experimental explorations remain the main stay in terms of accuracy The component of force parallel to relative velocity beween air and object is drag force. Lift force is perpendicular to drag force which

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RESEARCH ARTICLE

Experimental investigation of near-wake characteristics of hydrodynamic cavitating flow around circular cylindrical pins of different geometries with and without ultrasonic transducers

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ABSTRACT

The primary objective of this research is to study the hydrodynamic cavitating effects of fluid flow past a circular cylindrical pin of different geometries. An experimental investigation is carried out to study the effect of cylinder diameter and its length on the formation of wake cavitation in the upper sub-critical flow regime, which corresponds to Reynolds number (Re) in the range of 2×10^4 to 2×10^5. The vapour volume fraction was found to increase with a decrease in the cavitation number. The pressures in the cavitating region were found to be fluctuating and the Strouhal number was calculated. Additionally, to enhance the cavitation phenomena, an ultrasonic transducer is designed. Results reported that with an increase in the cavitation number, the size of the wake cavity decreased. Also, the size and the length of the wake cavity depend on the diameter of the cylinder and the size of the step provided. However, with an ultrasonic transducer, the time for inception cavitation decreases, and the noise level increases.

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KEYWORDS
Wake Cavitation; stepped cylinder; ultrasonic transducer; drag coefficient and cavity length

1. Introduction

Cavitation is the formation of vapour inside a liquid when the liquid's local pressure falls below the vapour pressure [,1]. Cavitation can occur in internal flow in systems like venturi or machines like pumps and hydraulic turbines and also due to fluid flow of high-speed bodies underwater. Many times, these bodies are in axisymmetric shape [,2]. The flow past axisymmetric bodies presents exciting features due to both longitudinal and circumferential pressure gradients. From a practical point of view, such flow is of considerable importance in aerospace engineering and underwater hydrodynamics.

Ye et al. [3] numerically and experimentally investigated the periodic shedding of cavitation flow over axisymmetric projectiles by implementing user-designed solver OpenFoam and reported that the initially recirculating jet is reported. However, in the second stage,

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Comparative analysis of the orientation dependent tensile deformation of commercially pure titanium and titanium alloy OT 4-1

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ABSTRACT

Correlation of mechanical properties and tensile deformation of hexagonal commercially pure titanium (CP-Ti) and acicular alpha titanium alloy OT 4-1 was studied in the present investigation. Tensile specimens were prepared along the rolling direction, along 45^0 to the rolling direction and transverse to the rolling direction to obtain different tensile deformation from cold rolled annealed sheets of CP-Ti and titanium alloy OT 4-1. The conjoint control of essential microstructural features and the orientation of specimen on tensile properties of commercially pure titanium and the titanium alloy OT 4-1 was highlighted.

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1. Introduction

Commercially pure titanium has wide applications in a variety of areas such as marine, chemical, plate-type heat exchangers, pressed parts and they are highly formable. OT 4-1 is a titanium alloy used for high-temperature applications in the aerospace industry [1] i.e. airframes, these materials are used extensively in the automotive sector. These materials also utilized for chemical processing industries, textile and paper plants, medicine, marine, oil industry, and even in some sports components [3]. Titanium experiences allotropic transformations from α to β at 882.5 °C if β stabilizers such as Mo, V, W, Nb, and Ta are present in the crystallographic structure [5]. If the above said β stabilizers are present in the material they should exhibit the response to heat treatment and α stabilizers like Al, O, and N are present in the material they don't depend on heat treatment.

The present investigation makes attempts to correlate the uniaxial tensile deformation of CP-Ti and OT 4-1 including the correlation of microstructure. Three initial orientations are deformed in uniaxial tension and the evaluation is compared between two materials.

2. Experimental setup

2.1. Sample preparation

The samples were prepared by an electrical discharge machine (EDM) which can be used efficiently in machining high-strength and temperature-resistant material like titanium alloy OT 4-1 and commercially pure titanium as shown in Fig. 1. Alternatively, machining can be done by all conventional methods but after the machining, the properties of the material may certainly differ. So EDM was best suited for sample preparation to protect the inherent properties of the above said two different materials [2].

The workpiece substance for titanium alloy OT 4-1 has the following composition: 2.24% Al, 1.44% Mn, 0.001% C, 0.048% V and rest Ti [12]. For the Commercially Pure Titanium (CP-Ti) the composition 0.094% O, 0.018% N, 0.0032% H, and balance Ti [3].

The microstructural studies of both the materials were studied before going to mechanical testing. After metallographic specimen preparation, with the help of an optical microscope, the sample was observed and the microstructure of CP-Ti material was revealed and it has α phase containing crystals of the hexagonal close-packed structure as shown in Fig. 2 [11].

Commercially pure titanium considered as α titanium alloy [4], as α indicates the phase present in the material and hexagonal

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Comparison of experimental and simulation results using erichsen cupping test of titanium alloy OT 4–1

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ABSTRACT

Titanium alloy is known for its higher tensile strength and ability to hold high temperatures thereby deforming at larger loads. Hence, it is incorporated in major appliances in the aerospace industry and automotive sector. Erichsen Cupping test is a ductility test performed in the sheet metal forming process in major industries. OT 4–1 material is selected for experimentation and the simulation using PAM STAMP™ software. Both the experimentation and simulation tests are carried out at a temperature of 23 ± 5 °C under controlled conditions. Blank holder, die and punch are the major components in the standard stamping and the punch is allowed to form an indentation on the blank with a minimal force and minimal stroke. The maximum stress obtained is 0.085847 Pa. The formability limit diagram, formability index and the stress graphs are determined in the current research from the simulation and compared with the experimental values. The future work would determine the aerospace and automotive applications by analytically developing new material models.

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1. Introduction

Titanium alloy is a material with high tensile strength and hence withstands extreme temperatures. It is light in weight with high resistance to corrosion. In general, three forms of Titanium (Ti) alloy are available namely, alpha (α), beta (β) and alpha–beta. These three forms are differentiated by the body structure of each element. The Hexagonal Closely Packed (HCP) structure corresponds to the alpha form of Titanium alloy, whereas, the beta type form is identified by the Body Centred Cubic Packed (BCCP) structure [1]. These structures are based on the elements that are mixed with the Titanium alloy. However, the alpha phase material maximises the strength of the alloy and decreases the density due to the mixture of Aluminium [2]. For beta phase, Vanadium acts as the stabilizer and at higher temperatures of about 800°C allotropic transformation of pure Titanium alloy occurs [3]. Both alpha and beta may coexist by the heat treatment method of Titanium alloy. With the addition of Aluminium or Vanadium to Titanium, the α-to-β transformation temperature changes over a particular range of temperatures. Depending on the composition and heat treatment, both the alpha and beta forms may coexist. Availability of the material, high production costs and high affinity for Oxygen are the challenges possessed by the Ti alloy OT 4–1 grade. Considerable efforts are implemented by different researchers which are directed towards forming and diffusion bonding techniques that reduce production costs and impart superior properties to Ti alloys [4]. In the present research Titanium alloy of grade 4 – 1 is used.

Titanium alloy grade OT 4–1 generally works in the temperature range between 888°C and 963°C, which minimises risk for complex fractures. The part geometries are manufactured by forming [5]. In this range of operating temperatures, the membrane deformations are regulated by alloy stability. The nature and fracture of the sheet metal are observed with care by considering the Titanium formability with respect to physical and mechanical properties [6]. However, the wrinkle formation is observed effectively to identify the tear formation for the punch force applied on the blank. This tear formation is observed with the experimentation process along with the simulation [7]. The quality and the formability of the sheet metal is estimated by the inverse which simplifies the overall design and manufacturing process for the standard stamping procedure of Titanium alloy [8]. Hence, the

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EXPERIMENTAL INVESTIGATIONS ON INJECTION TIMING VARIATION AT AN INJECTOR OPENING PRESSURE OF 190BAR ON SEMI- ADIABATIC DIESEL ENGINE WITH EXHAUST GAS RECIRCULATION

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ABSTRACT

Particulate emissions and Nitrogen oxides (NOx) levels are exhaust emissions from compression ignition (CI) engine. Once they are in-haled- in, they cause health hazards, besides environmental impact. Hence control of these emissions are important and an urgent task. In the context of depletion of fossil fuels, coupled with exponential growth rate of traction power engines in automobiles and for human luxuries, energy consumption has increased by many folds. This has triggered ever increase of fuel prices in international market and due to uneven distribution of oil resources in the world, a few oil rich countries are getting benefitted and oil lacking countries are suffering from non- affordability. Alcohols and vegetable oils are important substitutes for diesel fuel, as they are renewable. However, drawbacks associated with vegetable oils (high viscosity and low volatility) and alcohols (low cetane number and calorific value of the alcohols) call for low heat rejection (LHR) diesel engine. Exhaust gas recirculation (EGR) is one of the techniques to reduce pollution levels. Investigations were carried out to determine exhaust emissions of particulate matter and oxides of nitrogen with neat diesel operation at different values of brake mean effective pressure of the engine with varied injection timing with provision of

Analysis of Characteristics of Launcher Missile System and Its Optimization to Reduce Tip-Off Effect During Launch

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Abstract. This paper focuses on analyzing the motion characteristics of the launcher missile system and locations of interactions between missile shoes and launch rail. The deviation of direction of the thrust force from flight axis of the missile is known as thrust misalignment. And the deviation of direction of the missile is known as tipoff rate. The main objective of this paper is to analyze characteristics of launcher missile system and its optimization to reduce tipoff rate. The analysis is performed by modeling and simulating the launcher missile system using CAD package and ADAMS software.

Keywords: Missile · Launcher missile system · Thrust misalignment · Tip-off rate

1 Introduction

Missile is a self-propelled guided weapon, designed to deliver an explosive warhead at the target with great accuracy at high speed. It moves in the launcher for a certain amount of time during launching phase. Launching device, canister is used for launching of the missile [1].

On application of thrust force, missile attains free flight as it separates from launcher. With front shoe becomes unsupported while the rear shoe still supported by launch rail when missile reaches end of launcher, missile deviates from actual flight path under force of gravity known as known as tipoff rate. Mathematically, the tipoff rate is represented by the angular velocity of the missile with respect to the Z-axis (pitch axis), also known as pitch rate.

From the engineering point of view, minimum tipoff rate is desirable [2]. The purpose of this work is to achieve the minimum tipoff rate by analyzing the motion characteristics of the system and optimizing the obtained result by varying the parameters such as clearance between missile shoe and launch rail, location of the shoe with respect to center of mass of the missile and the number of launch lugs. Cochran, [3]: Developed a physical model of a launcher system in order to study the factors

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A Comparative Study on Performance of 3D-Printed EDM Electrode with Conventional EDM Electrode

L. Mahipal Reddy, L. Siva Rama Krishna, S. Sharath Kumar and P. Ravinder Reddy

Abstract Electro Discharge Machining (EDM) is an unconventional machining process used to make hard metal tools and complex shapes, which are difficult to machine by the conventional machining process. Additive manufacturing is the process of creating a 3D object from a CAD Model by adding one layer over another layer. In this work, it is proposed to fabricate an EDM electrode using Direct Metal Laser Sintering (DMLS) 3D printing process and compare its performance with conventional EDM electrodes in terms of Material Removal Rate (MRR), Tool Wear Rate (TWR), and surface finish. The material used for printing the EDM electrode is aluminum AlSi10 Mg and it is proposed to print it on the Direct Metal Laser Sintering 3D Printing machine. The workpiece material used for the EDM process is steel alloy 681-08 of grade D3. The experiment is conducted on EDM with the DMLS electrode and conventional electrode by varying the peak Current (I), Pulse on time (T_{on}), and Pulse off time (T_{off}). A comparison of MRR, TWR, and surface roughness is made varying the above-mentioned parameters.

Keywords EDM · 3D Printing · DMLS · MRR · TWR

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Structural Analysis of Pressurised Canister

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ABSTRACT: In this paper a canister (container) was designed and analyzed which is used for transportation and storage of missile. The canister is made of composite shell structure stiffened with rectangular ribs on the interior surface. An opening is provided on the canister at the rear end to insert the missile. Canister protects the missile from external heat, dust and moisture. Therefore canister plays an important role for missile.It was identified several causes of disturbances which damages the canister such as internal load, stacking load and lifting loads. Efforts have been made to design and optimize the canister for these loads. Detailed finite element stress analysis is carried out to determine the static response of the designed composite missile canister structure under mechanical loads. ANSYS package has been employed to perform the structural analysis.

KEYWORDS: Canister shell, Stress Analysis, Stacking Loads, Lifting Loads, Stability.

I. INTRODUCTION

A missile is an object which is forcibly propelled at a target, either by hand or any form of a mechanical weapon. Missile is a weapon that is self-propelled after leaving the launched device, usually with the intent of striking some distant object. Missile is a weapon designed to deliver an explosive warhead with great accuracy at high speed. Missiles are sturdy, well-constructed machines. But, because of their size, weight, and bulk, they are not that easy to handle. Most of the missile damage is unfortunately a result of carelessness and poor handling practices. Therefore we use containers, canisters, and handling equipment for maximum missile safety with minimum handling by personnel.

Dorothy S. Ng [1], has written in a book "Structural Analysis of Storage Container", performed the structural analysis to evaluate the storage container against a rare, short duration event. An accidental free drop of a container may occur in a combination of two events: a rare, short duration earthquake concurrent with an operation of raising the storage rack to a maximum height that the crane is capable of. This hypothetical free drop may occur only to the container in the uppermost shelf of the storage rack.The analyses were the structural evaluation of the storage container to determine the material containment integrity of the storage container after the accident. The evaluation was performed simulating a free drop from the storage rack, with a maximum load in the container, striking an unyielding surface in the worst orientation.The analyses revealed that, in the very unlikely event of a container drop, the integrity of the hermetic seal of the storage container could be compromised due to plastic deformation of the lid and mating flange. Simple engineering and administrative controls can prevent that from occurring. Serena, Joseph M [2] had presented a paper on "An On-Site Demilitarization Container for Unexploded Ordnance" and explained about design development, fabrication and analysis of the container. And also presented design techniques. At many of these sites, ordnance has been discovered very close to schools, homes, and other inhabited and privately owned facilities. The removal of ordnance presents some hazards from the effects of an explosion, including blast overpressures and fragment projectiles. Both people and their property must be protected from these effects. Currently, all munitions must be buried before onsite detonation, or transported to a remote site for demolition. Huntsville center has developed a containment structure for use in on-site demolition of unexploded ordnance. This structure is designed to contain the effects of the explosion and limit evacuation to a very small work area. The container uses innovative materials for the containment of fragments and reduction of overpressures. The container will permit onsite detonation of ordnance much more safely and efficiently. Bob Matthews [3] suggested book "Applied Stress Analysis" and explained the importance of the fiber orientation. He had studied on unidirectional tape as well as woven fabric, which have a significance of better surface finish, higher allowable strength and stiffness, lower raw material cost for unidirectional tape and for woven fabric low fabrication costs, easier forming on contours and corners and also more resistant to surface breakout and delamination. From these studies he concluded that the fiber should be arranged to optimize resistance to loads, limit number of different angles to expedite manufacturing and for filament winding hoop plies are used. The orientation of the tailor fiber arrangement explained as +/- 45 degree plies give buckling stability and carry shear, 0 degree plies give column

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Buckling Analysis of laminated Composite Cylindrical Shells Subjected to Axial Compressive Loads Using Finite Element Method

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Abstract

The Laminated cylindrical shells are being used in submarine, underground mines, aerospace applications and other civil engineering applications. Thin cylindrical shells and panels are more prone to fail in buckling rather than material failure. In this present study linear and non-linear buckling analysis of GFRP cylindrical shells under axial compression is carried out using general purpose finite element program (ANSYS). Non-linear buckling analysis involves the determination of the equilibrium path (or load-deflection curve) upto the limit point load by using the Newton-Raphson approach. Limit point loads evaluated for geometric imperfection magnitudes shows an excellent agreement with experimental reults [25]. The influence of composite cylindrical shell thickness, radius variation on buckling load and buckling mode has also investigated. Present study finds direct application to investigate the effect of geometric imperfections on other advanced grid-stiffened structures

1. Introduction

Various fields of engineering such as civil, mechanical, aerospace and nuclear engineering fields the thin walled cylindrical shells finds wider applications as primary structural members. The stiffened and unstiffened shells made up of metallic and laminated composite materials (large diameter to thickness ratio) are extensively used in underwater, surface, air and space vehicles as well as in construction of pressure vessels, storage vessels, storage bins and liquid storage tanks. The geometric imperfections due to manufacturing processes takes dominant role in decreasing the buckling load of cylindrical shells. Buckling is often viewed as the controlling failure mode of these structures due to its relatively small thickness of these structural members. It is therefore essential that the buckling strength of the thin shells along with knowledge of its buckling has been the subject of many researchers in both analytical and experimental investigations.

The researchers [1-10] has been investigated the problem of cylindrical shell buckling subjected to axial compressive loads using approximate analytical methods as well as finite element methods. The classical buckling load which is calculated theoretically much higher than the actual buckling load of the cylindrical shell and a knock-down factor is introduced to evaluate a better approximation based on an extensive experimental investigation. The effect of bending stresses and pre-buckling deformations investigated by Fischer [11], Yamaki and Kodama [12] and emphasized that the effect of pre-buckling deformations is not a primary reason for the difference between the classical prediction and the experimental results. According to von Karman and Tsien [13], Donnell and Wan [14], Koiter et al. [15], Budiansky and Hutchinson [16] the initial geometric imperfections are the single dominant factor for contributing the discrepancy between theories and experiments on cylindrical shell buckling.
The form geometric imperfections and amplitude dependent on fabrication process and quality of cylindrical shells according to Arbocz and Hol [17]. Buckling of imperfect cylindrical shells thus remains a subject of active area of research with special emphasis on modeling of the real imperfections as well as of boundary conditions and load eccentricity if any. The buckling of cylindrical shell structures taking dimple as geometric imperfection pattern was investigated by the Shen and Li [18], and Schneider [19]. Frano and Forasassi [20], Prabu et al. [21] investigated the buckling behavior of imperfect thin cylindrical shells under lateral pressure by taking ovality as

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EXPERIMENTAL STUDIES ON LAUNCH DYNAMICS OF SLANT LAUNCHED SURFACE TO AIR FLIGHT VEHICLE

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ABSTRACT

Surface to air flight vehicles are launched at low slant angles to intercept and neutralize low flying attacking enemy aerial targets like fighter aircrafts, helicopters which are on cruise missions. These flight vehicles are generally housed in hollow launch canisters which are used for storage, transportation and launching through mobile launchers. The lateral signature of launch canister is chosen such a way that more number of canisters can be accommodated per one launcher. To accommodate the flight vehicle in launch canister, it is accordingly configured with foldable wings and fins. New designs of flight vehicle, canister and launcher system need to be verified for all the interfaces and the controllability of flight vehicle when it clears the canister. While coming out of canister at low elevation launch angles, the flight vehicle starts deviating from its intended trajectory due to the combination of gravitational force, thrust misalignments, aerodynamic forces, low initial thrust, lateral shift of centre of mass, deployment forces of wing and fin etc. To record actual launch dispersions and to remove any hidden uncertainties in new designs, a live firing with a full scale short duration flight vehicle was undertaken. A propulsion system was specifically designed to function for a small duration simulating the actual thrust time profile of that of the full scale rocket motor system for that initial duration. One short duration rocket motor system was static tested to verify the design parameters and another one was integrated with the rest of the actual flight hardware

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VIBRATONAL ANALYSIS OF ROTOR DYNAMIC SYSTEM USING FEA

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ABSTRACT

The aim of this work is to analyze the dynamic behaviour of the rotor-shaft system and address the critical issues associated with them. Initially, a simple Jeffcott rotor is analyzed in detail to determine its natural frequencies, critical speeds from the Campbell diagram, the forward and backward whirl modes. This is followed by the analysis of rotor shaft system in SAMCEF in order to understand its dynamic behaviour which involves the detailed analysis of the Campbell diagrams, critical speeds, effect of the gyroscopic moments etc. Campbell diagrams are obtained and critical speeds, effect of the gyroscopic moments etc. are identified and discussed. In SAMCEF, in order to analyse the critical speeds and mode shapes, the analysis of critical speeds and stability analysis carried out. Next to this, analysis unbalance responses were analysed from the harmonic response analysis. After the harmonic response, transient analysis was carried out to analyse the unbalance responses with respect to the time variations.

KEYWORDS: Dynamic Behaviour, Rotor, Cambell Diagram, Gyroscopic Moments & Harmonic Response

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Original Article

1. INTRODUCTION

Many years ago, engines didn't operate with any high velocity and because of that engines had less stability problems. Today the turbines have to be more efficient, that means that they need to have higher rotational speed and because of that the turbines may get stability problems. Stability problems are the reason why rotor dynamics are important when developing gas turbines. Any stability problem in the rotor can easily lead to disaster and end up to be very expensive. The engineer wants to avoid oscillations in a system because oscillations can shorten the lifetime of the machine. Oscillations can also make the environment around the machine intolerable with heavy vibrations and high sound. Rotor unbalance and misalignment are major concerns in rotating machinery. Unbalance is the most cause of machine vibration. The problem of unbalance in a system occurs due to an uneven distribution of mass and when the centre of gravity of rotor does not coincide with the axis of rotation. Unbalanced rotor generates vibration may damage rotor system components. In order to extend the life of machine, vibration due to unbalance must be reduced to acceptable level.

Rankine [1] performed the first analysis of a spinning shaft. He predicted that beyond a certain spin speed ". The shaft is considerably bent and whirls around in this bent form Jeffcott [2] proposed a flexible rotor mode1 to analyse the response of high speed rotating shafts to mass imbalance. Jeffcott model is basically a particle or point-mass or lumped mass representation. In order to reflect the rigid-body character of flexible rotating equipment, Stodola and Green [3] used a rigid-body model to include the effects of rotary inertia and gyroscopic coupling. When a rigid disk is not located at the mid-span of a shaft, use of the Stodola-Green model is an appropriate

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Comparative analysis of the orientation dependent tensile deformation of commercially pure titanium and titanium alloy OT 4-1

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ABSTRACT

Correlation of mechanical properties and tensile deformation of hexagonal commercially pure titanium (CP-Ti) and acicular alpha titanium alloy OT 4-1 was studied in the present investigation. Tensile specimens were prepared along the rolling direction, along 45^0 to the rolling direction and transverse to the rolling direction to obtain different tensile deformation from cold rolled annealed sheets of CP-Ti and titanium alloy OT 4-1. The conjoint control of essential microstructural features and the orientation of specimen on tensile properties of commercially pure titanium and the titanium alloy OT 4-1 was highlighted.

Selection and peer-review under responsibility of the scientific committee of the International Conference on Newer Trends and Innovation in Mechanical Engineering: Materials Science.

1. Introduction

Commercially pure titanium has wide applications in a variety of areas such as marine, chemical, plate-type heat exchangers, pressed parts and they are highly formable. OT 4-1 is a titanium alloy used for high-temperature applications in the aerospace industry [1] i.e. airframes, these materials are used extensively in the automotive sector. These materials also utilized for chemical processing industries, textile and paper plants, medicine, marine, oil industry, and even in some sports components [3]. Titanium experiences allotropic transformations from α to β at 882.5 °C if β stabilizers such as Mo, V, W, Nb, and Ta are present in the crystallographic structure [5]. If the above said β stabilizers are present in the material they should exhibit the response to heat treatment and α stabilizers like Al, O, and N are present in the material they don't depend on heat treatment.

The present investigation makes attempts to correlate the uniaxial tensile deformation of CP-Ti and OT 4-1 including the correlation of microstructure. Three initial orientations are deformed in uniaxial tension and the evaluation is compared between two materials.

2. Experimental setup

2.1. Sample preparation

The samples were prepared by an electrical discharge machine (EDM) which can be used efficiently in machining high-strength and temperature-resistant material like titanium alloy OT 4-1 and commercially pure titanium as shown in Fig. 1. Alternatively, machining can be done by all conventional methods but after the machining, the properties of the material may certainly differ. So EDM was best suited for sample preparation to protect the inherent properties of the above said two different materials [2].

The workpiece substance for titanium alloy OT 4-1 has the following composition: 2.24% Al, 1.44% Mn, 0.001% C, 0.048% V and rest Ti [12]. For the Commercially Pure Titanium (CP-Ti) the composition 0.094% O, 0.018% N, 0.0032% H, and balance Ti [3].

The microstructural studies of both the materials were studied before going to mechanical testing. After metallographic specimen preparation, with the help of an optical microscope, the sample was observed and the microstructure of CP-Ti material was revealed and it has α phase containing crystals of the hexagonal close-packed structure as shown in Fig. 2 [11].

Commercially pure titanium considered as α titanium alloy [4], as α indicates the phase present in the material and hexagonal

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Design and Development of a Fuzzy Logic Controller for Prediction of TIG welded Al-65032 Specimens

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Abstract: Fuzzy logic controller (FLC) is well suited where there is a considerable amount of uncertainty in the process. The material properties of a weldment in TIG welding depend on welding parameters like shielding gas pressure, current, torch angle, electrode size, electrode projection , arc length etc. It is also influenced by the joint parameters like groove angle, land, root gap, preheating temperature. But a lot of noise parameters like variation of base material properties, variation in quality of inert gas used, variation in ambient conditions, variation in workman ship etc introduce the uncertainty into the process. To deal with such uncertainties an FLC is designed and validated. In the current work, four parameters namely inert gas pressure, current, groove angle of the joint and preheating temperature of base metal are considered as input parameters and the effect of these parameters on the percentage of elongation which is a measure of ductility is studied. Three linguistic terms are used for each parameter. To minimise the no. of experiments in designing data base an L-9 orthogonal array is chosen for experimentation. TIG welding is carried and data base with 9 rules are formulated. Triangular membership function is selected for the input and out variables and FLC is designed. The FLC is validated with 5 more experiments. Mamdani approach is used to develop the Fuzzy controller.

Key words: Orthogonal array, Fuzzy logic controller, TIG welding, Triangular function, Mamdani approach, crisp value, Membership function.

I Introduction

A fuzzy logic controller is described by a set of rules of type IF (condition) THEN (action) to convert the language control strategy acquired from a human expert into a well-adapted automatic control strategy [1]. Fuzzilogic controllers are extensively used in many engineering application [2-6]

Al-65032 is a precipitation hardening aluminium alloy that and one of the most common alloys of aluminium for general purpose use. Aluminium alloys are difficult to weld materials. Tungsten Inert gas Welding (TIG) is extensively used for welding aluminium alloys. TIG welding process is influenced by number of parameters individually and combinedly with a high complexity of interactions. The complex interaction of the parameters result into a wide variation in the weldment properties, geometry, and metallurgical features.

II. input Parameter selection

The input variable selected is pressure current groove angle and preheating. Three linguistic terms for the FLC design, are selected for each parameter; Low, Medium and High. For 4 parameters with 3 linguistic terms, the size of the rule base is 4^3. i.e 64. So a minimum of 64 experiments are to be conducted for developing the rule base which involves a huge cost and time. So for reducing the no. of experiments an orthogonal array L-9 is selected for experimentation. Experiments conducted with the Taguchi Orthogonal arrays will give the reasonably accurate results even in partial factorial case. So in the current work the validity of this hypothesis is tested.

Table 1: The input variables

S.No	Input Parameter	Level 1	Level 2	Level 3
1.	Pressure (KPa)	104	125	139
2.	Current (Amps)	145	150	160
3.	Groove angle (Deg)	45	60	70
4.	Pre-heating (^OC)	125	150	175

The three levels of the parameters selected after preliminary experiments are given in table 1. With four parameters and three levels Orthogonal array L9 was selected for the experimentation and the levels of the parameters shown in table 1 are assigned to the OA and presented in table 2.

III. Experimentation

Standard test pieces with dimensions 150mm X 150mm X 6mm are cut from the Al-65032 alloy sheet are prepared with an a saw machine. The plates are grooved to the desired angle on a milling machine. The milled pieces were engraved with a specific number for identification. The pieces were pickled. Hydrochloric Acid is used for the process. A ready to weld sample of weld specimen is presented in Fig 1 and the test pieces are shown in Fig2. Experiments are conducted on welding machines presented Fig 3.

The tensile test was carried out. The Percentage Elongation (%EL) values for various trials are presented in Table 3. For all the parameters output values at the levels 1,2,3 are summed up and averaged. The averaged values are presented in the table 3 against A1, A2 and A3 and the values are plotted in Fig 4 to know the variation.

Table 2: OA after assigning the values

Run	Pressure (KPa)	Current (Amps)	Groove angle (Deg)	Pre-heating (OC)
1.	104	145	45	125
2.	104	150	60	150
3.	104	160	70	175
4.	125	145	60	175
5.	125	150	70	125
6.	125	160	45	150
7.	139	145	70	150
8.	139	150	45	175
9.	139	160	60	125

Parametric Optimization During Wire EDM Taper Cutting on AISI D2 Steel Using Desirability Function

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Abstract. Wire electrical discharge machining (WEDM) has become very popular non-traditional process of machining. Taper cut WEDM involves making surfaces of sloping, this is essential in machining tools with angles included. AISI D2 steel with Mo and Cr has a variety of applications in engineering. This paper aims to study the effect of taper angle, wire feed and wire tension on the responses such as cutting time, angular error and surface roughness and also find the optimum values of each variable that achieve optimum cutting conditions. Central Composite design (CCD) of response surface methodology was used to design the experiments and five values of each of the three variables are taken. In order to combine the responses and the parameters in one model regression model has been generated. For each response separate analysis of variance (ANOVA) was calculated and the optimization was performed using desirability function. Results show that the most significant parameter is taper angle and the optimized parameter levels of the machining are taper angle 6°, wire feed 5.624 mm/min and wire tension 7.886 g respectively.

Keywords: Taper angle · Wire feed · Wire tension · Angular error · Response surface methodology

1 Introduction

Wire electrical discharge machining is a non-traditional process of machining uses heat from electrical sparks emitted from a wire of limited diameter to generate craters in the work piece while submerged in dielectric fluid. Taper WEDM aiming at producing segments with surfaces of sloping by offsetting the upper from lower guides of the wire holders where the angle is produced. Depending on the mechanical properties of the wire and the work piece thickness the ultimate angle value can be determined. Angles of (±30°) can be made in a work piece of 400 mm thickness but wire breakage is going to take place due to more vibrations [1, 2] and the higher the thickness to be cut, the lesser the angle that should be set.

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Prediction and Comparison of the Dilution and Heat Affected Zone in Submerged Arc Welding (SAW) of Low Carbon Alloy Steel Joints

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ABSTRACT

The present investigation has been made to realize the effect of submerged arc welding (SAW) process parameters in 'Purging' condition and has been compared to the traditional 'as weld' condition. It uses open-circuit-voltage (OCV), wire-feed-rate (WFR), welding-speed (WS) and nozzle-to-plate distance (NPD) as process parameters. The design of experiments is utilized to carryout efficient experimentation and multiple regression analysis is to build mathematical models to foresee responses like dilution and heat affected zone. The performance evaluation of control levels, which has been shown through the S/N ratio, its significance, along contributions is computed via ANOVA. The models are developed to build correlation among the parameters. The Grey Relational Analysis (GRA) is to normalize and optimize the results. These developed models are adequate; GRA responses are agreeable and are found to be within limits through confirmation tests. Results indicate that the best combination for Heat Affected Zone (HAZ) minimization is lower level of OCV and higher levels of WFR, WS and NPD; High dilution, in percentage, in both welding conditions. The Purging condition values are shown better than the as-weld condition values.

Keywords: Submerged Arc Welding; Design of Experiments; Multiple Regression Analysis;

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Effect of Various Parameters on the Bead Geometry and Flexural Strength of MIG Welded Joint

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Abstract*: Metal inert gas welding is the process in which a continuous coil of consumable electrode is used with inert gas shielding. It was extensively being used for Aluminum and Mg Alloys. But due to other alternatives available for, the cost of inter gas prohibited the use of MIG welding of steels. After the introduction of carbondioxide as shielding gas the economical viability in welding of steels was realized. The quality of weld joing and its productivity is influenced by the parameters such as arc current, wire feed rate, voltage, welding speed, torch angle, , nozzle to plate distance, welding position and gas flow direction. In the present work effect of gas flow rate, voltage and current are studied using Taguchi L-9 orthogonal array. The flexural strength, tensile strenght and bead geometry for various trails are computed and the optimum combination is obtained.

Keywords* : MIG welding, Taguchi, Flexural strength, Bead geometry.

I. INTRODUCTION

Metal inert gas (MIG) welding is a multi-factor and multi-objective welding process in which there is complex interaction of various process parameters which directly or indirectly influence the bead geometry, mechanical properties of the weldment [1].In conventional design optimization feasible design is obtained by trial and error, varying one parameter at a time and keeping all other parameters constant which is repeated for all the parameters under study [2].But this approach may take very long time making the approach to be expensive and sometimes infeasible [3]. So Taguchi developed an approach of taking all the parameters under study at a time and establish the individual and combined effect of the the parameters. [4]. According to Taguchi the parametric design experiment aims at the identification of the process parameters that influence the process the most and optimize them and make the process less sensitive to the noise[5]. The scope of this approach ranges from raw materials, systems and products.

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The steps involved in parametric design are: determination of the quality characteristic which is aimed to be optimized, Identification of the noise parameters and test conditions, identification of the control parameters, how many levels and their levels, selection of the suitable orthogonal array (OA), conduction of the experiments according to the selected OA, analysis of the data and finding the most influencing parameters, their contribution and proposing the optimum levels and performance prediction at these levels [6].

II. OA SELECTION AND THE DETERMINATION OF THE LEVELS

In the present work, the flexural strength, tensile strength and bead geometry are considered as the out parameters. Environments conditions such as temperature, humidity etc are considered as noise factors. The control parameters identified are current, voltage and gas flow. Three levels are taken for the control parameters based on the initial tests. Since there are three parameters and three levels full factorial experimentation is done by selecting the orthogonal array L-9.

Table 1: Levels chosen

Parameter	Level 1	Level 2	Level 3
Voltage (V)	25	26	27
Current (A)	75	100	125
Gas flow rate (liters/Min)	9	12	15

Table 2: OA after assignment

Trial	Current	Voltage	Gas flow rate
1	75	25	9
2	75	26	12
3	75	27	15
4	100	25	12
5	100	26	15
6	100	27	9
7	125	25	15
8	125	26	12
9	125	27	9

The range of parameters is chosen such that good beads are obtained in all the cases. The parameter levels are shown in table 1. L-9 orthogonal array after the assignment of the values the L9 OA looks as in table 2.

III. EXPERIMENTATION

Three samples of mild steel of 6 mm thickness are prepared for each trail.

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EXPERIMENTAL INVESTIGATIONS ON SEMI-ADIABATIC DIESEL ENGINE WITH EXHAUST GAS RECIRCULATION FUELLED WITH TAMARIND BOIDIESEL

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ABSTRACT

Particulate emissions and nitrogen oxide (NO_x) levels are exhaust emissions from compression ignition (CI) engine. Once they are inhaled-in, they cause health hazards, besides environmental impact. Hence control of these emissions are important and an urgent task. In the context of depletion of fossil fuels, ever increase of fuel prices in International Market causing economic burden on developing countries and increase of pollution levels with fossil fuels the search for alternative fuels has become pertinent. Vegetable oils have high viscosity and low volatility causing combustion problems in diesel engine. Biodiesel produced from feedstock by the process of esterification are renewable in nature, biodegradable, provide energy security besides addressing environmental concerns. However, drawbacks of high viscosity, low volatility call for low heat rejection (LHR) or Semi Adiabatic diesel engine (SAD e).

Investigations are carried out to evaluate the performance with different operating conditions (normal temperature and preheated temperature) of tamarind biodiesel with low heat rejection diesel engine consisting of air gap insulated piston with stainless steel, a low thermal conductivity material and air gap insulated liner with stainless steel insert with varied injection timing and injection pressure with provision of exhaust gas recirculation (EGR) with Tamarind biodiesel with diethyl ether as additive.

Key words: Particulate Emissions, Nitrogen Oxides ($_{NOx}$), LHR engine or Semi Adiabatic engine, Exhaust Gas Recirculation (EGR), Stainless Steel. (SS).

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BUTANOL BLEND REDUCES POLLUTANTS IN SPARK IGNITION ENGINE

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ABSTRACT

Tests were taken to determine exhaust emissions of a petrol engine having cuprum sprayed engine [CuE, Cuprum of thick, 0.3 mm) sprayed on the top portion of the piston and interior portion of cylinder head] coupled with catalytic converter (CC) with iron of sponge as oxidizer with two fuels of petrol and petroleum mixed with butanol (85% petrol and 15% butanol by V) and correlated with data of standard engine (SE) with operation of petrol. The effects of variables of engine with variety of types of engine on engine products of exhaust emissions were studied. The products of exhaust of engine of monoxide of carbon (CO) and partially-burnt hydro carbon (UBHC) were studied with scientific indicators at various magnitudes of specific torque (BMEP) of the engine. The measurement of aldehydes followed with method of wet (DNPH) method. CC was coupled with engine with iron of sponge/ore of manganese as oxidizers. Facility for injection of air into CC was incorporated. The workability of oxidizers was judged. Reduction of exhaust products were noticed with butanol mixed with petrol. Injection of air in CC greatly affected exhaust products of engine.

KEYWORDS: Petrol Engine, Butanol, Cuprum Sprayed Engine & Products of Exhaust, and CC

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Original Article

1. INTRODUCTION

The number of automotive vehicles determines the extent of civilization. Depletion of petrol due to large use in transport of individual, one has to go for concept of alternative technology for fuel. Properties of alcohols are matched to those of petrol, in the aspect of octane number, hence, they can be conveniently used in petrol engine, with small quantities of blend, as large quantities may require changes in structure of the engine.

Respiratory problems occur with CO and UBHC levels. [Fulekar, 1999; Usha Madhuri, *et al.,* 2003; Khopkar, 2004], along with problems in environment. [Khopkar, 2004]. Importance is given to aldehydes, which cause deadly deceases, if engine is run with alcohol. Condition of the vehicles and layout of the traffic dictate the quantity of the pollutants. [Usha Madhuri, *et al.,* 2003]. Hence, urgent care is to be needed to cut down the exhaust products. Cuprum spraying on engine components is one method to improve workability of the engine as thermal conductivity of the material, cuprum is high causing reactivity in combustion. [Nedunchezhian, and Dhandapani, 2004;Murali Krishna *et al.,* 2010; Murali Krishna *et al.,* 2010]. CC is one technique to reduce exhaust products from SE [Murali Krishna et al., 2000; Murali Krishna *et al.,* 2008; Kishor *et al.,* 2010]. Many variables of CC affect the exhaust products engine along with engine variables. Mixing of petrol with alcohols dictates the exhaust products. [Murali Krishna *et al.,* 2005; Murali Krishna *et al.,* 2006; Murali Krishna *et al.,* 2007] Engine stratification along with fuel mixing with alcohol further reduced exhaust products. [Murali Krishna *et al.,* 2012].

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EXPERIMENTAL INVESTIGATIONS ON EXHAUST EMISSIONS OF SEMI- ADIABATIC DIESEL ENGINE WITH EXHAUST GAS RECIRCULATION

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ABSTRACT

Particulate emissions and Nitrogen oxides (NOx) levels are exhaust emissions from compression ignition (CI) engine. Once they are in-haled- in, they cause health hazards, besides environmental impact. Hence control of these emissions are important and an urgent task. In the context of depletion of fossil fuels, coupled with exponential growth rate of traction power engines in automobiles and for human luxuries, energy consumption has increased by many folds. This has triggered ever increase of fuel prices in international market and due to uneven distribution of oil resources in the world, a few oil rich countries are getting benefitted and oil lacking countries are suffering from non- affordability. Alcohols and vegetable oils are important substitutes for diesel fuel, as they are renewable. However, drawbacks associated with vegetable oils (high viscosity and low volatility) and alcohols (low cetane number and calorific value of the alcohols) call for low heat rejection (LHR) diesel engine. Exhaust gas recirculation (EGR) is one of the techniques to reduce pollution levels. Investigations were carried out to determine exhaust emissions of particulate matter and oxides of nitrogen with neat diesel operation at different values of brake mean effective pressure of the engine with varied injection timing with provision of EGR and compared the data with conventional engine with neat diesel operation. LHR engine consisted of air gap insulated piston with Stainless Steel crown, a low thermal conductivity material and air gap insulated liner with Stainless Steel insert. Particulate matter and NOx emissions will reduce with optimum EGR system.

KEY WORDS : Particulate Emissions, Nitrogen Oxides (NOx), LHR engine and Exhaust Gas Recirculation (EGR)

INTRODUCTION

Energy demand (Lee *et al.*, 2014) is increasing due to ever increasing number of vehicles employing internal combustion engines (Haywood, 2013). World is presently confronted with the twin crisis of fossil fuel depletion and environmental degradation. Fossil fuels are limited resources; hence, search for renewable fuels is becoming more and more prominent for ensuring energy security (Murali Krishna *et al.*, 2014) and environmental protection. In the context of fast depletion of fossil fuels, ever increase of fuel prices and increase of pollution levels with fossil fuels, the search for alternative techniques has become pertinent. The concept of the engine with LHR combustion chamber (Murali Krishna *et al.*, 2014a) is to reduce heat loss to the coolant, by providing thermal resistance in the path of heat flow to the coolant. Any saving in this part of the energy distribution

Development of a Fuzzy Logic Controller for the Estimation of Ultimate Tensile Strength for the TIG welded Al-65032

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Abstract: Fuzzy logic controller (FLC) is well suited where there is a considerable amount of uncertainty in the process. The material properties of a weldment in TIG welding depend on welding parameters like shielding gas pressure, current, torch angle, electrode size, electrode projection , arc length etc. It is also influenced by the joint parameters like groove angle, land, root gap, preheating temperature. But a lot of noise parameters like variation of base material properties, variation in quality of inert gas used, variation in ambient conditions, variation in workman ship etc introduce the into the process. To deal with such uncertainties an FLC is designed and validated. In the current work, four parameters namely inert gas pressure, current, groove angle of the joint and preheating temperature of base metal are considered as input parameters and the effect of these parameters on the ultimate tesnsile strength is studied. Three linguistic terms are used for each parameter. To minimise the no. of experiments in designing data base an L-9 orthogonal array is chosen for experimentation. TIG welding is carried and data base with 9 rules are formulated. Triangular membership function is selected for the input and out variables and FLC is designed. The FLC is validated with 5 more experiments. Mamdani approach is used to develop the Fuzzy controller.

Key words: Orthogonal array, Fuzzy logic controller, TIG welding, Triangular function, Mamdani approach, crisp value, Membership function.

I INTRODUCTION

A fuzzy logic controller is described by a set of rules of type IF (condition) THEN (action) to convert the language control strategy acquired from a human expert into a well-adapted automatic control strategy [1]. Fuzzilogic controllers are extensively used in many engineering application [2-6]
Al-65032 is a precipitation hardening aluminium alloy that and one of the most common alloys of aluminium for general purpose use. Aluminium alloys are difficult to weld materials. Tungsten Inert gas Welding (TIG) is extensively used for welding aluminium alloys. TIG welding process is influenced by number of parameters individually and combinedly with a high complexity of interactions. The complex interaction of the parameters result into a wide variation in the weldment properties, geometry, and metallurgical features.

II. INPUT PARAMETER SELECTION

The input variable selected is pressure current groove angle and preheating. Three linguistic terms for the FLC design, are selected for each parameter; Low, Medium and High. For 4 parameters with 3 linguistic terms, the size of the rule base is 43. i.e 64. So a minimum of 64 experiments are to be conducted for developing the rule base which involves a huge cost and time. So for reducing the no. of experiments an orthogonal array L-9 is selected for experimentation. Experiments conducted with the Taguchi Orthogonal arrays will give the reasonably accurate results even in partial factorial case. So in the current work the validity of this hypothesis is tested.

Table 1: The input variables

. S.No	Input Parameter	Level 1	Level 2	Level 3
1.	Pressure (KPa)	104	125	139
2.	Current (Amps)	145	150	160
3.	Groove angle (Deg)	45	60	70
4.	Pre-heating (^{O}C)	125	150	175

The three levels of the parameters selected after preliminary experiments are given in table 1. With four parameters and three levels Orthogonal array L9 was selected for the experimentation and the levels of the parameters shown in table 1 are assigned to the OA and presented in table 2.

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Development and evaluation of water absorption, compression and impact properties of okra Nanofibrillated cellulose reinforcement in epoxy resin composites

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ABSTRACT

Nanofibrillated cellulose were extracted from natural fibre of Okra plant by a chemical, Acid hydrolysis and mechanical method to study their potential for use as reinforcement fibrils in bio composite applications. The okra Nanofibrillated cellulose composites were prepared by Compression moulding and VARTM method. The Present work was to investigate water absorption, compression and impact properties of okra Nanofibrillated cellulose reinforced epoxy composites. The water absorption compression and impact of okra Nanofibers Reinforced Epoxy composites were studied and the effects of okra Nanofiber (0, 1, 2, 4 and 6 wt%) are also examined. The water absorption, compression and impact properties of Nanofibre reinforcement has improved when compared with the virgin composite. Water Absorption capacity is less for okra Nanofibrillated cellulose reinforced epoxy resin composites sample when compared to other composite samples but it is high when compared to pure epoxy resin sample. The compression strength of 4 wt% okra Nanofibrillated cellulose composites shows improve quality result among other composites and it gives 4 wt% improved strength of the pure epoxy resin composites. Whereas 4 wt% okra Nanofibrillated cellulose composites (OKCNFs) shows improve impact strength as compared to Epoxy resin composites. The okra Nanofibrillated cellulose composites are tested by means water absorption, compression and impact test based on ASTM standard. Effect of Fibril surface Treatment on water absorption, compression and impact properties are also observed.

Selection and peer-review under responsibility of the scientific committee of the 1st International Conference on Manufacturing, Material Science and Engineering.

1. Introduction

Development of thermosetting natural fibrillated cellulose composites has drawn attention of the researchers all over the globe, owing to the availability and biodegradability of natural fibers [1]. Such materials are used for making variety of components for domestic, automobile, structural and packaging applications. In recent times, Nanofibrillated cellulose composites have been the hot research area for automotive, packaging and medical applications [2–10]. Nanofibrillated cellulose composites are fully biodegradable and biocompatible with excellent mechanical properties. Due to high crystallinity and high aspect ratio and low density of the nano cellulose fibrils, there is considerable increase in the stiffness of the composites produced. Nano scale cellulose fibrils are produced by a mechanical process called homogenization which involves high energy consumption. In order to lower the energy consumption, the homogenization process is preceded by mechanical treatments such as refining, cryocrushing, biological treatments like enzyme and chemical treatments like alkaline to reduce the size of the fibers before homogenization [2].research interest of using natural fibrils to reinforce polymers is re-emerging in the field of composites manufacturing over the last ten decades[19–23]. Cellulose is the primary constituent of the plant cell wall and can be extracted from a variety of sources, such as bast fibers, seed fibers, grasses, marine animals, invertebrates, and bacteria [13–15]. Besides cellulose, the plant cell wall. Nanocomposites are generally advanced materials where at least the length of one filler is in the order of one nanometer.

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Performance Evaluation of Copper Coated Aluminum Electrodes in EDM Process

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ABSTARCT: The electrical discharge machining process is one of the non-traditional processes used in the field of manufacturing. In this process a formed electrode tool produces the shape of the finished work surface. Electrode materials are high temperature, but easy to machine, thus allowing easy manufacture of complex shapes. Typical electrode materials include copper, tungsten, and graphite. The main focus of our thesis is to study the influence of copper electroplating on Aluminum electrode by varying parameters such as Pulse on time(50µs,70µs and 80µs) and discharge current(10 A,15A,20A).The resultant Metal Removal rate obtained on the AISI 1040 workpiece and Tool wear rate of the electrodes were studied and comparisons were drawn between Regular Aluminum electrode and copper coated Aluminum electrode. The aim of the experiment was to achieve the Minimum tool wear rate for the copper coated Aluminum electrode and maximum Metal removal rate of the AISI 1040 workpiece using the same copper coated Aluminum electrode.

KEYWORDS: Electrodeposition, Copper coated, Pulse ON time, Pulse OFF time, Current.

ABBREVIATIONS: EDM, Electrical discharge Machining; MRR, Metal removal rate; TWR, Tool wear rate; SR, Surface roughness.

1.INTRODUCTION

The Electrical discharge Machining process is a thermoelectric process which removes the material from the workpiece in the form of discrete sparks. This eliminates the chances of mechanical stress, chatter and vibration problems, as is prominent in traditional machining. Therefore, this process is categorized under Non-traditional machining process. [2]A formed electrode tool produces the shape of the finished surface. Common methods of evaluating machining performance in EDM operation are based on the following performance characteristics: MRR, SR, and EWR. Basically, these characteristics are correlated with the machining parameters such as work piece polarity, pulse on time, duty factor, open discharge voltage, discharges current and dielectric fluid. Proper selection of the machining parameters can obtain higher material removal rate, better surface roughness, and lower electrode wear ratio. Machining takes place by the discharge pulse from the cathode to the anode. Usually, the polarity is set, so that the work piece acts as the anode and the tool electrode acts as the cathode, in order to obtain a higher material removal rate. The discharge pulse gap is relatively small, thus the accuracy of components or parts manufactured by EDM is very high. EDM is accomplished with a system comprising two major components: a machine tool and power supply. The sparks are generated by a pulse generator, between the tool electrode and the work material, submerged in a liquid dielectric such as Kerosene, leading to metal removal from the work material by erosion and vaporization. The EDM phenomenon, as it is understood, can be divided into three stages namely application of adequate electrical energy, dielectric breakdown, sparking and expulsions (erosion) of work material. The spark erosion of the work material makes use of electrical energy, converting them into thermal energy the rough a series of repetitive electrical discharges between the tool electrode and the work material electrode. The thermal energy generates a channel of plasma between the two electrodes and the breakdown of plasma channel occurs, resulting in a sudden reduction in the temperature, allowing the circulating dielectric fluid to flush away the molten work material from the EDM machined surface in form of microscopic debris. Melting and vaporization of the work material dominates the material removal

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EXPERIMENTAL STRESS ANALYSIS OF ROCKET MOTOR CASING USING ELASTO-PLASTIC STRAIN THEORY

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ABSTRACT

The purpose of rocket motors isto generate thrust or impulsive force to be passed on aninclined velocity to flight vehicle to transport its payload to its requiredtarget. It will be subjected to high pressure loads and temperature during the operating conditions of the motor mechanism. So, while selecting the material for the manufacturing of motor case, utmost care has to be taken, because the material chosen has to withstand all kinds of structural and thermal loads acting on it.15CDV6 steel is one of the latest trends, used in the design of rocket motors due to its high strength and hardness. The unique quality of 15CDV6 steel is that, it is a hypo-elastic material. This paper intends to analyze and evaluate the performance of 15CDV6 steel in its elasto-plastic range. Three specimens of the material were evaluated with the help of tensile tests and strain gauge data. For calculations, plane stress condition has been considered. From the resulting design parameters, a code was developed on the digital computer using Microsoft Excel, to create data sheets which produce stress data as output, when strain data is given as input. This code is also helpful in quickly analyzing the material behaviorby finding the factor of safety for the casing.

KEYWORDS: Motor Casing, Strain Gauges, Elasto- Plastic Range & Microsoft Excel

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Original Article

1. INTRODUCTION

A rocket engine is a standard energy shift system. High pressure as well as hightemperature combustion product gases has been enlarged viaconverging-diverging nozzle. With the procedure, internal energy of the gas will be transformed to kinetic energy of the fatigue flow; alsothe thrust was created through gas force over the surfaces subjected to this gas [8]. Solid propellantrocket engine was majorly utilized than the other rocket engines because of its comparatively easy model, higher reliability, simplicity ofproduction also prepared to work with on demand. Since solid-fuel rockets may stay in stock for extended durations, and then reliably initiate on short note,they've been often utilized in military programs like missiles. Nevertheless, it is often utilized together with strap-on boosters to maintain payload potential. An easy solid rocket engine is made up of motor casing, nozzle, inner insulation,propellant grain as well as igniter. The choice of substance for rocket engine parts relies upon high particular power, high particular modulus, fabricationuncomplicated, simple accessibility, crucial needs as well service requirements [6]. Majorly utilized substances for solid rocket engine parts were 15CDV6 steel, M250 Steel, Titanium alloy, Aluminium Alloys. The15CDV6 steel was high powered steel including fewer concentrations of chromium,molybdenum, and vanadium because alloying components. Due to its great power-ductility integration and also simplicity of fabrication, the substance was broadly utilized in rocket-motor hardware at the Indian space program. Thismetal locates numerous programs in the aerospace as well as motorsports businesses inthese elements

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DESIGN, ANALYSIS AND OPTIMIZATION OF 6 DOF ROBOTIC ARM

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ABSTRACT

The main objective of this paper is to design, analyse and optimize a stationary 6-axis pick and place robotic arm. Motive here is to reduce the risk factor involved physically in pick and place operations. An available 4 axis robotic arm is taken as reference and is modified to six axis robotic arm with an intention to increase the flexibility and to reduce cost by shape optimization. The model of robot is established using the solid works software and finite element analysis is done. Payloads and gravity are applied for analysis and the strains, stresses and deformations are calculated.

Modifications are made to lower arm which has more weight compared to others, with an intention to reduce the weight. The weight of the robotic arm is reduced by 12% without compromising its functionality.

KEYWORDS: Robotic Arm & Optimization

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Original Article

1. INTRODUCTION

In the highly developing society time and man power are critical constrains for completion of task in large scales. The automation is playing important role to save human efforts in most of the regular and frequently carried works. One of the major and most commonly performed works in industry is picking and placing of jobs from source to destination.

Present day industry is increasingly turning towards computer-based automation mainly due to the need for increased productivity and delivery of end products with uniform quality. The inflexibility and generally high cost of hard-automation systems, which have been used for automated manufacturing tasks in the past, have led to a broad based interest in the use of mechanical arm capable of performing a variety of manufacturing functions in a flexible environment and at lower costs. The use of industrial mechanical arm characterizes some of contemporary trends in automation of the manufacturing process. However, present day industrial mechanical arm also exhibit a monolithic mechanical structure and closed-system software architecture. They are concentrated on simple repetitive tasks, which tend not to require high precision.

For the last few decades, robotics have played a very important role in process automation, with robot manipulators assuming a leading role in the development of several productive areas. Nowadays, industrial robots are used for the automation of a variety of tasks such as assembling, transfer of materials, all kinds of welding, precision cutting of materials, palletizing, painting, remote surgical procedures, among many possible applications **[1,7]**.In general, industrial robots are employed to carry out repetitive jobs and/or those that require precision and speeds difficult to achieve by human beings. This has made it possible to improve the quality of products and the efficiency of their manufacturing [**2, 3**]. Therefore, industrial robots are increasingly used in modern and automated production processes, as well as in hazardous applications, in which their use is clearly justified. On the other hand,

Strut Flame Holder Performance for Supersonic Combustion using Computational Fluid Dynamics

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Abstract : The Supersonic burning process in ramjet engine is considered to be viable propulsive system for hypersonic vehicle. As the combustion is taking place at supersonic speeds, the flow has very less residence time (milliseconds) in the combustor. An attempt has been made to evaluate the fuel-air mixing and Combustion efficiency with normal and tangential fuel injection. The shocks generated and vorticity generated in the combustor acts as a flame holder and increases the residence time of flow. CFD Analysis is carried out using commercially available numerical software ANSYS FLUENT 15 where geometry and meshing is created using ICEM CFD software and analysis is carried using FLUENT. k-ε SST turbulence model and the finite-rate/eddy-dissipation reaction model have been applied to numerically simulate flow field of the hydrogen fueled scramjet combustor. Effect of number of Fuel injectors, is being studied at various Combustor inlets Mach number of 2.0 with fuel injected at sonic conditions. H2O mass fractions along the combustor domain are considered as combustion efficiency. The work concentrated on to enhance better fuel air mixture in the combustion chamber, attain maximum combustion efficiency.

IndexTerms **- Combustion, Flame, Holder, Ramjet, Engine, Strut.**

I. INTRODUCTION

A This Turbojets and ramjets are the air breathing engines which can fly within atmosphere with a speed of maximum Mach 6. But rockets have been used for many purposes ranging from missiles to lunar flights with a speed of maximum Mach 20 and above. Although rockets have served well up till now, and will remain the sole mode of interplanetary transportation for a long while, there is a disadvantage of carrying its own oxygen with fuel. When there is so much ambient oxygen available in atmosphere at no cost, why to carry massive tanks of oxygen which results in losses of payload capacity. Current studies show that typical payload weight fraction of aircraft and multistage rocket transportation systems are 15% and 4% respectively. This question has motivated researchers around globe to look for a better solution. The Scramjet engine is composed of four main sections: the inlet, isolator, combustor and exhaust nozzle. The inlet heats and slows the flow through a series of oblique shockwaves. Isolator serves to separate the combustor from the inlet of the engine, allowing further slowing of flow. Fuel is injected in the combustor and combusts with free-stream supersonic air, increases pressure and temperature of the flow. Finally the flow is expanded in nozzle which provides a mechanism by which the increase in pressure can be converted into forward thrust.

Current Scramjet Technical Challenges: The main challenges are shown as a schematic in Fig.1. In recent years, the research and development of scramjet engine has promoted the study of combustion in supersonic flows. Hydrocarbon fuel scramjet engine is still understudy and research. Mixing, ignition and flame holding in combustor, ground test facilities and numerical simulation of Scramjet engine are the critical challenges in the development of scramjet engine.

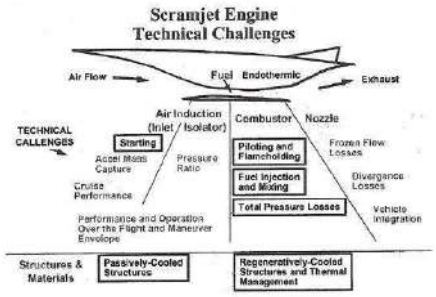

Fig.1. Schematic diagram of scramjet engine

Wei Huang[1] had used k-ε turbulence model and finite-rate/eddy-dissipation reaction model to numerically simulate the flow field of the hydrogen fueled scramjet combustor with cavity flame holder. There exists a complex shock wave/shock wave interaction of the boundary layer and the oblique shock wave. Even though the cavity acts as a flame holder for supersonic combustion yet particular design of cavity had not proposed .M.R.Gruber et al [2] had performed experimental and computational investigations of the non-reacting flow with several cavity flame holders and found a drag coefficients and shorter residence times in cavities with shallower ramp angles and also a decrease in cavity residence time in cavities with longer length and slanted rear walls. Ben –Yakar and Hanson[4] found a larger cavities (L/D=7) had significantly higher drag coefficient than the smaller cavities(L/D=3). Reduction of back wall angle below 90 degrees resulted in additional drag. Hyungseok SEO et al [5] had concluded that grater vorticity magnitude indicates stronger rotation and allows the flowfield to mix the air and fuel more effectively. Increasing cavity sizes increases vorticity and enhances fuel-air mixing.Overall shape of the pressure distribution throughout the combustor does not change inspite of different fuel injection pressure for angled injection. Thus cavity geometry has the greatest effect on pressure distribution in combustor. The cavity effect on the overall heat release is secondary to the effect of the oblique shock generated by the rear of the cavity had been observed by EunjuJeong et al [6]. Struts offer the possibility of injecting fuel directly into the core of a supersonic flow without using high fuel supply pressure. Strut designs tend to create more aerodynamic disturbances than non-intrusive mechanisms, with an inevitable increase in total pressure losses and drag. Having a fuel port

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Performance of Waste Fried Oil based Biodiesel in a Stationary Diesel Engine

R.P. Chowdary, N.Janardhan

Abstract*: The research activities related to alternative fuels has gained prominence, due to exhaustion of the present fossile fuels and rise in pollution levels. Any substitute to diesel will help mankind for safeguarding the environment due to redced usage of conventional fuels, as diesel consumption is high in goods transshipment sector and cultivation fields.Suitable replacement for diesel are Vegetable oils, because their cetane value is nearer to pure diesel. The combustion related issues with vegetable oils, either edible or nonedible can be resolved to a major extent by esterifying them.For this study the biodiesel extracted from used cooking oil, was used as fuel, in a 3.68 kW, 1500 RPM stationary diesel engine at distinct injection timings.The injection timings were changed by keeping copper shims between body of fuel pump and frame of diesel engine. The value of optimum injection timing(where maximum efficiency is obtained) was observed to be 31^0 forbiodiesel and diesel fuels. The performance parameters, combustion characteristics and pollution levels were recorded, at recommended and optimum timings of injection of 27^0 and 31^0 before the top dead centre(bTDC).Studies were conducted with pure diesel and biodiesel, made using waste fried vegetable oil (WFVOBD). The biodiesel showed equivalent performance at both manufacturer recommended and experimentally obtained optimum injection timings, but marginally increased levels of NO_x.

Keywords : biodiesel, performance parameters, used cooking oil, waste fried oil .

I. INTRODUCTION

Energy has a predominant role for realising continuous progress of a nation and also for movement of goods and people. With increase in vehicles day by day and their pollution levels, the alternative fuel research has gained importance. Emissions from conventional fuels were established as a source for global warming. Increasing trends in the prices of petroleum products is a matter of concern for many nations like, India because our oil requirements are met mostly by imports. Hence initiatives in developing efficient renewable fuels results in solving pollution related problems, to conserve the conventional petroleum fuels and also for savings in imports category.

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In the entire world (as well as in India) the diesel Engines dominates commercial transportation and agricultural sectors due to their better fuel efficiency. A suitable substitute to diesel will be a great development in conservation efforts of energy. Among several substitutes available, vegetable oils (renewable in nature) hold a special promise, as their cetane value is nearer to diesel fuel and also compatible with materials used in distribution and engine fuel pipeline systems.

Many researchers reported reduction in performance, increased emissions, certain operational related and combustion problems after using vegetable oils of different origins, as fuel in compression ignition engines [1-4]. Little volatility and higher viscous nature are difficulties encountered with use of vegetable oils . These issues can be handled to a major extent by converting them into methyl esters. As demand continuously exists for edible or cooking oils and also costly, non edible oils can only be used for production of biodiesel. Even non edible oils have their own applications

Biodiesel in various proportions (0 to 100%) was used as fuel in diesel engine, by several researchers, and reported marginal improvement in performance, reduced particulate emissions but rise in levels of NO_x(Nitrogen Oxides)[5-9]. Biodiesel can be made through various sources like pongamia, jatropha, soya, mustard oil seeds etc.Now in this particular case study the biodiesel was made by Trans esterification method , from collected waste oil at various hotels and restaurants which otherwise will be disposed as waste. In this study inplace of mineral diesel the biodiesel made using wate cooking oil (WFVOBD) was tried as a total substitute in CI engine and its performance was correlated with numerical values of diesel operation at 27^0 and 31^0 bTDC.(Recommended and experimental determined optimum injection timings)

II. MATERIALS AND METHODOLOGY

Figure.1 represents the snapshot of test setup employd for experimentation with biodiesel and diesel. The engine employed was of kirloskar make with bore 80 millimeters(mm) and a stroke length of 110 mm. This engine develops a power of 3.68 KiloWatts at 1500 revolutions per minute. This is a vertical engine having one cylinder, four-stroke cycle, employing water- cooling with 16:1 compression ratio. The manufacturer has recommended 27^0beforeTop Dead Centre(bTDC) injection timing,at 190 bar pressure. The test engine was of DI(direct injection) type. The brake power was determined by connecting it to dynamometer (electrical type).

Performance of Used Cooking Oil Based Biodiesel in a Low Heat Rejection Diesel Engine

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Abstract- Rapid industrialization of developing countries is resulting in increased demand for diesel worldwide, leading to depletion of traditional fossil fuels apart from higher pollution levels caused by them. Alcohols and vegetable oils are important substitutes for diesel fuel and are renewable in nature. Biodiesel derived from feedstock is renewable, bio degradable and provide energy security besides addressing environmental issues. Alcohols have low cetane number and energy content in comparison with diesel fuel. Though vegetable oils have comparable energy content and cetane number, these fuels have high viscosity and low volatility. Hence low heat rejection (LHR) engine is gaining momentum for burning high viscous fuels. These LHR engines have significant characteristics of higher operating temperature, maximum heat release, and ability to handle low calorific value fuel. High grade LHR engine consists of ceramic coated cylinder head, air gap insulated piston and air gap insulated liner. Waste fried cooking oil collected from various restaurants was converted to biodiesel through esterification process. Tests were conducted on 3.7kw, 1500 RPM conventional diesel engine (CE) and LHR engine with used cooking oil biodiesel as fuel instead of diesel fuel as a total substitute. The experimentation work was carried out at manufacturer specified injection timing of 27^0bTDC only but injection pressures include 230 and 270 bar apart from the recommended 190 bar pressure. Performance parameters and Pollution levels were investigated at full load and observed that biodiesel operation on LHR engine showed better performance in terms of efficiency and smoke levels but increased NO_x levels which can be dealt with selective catalytic reduction technique.

Keywords – LHR engine, Biodiesel, used cooking oil, performance parameters

I. INTRODUCTION

The prominent areas of research, nowadays includes alternative fuels, since we are sure of extinction of conventional fuels, and the pollution levels caused by them. Throughout the world and more particularly in India, diesel consumption was heavy, in cultivation and goods transshipment sectors because of its fuel efficiency and any replacement for diesel fuel will be a major breakthrough. In this aspect vegetable oils holds a special promise, since their cetane number is near to the diesel fuel. Vegetable oils possess low volatility and more viscosity. Edible oils are of high demand and costlier also. Non-edible oils should only be used as fuel, but at the same time nowadays they have their own applications. In this connection the operational problems involved with vegetable oils can be effectively dealt to a major extent, if these oils are esterified to obtain biodiesel. In the present experimental work the used cooking oil (which otherwise had to be discarded) was gathered from different hotels, canteens and converted to biodiesel. Biodiesels have advantages compared to conventional fuels as they are renewable, bio degradable; provide energy security apart from addressing environmental issues. Experiments were conducted on conventional engine fuelled with biodiesel [1-4] and it was reported that performance was compatible. The drawbacks associated with biodiesel for use as fuels in compression ignition engine call for a Low Heat Rejection (LHR) engine. The concept of low heat rejection engine is to reduce the heat flow to the coolant by providing thermal insulation in the path of the heat flow to the coolant. The achieved results were compared to that of biodiesel operation on conventional engine (CE) at manufacturers recommended values of 27^0 bTDC injection timing, and 190 bar injector opening pressure.

II. MATERIALS AND METHODOLOGY

The test engine used for the present study is a 5 H.P engine whose rated speed is 1500RPM with bore and stroke of 80 and 110 mm respectively. The values recommended by manufacturer are 27^obTDC injection timing and 190 bar injector opening pressure. The engine was attached to an electrical type dynamometer for measurement of power. The engine is designed for water cooling system and the injector opening pressure was varied, during testing from 190 to 230 and then to 270 bar with the nozzle pressure testing device. The pressure was restricted to 270 bar

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In the entire world (as well as in India) the diesel Engines dominates commercial transportation and agricultural sectors due to their better fuel efficiency. A suitable substitute to diesel will be a great development in conservation efforts of energy. Among several substitutes available, vegetable oils (renewable in nature) hold a special promise, as their cetane value is nearer to diesel fuel and also compatible with materials used in distribution and engine fuel pipeline systems.

Many researchers reported reduction in performance, increased emissions, certain operational related and combustion problems after using vegetable oils of different origins, as fuel in compression ignition engines [1-4]. Little volatility and higher viscous nature are difficulties encountered with use of vegetable oils . These issues can be handled to a major extent by converting them into methyl esters. As demand continuously exists for edible or cooking oils and also costly, non edible oils can only be used for production of biodiesel. Even non edible oils have their own applications

Biodiesel in various proportions (0 to 100%) was used as fuel in diesel engine, by several researchers, and reported marginal improvement in performance, reduced particulate emissions but rise in levels of NO_x(Nitrogen Oxides)[5-9]. Biodiesel can be made through various sources like pongamia, jatropha, soya, mustard oil seeds etc.Now in this particular case study the biodiesel was made by Trans esterification method , from collected waste oil at various hotels and restaurants which otherwise will be disposed as waste. In this study inplace of mineral diesel the biodiesel made using wate cooking oil (WFVOBD) was tried as a total substitute in CI engine and its performance was correlated with numerical values of diesel operation at 27^0 and 31^0 bTDC.(Recommended and experimental determined optimum injection timings)

II. MATERIALS AND METHODOLOGY

Figure.1 represents the snapshot of test setup employd for experimentation with biodiesel and diesel. The engine employed was of kirloskar make with bore 80 millimeters(mm) and a stroke length of 110 mm. This engine develops a power of 3.68 KiloWatts at 1500 revolutions per minute. This is a vertical engine having one cylinder, four-stroke cycle, employing water- cooling with 16:1 compression ratio. The manufacturer has recommended 27^0beforeTop Dead Centre(bTDC) injection timing,at 190 bar pressure. The test engine was of DI(direct injection) type. The brake power was determined by connecting it to dynamometer (electrical type).

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Performance of Semi Adiabatic DI Diesel Engine with Supercharged air using Crude Jatropha Oil

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Abstract: ***Vegetable oils are the only fuels, can be substituted as alternative to overcome the shortage in developing countries. Using non-edible oil like crude jatropha as alternative, waste land can be effectively cultivated and employment can be improved. Experiments were Initiated on semi adiabatic diesel engine with super charging air through the intake manifold using crude jatropha oil with varied injection pressure and varied injection timing to study the performance of the engine. Tests were also conducted using diesel fuel in diesel engine and engine with high grade heat rejection combustion chamber at recommended injection timing at 27^0bTDC with super charging air using crude jatropha oil. Improvement in performance was found with super charging when comparing with natural aspiration.***

Keyword: ***Vegetable oils, fuels, crude jatropha oil, semi adiabatic diesel engine,***

I. INTRODUCTION

Vegetable Oils are being considered as an important alternative for diesel due their properties are near to diesel fuels. After went through the experimentation of the different researchers it was cited that the performance was poor, high viscosity, low volatility ,combustion chamber deposits ,fuel system deposits. The other major draw backs that they were found decrease in brake power and increased exhaust emissions[1-8]. Fatty acids presence in the increases the exhaust emissions from the engine. Few researchers conducted their experiments on single cylinder, four stroke, water cooled diesel engine with direct injection diesel engine with 3.68 kw , 1500rpm and 16:1 compression ratio with varied injection pressure and varied injection timing using vegetable oil. Increased Injector opening pressure by using the nozzle testing device and the injection timing can be varied by inserting the copper shims between fuel pump and the engine body. It was found that decreased thermal efficiency by 10% and the 56% emissions increased and 18% of NOx oxides decreased comparing with diesel operation. Researchers done thier experimentation with vegetable oil at preheated condition to reduce the viscosity to that of diesel at manufacturer recommended injection timing at 27^0bTDC [9-10] .

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Increased Brake thermal efficiency to be 3-4% and decreased exhaust gas by 4-5% was and decreased particulate matter by 8-9%. Increased injector opening pressure was found to be positive aspect in increasing the brake thermal efficiency. Experiments were conducted with increasing the injector pressure [11-13]. They were reported that performance of the engine marginally improved. Researchers conducted experiment on conventional engine 3.68kw, speed 1500 rpm with varied injection timing [14-15]. Brake thermal efficiency increased by 5-6%, exhaust gas temperature was decreased by 8-10% and NOx levels increased by 10-14%.Though the vegetable oil properties are comparable that of diesel, due to high viscous and low fugitivity they needs hot combustion chamber called Low Heat Rejection (LHR) combustion chamber or semi adiabatic engine. When combustion takes place with in the engine, heat will be rejected all three possible ways, through the cylinder head, liner and piston. Restricting heat from engine to surroundings by placing insulation becomes hot combustion chamber and also called semi adiabatic combustion chambers. Heat flow will be restricted by coating the thermal barrier layer to cylinder head, named as low grade heat rejection combustion chamber. If the heat flow will be restricted through the liner and through the piston by keeping the 3mm air gap, is named as medium grade combustion chamber. Restricting the heat by coating to the cylinder head and keeping the air gap in the liner, piston is said to be engine with high grade heat rejection combustion chamber. Author has conducted the tests with alternative fuels with engine with different grade combustion chambers. It was came to know that the improvement with vegetable oil operation was quiet good. As the degree of insulation in the combustion chamber increases from low to high causing reduced exhaust gas temperature and increased volumetric efficiency. Author has made an attempt to experiment with turbocharged air and engine with adiabatic combustion chambers using jatropha oil.

II. METHODOLOGY

2.1. Jatropha Oil(Vegetable Oil).

Jatroha oil is the suitable to replace the diesel fuel. It will be called with different names moglaerand, beghierand, chandsai yoti in india. It will grow very fast and can be useful various purposes. It can grow with normal rain fall and therefore non forest and degraded land can be effectively useful to cultivate the plant. The plant can bear even without water up to one year. The plant bring in starts the third year onwards and will continue to give next 25 years.

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INVESTIGATION OF DAMAGE DETECTIONS ON GLASS/JUTE-EPOXY, GLASS-EPOXY AND JUTE-EPOXY COMPOSITE BEAMS WITH AN EDGE CRACK USING MODAL ANALYSIS

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ABSTRACT

Now a day, the use of composite structures is increased in many engineering fields, emphasis on detecting damages becomes crucial in recent times. Non-destructive methods gaining importance in this scenario, in which the damage in a structure is detected by the structure vibration characteristics. The property like stiffness of the laminate is dependent on modal parameters. So, any change in natural frequency of structure could be easily related to stiffness of structure by which the damage in the structure can be easily detected.

The present work is focused on damage detection method of cantilever beam with crack at edge, which has been studied using finite element method ANSYS. Three composite beams are taken for study. They are Glass-Epoxy beam, Jute-Epoxy beam, Glass/Jute-Epoxy Beam. The activity is then to observe the selected indicators derived from modal analysis to distinguish between undamaged and damaged states. By varying crack depth at a location from fixed end and crack location from fixed end, the change in behavior of model like natural frequency is estimated using ANSYS.

KEYWORDS: Glass-Epoxy Beam, Jute-Epoxy Beam, Glass/Jute-Epoxy Beam & ANSYS

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Original Article

1. INTRODUCTION

Nayak [1] determined the natural frequencies of hybrid glass/carbon composite. By using fast Fourier analyzer, the experimental values are estimated which compared against ANSYS values. Douka [2] have used a method for finding the depth and location of crack in a beam having double crack and established that any variation on the size and location of the cracks effect a shift in the anti-resonance of the cracked beam. This method makes use of a Plexiglas to detect the location of crack and characteristic both analytically & experimentally. Crack can also be identified by using the variations in anti-resonance property and natural frequency. Cam [3] has investigated to anticipate the location of the crack and its depth in a cracked beam structure using impact echo method. The frequency signals obtained in crack free beam and cracked beam are studied & compared. Irshad [4] diagnosed cracked composite cantilever beam by measurement of vibration and for finding damage intensity and severity using Radial based function neural networks technique. Sanjay [5] studied frequency measurement for the diagnosis of damage in laminated composites. Abdeldjebar [6]did Vibration tests, which were useful to arrive the elasticity modulus in two directions. This technique is employed to materials of composite like glass / polyester. Experimental results made on a specimen in free vibration showed the efficiency of this method. Obtained results were validated by a comparison to results stemming from static tests. Lee [7] has presented a paper based on non-destructive analysis to locate the crack. The lowest four frequencies of the crack structure are used by finite element method analysis. Then, Armors Rank ordering method is used considering the above four natural frequencies to obtain the approximate crack location. A FEM model have been developed applying the result of crack positioned

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RESEARCH ARTICLE OPEN ACCESS

Analysis of Nose Cone of Missile

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ABSTRACT
Nose cone is the forward most section of a rocket, guided missile or aircraft. In guided missile nose cone although reduces the drag force, should also serve the purpose of storing and protecting payload (warhead, guiding systems) until the target is reached. In this work an attempt is made to compare two different nose cone profiles with near same payload capacity. The effect of pressure, velocity and various other parameters are analyzed using ANSYS FLUENT software. The analysis will be carried out for two models of nose cone namely Conical and Tangent Ogive nose cone for supersonic flow of different match numbers.
KEY WORDS: Nose cone, lift, drag, match number

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I. INTRODUCTION

1.1.1 LIFT

A fluid flowing over the surface of a body exerts a force on it. It makes no difference whether the fluid is flowing past a stationary body or the body is moving through a stationary volume of fluid. Lift is the component of this force that is perpendicular to the oncoming flow direction. Lift is always accompanied by a drag force, which is the component of the surface force parallel to the flow direction. Lift is most commonly associated with the wings of fixed-wing aircraft, although it is more generally generated by many other streamlined bodies such as propellers, kites, helicopter rotors, racing car wings, maritime sails, and wind turbines in air, and by sailboat keels, ship's rudders, and hydrofoils in water.

1.1.2 LIFT COEFFICIENT

The lift coefficient (C_L, C_N or C_Z) is a dimensionless coefficient that relates the lift generated by a lifting body to the fluid density around the body, the fluid velocity and an associated reference area.. The lift coefficient C_L is defined by:

$$C_L \equiv \frac{L}{q\,S} = \frac{L}{\frac{1}{2}\rho u^2\,S} = \frac{2L}{\rho u^2 S}$$

where **L** is the lift force, **S** is the relevant surface area and **q** is the fluid dynamic pressure, in turn linked to the fluid density ρ, and to the flow speed **u**. The choice of the reference surface should be specified since it is arbitrary

1.1.3 DRAG

In fluid dynamics, drag (sometimes called air resistance, a type of friction, or fluid resistance, another type of friction or fluid friction) is a force acting opposite to the relative motion of any object moving with respect to a surrounding fluid. This can exist between two fluid layers (or surfaces) or a fluid and a solid surface. Unlike other resistive forces, such as dry friction, which are nearly independent of velocity, drag forces depend on velocity. Drag force is proportional to the velocity for a laminar flow and the squared velocity for a turbulent flow. Even though the ultimate cause of a drag is viscous friction, the turbulent drag is independent of viscosity. Drag forces always decrease fluid velocity relative to the solid object in the fluid's path.

1.1.4 DRAG COEFFICIENT

In fluid dynamics, the drag coefficient (commonly denoted as: C_D, C_X or C_W) is a dimensionless quantity that is used to quantify the drag or resistance of an object in a fluid environment, such as air or water. It is used in the drag equation in which a lower drag coefficient indicates the object will have less aerodynamic or hydrodynamic drag. The drag coefficient is always associated with a particular surface area. The drag coefficient C_D is defined as:

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INVESTIGATION ON MECHANICAL PROPERTIES OF FERRITIC AND AUSTENITIC STAINLESS STEELS JOINT (DISSIMILAR) USING PLASMA ARC WELDING

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ABSTRACT

Joining of dissimilar metals has found its use extensively in power generation, electronic nuclear reactors, petrochemical and chemical industries. However efficient welding of dissimilar metals has posed a major challenge due to mechanical properties of the materials to be joined under a common welding condition.

This causes a steep gradient of the mechanical properties along the weld. A variety of problems come up in dissimilar welding like cracking, large weld residual stresses, migration of atoms during welding causing stress concentration on one side of the weld, compressive and tensile thermal stresses, stress corrosion cracking, etc.

Continuous development of the technological processes led to the necessity of using industrial equipment made of high temperature resistant materials that provide the ability to work in heavily corrosive environments.

The present empirical study aims to optimize the process parameters of plasma arc welding for welding of dissimilar metals: austenitic stainless steel SS-304 and ferritic stainless steel SS-410.

It investigates the effect of welding current and welding speed on the quality of the welded joints. The quality characteristics like bead geometry, hardness, tensile test, yield strength and elongation are considered for qualification of the welded samples. Welded specimens were prepared both with and without filler material.

KEYWORDS: Dissimilar joint, Plasma Arc Welding, SS-304; SS-410, Tensile Test & Hardness.

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Original Article

INTRODUCTION

Welding is a manufacturing process of creating a permanent joint obtained by the fusion of the surface of the parts to be joined together, with or without the application of pressure and a filler material. The materials to be joined may be similar or dissimilar to each other. The heat required for the fusion of the material may be obtained by burning of gas or by an electric arc. The latter method is more extensively used because of greater welding speed. Welding plays an important role in engineering industries. It is a major tool for fabrication and repairing of metal products. Welding has proved its ability in manufacturing, construction, fabrication and maintenance. Stainless Steels are gaining widespread acceptance in several interesting applications in the field of automobiles, aerospace, marine, sports, etc., owing to its excellent wear resistance in addition to superior mechanical properties such as strength, modulus and hardness when compared with conventional alloys. Stainless steels are steels with a minimum of 10% chromium. They gain their resistance to corrosion from a thin, tenacious surface layer of chromium oxide. If the oxide layer is physically damaged there is rapid regeneration of the layer, thus preserving the corrosion resistance.

AUSTENITIC SS 304

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TRANS STELLAR
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Original Article

IMPACT OF SPARK IGNITION TIMING ON POLLUTANTS OF MODIFIED COMBUSTION CHAMBER OF SI ENGINE

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ABSTRACT

The most important and prominent pollutants from Spark ignition engines are carbon monoxide (CO), un-burnt hydro carbon (UBHC) and nitrogen oxide levels (NO_x). Inhalation of these pollutants from atmospheric air cause serious health disorders. To control these pollutants effectively and efficiently is the need of the automobile industry. Alcohols support in reducing the pollutants as their physical properties and chemical properties are nearer to neat gasoline. Experimentation is done on four stroke variable compression engine with copper coating (300 μ , thickness) on top surface of the piston, inside of the liner and cylinder head with gasohol (20% ethanol and 80% gasoline, by vol) as fuel and with varying ignition timing and found the pollution levels of CO, UBHC and NO_x. CO and UBHC are controlled with Catalytic converter and NOx levels are controlled with selective catalytic reduction (SCR) technique. Pollution levels in CCE reduced at optimum ignition timing in comparison with conventional engine with recommended ignition timing.

KEYWORDS: CE, CCE, Pollutants, Modified Catalytic Converter, Selective Catalytic Reduction Technique, Air Injection, Optimum Ignition Timing, Recommended Ignition Timing

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INTRODUCTION

In this world of enormous emerging developments in automobile industry, there is a great requirement to modify conventional spark ignition engine such that human, animal and plant life are protected from the large amounts of harmful pollutants released to atmosphere. The major contributing pollutants effecting the atmosphere are CO, UBHC and NO_x, released from the SI engine. In order to reduce carbon monoxide (CO), Unburnt Hydrocarbons and Nitrogen Oxides (NO_x) pollutants more effectively and efficiently many methods are tried like, combustion chamber modification, alcohols blended with neat gasoline and using modified catalytic converter attachment. Alcohols are found to be the best alternative fuel to neat gasoline as their properties are comparable to gasoline. Octane number for alcohols are higher than that of gasoline fuels.[1-3].Blending alcohol with neat gasoline has potential to decrease pollutants with a minimum modification of the engine.[4].Ethanol blended gasoline [neat gasoline blended with ethanol, 20%, by vol) showed considerable decrease in pollution levels when compared with neat gasoline on CE. [5-6]. Formation of carbon dioxide is due to incomplete combustion and UBHC is due to settlement of fuel in the crevices and comes out during exhaust stroke without participating in combustion which is called as quenching effect. They cause human health disorders like asthma, vomiting sensation, etc and effect the environment. Due to high temperatures and availability of oxygen, NO_x is produced which also effect animal and plant life.[2,7].Catalytic converter supports potentially in effectively reducing pollutants in SI engines. [8-11].Combustion

Design of Mini Tractor Cage Wheel For Wet Land Ploughing

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Abstract- Agriculture is one of the oldest profession but the development and use of machinery has made job title of the farmer a rarity. A tractor is an engineering vehicle specially designed to deliver a high tractive effort such as "Torque" at low speeds, for the purpose of agriculture and construction. The main purpose of our tractor is for wet land ploughing by using cage wheels and making the arrangement simple. Cage wheel are designed by considering dimensions and they are attached directly to the rim of the tires mainly to reduce the time in assembling and dissembling them in normal tractors. The fabrication of prototype of ratio 1:4 is developed.
Keywords – Chassis, Cage wheels, Tractor, Wet land, Ploughing.

I. INTRODUCTION

A Mini tractor is an engineering vehicle specifically designed to deliver a high tractive effort (or torque) at slow speeds, for the purposes of hauling a trailer or machinery used in agriculture or construction. Most commonly, the term is used to describe a farm vehicle that provides the power and traction to mechanize agricultural tasks, especially (and originally) tillage, but nowadays a great variety of tasks. Agricultural implements may be towed behind or mounted on the tractor, and the tractor may also provide a source of power if the implement is mechanized. The main type of tractor that is used for farming is farm tractor. This type of tractor is generally used for ploughing the land, planting, etc.

1.1 Farm tractor

The most common use of the term "tractor" is for the vehicles used on farms. The farm tractor is used for pulling or pushing agricultural machinery or trailers, for plowing, tilling, disking, harrowing, planting, and similar tasks. A variety of specialty farm tractors have been developed for particular uses. These include "row crop" tractors with adjustable tread width to allow the tractor to pass down rows of corn, tomatoes or other crops without crushing the plants, "wheatland" or "standard" tractors with fixed wheels and a lower center of gravity for plowing and other heavy field work for broadcast crops, and "high crop" tractors with adjustable tread and increased ground clearance, often used in the cultivation of cotton and other high-growing row crop plant operations, and "utility tractors", typically smaller tractors with a low center of gravity and short turning radius, used for general purposes around the farmstead. Some farm-type tractors are found elsewhere than on farms: with large universities' gardening departments, in public parks, or for highway workman use with blowtorch cylinders strapped to the sides and a pneumatic drill air compressor permanently fastened over the power off. These are often fitted with grass (turf) tyres which are less damaging to soft surfaces than agricultural tires.
The design of cage wheels to the mini tractor such that the rear tires attached to the tractor does not require any disassembling .The cage wheels are directly attached to the rim of the rear tires such that it reduces the time for attaching and removing of the cage wheels for the tractors.

1.2 The cage wheels

Tractor is used for many different tasks. As it is a versatile machine, perators sometimes stretch the use of the tractor beyond what the machine can safely do. In the process accidents occur. Nearly 50% of tractor fatalities come from tractor overturns. No other machine is more identified with the hazards of farming as the tractor.
The cage wheels give high traction, support the vehicle by distributing the weight of the machine over as great an area as possible, reduce soil compaction and prevent it from bogging down. Cage wheels for these conditions are inexpensive and easy to fabricate, and can be made much wider than a conventional tyre. Improvement in the traction performance of the conventional cage wheel is a challenge. Of the various design factors for the cage wheel, lugs have received the most attention and several parameters were found to affect its performance such as lug angle, lug spacing, lug size, lug shape, lug sinkage, lug mechanism and circumferential angle. The performance of a cage wheel depends mainly upon the performance of the lug because the lug of a cage wheel is the basic element to interact with soil and to produce the pull and lift forces.

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MANUFACTURING AND TESTING OF COMPOSITE ROD FOR REPLACEMENT OF MILD STEEL FOR CONSTRUCTION PURPOSE

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ABSTRACT

Composite rods of glass fiber/epoxy with 70% of fiber and 30% of matrix are manufactured using the Pultrusion process as an alternative to steel for construction process. Pultrusion is a highly automated production process that continuously draws resin impregnated fiber reinforcements, at speeds ranging from 1 to 5 feet per minute, through a heated die which forms and cures to the desired cross-section with no part length limitation. The main aim is to manufacture a composite rod and conduct experimental tests on both composite rod and mild steel rod to compare and for replacement of mild steel in construction process. The rods are subjected to tensile test, at room temperature and results are compared. From the results, we can conclude that composite rod can effectively replace mild steel in construction purpose.

KEYWORDS: Pultrusion, Reinforcement, Glass Fiber, Composite Rod, Mild Steel

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Original Article

INTRODUCTION

Composites as Building Material - Indian Scenario by Sangeeta Baksi, Gudavalli Srikanth, M. Suresh Babu, Soumitra Biswas published by Technology Information, Forecasting & Assessment Council (TIFAC) discusses about the use of high performance of FRP in primary structural applications. It discusses how composites present immense opportunities to play increasing role as an alternate material to replace timber, steel, aluminum and concrete in buildings. It also discusses about how FRP pultruded profiles developed have met all the desired properties. It also discusses how Indian efforts center around developing cost effective building materials as well as for catering to the housing needs of urban & rural poor. With the scarcity of wood for building products, the alternative, which merits attention is to promote the manufacturing of low cost FRP building materials to meet the demands of the housing & building sectors. It gives us a comparison between FRP pultruded rods with Polyester and Vinyl ester resin and different structural members we normally use. It focuses on how composites can be useful as building material. This paper discusses in detail the international trends & indigenous efforts towards synthetic & natural fiber composite applications in building & construction sector. It also brings out a complete overview of product features, specifications and its usage in civil infrastructure.

Fiber Reinforced Plastics, a book published by the Rotary club gives detailed information of what exactly composites are, the types of fibers that can be used as reinforcements, types of resins and different types of production of FRP's. The book also gives the applications of FRP's in different industries and discusses how FRP's can replace many of the materials we traditionally use. It also gives comparison of various different types of resins, types of glasses and the advantages of pultrusion process over other processes. The book also gives detailed information about the history the present and the future of FRP's in different aspects of life.

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RESEARCH ARTICLE OPEN ACCESS

Performance of Catalytically Activated Two Stroke SI Engine with Alternate Fuels with Catalytic Converter

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Abstract:

This paper reports performance evaluation of two-stroke, single cylinder spark ignition (SI) engine with alcohol blended gasoline (Gasohol-80% gasoline and 20% ethanol; 80% gasoline and 20% methanol by volume) having copper coated engine [copper-(thickness, 300 μ) coated on piston crown and inner side of cylinder head] provided with catalytic converter with sponge iron as catalyst and compared with conventional SI engine with pure gasoline operation. Brake thermal efficiency increased with ethanol blended gasoline with both versions of the engine. Copper-coated engine showed improved performance when compared to conventional engine with both different test fuels. Catalytic converter with air injection significantly reduced pollutants with different test fuels on both configurations of the engine.

Keywords — SI engine, Performance, Pollutants, Catalytic converter, Air injection

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I. INTRODUCTION

Alcohol blended gasoline improved engine performance and decreased pollution levels when compared to pure gasoline on conventional engine [1-6]. Carbon monoxide (CO) and un-burnt hydrocarbons (UHC), major exhaust pollutants formed due to incomplete combustion of fuel, cause many human health disorders[7-12]. Such pollutants also cause detrimental effects[13] on animal and plant life, besides environmental disorders. Engine modification [14,15] with copper coating on piston crown and inner side of cylinder head improves engine performance as copper is a good conductor of heat and combustion is improved with copper coating. Catalytic converter is effective [16-20] in reduction of pollutants in SI engine. The present paper evaluated the performance of copper-coated engine (CCE) with catalytic converter with alcohol blended gasoline and compared with conventional engine (CE) with pure gasoline operation

II.MATERIALS AND METHODS

Fig.1 shows experimental set-up used for investigations. A two- stroke, single-cylinder, water- cooled, SI engine (brake power 2.2 kW at the rated speed of 3000 rpm) is coupled to a rope brake dynamometer for measuring brake power.Compression ratio of engine is 9:1 Exhaust gas temperature and fuel consumption of engine are measured with electronic sensors. In catalytic coated engine, piston crown and inner surface of cylinder head are coated with copper by plasma spraying. A bond coating of NiCoCr alloy is applied (thickness, 100 μ) using a 80 kW METCO plasma spray gun. Over bond coating, copper (89.5%), aluminium (9.5%) and iron (1.0%) are coated (thickness 300 μ). The coating has very high bond strength and does not wear off even after 50 h of operation[15]. Performance parameters of brake thermal efficiency (BTE), exhaust gas temperature (EGT) and volumetric efficiency (VE) are evaluated at different magnitudes of brake mean effective pressure (BMEP) of the

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INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

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Experimental Study of the Effects of Biodiesel on the Performance of a Ceramic Coated diesel engine

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The uses of biodiesel are increasingly popular because of their low impact on environment. However, it causes combustion problems in conventional diesel engine[CE]. Hence it is proposed to use the biodiesel in low heat rejection (LHR) diesel engines with its significance characteristics of higher operating temperature, maximum heat release, and ability to handle the lower calorific value (CV) fuel etc,. In this work, biodiesel from linseed was used as sole fuel in both versions of the combustion chamber. Engine with LHR combustion chamber was developed with ceramic coating on inside portion of cylinder head by partially stabilized zirconia of 0.5 mm thickness. The experimental investigations were carried out on a four stroke, single cylinder, DI 3.68 kW at a speed of 1500 rpm, In this investigation, comparative studies on performance parameters was made on CE and engine with LHR combustion chamber with different operating conditions of biodiesel with varied injector opening pressure and injection timing. CE showed compatible performance while LHR combustion chamber showed improved performance with biodiesel operation in comparison with pure diesel operation on CE.

KEYWORDS: *Alternate Fuels, Vegetable Oils, Biodiesel, LHR combustion chamber, Performance parameters.*

I. INTRODUCTION

The paper is divided into i) Introduction, ii) Materials and Methods, iii)Results and Discussions, iv) Conclusions, Future scope of work, v) Acknowledgements followed by References.

Introduction deals with investigations carried out by researchers in the work related to the authors or brief literature review. .

This section deals with need for alternate fuels in diesel engine, problems with use of crude vegetable oil in diesel engine, advantages of use of preheated vegetable oil in diesel engine, use of biodiesel in diesel engine, effect of increase of injector opening pressure and advanced injection timing on the performance of the diesel engine, concept of engine with LHR combustion chamber, advantages of LHR combustion chamber, classification of engines with LHR combustion chamber, use of diesel, crude vegetable oil and biodiesel in engine with LHR combustion chamber, research gaps and objectives of the investigations.

It has been found that the vegetable oils are promising substitute, because of their properties are similar to those of diesel fuel and they are renewable and can be easily produced.

Rudolph Diesel, the inventor of the diesel engine that bears his name, experimented with fuels ranging from powdered coal to peanut oil. Several researchers [1-3] experimented the use of vegetable oils as fuel on diesel engine and reported that the performance was poor, citing the problems of high viscosity, low volatility and their polyunsaturated character.

Viscosity can be reduced with preheating. Experiments were conducted [4] on preheated vegetable [temperature at which viscosity of the vegetable oils were matched to that of diesel fuel] oils and it was reported that preheated vegetable oils improved the performance marginally. The problems of crude vegetable oils can be solved, if these oils are chemically modified to bio-diesel.

Bio-diesels derived from vegetable oils present a very promising alternative to diesel fuel since biodiesels have numerous advantages compared to fossil fuels as they are renewable, biodegradable, provide energy security and foreign exchange savings besides addressing environmental concerns and socio-economic issues. Experiments were carried out [5-6] with bio-diesel on direct injection diesel engine and it was reported that performance was compatible with pure diesel operation on conventional engine.

The other important engine variable to improve the performance of the engine is injection timing. Investigations were carried out [7-9] on single cylinder water cooled vertical diesel engine with brake power 3.68 kW at a speed of 1500 rpm with varied injection timing from 27-34^{o}bTDC. It was reported from their investigations that performance of the engine improved with advanced injection timing. However, it increased NOx emissions and decreased smoke levels.

Sound levels determine the phenomena of combustion in engine whether the performance was improving or deteriorating. Studies were made [22-24] on sound levels with convention engine with vegetable oils and it was reported from the studies, that performance deteriorated with vegetable oil operation on conventional engine leading to produce high sound levels.

The drawbacks associated with biodiesel for use in diesel engine call for low heat rejection (LHR) combustion chamber.

The concept of LHR combustion chamber is to reduce heat loss to coolant by providing thermal insulation in the path of heat flow to the coolant. LHR combustion chambers are classified depending on degree of insulation such as low grade, medium grade and high grade insulated combustion chamber. Several methods adopted for achieving low grade LHR combustion chamber are using ceramic coatings

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EXPERIMENTAL ANALYSIS OF COMPOSITE BRAKE LININGS

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ABSTRACT

Fiber reinforced polymers are promising materials for the applications in modern vehicles. Materials used for brake pads should have stable and reliable frictional and wear properties under varying conditions of load, velocity, temperature, and high durability. The main aim of this work is to replace the existing conventional asbestos based brake linings by fiber reinforced polymers. The frictional composite is developed by combining Rubber scrap (tire peels) (used as reinforced material), Graphite (friction modifier), Phenolic resin (binder), aluminum oxide (abrasive); and the efficiency, performance is tested and compared with the existing materials in brake linings.

KEYWORDS: Fiber Reinforced Polymers, Brake pads & Brake Linings

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Original Article

1. INTRODUCTION

Brake is a mechanical device is used for slowing or stopping a moving vehicle, wheel, axle, or to prevent its motion by means of friction. The purpose of friction brakes is to decelerate a vehicle by transforming the kinetic energy of the vehicle to heat, via friction, and dissipating that heat to the surroundings. Figure1 illustrates the basic structure of the two different types of braking system that are available in the vehicles nowadays. The disc brake is most widely used over the drum brake as they provide very efficient braking without any slipping or sliding. Brake linings, a frictional material attached to a brake shoe, are composed of a relatively soft but tough and heat-resistant material with a high coefficient of dynamic friction typically mounted to a solid metal backing using high-temperature adhesives or rivets. The dynamic friction coefficient "μ" for most standard brake pads is usually in the range of 0.35 to 0.42. Figure2 shows the components of the drum brake

Asbestos has been used as reinforcement material in brake lining production because of it's good physical and tribological properties. Recent studies have shown that asbestos is hazardous resulting in the need for an alternative. **K.K. Ikpambese** [1] et.al. prepared brake pad material using ecofriendly palm kernel fibers (PKFs) with CaCO3, graphite and Al2O3 as other constituents. Epoxy resin was used as binder. Composition of 40% epoxy-resin, 10% palm wastes, 6% Al2O3, 29% graphite, and 15% calcium carbonate gave better properties than other composition. Results shown that PKF can be suitable for replacement of asbestos brake pads with epoxy resin as a binder. **Idris** et-al[2] investigated the Morphology, physical, mechanical and wear properties of the brake pad fabricated with banana peels waste and phenolic resin varying from 5 to 30wt% with interval of 5wt%. The results shown that compressive strength, hardness and specific gravity of the produced samples were seen to be increasing with increased in wt% resin addition, while the oil soak, water soak, wear rate and percentage charred decreased as wt% resin increased. The result of this research indicates that banana peels particles can be effectively used as a replacement for asbestos in brake pad manufacture.

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Original Article

SMART E-COMMERCE APPLICATION WITH SECURE BLOCKCHAIN

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ABSTRACT

Now as technology is increasing there are lots and lots of developments in the field of science and technology but even in these days the credit/debit card information that we give while doing payment are getting stolen in some cases which is resulting in huge loss. But if the payments are digitalized where just by scanning QR code we can unlock the digital content like videos or any other items by using blockchain technology in which each transaction that is made in stored in blockchain and becomes immutable by making the chances of amount getting stolen to almost negligible. I would like to create a electronic commerce website containing videos which are locked and can only be accessed after the payment, a mobile wallet application for making payments and also create a user interface for blockchain which helps in tracking the transaction. By using this system the items can be purchased with safety, speed and accuracy. Also the whole transaction can be tracked in the blockchain.

KEYWORDS: Electronic Commerce, Cryptography, Data Security, Transaction Databases, Cryptographic Protocols

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INTRODUCTION

In normal payment methods that are used in e-commerce [1] site like debit/credit cards sometimes get saved as shown in Fig. 1 in the website which hackers can take advantage of steal the money. This will lead to huge loss and sometimes it is almost impossible to catch the hacker. Even the ATM the card pin may be secretly seen by someone using cameras.

Figure 1: Credit/Debit Card Saved Information.

New research reveals the ease with which criminals can hack an account or working out the card number, expiry date, security code of any visa card or debit card can take as little as six seconds and uses nothing more than guesswork. Research published by IEEE security and privacy, shows how the so-called distributed guessing attack is able to circumvent all the security features put in a place to protect online payment [2].

The credit/debit card information that are given while doing payment are getting stolen in some cases which is resulting in huge loss. Exposing the flaws in VISA payment system [3], the team from the Newcastle

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RESEARCH ARTICLE - MECHANICAL ENGINEERING

Selective Laser Melting of Single Track on Ti–6Al–4V Powder: Experimentation and Finite Element Analysis

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Abstract
The present work has been carried out to establish finite element analysis (FEA) simulation of selective laser melting (SLM) process and validate through experimental results obtained on the powder bed of Ti6Al4V alloy. Process parameters included variable laser power (60–75 W) and scan speed (200–400 mm/min) along with constant parameter and the laser spot diameter of 0.45 mm. Variation in width and depth of melted track was observed through an optical microscope and was compared with FEA results. A code for a nonlinear transient model was developed in ANSYS parametric design language to simulate the process of SLM. It was observed that both the width and depth of the melt pool decrease at high scan speeds and both dimensions increase with power increase. The FEA code developed shows an average deviation of 4.5% in width and 4.65% in depth from the experimental results. The FEA model can be used to establish parameters to obtain specific dimensions of the melt pool in single line scan and optimize the process of SLM by controlling the width and depth of the melt pool.

Keywords Laser · Finite element analysis · SLM · DMLS · Beam spot diameter

1 Introduction

Advancement in rapid prototyping has resulted in numerous methodologies for manufacturing in small scales and in development stages of the product. Direct metal laser sintering (DMLS) is often used interchangeably with selective laser melting (SLM) for the process of layer manufacturing using metal powder fused using a high-speed laser. Ti6Al4V is known for its superior mechanical characteristics, namely hardness, wear and chemical resistance and high strength to weight ratio. It has found high utilization in turbine engines and airframe applications due to its good diffusion-bonding and superplastic forming characteristics. Due to its low modulus, good fatigue and tensile strength and biological compatibility, it is used for bone screws, elbow, hip, knee and other replacement joints. Ti–6Al–4V is also used in high-performance cars, for manufacturing reciprocating and rotating parts [1]. This process enables manufacturing of more complex designs with properties similar to that of bulk material. SLS results in porosity which is undesirable for tools and dies. For this reason, selective laser melting (SLM) has been proposed in which powder particles completely melt to form solid of about 95% density of the metal.

The literature study on simulation of SLS and SLM process reveals that a lot of work has been done on these processes, including both single and multiple layers in 2D and 3D. Most of the work has been concentrated on the study of stress–strain and temperature distribution. Matsumoto et al. [2] developed a single-layer selective laser melting (SLM) FEA model for the study of temperature and stress developed within the solidified layer on the powder bed. It was also found that the stress and the deflection caused while the laser travels on the track depend on the temperature and the length of the track. As the length of the track is increased, the extent of the deflection associated with the solid part gets increased. Due to this reason the scanning of a long track is avoided to fabricate a large area on the powder bed. Yadroitsev et al. [3] discussed the geometry of a single track over a substrate for various materials and concluded on the versatile nature of the parameters and deviation from them,

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A Study on Welding of Thin Sheet of Ti6-Al-4V Alloy Using Fiber Laser and Its Characterization

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Abstract In the present research work, an attempt has been made to study and investigate the weldability of 1.2-mm-thick Ti6-Al-4V alloy sheet using CW (continuous wave) fiber laser. The influences of the variable process parameters such as laser power, weld scanning speed and laser beam diameter on the microstructure, heat-affected zone (HAZ) and mechanical properties of the final butt-welded joints of Ti6-Al-4V sheets have been investigated. All the experiments were performed by using a CW fiber laser having a laser power capacity of 400 W. At different parameter setting conditions such as laser power varying from 200 to 350 W, weld scanning speed from 120 to 200 mm/min and laser beam diameter (0.4 mm) were considered for the experimentation. Based on the experiments weld quality was investigated and characterized in terms of the surface microstructure, micro-hardness, and tensile strength of the welded samples. Morphological studies at different processing conditions were carried out to study their effects on the HAZ (Heat-affected zone) and weld bead geometry. Microscopic images of welded samples clearly show a decrease in weld width of the welded sample with an increase in weld scanning speed and with increasing laser power increase in width was observed. At a scanning speed of 120 mm/min with varying power from 200 to 350 W the size of heat-affected zone (HAZ) are 3.55, 3.70, 3.84, 4.8 mm, and the corresponding size of fusion zones is 1.751 mm, 1.83 mm, 1.921 mm, 2.032 mm, respectively. The trend in micro-hardness variation was observed and it depends on grain size in laser welding. At 350 W laser power with varying speed from 120 to 300 mm/min, the micro-hardness values of the welded sample were found as 387.1, 395, and 403 HV. The tensile strength of the

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Optimization of Micro-electro Discharge Drilling Parameters of Ti6Al4V Using Response Surface Methodology and Genetic Algorithm

Pankaj Kumar and Manowar Hussain

Abstract In the present investigation, an organized study with optimization of the process parameters for the fabrication of micro-holes and their surface integrity is carried out using the response surface methodology (RSM). The influence of variable parameters, such as machining voltage and machining on time, on the recast material layer and micro-hardness of the machined sample were investigated. The RSM is used to establishe a regression equation to predict output parameters such as micro-hardness and thickness of recast materials of the fabricated holes. From the developed model, the effects of the input variable parameters on the micro-hardness, thickness of recast materials and change in the chemical composition are accomplished with the optimized results. In order to get minimum values of recast layer thickness and micro-hardness of the fabricated micro-holes, a mathematical model was established using response surface methodology (RSM), and subsequently, genetic algorithm (GA) was utilized to reach a set of input machining parameters. Machining input parameters such as gap voltage (V) and machining on time (T_{on}) were selected. The analysis of variance (ANOVA) result indicates that developed models are adequate. The genetic algorithm method in conjugation with RSM is able to identify a particular set of machining parameters which gives minimum values of recast layer thickness and micro-hardness. Confirmation test is also carried out and found that the difference between predicted and measured value is insignificant.

Keywords Mirco-EDM · Recast layer thickness · Micro-hardness · RSM · GA

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Effects of Micro-EDM Parameters on the Surface Integrity of the Micro-Holes Fabricated on Nickel Sheet

Pankaj Kumar and Manowar Hussain

Abstract This paper presents the machining of the nickel sheet using The micro-EDM process. The effect of machining parameters such as pulse on time and gap voltage on the surface integrity parameters such as recast layer thickness, heat affected zone, change in micro-hardness of the workpiece surface and metallurgical transformation in the machined samples has been reported. It is found that ultrasonic vibration given to the workpiece, results in a reduction in the thickness of the recast layer and varies from **7 to 22** μm. The hardness of the fabricated micro-holes improves significantly on the introduction of ultrasonic vibration to the workpiece and was in the range of **116–141**HV. In this study, heat-affected zone was not observed in optical as well as in SEM images. The result of the EDS analysis shows that less amount of the residuals of the carbon and oxygen were present over the fabricated holes.

Keywords Micro-hole · Micro-EDM · Nickel sheet · Ultrasonic vibration · Surface topography · Micro-hardness

1 Introduction

In recent years, the needs for the development of products containing micron-size features are growing very rapidly. Some of the application areas of these products include missiles, space vehicles, micro-electromechanical systems (MEMS) and communication systems. The micro-holes are used in various components for different applications such as in fuel injection nozzles, inkjet printer nozzles, spinner holes, drug delivery orifices, and cooling channels of the turbine blades [1]. At present, the micro-holes in different materials are manufactured by different machining processes

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A COMPREHENSIVE STUDY ON CFD ANALYSIS WITH SEA WATER AND ENGINE OIL OF HEAT EXCHANGER PLATE TYPE

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Abstract

There is a wide use of Plate heat exchanger in the field of marine, dairy and other present day applications for its improved heat trade traits and moderate structure. Conservative heat exchangers are most extensively used for heat transfer applications in adventures. Plate type heat exchangers are commonly used for fluid to-fluid heat transfer applications with high-thickness working liquids. This examination is centered around the utilization of plate type heat exchanger for seawater and motor oil as the working liquids. This assessment work oversees assessment of the plate-type heat exchanger with an appraisal of convective heat transfer coefficient, overall heat transfer coefficient, exchanger effectiveness, yield temperatures of the liquids. The improvement of this work is done by taking Low, medium and high Reynolds number and moreover K-Epsilon choppiness. Finishing this work includes dainty metal welded plates of Titanium with 7mm thickness, rectangular geometry, and detachment between two plates is 1mm. Tests are driven by changing working parameters like mass stream rate, gulf temperatures of hot and cold liquids. The chief objective of this work is to find the effects of these parameters on the execution of the presentation of plate heat exchanger with equal stream plan and to locate the most extreme effectiveness. The most extreme effectiveness accomplished right now 0.61. Usage of plate type heat exchanger is more beneficial than the cylinder type heat exchanger with a similar ampleness, as it includes less space. The investigation was finished utilizing ANSYS 12 CFD system. Particular parameters are figured from the results procured and outlines are plotted between various parameters. These graphs have been researched and discussed to find the perfect result for which the plate Heat exchanger would give the best execution.

Keywords--- Convective heat transfer coefficient, Effectiveness, Overall heat transfer coefficient, Plate heat exchanger, Reynolds number.

I. Introduction

A heat exchanger might be characterized as hardware which transfers the vitality from a hot liquid to a cool liquid, with the best rate and least endeavor and running cost. The pace of trade of heat depends on the conductivity of the separating divider and convective heat transfer coefficient between the divider and liquids. A plate heat exchanger is a smaller kind of heat exchanger that utilizations metal plates to transfer heat between two liquids. This energizes the transfer of heat and extraordinarily speeds up temperature change [1]. Plate heat exchangers have a quality of higher choppiness. Such high choppiness brings about higher convection that prompts effective heat transfer between the media [2]. It, thusly, implies that

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OPTIMIZATION OF 3D PRINTING PARAMETERS ON SURFACE ROUGHNESS BY TAGUCHI METHOD

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ABSTRACT

Fused Deposition Modeling (FDM) is a type of rapid prototyping technique used in manufacturing prototypes among the additive manufacturing technologies.3D printing is a type of FDM where the prototypes are made layer by layer addition of molten filament material.3D printing directly converts the 3D-CAD data into prototypes(model). Our present involves studying the parameters which affect the surface roughness of 3D printed material are optimized. The material used for deposition is Polylactic Acid (PLA), a common thermoplastic polymer. The parameters like infill density, print speed, printing temperature and wall thickness are varied according to the design of experiments. Taguchi method was adopted to design the experiments and an orthogonal array of L9 (34) is designated and performed to find out the optimal values to minimize the surface roughness of 3D printed PLA material. The surface roughness test is conducted on each specimen as per standards.

KEYWORDS: Fused Deposition Modeling (FDM), Additive Manufacturing, Poly Lactic Acid (PLA), Taguchi Method & Surface Roughness Test

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Original Article

1. INTRODUCTION

In the manufacturing zone, Additive manufacturing a new technology has been proven to be a promising method for adopting in rapid prototyping. This technology substantially has evolved and improved into a useful tool for many fields like in researcher, designing, manufacturing sector. Collaborating different fields in single package molded 3D printer which includes Design, manufacturing, electronics, materials, and business. The classic difference between traditional manufacturing method and 3D printing is, the 3D printer involves additive approach but mostly traditional manufacturing processes involve subtractive approach which includes a combination of cutting, bending, grinding, forging, molding, welding and assembling operations.

Additive Manufacturing (AM), usually known as 3D printing, is defined as the "joining of materials to make an object from 3D model data, generally by layer upon layer, as opposed to formative manufacturing methodologies" according to International Organization for Standardization (ISO)/American Society for Testing and Materials(ASTM) 52900:2015 standard [1].Based on standards, AM processes is classified into seven classes: Binder-Jetting, Material's Extrusion, Powder Bed Fusion, Directed Energy Deposition, Material-Jetting, Sheet Lamination and Vat Photo Polymerization.

2 FUSED DEPOSITION MODELING

Fused Deposition Modeling (FDM) or Fused Filament Fabrication (FFF) is a3D printing material-extrusion process which employs, a continuous distributing of filament of a thermoplastic material which is encouraged from alarge

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STABILITY ENHANCEMENT OF DOUBLY FED INDUCTION GENERATOR WITH VIRTUAL RESISTANCE UNDER NETWORK DISTURBANCES

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Abstract: In olden days the grid stability can be maintained by crowbars but this method has few considerable limitations. In this paper a new technique dynamic virtual resistance control strategy is proposed for the case of over current on the rotor side converter of the DFIG under grid faults. In order to fulfill the requirements of reactive power in wind farms the crowbars are not preferable because they absorb the reactive power from grid whereas virtual resistance system supplies the reactive power to the grid. This control method can suppress the oscillations of the current component on the rotor side and improves the transient stability of the DFIG. The resistance of the virtual resistor will change with the voltage drop and it can better meet the synergistic suppression of the rotor side converter electrical stress under different conditions. Hence this paper in order to maintain stability of DFIG, first transient mathematical models of doubly fed induction generator under grid voltage symmetrical drops are established, and a modified control strategy is developed with virtual resistance then analyze the transient characteristics of it.

Keywords: Crow bar circuit, DFIG (Doubly Fed Induction Generator), Virtual Resistance.

1. Introduction:

The wind power energy technology has developed rapidly due to its clean and pollution free nature. It also does not produces green house gases, occupies less area on the land and its maintenance is also very less. In the variable speed constant frequency wind power generation system, the DFIG is widely used due to its advantages of small converter capacity, independent control of active power and reactive power. The stator of DFIG is directly connected to grid and rotor is connected to the back to back power electronic convertor through slip rings when a disturbance occur in grid, therefore rotor cause high voltages which damages the converters connected to rotor and high voltage disturbances in the system. Due to high rotor inflow current, the over voltage and torque oscillations results damage of the doubly fed induction generator, this results the failure of rotor converters and mechanical parts [1]. To overcome this problem and to obtain an international standard grid code values called E.ON standards in olden days, the rotor crow bar circuit is connected to the rotor side converter [2-5]. The crow bar circuit is a series resistive network controlled by power electronics convertor. Crow bars care the rotor converters, when the grid disturbance is occurs it provides low resistance path to high rotor circuit and by pass the faculty rotor current, thereby it protect the rotor the rotor side converter from high voltages and current under grid disturbances but it converts doubly fed induction generator to squirrel cage induction generator, it consumes high reactive power from the grid. So turbines with crowbars is not efficient in maintaining grid codes, there is another disadvantage like equipment cost and it not decisive. To fulfill the new grid codes fault ride through capacity is crucial for DFIG. Many researchers have proposed different techniques to control this rather than using a crow bars, reference [6] proposed that the series resistance of current transformers on the rotor side could prevent rotor over current, thus preventing the rotor side converter from losing control over the generator. There are other proposed solutions from references [7-9] to achieve fault ride through the static synchronous compensator [STATCOM] and dynamic voltage restorer [DVR] are examined and compared. In reference [10] the current hysteresis PWM modulation technology in the moment of grid voltage change to achieve the suppression of rotor current. In reference [11] uses phase angle compensation technology to make the phase angle orientation of the control system move accurate during the grid voltage recovery, thus achieving the suppression of rotor current fluctuation, then the grid voltage drop is more serious, the above control strategy cannot remain DFIG in the safe operation state. At this time, the cascade crow bar device can be used to by bags and block the machine – side convertor [12] and the DC link of the convertor increases the chopper resistance to prevent DC over voltage [13], the machine-side convertor string resistance or DFIG's stator series resistance to avoid the convertor's short time out of control [14]. It is necessary to enhance the adaptability of the wind power system when the grid voltage drops by improving the control strategy. In order to solve these problems, some authors proposed a "demagnetization" control strategy [15]. To enhance the operation capability of DFIG under grid

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A Novel Method to Improve the Stability of Doubly Fed Induction Generator Under Grid Disturbances using Fuzzy Controller

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Abstract: This paper proposes a new technique called fuzzy logic to improve the behavior of stability of DFIGs during grid faults, to ability of wind generators to stay connected to the grid during grid fault occurrence.. The controller is designed in order to compensate the voltage in the faulty lines without disturbing voltage at healthy lines at the point of common coupling by controlling the active and reactive power generated by DFIG. The Simulation results are carried out on faulty system. So the proposed controller can improve stability of DFIG

***Index Terms — Doubly Fed Induction Generator (DFIG), Faulty networks, Stability*, Fuzzy control.**

1. Introduction

Wind power plays important role on performance of power system during abnormal situations. Due to recent developments in modern power electronics, the doubly fed induction generator (DFIG) play very important role in wind power generation. In DFIG the AC/DC/AC converter consists of a rotor-side converter (RSC) and a grid-side converter (GSC) connected back-to-back by a dc-link capacitor. The AC/DC/AC converter handle a full control of the generator and control of active and reactive power, faster dynamic response with low harmonic distortion, and so forth, handling only a very small fraction (30–40%) of the total power. DFIG wind turbine also improves system efficiency, reduces noise and mechanical stresses, and improves power quality. In this paper the rotor circuit is first short-circuited by a crowbar circuit, the generator starts to absorb VAR power as it acts as a conventional induction generator. The operation of the DFIG in producing active power continues and, to have a control over there active power and voltage, the GSC can be set. The interface of DFIG with the grid becomes extremely critical, unlike conventional power plants, during and immediately following a grid failure. Like conventional power plants, these renewable energy generators should be able to with standard supply active and reactive power support immediately after the fault has been cleared to control and stabilize the power system. One of the most common control techniques is decoupled PI control of output active and reactive power to improve dynamic behavior of DFIG. The fuzzy control technique can produce controller outputs more consistent, for the reason that the effect of other parameters such as noise and events due to wide range of control and online changing of the controller parameters can be considered. Moreover without the need of a detailed mathematical model of the system and just using the information of the total operation and behavior of system, alteration of parameters can be done more simply.

2. DFIG Wind Turbine Model:

Dynamic model of a DFIG can be represented in terms of the equations of each of the subsystems, mainly the turbine, the drive train, the generator, converter system and the control system. The detailed description of the dynamic modeling of DFIG is out of the scope of the this paper .Detailed information regarding this can be found I the block diagram shows in figure

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A Novel Approach in Audio Compression using Vedic Concepts

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Abstract: ***It is needless to say that the popular seven notes called as SAPTA SWARAS drawn from Shrutis are Shadja, Rishabha, Gaandhara, Madyama, Panchama, Daivata and Nishada which are written in short as Sa-Ri-Ga-Ma-Pa-Da-Ni. Natural sounds are produced from these basic notes. Chanting of Veda mantras and any way of expressing emotions is possible through these musical notes. Each note has a frequency, amplitude and time. A sound depends on these parameters. Set of such sounds give a meaning when vector addressed from a text file containing the audio code.***
Keywords: ADC, Frequency to Voltage converter, Memory, Microcontroller, Recording, Multiplexing.

I. INTRODUCTION

This is an attempt to encode Sa-Ri-Ga-Ma-Pa-Da-Ni into a microcontroller to reproduce meaningful and clear sounds occupying less memory space [1]. This method records sound in 8-bit text format. This is stored into a small memory capacity of the range in KBs. These text data are the code to evoke the musical notes stored in the dedicated microcontroller. The text carries a sequence 8-bit data which is understood by the programmed microcontroller. Each expression of the 8-bit sequence carrying 3 bite. First 8 bits define a musical note of Sa Ri Ga…. Second 8 bit defines duration of the musical note. Third 8 bits define amplitude of the musical note. Since time component is not stored in the memory space is saved. Time is mentioned as 8-bit data in one location.

Sample code is as follows:

1) b'10110111' ; B7H
2) b'10101010' ; AAH
3) b'01001000' ; 48H

These go with B7H, AAH, 48H in hex values. 'B7H' stands for the note defined under it. 'AAH' stands for duration of the play which goes in milliseconds. '48H' stands for amplitude of the musical note in the strength of volts.
Pingala Chandassastra is the origination for these sequences with the help of which this research is carried.

II. DIGITIZED SIGNAL CAPTURE

Each of Sa-Ri-Ga-Ma-Pa-Da-Ni are a frequency. Their amplitude varies for producing them as a meaningful music [2]. This is described to capture an audio signal which can be enhanced to deliver stereo capture and an HTS of 5.1 or higher to deliver natural sounds with 3 dimensions in audio system.
Audio signal is always in analogue. To capture into a digital media a coded data is required. This is an attempt to capture analogue signal in the form of its frequency and amplitude at every division of time. Here time is 1m Sec.

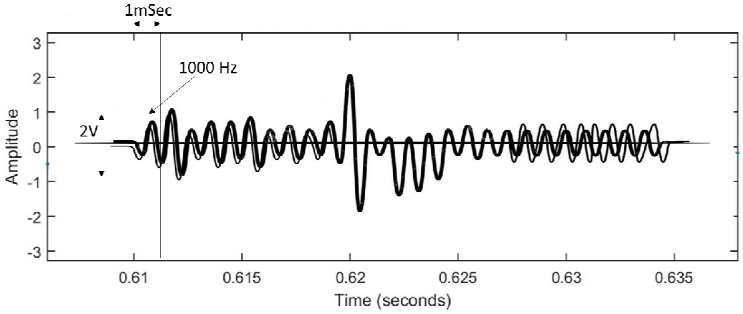

Fig.1 Audio signal with Amplitude, Frequency and Time

A Novel Squirrel Search Optimization Algorithm for Solving Optimal Power Flow Problem with TCSC Device

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***Abstract*: This paper presents a novel squirrel search algorithm to search the solution for optimal power flow problem with installation of TCSC device and the effect of equality, inequality constraints on it. In this algorithm squirrels use a special technique for their locomotion known as gliding rather than flying. The viability of this algorithm proves that SSA deals with a better accuracy in the solution when compared over other well known algorithms. Hence SSA method is effective for solving optimization problem and can be applied to optimize the electrical power system objectives. This paper deals with the improvement of bus voltages and also to minimize single objective functions i.e., generation fuel cost and emission with incorporated TCSC by fulfilling the equality and inequality constraints. IEEE-30 bus system has been tested using proposed method and results will be analyzed, compared with existing algorithms.**

***Keywords:* Squirrel Search algorithm (SSA), Optimal power flow (OPF), Flexible AC Transmission system (FACTS), TCSC, Total generation fuel cost, Total gas emission.**

I. INTRODUCTION

In earlier sixties, Optimal power flow (OPF) begins as the difficult and demanding necessity for power system operations. In order to reduce the transmission loss and improve voltage stability, OPF incorporating FACTS cannot be over stressed just a fine coordination should be present between them and the need for operating limits that terminates the OPF objective optimization. OPF is a power flow study that uses optimization techniques to adjust control variables to decide the ideal operating levels of the power system. Numerical point of view, OPF is a non-linear large-scale optimization problem subject to non-linear constrains. Since 1960s, several conventional techniques have been introduced by researchers to solve OPF problem [1].

Traditional techniques include gradient methods, linear programming, nonlinear programming, quadratic programming, interior point and Newton formulation [2-5]. Although, many improvements have been included to classical techniques these are failed due to many drawbacks to solve OPF optimization in its complexity. The main disadvantages are (i) particular techniques require linearization and differentiability (ii) the optimal solution depends on initialization thus, the optimization could close at local optimum solution and misses the global optimum solution.(iii) poor convergence (iv) number of decision variables increases then the convergence becomes slow. Researchers have been developed various nature-inspired optimization algorithms to overcome these drawbacks in classical methods, which imitates some biological behaviour or physical phenomena. Genetic algorithm (GA) [6], Particle swarm optimization (PSO) [7], Ant colony optimization (ACO) [8], Artificial bee colony (ABO) [9], Firefly algorithm (FF) [10], Bat algorithm (BA) [11], Spotted hyena optimizer (SHO) [12] these are some of the nature inspired algorithms.

Flexible AC Transmission Systems (FACTS) are the power electronic devices to control the power flow capacity and other parameters in the electrical power system. These devices provide the reliability, improvement in the power system performance, quality of supply and also environmental benefit. To overcome the transmission losses and to prevent voltage collapse there is a need to either reduce or inject the reactive power to the system before it goes to the voltage collapse [13-14]. Therefore, to increase transmission line capacity, and to improve system stability FACTS need to be incorporated. Thyristor controlled series capacitor (TCSC) is the most frequently used FACTS device.

Similarly in this paper, a nature inspired squirrel search algorithm [15] is used for solving OPF problems with incorporation of FACTS device i.e. TCSC. This paper deals to analyze the effect of constraints on solving optimal power flow problem for considered objectives and is compared with existing algorithms for IEEE-30 bus standard test system.

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21 Level inverter topologies

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ABSTRACT

This paper presents the effective and important topologies be found of diode clamped inverter (neutral point clamped), capacitor clamped inverter (flying capacitor) and cascaded multicell inverter. An outline of the multilevel converters with a concentrate on succeeding minimum harmonic distortion and high efficiency at low switching frequency operation. Multilevel converters are taken into consideration nowadays as the modern power conversion systems for high power and high-power quality requiring applications. This multilevel inverter produces 21 levels and results are approved through the harmonic spectrum of FET window by utilizing MATLAB Simulink.

Top

Keywords:

Multilevel inverter, Total Harmonic Distortion, MATLAB/Simulink.

Top

Emergency System Based Smart Grid

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Abstract: **In this paper, new hierarchically coordinated approach to take the edge off and manage the effects of augmented grid complexity by smart grid which uplifts the electricity via hybrid renewable energy sources for the power system is planned. The perception is based on predicting power diversity state of affairs in real-time, adapting preventive measures to the power system's existing conditions, and get through the corrective actions for undesirable outcome. As there is in demand of energy increase and de-regulation of power, Conventional structure grid with few sources of generalized and centralized sources of system transmission i.e. it will supply passive distribution of load in a system that will be charged with network based on energy renewal distribution system connected to all levels of voltage. Hierarchically coordinated system utilizes local distribution and wide area distribution measurements of the power system parameters. Solar, hydel and magnetic sources are applied to the booster for harvesting the resources through the boosting circuits. The electrochemical cells with reversible chemical reaction secondary batteries like Lithium-ion, Nickle Cadmium, Nickle metal hydride and lead acid are used. The voltage level of this battery is incessantly monitored through voltage track and microcontroller. Depending on the requisite voltage, if it is less than pre specified value then automatically cut-off the supply of that battery where the load is connected through an inverter and connects to another battery through relay driver circuit which makes uninterrupted power supply to the load.**

Keywords: **smart grid, micro grid, battery energy storage system, BESS, renewable energy sources, hybrid power, solar energy, energy harvesting.**

I. INTRODUCTION

As there is in demand of energy increase and de-regulation of power conventional structure grid with large few sources of generalized centralized sources of system transmission that will supply passive distribution of load in a system will be charge within the network based on energy renewal distribution system connected to all levels of voltage. In the past decade there was a significant due in electronics and control digital technology, as there were number of on and off shore wind generation units are setup in power transmission [1]. At present time, system transmission structure has become more and more complex in operation and scenarios changes due to infrastructure grid up gradation.

The planned system is operated with margins tighter, redundancy less, system reduced with internal faults, which was under dynamic exemplified grid operating based on phenomena of power and oscillation of voltages, as well related to frequency, voltage and instability angular [2]. The dynamic behavior which is caused phenomena based on measurement of protection such as frequency, current, voltage; power etc. the changes which are measured on property which are deterated for protection and checking the leading performance and operation of misused. The diverse techniques which are employed for analyzing, preventing and result cascading which are available in the literature. The integration of uplift using

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Comparison Of DC-DC Converters For Renewable Energy Applications

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Abstract **- In renewable energy applications, generated energy from renewable energy sources is very low. In most of the cases, It is necessary to use High Step-up DC-DC converters that allow to adjust the voltage and current levels of RES, in order to achieve high voltage gain at small duty ratio and process large amounts of power. Theoretically, a conventional boost converter is able to provide high-voltage-gain with extremely high duty cycle, which degrades the overall conversion efficiency due to the output diode reverse-recovery problems, which will also increases the electromagnetic interference (EMI) levels. High duty cycle also results in increase of the rating of the device which leads to high conduction and switching losses.**

In this regard, Here a step up converter is proposed which possess high voltage gain characteristics. Along with this, it provides additional advantage of supplying power to two different loads (one of low power applications and other of high power applications). Also comparison between Boost converter, Switched Inductor Boost converter and High gain step up converter is made in terms of high voltage gain along with the other advantages such as simple control, less cost etc. simulation results are verified using Matlab/Simulink.

Index Terms **- *DC-DC Converter, DC micro grid, High gain.***

I. INTRODUCTION

In recent years, renewable energy sources become more prominent with the shortage of conventional energy sources. How to achieve high step-up and high efficiency DC/DC converters is the major consideration in the renewable energy applications due to the low voltage of PV arrays and fuel cells [2]. For this purpose, Lots of efforts have been made to develop high step-up DC-DC converters with a high efficiency. Also, the demand of DC–DC converters with high step-up voltage gain is gradually increasing in applications such as battery-powered portable devices, electric vehicle, uninterrupted power supplies (UPS), and renewable energy applications. Besides the high step-up voltage gain and non isolation requirement, these applications also demand for high efficiency, high power density, and reduced cost [3].

Practically, the conventional boost converter cannot provide a large voltage gain due to its parasitic components. Limitations of the conventional boost converter are current ripple of the switches and the output diodes are large, switch voltage stress is equal to the output voltage, which is large in high output voltage applications, switching losses and the output diode reverse-recovery losses are large due to the hard switching operation and high voltage stress across switch [2].

Moreover, operating the conventional boost converter with extreme duty-cycle degrades the overall conversion efficiency due to the output diode reverse-recovery problems, which will also increase the electromagnetic interference (EMI) levels. Also, the conventional boost converter requires a high current and voltage rated MOSFET; hence, it will require a MOSFET with a higher RDS-ON, which leads to high conduction and switching losses. The use of DC-DC converters in cascade is an effective way to achieve a large voltage gain, The main drawback of this system are the large number of components and losses, since each power conversion stage contributes a portion of conduction losses. On the other hand, the quadratic boost converter is able to provide high voltage gain without the penalty of extreme duty-cycle; however, the switch voltage stress is equal to the output voltage. Thus, no advantage over the conventional boost converter is achieved [2].

To obtain high voltage gain and efficiency, various non-isolated converter topologies have been proposed. These converters can be roughly classified into categories: high step-up converter with coupled inductor, high step-up converter with switched capacitor, high step-up converter with inductor and switched capacitor, high step-up converter with coupled inductor and switched capacitor and so on [2]. Topologies based on switched capacitor [14-17] can provide high efficiency, high power density and bi-directional converter, which is suitable for vehicle applications. The components, such as inductor, transformer are not required in switched capacitor converters to reduce circuit size. switching frequency can be pushed to a high level to improve the power density. However, a lot of power MOSFETs are necessary to realize a high voltage gain which increases the switching losses as well as cost and the gate driver circuit is complex Topologies based on inductors and switched capacitor [18-23], Stepless voltage gain can be realized and input and output current ripples are small to reduce the EMI noise. The main limitation of the converter is that diodes should sustain a high voltage stress, which increases the conduction losses and the output diode reverse-recovery problem is serious. These converters have been utilized widely to obtain high voltage gain. However, in switched inductor topologies, the voltage stress among components is high and in the

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REVIEW ON DIFFERENT CONTROL METHODS USED FOR INDUCTION HEATING APPLICATIONS

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ABSTRACT

Different control methods like fixed and variable -frequency operations on Series Resonant Inverter(SRI) that are used in Induction Heating applications are reviewed in this paper. The advantages of Series Resonant Inverter are being its high power density with high efficiency for wide input and output load range. The other advantages like reduced output voltage ripple with high power factor can be achieved for SRI's. In practice, SRI's operated at high frequencies (kHz to MHZ) results in the increase of turn-off and gate charge losses leading to the reduction in the efficiency of Inverter. Different Control Methods implemented on SRI are reviewed for Induction Heating(IH) application in this paper. The review includes merits and demerits of these control Methods along with their applications.

Key words: Induction Heating, Series Resonant Inverters, resonant tank, soft-switching.

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1. INTRODUCTION

In Pulse-Width-Modulated (PWM) Inverters, the switches undergo switched mode operation. In this operation, the switches experiences high switching stress and switching losses. This switching losses are in linear proportion to switching frequency of the system. Therefore, electromagnetic interference produced in this mode of operation is large due to high dv/dt and di/dt values. Resonant Inverters/Converters with high frequency operation have come into existence to overcome the limitations posed by PWM converters. In these systems, resonant switch is used in place of PWM switch. In this resonant switch, an LC- resonant circuit is developed such that current through the switch and voltage across the switch are enforced to pass zero crossings. [1],[2]. Many tank circuits that come as voltage / current-type are available in the market. These types can be determined by the resonant tank signal which transfers the

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WITHDRAWN: Historical text retrieval with spectral data and adaptive variants of bacterial foraging

Ch. Venkata Krishna Reddy [a], T.R. Vijaya Lakshmi [b]

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This article has been withdrawn as part of the withdrawal of the Proceedings of the International Conference on Emerging Trends in Materials Science, Technology and Engineering (ICMSTE2K21). Subsequent to acceptance of these Proceedings papers by the responsible Guest Editors, Dr S. Sakthivel, Dr S. Karthikeyan and Dr I. A. Palani, several serious concerns arose regarding the integrity and veracity of the conference organisation and peer-review process. After a thorough investigation, the peer-review process was confirmed to fall beneath the high standards expected by Materials Today: Proceedings.

The veracity of the conference also remains subject to serious doubt and therefore the entire Proceedings has been withdrawn in order to correct the scholarly record.

 International Journal on Electrical Engineering and Informatics - Volume 12, Number 3, September 2020

Critical Elements Based Optimal PMU Placement Considering Substation Coverage

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Abstract: The Phasor Measurement Unit (PMU) is becoming the most prominent tool for power system applications like power system operation, control, and protection. In a robust and accurate wide-area measuring system, the PMU should observe not only the elements in its substation but also the critical elements and its incident busses. As the PMU cost limits their deployment, they must be installed optimally considering the substation installation and the critical lines in the power system. This paper introduces a new Optimal PMU Placement algorithm considering the optimal substations and the critical elements. This has been done based on the assumption that there must be a PMU in each constructed substation (optimal substation). This will assure the observability of all the elements in the substation. The proposed method has been tested on some standard test systems and then applied to a practical regional Indian grid.

Index Terms: Optimal PMU placement (OPP); Substation coverage; Critical lines; Critical bus; Binary Cuckoo Search (BCS);

1. Introduction

Optimization has become an important tool for solving many design problems [1-2]. This paper introduces the application of an optimization technique to the power system designing problems. The power system can be operated securely and accurately if it is possible to estimate the system state with a variety of measurements. With the integration of Phasor Measurement Unit into the measurement system, this has become easy to monitor, control and protect the power system. Then, engineers started applying optimization problems PMUs for complete system observability. As the PMU costs considerably, the deployment and its number are needed to be optimized. In [3], the actual PMU optimum placement problem was introduced. Later, with the advent of heuristic methods, Genetic Algorithm (GA) in [4], Particle Swarm Optimization (PSO) in [5] and many more approaches were applied to the optimization problem for PMU placement.

After, a deterministic strategy like Integer Linear Programming (ILP) is applied in [6]. Thereafter, it is extended to the power systems, with and without conventional measurements in [7], and considering zero-injection bus (ZIB) effect in [8]. In practical substations, buses exist at different voltage levels as shown in Fig. 1. Circles in the figure represent substations. One should not forget that one bus being observed inside the substation should not transfer it to other buses inside the same substation. The above methods were developed based on the thumb rule that the PMU installed bus could observe all the buses connected to it including itself. And, as the practical tap ratios are not known, authors have assumed that the buses with different voltages were decoupled in-order to observe them in an individual manner which will increase both search space and bus number. So, it is clear that they have only concentrated on reducing the number of PMUs rather than reducing substation number.

Wide-area system planning studies say that the major part of the cost of synchrophasor measurement system deployment is associated with transmission network outages and maintenance costs but not with PMU devices. So, optimization must be towards reducing substation number. Moreover, the blackout reports suggest that critical lines which may connect

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A Simplified Control Strategy for an Enhanced Performance of Six Level Dual Inverter Fed Induction Motor Drive

Usha Nadimpalli, P.V. Prasad, Kolli Ramesh Reddy

Abstract: ***Induction motor drives are employed in many of the industrial applications. The drives output depends on the inverter. Multilevel inverters are generally used in the induction motor drives but the dual inverter fed induction motor drive found more advantageous than the multilevel inverters. The performance of the Induction motor drive with open end winding for various levels of output voltage is presented in this paper. The inverter configuration implemented produces three-level, four-level, five-level and six-level in the output voltage waveform. The voltage and current harmonic distortion decreases as the number of levels are increased. The performance of the motor drive with the proposed inverter topology was found effective for sixth level. The simulation analysis of Induction motor drive with dual inverter is carried out in MATLAB-Simulink environment.***

Keywords: Open end winding Induction motor drive, Dual Inverter, PWM, SPWM,SVPWM,THD.

I.INTRODUCTION

Most of industrial drive applications employ Voltage source Inverter for their effective control. When a single inverter is used, output voltage contains harmonics which have effect on the induction motor performance and also leads to the phase currents ripple. So there is a need for improving the performance of inverters[1]. The essential characteristics of inverters are less harmonics in the output, low switching losses and less common mode voltage. In order to obtain sinusoidal voltage without harmonics from inverter various methods are employed such as PWM Technique with High frequency, Low Frequency and Dual inverter[2]. In this work, a dual inverter is used to drive the induction motor. This dual inverter circuit utilises less number of diodes, capacitors and DC sources therefore minimising overall cost. In Dual fed induction motor stator windings of motor are opened and fed from inverters on either side. Isolated DC supply are provided to both the inverters and AC obtained from inverter is given to induction motor stator. If the DC input supply given to both the inverters is same then such configuration is called symmetrical dual inverter fed open end winding Induction motor drive and if DC input is different for both the inverters then it is called as Asymmetrical dual inverter fed open end winding induction motor drive.

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As the levels in the inverter output voltage increased, the harmonic content in the output of inverter can be reduced. The output voltage levels are increased by adjusting the DC input voltages leading to reduction in cost and complexity in the circuit[3]. The increase in levels also increases the complexity of circuit but with this proposed circuit configuration, one more bridge circuit is included for obtaining the fifth and sixth levels of output voltage. This control strategy yields less switching losses along with reduced current ripples.

In this proposed power circuit configuration three isolated DC supplies are essential to produce higher levels in the inverter voltage. The common issue in the induction motor drive with dual inverter is zero sequence currents which can be overcome by choosing a carrier based PWM method[4].

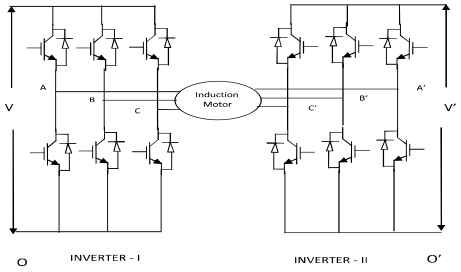

Figure 1 Dual inverter fed open end stator winding induction motor drive

A simplified circuit with two level inverters, Inverter I and II are used as shown in the Fig.1. The difference of output voltage of Inverter-I and Inverter-II is effective voltage which is fed to the induction motor stator. A symmetric dual inverter with input DC voltage of $\frac{2V_{dc}}{3}$ is used to produce three levels of voltage. An asymmetric dual inverter is used to generate four levels voltage with a DC input voltages of $\frac{2V_{dc}}{3}$ and $\frac{V_{dc}}{3}$. To generate five levels one more bridge circuit is included in the Inverter-I by making 6 switches as each group with input DC voltage as $\frac{V_{dc}}{4}$ and the input voltage to Inverter-II is taken as $\frac{V_{dc}}{2}$ as shown in Figure 2. Same circuit configuration is used to generate the six levels of DC voltage input as $\frac{2V_{dc}}{6}$ and $\frac{V_{dc}}{6}$.

Distribution Network Reconfiguration using GA & BPSO

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Abstract

As increase in the high demand utilization of electrical energy over few decades the power loss issue is persevered. In order to minimize the power losses, various meth such as capacitor placement, distribution generator placement and proper conductor selection methods. In all these methods, lot of money is to be invested to decrease method is one, where investment for loss reduction is minimum. By changing the position of sectionalizing and the tie switches the distribution system reconfiguration is do paper, Genetic Algorithm (GA) and Binary Particle Swarm Optimization (BPSO) techniques are used for distribution system reconfiguration. The performance of the two alg systems i.e. 33 and 69 node radial distribution systems. The outcomes illustrate that after reconfiguration the power loss is minimized and voltage profile is improved. Fina compared and found that BPSO has given better results compared to Genetic Algorithm.

Keywords

Distribution Network Reconfiguration, Power loss Reduction, Genetic Algorithm, Binary Particle Swarm Optimization

How To Cite This Article?

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A Novel Technique to Observe the Performance of Virtual Solar PV Module System

G. Suresh Babu & N. R. Sai Varun

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664 Accesses | **1** Citations

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Abstract

Photovoltaic (PV) energy source or a PV emulator is required to analyze the performance of PV

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INVERSE DEFINITE MINIMUM TIME RELAY COORDINATION IN RADIAL TRACTION SYSTEM

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ABSTRACT

For stable and reliable operation of power system, the coordination of relays plays an important role. In order to achieve fast and selective protection, the relays are to be coordinated through appropriate relay settings with correct grading margins. Relay settings are to be done at upstream and downstream in such a way that proper coordination is achieved along various series networks. This paper presents different factors which play major part in selection of Inverse Definite Minimum Time (IDMT) over current protection on radial network. The selection of IDMT curves and procedure applied in relay settings such as Plug setting multiplier (PSM), Time settings multiplier (TSM), grading margins and different techniques used in relay coordination in a traction system are discussed.

Key words: Definite Minimum Time, Grading margins, Inverse definite minimum time, Plug Multiplier, Radial network, Relay coordination, Time multiplier, Time-Current curves , Traction system

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PERFORMANCE EVALUATION OF DC ELECTRIC SPRING PLACED IN MICRO GRID SYSTEMS USING SOLAR PV EMULATOR

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ABSTRACT

The use of D.C micro grids(MG) in the electricity distribution level especially for domestic and commercial applications is gaining momentum. D.C power is more lucrative because of low losses due to the absence of reactive power. Hence an attempt is made to realize the effect of both critical and non- critical loads connected to DC Electric spring which forms an integral part of DC MG system. As the buck chopper function meets the requirement of energy, the chopper circuitry is christened as Electric spring. The input to the MG system is obtained from a real time output of solar PV Emulator. In order to avoid multiple AC/DC conversions, solar DC power is directly fed to the loads in addition to charging the batteries. During uncertain conditions of the input supply, the so fabricated DC Electric Spring plays vital role in maintaining constant voltage at critical loads which (this result) leads to the enhancement of the capacity of the battery which is evident from the experimental results.

Key words: DC Micro Grid, DC Electric Spring, Battery, Critical loads, Solar PV Emulator.

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1. INTRODUCTION

Among the renewable energy resources, the energy through the photovoltaic(PV) effect can be considered as the most economical and sustainable resource, because of the abundance and attainability of solar radiant energy. So PV based systems are being increasingly employed in diverse applications both at domestic and commercial levels. Photo voltaic systems can be broadly classified into stand-alone system and grid-connected system. The stand-alone system is widely used in remote places where access to electricity is not viable, but the configuration can provide a well-regulated load voltage. Storage batteries are widely used to improve the

Performance analysis of DC-DC converter based standalone PV system using cloud connected Solar PV Emulator

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Abstract. Laboratory testing and validation of Photovoltaic based energy conversion system requires Photovoltaic (PV) Panels. On the advancement of technology, a flexible system with PV Emulator overcomes the difficulties of conventional PV modules in terms of economics and research point of view. A PV Emulator can assimilate the features of different PV Modules under several test conditions (type of area, conditions of atmosphere, different irradiations, varying temperatures and various Maximum Power Point Tracking (MPPT) algorithms virtually. This paper presents a practical implementation of Perturbation and Observation (P&O) and Incremental Conductance (INC) to achieve MPPT control with a Switched Mode Power Supply (SMPS) based cloud connected Solar PV Emulator to analyze Power variation of selected module in Emulator with applied MPPT Algorithms.

Keywords. Solar PV Emulator, MPPT Algorithms, DC-DC Buck converter, Arduino Controller.

1. Introduction

The Renewable Energy Sources (RES) are gaining more and more importance in order to meet world energy needs to counter the degrading effects of fossil fuel based Sources on Climate change and ecosystem. Along with this surge in importance of RES there is a need to address the problems in RES with optimal solutions. The noted barriers that effect the progress of research in this environment friendly system are the economics of Solar PV modules involved being high, Huge space requirement, and unable to reproduce various test conditions repeatedly.[1-2].

In order to address above issues, solar PV Emulator is one of the possible solution in present conditions. By using a PV Emulator it is possible

to test practical conditions with high reliability, low cost, and improved efficiency. A Wide range of PV Emulators haven been discussed in literature. In [3], a photodiode is used along a DC power amplifier to match the PV panel power level. But this methodology is not normally used as this requires a light source and corresponding circuit to reproduce I-V curves [4]. The other kind of Emulators requires a power electronics converter which is regularly used to emulate the I-V and P-V curves of PV panel accurately [4-12]. In numerous cases, PV Emulator is based on current controlled buck controller [4] [5] [7-9] [11].

In [4], a buck converter is controlled by curve-fitting method using multiple simple linear equations to reproduce I-V curves of PV panel. PV Emulator working on Field Programmable Analog Arrays (FPAA) is discussed in [5]. In [7], the control algorithm intended for the emulator model is realized by a Field Programmable Gate Array (FPGA). A PV emulator based on a current–voltage lookup table is proposed in [8]. In [6] and [12] an AC/DC converter is used. Paper [10] proposes a PV simulator based on Push-Pull forward converter. A buck converter is best solution for a low cost PV Emulator. In this paper a Switch Mode Power Supply (SMPS) based cloud connected PV Emulator is presented.

2. System Description

Fig.1 below. The proposed PV Emulator is a programmable power supply designed to emulate solar panels. With fast transient response, the emulator responds to change in load conditions and maintains the output on IV characteristics of the selected panel for a given ambient condition. Figure 1 illustrates the block diagram of SMPS based PV Emulator which is four channel device, where each channel serve as a panel. These channels can be

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Security Constrained Optimal Power Flow Problem Solution with Practical Constraints using HALOA

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Abstract*: To solve the OPF problems with three objective functions like fuel cost minimization, emission and power loss. The proposed algorithm is hybridizing conventional Anti Lion optimization algorithm with Genetic algorithm. The considered objectives are solved by considering the equality and in-equality constraints along with practical constraints. The effectiveness of the proposed method is tested on the IEEE 30 bus test system and compared with existing literature. The proposed method gives the best optimal values for the minimizing the considered objectives.

***Keywords* : Ant lion optimization, OPF, Practical constraints, crossover operation, generation fuel cost, emission, transmission loss.**

I. INTRODUCTION

Optimal power flow (OPF) is used in power system optimization. OPF represents the best operating levels for the existing system in order to meet the demands given throughout the transmission network, usually with the considered objectives of minimization of cost, emission and transmission losses. OPF was first introduced in the year 1962 by Carpentier. It is being discussed since then. It is considered to be a large, nonlinear mathematical programming problem. There are two types of methods in optimization: conventional and intelligent methods.

There are several optimization techniques implemented recently to solve many electrical problems, some of them like GA, DE, EP, PSO, Tabu Search (TS), SA, ACO, ABC, CSO have been suggested [1-9]. Dr. Syedali Mirjalili [10] proposed an Ant lion optimizer (ALO). This proposed algorithm was analyzed in three different forms such as mathematical functions, classical engineering problems and shapes of two propellers are optimized. A.Salhi, D.Naimi and T.Bouktir [11] proposed OPF using ant ALO technique and compared with existing literature. Khalid. H. Mohamed and K. S. Rama Rao [12] proposed optimization algorithms for OPF problem solution. They concluded that intelligent techniques are more suitable when compared to conventional methods for optimal power flow.

In the above literature while solving the OPF problem they are not considered the practical constraints such as ramp rate limits and prohibited operating zones. In this paper along with equality and in equality constraints, practical constraints has been consider for OPF problem to test the effectiveness of the proposed HALOA

II. PROBLEM FORMULATION

The optimization problems as follows:

$$Min\left[C_n(x,u)\right]; \qquad \forall n = 1,2,....,m \tag{1}$$

Subject to $p(x,u) = 0$

$q(x,u) \le 0$

Where $'p'$ and $'q'$ are constraints, $'x'$ & $'u'$ are dependent and control variable

A. Objective Function

The objective functions are as follows:

i. Generation fuel cost

The generation cost function as follows:

$$F_i(P_{Gi}) = a_i P_{Gi}^2 + b_i P_{Gi} + c_i \ \$/h$$

Where a_i, b_i and c_i are generation fuel cost-coefficients of i^{th} unit.

Generation cost for all units

$$C_1 = \min(F_T) = \sum_{i=1}^{N_G} F_i(P_{G_i}) \ \$/h \tag{2}$$

ii. Emission

The emission generated can be approximated as

$$C_2 = \min\left(E(P_{G_i})\right) = \sum_{i=1}^{N_G} \alpha_i + \beta_i P_{G_i} + \gamma_i P_{G_i}^2 + \xi_i \exp^{(\lambda_i P_{G_i})} \ \text{ton/h} \tag{3}$$

Where α_i, β_i, γ_i, ξ_i and λ_i are emission coefficients of the i^{th} generator.

iii. Total power loss

$$A_3 = \min(TPL) = \sum_{i=1}^{N_{line}} P_{Loss,i} \ \text{MW} \tag{4}$$

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Squirrel Search Algorithm for Solving Optimal Reactive Power Dispatch Problem with FACTS Device

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Abstract*: In this paper, a novel algorithm which is being inspired by the natural foraging phenomenon of squirrel, called as Squirrel SSA for solving optimal reactive power dispatch (ORPD) problem of power system, in which FACTS device namely, UPFC is incorporated. Power Injection Modeling (PIM) and Current Injection Modeling (CIM) of UPFC are considered, both are compared for determining the best modeling technique of UPFC which can be incorporated in power system. The performance and possibility of the proposed algorithm are validated on IEEE 30-bus power system. Results obtained are compared with the other recent algorithms to show the superiority of SSA.

Keywords* : Squirrel Search Algorithm (SSA), ORPD problem, UPFC, generation fuel cost, transmission line losses.

I. INTRODUCTION

In the recent years, power system's development, mainly transmission network has been increased because of higher requirement in industries and deregulation. Thus, new ways to maximize the power transfer and effectively using existing transmission network has become an important aspect which is to be considered with balancing the acceptable levels of the stability. One of the ways is to incorporate the latest emerging power electronics devices i.e., FACTS (flexible AC Transmission system) controllers including TCSC, SSSC and UPFC which can vary the system parameters effectively, the detailed explanation regarding these devices are referred from [1].

On the other hand, solution of OPRD problem lead to improvise the planning and operation in the power system. Usually, OPRD is considered as a complex, nonlinear problem that can minimize the general objectives including generation fuel cost and transmission line losses. This can be achieved by identifying optimal values of control parameters which includes generator's voltage, tap-changing transformers, and shunt capacitors. Whenever power system is operating, the changes in demand exhibit to vary the generation of reactive power and then load voltages also suffer fluctuations. The voltages may be adjusted by suitable reactive power controlling devices. For solving the OPRD problems, a number of classical and metaheuristics optimization techniques have been developed by researchers in past decades. Classical techniques include gradient methods, linear programming, nonlinear programming, quadratic programming, interior point and Newton formulation [2-5], but these techniques cannot be used to solve problem of large-scale power systems and sometimes it led the solution to be stuck in local minima. On the other hand, the metaheuristic optimization techniques such as genetic algorithm [6], GSA [7], simulated annealing (SA) [8], grey wolf optimizer [9], PSO [10], ABC algorithm [11] and many more algorithms had been developed which are considered as intelligent algorithms which help to overcome the problem faced in classical approaches.

Similarly in this paper, a novel squirrel search algorithm [12] is used for solving OPRD problems with incorporation of FACTS device i.e. UPFC. This paper deals to identify the most suitable way of modeling UPFC among PIM and CIM [13]-[14] of UPFC and furthermore optimal values for considered objectives is compared with existing algorithms for IEEE 30-bus standard test system.

II. STEADY STATE MODEL OF UPFC

A. Power Injection Modeling of UPFC

PI model of UPFC is referred from [13] is shown in Fig. 1. This modeling helps to understand the effect of the UPFC on the system in the steady state condition. Furthermore, it can be incorporated in the power flow model easily. The modeling of UPFC is expressed as

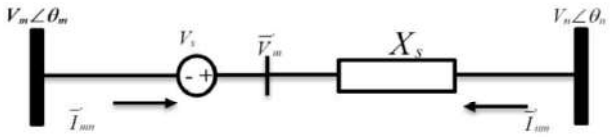

Fig. 1. Representation of VSC of UPFC

where, $\overline{V}_m = V_s + V_m$ and $V_s = rV_m e^{j\gamma}$, directs the limits for the operation of UPFC which are: $0 \le r \le r_{max}$ and $0 \le \gamma \le 2\pi$. Final elements of equivalent power injections are:

$$P_m^{UPFC} = rB_s V_m^2 \sin\gamma - rB_s V_m V_n \sin(\delta_{mn} + \gamma) \quad (1)$$

$$Q_m^{UPFC} = rB_s V_m^2 \cos\gamma \quad (2)$$

$$P_n^{UPFC} = -rB_s V_m V_n \sin(\delta_{mn} + \gamma) \quad (3)$$

$$Q_n^{UPFC} = rB_s V_m V_n \cos(\delta_{mn} + \gamma) \quad (4)$$

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Performance evaluation of different structures of power system stabilizers

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ABSTRACT

The electric power from the system should be reliable and economical for consumer's equipment satisfaction. An electric power system consists of many generators, transformers, transmission lines, loads, etc. For the power system network, dynamic performance and stability are important. The system is lost its stability by some disturbances i.e., load variations, generator failure, prime mover failure, transmission line outage, etc. Whenever load variations in the system, generator rotor speed will vary, means oscillations in the rotor speed, which is deviating from rated speed. The excitation system will control the generator rated line voltage. When fault occurs at any equipment in the system, the system will unstable. If fault occurs at generator, the generator oscillates. To reduce the oscillations and to make the system stable used power system stabilizers (PSS's). Here, three types of PSS's are used i.e., PSS1B, PSS2B, PSS4B. Comparisons of three PSS's are on the multi machine system under some disturbance. From the observations, concluding that PSS4B is quickly control the oscillations in the physical parameters of machine in the system than other power system stabilizers.

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1. INTRODUCTION

Modern power system is interconnected with multiple machines, transformers, transmissionlines, loads. The supply should be reliable and economical electric energy is major requirement of industrial progress and consequent rise in the standard of living. The frequency and voltage should be held within allowable tolerances to satisfy consumer's equipment operation. With Deregulation of power supply system, Power transmitting to various places wherever it is required. Here, dynamic performance and stability are important. The system lost its stability under certain faults i.e.,generator failure, prime mover failure, transmission line outage, load variations, etc.These disturbances affect the power system variables such as frequency and voltage this leads to instability of the system. The stability is defined as when a disturbance occurs in the electric power system, the system regains its original state after the disturbance [1, 2]. The stability problem is related with the behavior of the synchronous machines under disturbed conditions. When the system changes its operating point from one stable point to the other, it is mandatory that all interconnected synchronous machines should remain in synchronism. i.e., machines should connect in parallel with same speed [3]. In [4] this, proposed new polymorphic bacterial chemotaxis optimization

Design and Development of a Hybrid Micro-Grid System using State of Art Multi-Objective Optimization Technique

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Abstract

Distributed Generators are gaining significantimportance in bridging the gap between limited generationcapacities and steeply increasing demands. Anovel multi-objective optimization algorithm will been developed to identify the optimal sizing of DG units (solar PV, windmill, battery and diesel system) to beplaced in the distribution system, based on certain performanceindices like emission and generation cost minimization and also an optimal sizing methodology for the DG units will been formulated. The operation results of PV-wind-diesel-battery hybrid power system verify the effectiveness of the micro-grid system, and the optimal operation of energy system and improved control method of micro-grid should bepaid more attention. Considered micro-grid system will be fabricated to verify the simulation results. During experiment both emission and generation cost minimization will be considered for analysis.

Keywords: Hybrid micro-grid system, Power management Scheme, Multi objective optimization, batteries, optimal control.

1. Introduction

Today's world depends on an uninterrupted flow of cost-effective electricity. However, many variables, including severe storms, outages, aging infrastructure, and cost pressures can lead to uncertainty in power generation and distribution. Organizations are turning to micro-grids to lower risks and improve operational performance. Micro-grid applications shift control to local users and help them create energy independence [1-5].

In this work it is proposed to provide methodology, the wind turbines (WT), Photovoltaic (PV) module, battery energy storage system (BESS) and diesel generator are utilized to keep a continuous power to meetthe power required by load in hybrid micro grid systems (HMGS).

Performance and cost analysis for 400kWp Grid Connected PV system in Tirupati using PVsyst software

M Balasubbareddy

Abstract

Solar system is important alternative electrical sources of energy for houses, Institutions and industry. Recent development in solar technology solar energy system is more attractive source of energy for micro grid system. The generation capacity of PV system at a particular area can be calculated through PV Syst software. In this paper 400kWp solar system performance and cost analysis has been analysed for solar system in Tirupati city Andhra Pradesh, India. This study focuses on the analysis of energy generation, cost analysis and payback period calculation for the considered system. The result obtained showed that cost of generation per unit in solar plant is very less when compare to grid power and also payback period is 3 years

Power Quality Enhancement using Unified Power Quality Conditioner

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***Abstract*— In this paper presents a style of a Unified Power Quality conditioner (UPQC) connected to 3 section four wire system (3P4W). The neutral of series electrical device employed in the fourth wire for the 3P4W system. The neutral current which will flow toward electrical device neutral purpose is paid by employing a four-leg voltage supply electrical converter topology for shunt half. The series electrical device neutral are at virtual zero potential throughout all operational conditions. during this simulation we tend to observe the facility quality issues like unbalanced voltage and current, harmonics by connecting non linear load to 3P4W system with Unified Power Quality conditioner. a brand new management strategy like unit vector guide is employed to style the series APF to balance the unbalanced current gift within the load currents by increasing the thought of single section P-Q theory. The P-Q theory applied for balanced 3 section system. And even be used for every section of unbalanced system severally. The MATLAB/Simulink primarily based simulations area unit provided the practicality of the UPQC**

Key words - Series active power filter, Shunt active power filter three-phase four wire system (3P4W), P-Q theory, Harmonics, power quality, unified power quality conditioner (UPQC)

I. .INTRODUCTION

The power electronic devices thanks to their inherent non- dimensionality draw harmonic and reactive power from the availability. In 3 section systems, they may additionally cause unbalance and draw excessive neutral currents. The injected harmonics, reactive power burden, unbalance, and excessive neutral currents cause low system potency and poor power issue. the planning of shunt active filter is delineate. the utilization of the subtle equipment/loads at transmission and distribution level has raised significantly in recent years thanks to the event within the semiconductor technology. The instrumentality desires clean power so as to operate properly. At

Reduction of Negative Sequence Correction in Grid Interfacing Inverter with Integrated Voltage Unbalance Correction

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Abstract: This paper presents the control of a grid interfacing inverter with integrated voltage unbalance correction. It is proposed to add an additional function to the inverter to decrease the negative-sequence voltage at the point of connection with the utility grid. Based on symmetric sequence voltage decomposition and using an improved multi-variable filter, the grid-interfacing inverter intentionally absorbs a small amount of negative-sequence current from the grid, thereby helping to correct the negative-sequence voltage. Although the amplitude reduction contributed by each individual inverter system is small compared to the total negative-sequence component, grid interfacing inverter modules can collectively achieve substantial results in the grid. The integrated function and proposed control has been verified in simulations and by experiments on a laboratory prototype.

Keywords: *We would like to encourage you to list your keywords in this section*

1. INTRODUCTION

For practical three-phase power systems, problems of Voltage unbalance exists. The problems are mainly caused by unbalanced distribution of single-phase and nonlinear loads. Together, these induce unequal voltage drops across transformers and line impedances. These negative sequence voltages are especially troublesome in practical applications, contrary to zero-sequence components which do not exist in three-wire systems. The effects of voltage unbalance are quite severe for electrical machines, power electronic converters, and drives. There are power electronic converters designed for mitigation of voltage unbalance of the utility grid that work by regulating reactive power, but this approach is not suitable for underground cables where the resistance of a cable dominates its inductance. To maintain a balanced voltage at the load terminals, an often used idea is to inject a series voltage. It is straightforward to mitigate the voltage unbalance problem with such converters, but a disadvantage is that they are unused or only lightly loaded when there are no voltage unbalance problems. For dealing with other power quality problems than voltage unbalance, so-called unified power quality conditioners (UPQC) are proposed and continuously improved. However, the UPQC has no energy storage capabilities, and should be extended to cope with distributed generation (DG). Facing the emerging application of distributed generation, power electronics-based grid-interfacing inverters are playing an important role interfacing DGs to the utility grid. In addition to conventional delivery of electricity, ancillary functionality for improvement of power quality problems is being introduced into grid-interfacing inverters. In this paper, it is proposed to integrate voltage unbalance correction

Modeling and Simulation of Linear Electro Mechanical actuator for Missile Application with high redundancy

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Abstract. The military, defense missiles are self propelled systems with high security, reliability, and accuracy in targeting the obstacle. The firing of missiles is considered as milestones in growth of research areas. In such field, Electro Mechanical Actuator (EMA) helps to maintain the altitude of missile path, which is predefined path. Moreover, As EMA is exposed to environmental aspects, the altitude of missile may get altered. So on replicating the critical components i.e., BLDC drive and power inverter in EMA based control systems, the accuracy in monitoring the altitude is improved without any interruptions and with high reliability. This paper proposes dual redundant power inverter system to run BLDC motor with redundancy management and logic, fault tolerant and fault diagnosis by using MATLAB/SIMULINK with the results.

Keywords: Missile, Electromechanical actuator (EMA), Dual redundant, Inverter, BLDC drive, Fault diagnosis.

1 Introduction

Military defense systems [1] involve updated technology in firing, detection, tracking, attacking of against missiles. Military missiles can be surface to air missiles, surface to water missiles, air to air missiles to protect India and in advancement in technology aspect. In such defense applications, an expertise, and mastered, highly equipped control architectures are required. In such control surfaces, EMA plays a key role and it should be capable to act according to the desired conditions. A subsystem of an EMA includes power electronic circuitry, intelligent controller, an BLDC drive, ball screw mechanism for position detection, and its associated components. In order to decrease the complexity, the replication of building block is enough to meet the criteria. As the fundamental structural blocks in EMA are power converters and BLDC drive, designing of these components became a challenge. In some of the missiles, EMA is installed in two stages each for some amount of distance and it is triggered through battery. The concept of missiles are completely different as in aircraft. A simple fault occurrence in any subsystem of electromechanical actuator leads to whole outage in the system and investment would be in risk. So, missile applications also require safety and accessibility, So 'Redundancy management' is necessary.

Dual redundant[3] logic is a combination of two modules, each module is having three phase power inverter stage and BLDC motor windings as shown in the below Fig.1.

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Performance of BLDC Motor for Enhancing the Response of Antenna's Positioner Using PI Controller

Bhaskaruni Suresh Kumar, D. Varun Raj & Segu Praveena

Conference paper | First Online: 23 April 2020

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MPPT SCHEME INTENDED FOR PHOTOVOLTAIC ARRAYS IN PARTIAL SHADING SITUATIONS BASED FUZZY LOGIC CONTROLLER

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ABSTRACT

The power–voltage characteristic of photovoltaic (PV) arrays displays multiple local maximum power points when all the modules do not receive uniform solar irradiance, i.e., under partial shading conditions (PSCs). Conventional maximum power point tracking (MPPT) methods are shown to be effective under uniform solar irradiance conditions. However, they may fail to track the global peak under PSCs. This paper proposes a new method for MPPT of PV arrays under both PSCs and uniform conditions. By analyzing the solar irradiance pattern and using the popular Hill Climbing method. However, the disadvantages of Hill Climbing method is that it has very poor dynamic response and the operating point keeps fluctuating around the maximum power point during steady state operation. So in this paper the emphasis is given to the fuzzy logic controller design and a comparison is made between fuzzy logic controllerswithHill Climbing method and conventional Hill Climbing method. The algorithm implemented here was used to track the maximum power of a day. The implementation used a fuzzy logic controller and a DC-DC converter is used to maintain the PV output power at the highest level all the time. All the results are simulated using MATLAB/SIMULINK.

Key Words: Photovoltaic (PV) array, MPPT, Fuzzy logic controller, Hill climbing method, DC-DC converter

I. INTRODUCTION

Popular MPPT methods like perturbation and observation (P&O), hill climbing (HC), and incremental conductance (IC) methods are shown to be effective when the solar irradiance condition is uniform for all PV modules. Since, the tracking becomes more complicated under partial shading conditions (PSCs), i.e., when all the modules do not receive uniform solar irradiance, these basic methods fail to track the GP.

Though in uniform solar irradiance conditions the P-V characteristic of PV array has just one peak, the P-V characteristic of PV array displays multiple peaks under PSCs. Hence, several MPPT methods are proposed which are applicable in PSCs.

Many researchers and industry delegates from all over the worldhave developed several MPPT algorithms. Some of these algorithm like perturbation and observation(P&O) method, fuzzy logic control method, linear approximation method, incremental conductance method, voltage feedback method, hill climbing method, actual measurement method and so on [14-15]. Appropriate MPPT method alongwith good weather conditions are required for implementing maximum performance of a photovoltaic system [9-11]. This paper mainly focuses on studying and comparing execution efficiency, advantages, disadvantages for two power-feedback type MPPT methods, including perturbation & observation (P&O) and fuzzy logic (FL) methods. For implementation of modelling and simulations tasks, and to compare execution efficiency and accuracy for selected MPPT methods Matlab/Simulink is used in this paper. In [4], the HC method has been improved. It can efficiently detect the shading condition. Then, by measuring power in suitable points, it chooses the highest one and performs the HC around this point. However, it does not have an acceptable accuracy for tracking the GP, since it compares the power of points near the LPs instead of the LPs themselves. In [13], a modified P&O method has been introduced which benefits from a unique characteristic that has been observed in the P-V curves. Although it has a great performance, since almost two measurements are done for each LP, the tracking speed is low. In [14], it is claimed that the GP is around the intersection of the I-V characteristic of PV arrays and a certain line. It depends on short circuit current of array which is problematic [1]. This problem is almost resolved by updating this value based on the solar irradiance. However, it is uncommon to find sensors that measure solar irradiance levels [1].

Performance of Five Level Inverter with Different Multilevel Topologies

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Abstract

An inverter is a power electronic converter which converts DC voltage to AC voltage at required voltage and frequency and is classified into basic two level inverter and multilevel inverter. Conventional inverter requires switches of high rating and also suffers with large dV/dt and provides more THD in the output. In order to overcome the above drawback multilevel inverters are used. Multilevel inverter is an alternative in high power and medium voltage situations which is operated through multiple switches.
There are different topologies in the process of realization of multilevel inverter such as diode clamped, flying capacitors and cascaded H-Bridge topologies which requires more number of switches. In this paper a new topology multi winding transformer is introduced which is simulated in MATLAB simulink environment whose performance is compared with conventional multilevel inverter topology

Keywords— **Multi Level Inverter, Topology, Multi winding transformer, Total Harmonic Distortion, Gating signals**

I. INTRODUCTION

The global electrical energy consumption is rising exponentially day by day and there is a steady demand to increase the power capacity. It is expected that it must be doubled within 20 years. Deregulation policies of electrical energy have reduced the outlay establishing larger power plants, which gives rise to the necessity for construction of more sources of electrical power which may force two possibilities to play key roles to solve the future problems. First one is to replace the sources of electrical power generation from the conventional, i.e. to increase the usage of renewable energy resources and the other is to increase the efficiency of power transmission/distribution and end-user application in which power electronic converters are gaining more importance day by day.

The power electronic converters are electronic devices used for conversion of electrical energy from one form to the another form. It can convert DC to AC using a converter called Inverter. Likewise, it have different combinations like fixed AC- variable AC of same frequency (AC Voltage Controller), AC-DC(Rectifier), DC-DC(Chopper),fixed AC- variable AC of different frequency (Cyclo-Converter). To convert constant AC to Variable AC Cyclo-Converter is used. But rather than using cyclo-converter using a rectifier and inverter is most economical and less hormonic distortions. A conventional two-level inverter has several disadvantages like stresses on the switches, high Total Hormonic Distortion(THD), more THD effect the lifetime of the inverter. To overcome these problems several methods have been proposed by using Multilevel inverters. In which multi-level inverters are more advantageous.

Komal Satose, et.al. [1] presented an analysis on different multilevel topologies in which it was mentioned that multilevel inverters are very popular and have many applications in electric utility and for industrial drivers. The paper compares three different topologies of inverters (Diode clamped inverter, Flying capacitor inverter and Cascaded H-bridge inverter). The comparison is done with respect to cost, power losses and Total Harmonic Distortion(THD). MOSFETs and IGBTs are used as switching device for analysis

E.S Deepak [2] proposes a simple cost effective multilevel topology for generating high quality sinusoidal AC waveform based on multi-tapped multi-winding transformer switching technique. Tiirev Sarikurt [3], presented a paper on A multilevel system design with multi winding transformer. Also a

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A Novel Modified Voltage Oriented Control of an Active Front-End Rectifier used for PMSG based Wind Turbine Systems

Kowstubha Palle, A Bhanuchandar

Abstract: ***This Paper proposes a Novel and Modified Voltage Oriented Control (M-VOC) strategy of an Active Front-End (AFE) Rectifier that can give unity power factor at input side and regulated DC voltage at output side with reversible/bidirectional power flow. The proposed rectifier with M-VOC can find its place in applications like Wind energy conversion systems, DC load for electronic equipment, and adjustable AC drives. Simulation Analysis is done on this M-VOC strategy for an Active Front-End (AFE) Rectifier on MATLAB/ Simulink platform with the verification on the validity of the proposed system. The proposed Rectifier with M-VOC strategy gives good transient/dynamic response for the variations of load at output side. It also gives a pure sinusoidal input current with the elimination of harmonics so that this proposed Rectifier can be used in the case of back to back 2/3 level voltage source converters of wind energy systems that supports bidirectional power flow.***

Keywords**:** ***Converter control, harmonics, dynamic response, Unity Power Factor, AFE Rectifier, Wind Energy Systems.***

I. INTRODUCTION

The main advantages of three-phase rectifiers with diode bridge circuit and a bulk storage capacitor are being robust and simple giving rise to low cost. However, the limitations posed by these diode rectifiers are unidirectional power flow, input side harmonic currents and low power factor. Some of these limitations can be overcome with thyristor based rectifier circuits that introduces the possibility of control of power flow with the control of firing angle given to thyristor. This happens as the output voltage is a function of line voltage as well as firing angle (for controlled rectifiers).[1]-[3] However, thyristor based rectifiers do face limitations like low power factor, harmonic pollution as in case of diode rectifiers. In thyristor based rectifier, as the value of firing angle increases the phase displacement of the input current with respect to the source AC voltage shifts which correspondingly increases the amount of fundamental reactive power. [4]

At this juncture, a power converter capable of both the active filter operation and Active Front-End (AFE) Rectifier has come into existence. Such a combination operates as a PWM rectifier to supply DC power and at the same time operates as an active filter to supply to the AC line a compensating current equal to the harmonic current produced by the nonlinear load connected to the same AC line. Fig.1 represents a three-phase AFE Pulse Width Modulated (PWM) rectifier with high frequency operation. But, the limitation of AFE rectifiers is its higher cost in comparison with the conventional diode and thyristor based rectifiers. However, AFEs are recommended as it allows the elimination of power factor correction systems and AC harmonic filters at the input side. In recent years, Active Front-End (AFE) rectifiers are playing a vital role in the applications like power supplies for electronic equipment, adjustable DC drives, grid connected renewable sources, battery-chargers, and in various kinds of household appliances etc. [5]

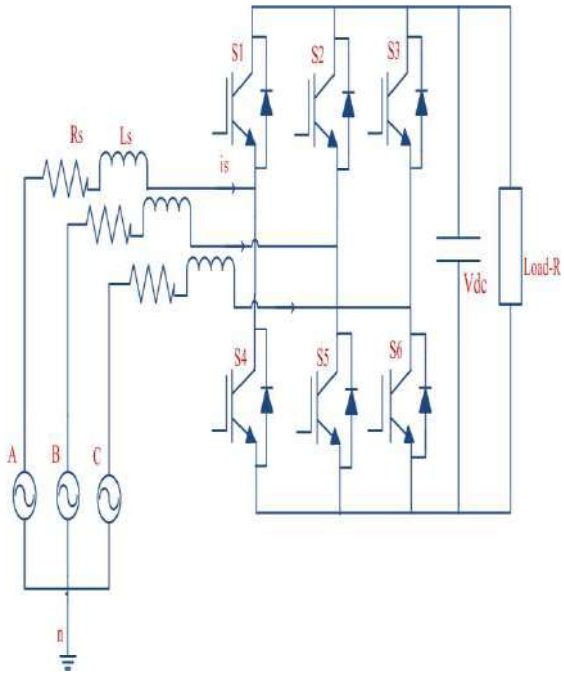

Fig.1 Basic Active Front End Rectifier

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Comparison of Symmetric and Asymmetric Cascaded H-Bridge Multilevel Inverters using Multicarrier PWM technique

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Abstract - *Multilevel inverters have become a promising power conversion technology for number of applications in renewable energy systems, flexible ac transmission systems and high voltage direct current systems. For a medium voltage grid, it is troublesome to connect only one power semiconductor switch directly as voltage stress on the switch increases its lifespan gets decreased. As a result, a multilevel power inverter structure has been introduced as an alternative in high power and medium voltage situations. The three main topologies in Multilevel inverters are Diode clamped(Neutral clamped), Flying capacitor(capacitor clamped) and cascaded H-Bridge type. Of the above mentioned three the cascaded H-bridge has become popular due to its simpler design and modular property. Further the cascaded H-bridge type can be classified into two types on the basis of equality of input DC sources into Symmetric and Asymmetric cascaded inverters. This paper presents the comparison of symmetric five level inverter and Asymmetric seven level inverter. The symmetric topology consists of two equal DC sources and the Asymmetric topology consists of two DC sources which are in the ratio of 1:2. The two topologies are simulated in MATLAB/Simulink and the results are obtained by connecting these topologies to asynchronous induction motor.*

Key Words: Multilevel inverters, Symmetrical, Asymmetrical cascaded H-bridge multilevel inverters, Total Harmonic Distortion(THD), Carrier based Level shifted Pulse width modulation(PWM).

1. INTRODUCTION

Multilevel inverters include an array of power semiconductors and DC voltage sources, the output of which generate voltages with stepped wave forms. The commutation of the switches permits the addition of the DC voltages, which reach high voltage at the output, while the power semiconductors must withstand only reduced voltages. By increasing the number of levels in the inverter, the output voltages have more steps generating a staircase waveform, which has a reduced harmonic distortion. However, a high number of levels increases the control complexity and introduces voltage imbalance problems.

Multilevel inverters are more advantageous than two level inverter owing to their,

- Quality power output with reduced Harmonic content
- High voltage handling capability
- Low Electromagnetic Interference(EMI)
- Low switching losses and Higher efficiency

The diode clamped multilevel inverter topology uses diodes to clamp the DC bus voltage to achieve steps in the output voltage. But diode clamped topology has the disadvantage of the capacitor imbalanace where each capacitor is required maintain the voltage which demands a control circuit to ensure this. Also their is a quadratic relation between the number of diodes and output levels to be produced, which for higher levels make the circuit cumbersome.

The flying capacitor topology uses capacitors to clamp the DC source voltage to produce the stepped output voltage. This topology require a large number of storage capacitors and also require a separate circuit to track the voltage across the capacitors and the requirement of more number of capacitors make the circuit bulky and costly.

The third type cascaded H-bridge is formed by the series connection of single phase inverters or H-bridges(see Fig 1.0). These are also referred as 'multicells'. Each multicell is capable of producing three output voltage levels. If 'V_{dc}' is the input DC source then the possible output voltage levels are '$+V_{dc}$', 0 and '$-V_{dc}$' , and cascading of such cells with the employment of suitable control mechanism (multicarrier PWM, Space vector modulation, Selective harmonic Elimination) can produce varied output levels with reduced harmonic content.

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Control Quality Enhancement of Inverted Pendulum Using Fractional Controller

K. Muralidhar Goud & C. Srisailam

Conference paper | First Online: 24 March 2020

Part of the Lecture Notes in Electrical Engineering book series (LNEE,volume 626)

Abstract

This manuscript deals with a fractional PID controller which is proposed for inverted pendulum

INTERNATIONAL TRANSACTIONS ON
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RESEARCH ARTICLE

Control and state of charge balancing algorithm for modular multilevel STATCOM with distributed ultracapacitor-based energy storage system at the DC link

Anil Bharadwaj, Suman Maiti

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Instantaneous Symmetrical Component Theory (ISCT) Controller for Mitigation of Harmonics in Micro-grid System

Devireddy Sathish, Gajangi Arun Kumar, Chowdary Vinay Kumar

Abstract: ***Now a days, the usage of non-linear loads are increased rapidly which increased the power quality (PQ) problems in electric power system like voltage sag and swell, harmonics, etc., in the mentioned problems, one of the major significant PQ problem is the harmonics. This paper proposes the power quality improvement by using Shunt Active Power Filter (SAPF) in AC Electric supply System feeding 3-phase balanced non-linear load. For reduction of harmonics in the system, the Instantaneous Symmetrical Component Theory (ISCT) based controller along with the other controllers named PI controller and Hysteresis current controller are which helps in the micro-grid system. In this, hysteresis current control compares the difference of compensating current, load current with filter current of DSTATCOM. In the proposed method, DSTATCOM has shown good performance in the system to eliminate harmonic component. The system performance is simulated in the MATLAB environment and it is evaluated by calculating the source current Total Harmonic Distortion(THD).***

Keywords: ***ISCT; DSTATCOM; PI Controller; Hysteresis Control; Total Harmonic Distortion (THD)***

I. INTRODUCTION

The integration of voltage and current qualitatively in electrical network ensures the quality of power. The necessary thing in this network is to analyze the voltage and current quality which leads to different power quality problems like sag, swell and poor power factor. From the following discussion, there is a relation between PQ and disturbances in voltage, current, frequency and power factor. Due to the lightning, equipment failure, faults, distortions in voltages, notches, the supply of the AC system becomes non-sinusoidal. The domestic applications will also affect the Power Quality (PQ) ensures the integration of voltage and current qualitatively.

The equipment may lead to the failure or mal-operation due to the power quality problems. Some of the PQ issues that may arise because of the non-linear loads burden, harmonic currents, unbalanced currents and excessive currents in neutral currents.

Types and Causes of PQ problems:

The PQ problems are increasing day- by -day with the increase of electronic equipment. These are classified based on the nature of the disturbance [8]. They are a) transient state b) steady state.

Transient state: This power quality problem occurs in transient nature disturbances such as sags, swell, voltage variations for the shorter duration, power frequencies and fluctuations in voltage will come under this category. The causes for poor PQ such as faults, lightening, weather conditions come under the category of transient state.

Steady state: This power quality problem occurs in steady in nature disturbance such as voltage variations for the long duration, notches, deviation of the waveform, voltage unbalances.

Effects of PQ problems on customers:

PQ problem affect the customers in many ways by damaging the conducting material, causing financial loss for manufacturers, increasing production losses, corrupting data and power utilities. Power quality issues will also affect the protection equipment such as relays, fuses circuit breakers, earthing, grounding, isolators and it may lead to mal-operation of the protective equipment. Power quality also affect the electromechanical measuring instruments such as moving iron instruments, moving coil instruments, the monitoring systems such as critical loads, emergency, etc. The harmonic current increases the losses in electronic equipment and distribution system which in turn leads to the wastage of energy.

Classification of mitigation techniques for PQ improvement:

For improving PQ, there are many techniques are suggested by researchers. These techniques uses passive components, active components, reactors, FACT devices, series compensator, shunt compensator, custom power devices, UPQC'S, converters such as AC-DC, Matrix Converters. The series and shunt compensation can be done using active, passive filters and hybrid filter. By using these two filters, we can reduce PQ problems on load side.

II. DESIGN OF PROPOSED SYSTEM

In AC networks, the power quality issues are compensated by the Active Power Filter (APF) technology [2].The shunt active power filter is used to inject component equal and opposite to harmonic current. The injecting component of current can be obtained from the distorted waveform using the control techniques such as PQ theory,

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An Improved Mosfet Neutral-Point-Clamped Full-Bridge Transformerless Inverter for High Efficiency Distributed Photovoltaic System

Ahmad Syed, Tara Kalayani Sandipamu, Freddy Tan Kheng Suan

Abstract

Transformerless inverters are widely used in grid connected photo-voltaic (PV) distributed system due to reduced size, weight, low-cost and have mainly higher conversion efficiency. But the problems related to the galvanic isolation between the PV strings to the grid, which results dangerous leakage current is generated via parasitic parameters. Many topologies have been investigated based on the elimination of the leakage current with constant common-mode- voltage (CMV). However, neutral-point-clamped (NPC) inverter is the most efficient way for the complete elimination of the leakage current. Recently, MNPC topology has been proposed with low leakage current and high-efficiency. Based on that, here an improved MOSFET neutral-point-clamped (I-MNPC) transformerless photo-voltaic inverter (TPVI) and corresponding control strategy is proposed without sacrificing the overall performance of the PV system. It consists of seven switches and three diodes with a constant common-mode-voltage (CMV) and complete elimination of the leakage current. The performance characteristics of the proposed I-MNPC topology are similar to the M-NPC topology except in the converter structure and efficiency.The operating modes and common-mode behaviour of the I-MNPC are examined in detail.The theoretical findings of the proposed I-MNPC are verified through the Matlab / Simulink environment. Finally, the performance of the proposed I-MNPC inverter in terms of leakage current, CMV and number of components are compared with other well-known non-NPC and NPC inverter topologies.

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Smart Gloves for Specially Challenged People

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Abstract – *People who are specially challenged, i.e. deaf and dumb are unable to communicate with their fellow mates.To overcome this issue, these gloves are designed. With the usage of these gloves, deaf and dumb people can translate hand gestures into visual output as well as audio output. To simplify the daily chores of those people there is functionality in the gloves which can be utilized to control home appliances just by using hand gestures.*

Key Words: gloves, Arduino, rf, sign language

1. INTRODUCTION

In our everyday life, we meet several deaf and dumb people who find difficulty in communicating with others. Deaf cannot speak out their feeling, and dumb cannot hear other people. To simplify the life of such people, we are trying to give an alternate ear and alternate eye to them in the form of an LCD monitor and a speaker. We have also added functionality where the home appliances can be controlled with hand gestures.

To make this complete system possible, we are actually using the flex sensors as a major component. To process the data, two microcontrollers played a vital role named atmega328p and 8052. The variations in finger movements are captured by the flex sensor, and these microcontrollers process them. To make this complete system wireless, we had used RF modules.

2. Literature Review

Research in the sign language system has two well-known approaches, known as Image processing and Data glove. The image processing technique uses the camera to capture the image/video. It analyses the data with static images and recognizes the Image using algorithms and produces sentences in the display. Vision-based sign language recognition system mainly follows the algorithms known as Hidden Markov Model (HMM), Artificial Neural Networks (ANN) and Sum of Absolute Difference (SAD).These algorithms are used to extract the Image and eliminate the unwanted background noise. The main drawback of vision-based sign language recognition system is with image acquisition process which has many environmental apprehensions such as the place of the camera, background condition and lightning sensitivity. Higher-resolution camera takes up more computation time and occupies more memory space. The user always needs a camera and cannot implement in a public place.

Another research approach is a sign language recognition system using a data glove. User needs to wear glove consist of flex sensor and motion tracker(MEMS). Data are directly obtained from each sensor depends upon finger flexures and computer analyses sensor data with static data to produce sentences. The main advantage of this approach is less computational time and fast response in real-time applications. Its portable device and cost of the device also low

So keeping in view of all these challenges, we developed smart tech gadget that is capable of translating sign language into voice and text and also can control AC loads connected to it. What makes this technology exciting is the ability to open up conversations between the people who make signs and speakers in the marketplace, workplace, schools, health care, and civic centres

3. Implementation

The following block diagram represents the complete block diagram of the smart gloves. The system is wireless, and at the transmitter section, i.e. at gloves, it uses a development board based on atmega328p, and at receiving end, it uses board based on 8052 microcontroller.To transmit signal wirelessly, we had used rf transmitter and a receiver module. To track the axis of hand, we had used the accelerometer sensor. So that with the usage of accelerometer we can have commands with same fingers placed in different axis positions.

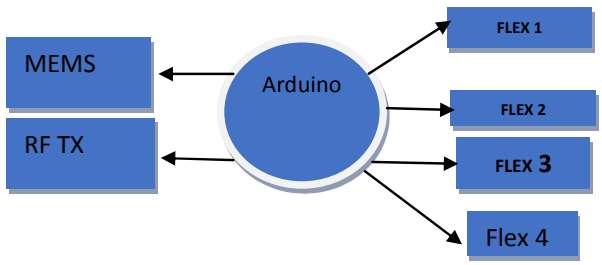

Fig- 1Block diagram Transmitter

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HAND DETECTIONAND TRACKING USING OPENCV AND PYTHON

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ABSTRACT

Man, always strived to do things differently using artificial technology which is trending in the present-day scenario. One among such wonderful ideas there born this "hand gesture recognition and finger counting". In this, see how a human hand will be detected when and how to finger counting takes place. Hand gestures play a vital role in human-computer interaction. In this article, presented a method for hand recognition, detection and the finger count will be done and displayed. Moreover, it is not only meant for fun and entertainment but can also be used in our daily life for various applications. The proposed method is a very efficient method and easy to use for Human-computer interaction. The logic present behind its detection is new and showing robustness over the existing method.

Key words: hand detection, finger counting, hand gesture recognition, human-computer interaction.

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https://iaeme.com/Home/issue/IJARET?Volume=11&Issue=12

1. INTRODUCTION

As it know, the vision-based technology of hand gesture recognition became an important part of human-computer interaction. Over the past few decades, we have been communicating to the computer using a keyboard and mouse. In today's generation, we are using voice-to-text (Speech recognition) methods to interact with computers. But we all know that gestures play an important role in communicating whether it may be a person or a machine. Every gesture has its unique way of expression. So, gestures can be used as a tool for human-computer interaction. That's how the concept of communicating to the computer using handmade gestures was born[1], [2]. The existing methods can detect the hand and count the fingers only when they are placed in the selected region of the area. Moreover, they use other programming languages that involve larger coding which makes it complex[3]–[5]. But the proposed model is capable of detecting and counting all the hands and fingers that are placed in front of the camera and it is made of python programming language which is easy to understand. So, the

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Abstract—**Hvn bo bdujpo sfdphojujpo (HAS) jt b di bmmfohjoh ubtl evf up ui f qsftfodf pg ui f qptf boe ufn qpsbmwbsjbujpot jo ui f bdujpo wjefpt. Up beesftt ui ftf di bmmfohft, HAS-Dfqui jt qspqptfe jo ui jt qbqfs xjui tfrvfoujbmboe ti bqf mfbsojoh bmpoh xjui ui f opwfmdpodfqu pg efqui i jtupsz jn bhf (DHI). A effq cjejsfdujpobm mpoh ti psufsn n fn psz (DBjLTUM) jt dpotusvdufe gps tfrvfoujbm mfbsojoh up n pefmui f ufn qpsbmsfmbujpoti jq fyjtujoh cfux ffo ui f bdujpo gsbn ft. Adujpo jogpsn bujpo jo fbdi gsbn f jt fyusbdufe vt-joh qsf-usbjofe dpowpmvujpobmofvsbmofux psl (CNN). Ui f efqui jogpsn bujpo pg fbdi bdujpo gsbn f jt ftujn bufe boe qsplfdufe poup ui f Y-a qmbof up gpsn ui f DHI. Dvsjoh ti bqf mfbsojoh, ui f ti bqf jogpsn bujpo DHI jt vtfe up usbjo b effq qsf-usbjofe CNN ofux psl. Bz mfwfsbhjoh ui f usbjofe l opxmfehf pg ui f qsf-usbjofe ofux psl, pwfs-ujoh jttvf jt i boemfe. Ui f -ofuwofe ofux psl jt vtfe up sfdphojfi bdujpot gspn rvfsz DHI jn bhf. Dbub bvhn fo-ubujpo jt bepqufe up bwpje pwfs-ujoh pg ui f ofux psl cz wjsuvbmm jodsfbtjoh ui f usbjojoh tfu Ui f qspqptfe x psl jt fwbmvbufe po qvc-mjdm bwbjmbcmf ebubtfut mjlf KUH, XCF tqpsut, JHMDB, XCF101, boe HMDB51 boe bdi jfwft ui f qfsgpsn bodf bddvsbdz pg 97.67%, 95.00%, 73.13%, 92.97%, boe 69.74% sftqfdujwfmz. Ui f sftvmut po ui ftf ebubtfut tvhhftu ui bu ui f qspqptfe x psl pg ui jt qbqfs qfsgpsn t cfuufs jo ufsn t pgpwfsbmmbddvsbdz, l bqqb qbsbn fufs boe qsfdjtjpo dpn qbsfe up ui f pui fs tubuf-pg-ui f-bsu bmhpsjui n t qsftfou jo ui f fbsmjfs sfqpsufe mjufsbuvsf.**

Index Terms—**Adujpo sfdphojujpo, ebub bvhn foubujpo, efqui ftujn bujpo, -of uvojoh, tfrvfoujbmmfbsojoh.**

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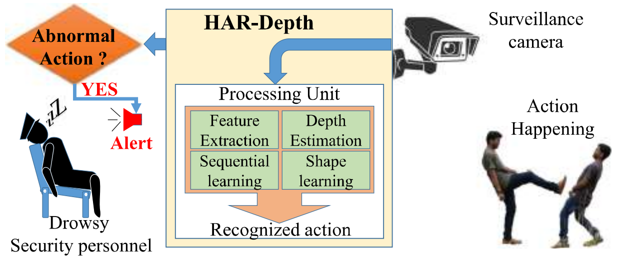

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Identifying Brain tumor presence using Support Vector Machine

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ABSTRACT: The abnormal development of tissues within the brain that affects its activity is referred to as a brain tumor. The accurate detection of brain tumors is an important diagnosis function. The proposed work can classify the given MRI image into the presence of a tumor or the absence of a tumor. Initially, the given MRI image undergoes to prepossessing to remove noise using various filters, then segmentation using OTSU method, the features of segmented MRI image extracted using Discrete Wavelet Transform. The effective features from a bunch of features obtained by using Principle Component Analysis. These features are used to train Support Vector Machine with Radial Basis Function as well as test. The results of the proposed tumor detection method are efficient over literature.

KEYWORDS: Identifying Brain tumor presence using Support Vector Machine

I. INTRODUCTION

With the advancement of image processing technologies like image detection, interpretation and progress, the medical images are evolving rapidly. Medical imagery could be described as the production process for the scientific and medical study and treatment of visible photos of internal body structures and a visible insight into the function of the inner tissues. The whole approach aims at identifying and managing disorders. The quick advancements in biomedical imaging technology over the past two or three decades, with high-resolution, three-dimensional anatomical and physiological images, continue at an accelerating rate, enabling increasingly powerful diagnostic and intervention progress. “The National Cancer Institute defined tumor as an abnormal mass of tissue that results when cells divide more than they should or do not die when they should” [1]–[4]. There have been two different forms of brain cancers, malignant or benign. The malignant tumor is fast-growing throughout the brain cells that carry tissue. Unless this issue is not correctly and quickly observed, it will kill patients [5]. Brain MRI is a simple and safe procedure that uses radio signals as well as a magnetic field to obtain a complete brain imaging. Typically, the treatment of tumor sections in the picture is performed using MRI modalities. Thermal effects cause MR images to have little interference. Thus, it is important to eliminate interference before brain tumor segmentation[6].

The brain tumor detection uses MRS and MRI imaging. Venu, Natesan et al proposed deep learning algorithm for detection of brain tumor[7]. Rehman et al proposed machine learning based algorithm for detection and localization of brain tumor. The low-level features are obtained from segmented superpixels. These features are very helpful for prediction into tumor or non-tumor and further helpful for localization of tumor. Authors claiming this autonomous algorithm results good over literature [8]. Gokulalakshmi et al proposed a classifier to classify MRI images into tumor or non-tumor brain. GLCM features and Discrete Wavelet Transform features are extracted from MRI filtered image. Support Vector machine used to classify the given features in binary types such as tumor or non-tumor images. The outcomes of the simulation are fine, but it takes longer time [9]. The paper detailed as follows. Section 2 describes the proposed brain tumor methodology. The findings of the suggested brain tumor approach in section 3. Section 4 provides conclusions.

II. PROPOSED METHODOLOGY

In the proposed methodology first step, MRI image undergoes to prepossessing. Preprocessing consists of two steps, one is conversion of color image to gray scale image and second step is to remove noise using various filters such as Median, Adaptive Weiner, Gaussian filters. Segmentation involves partitioning the image into two major

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Recognition of Face Emotion using Convolutional Neural Network

Panyam Narahari Sastry, Mohammed Sameer Syed

Abstract*: Recognition of face emotion has been a challenging task for many years. This work uses machine learning algorithms for both, a real-time image or a stored database image in the area of facial emotion recognition system. So it is very clear that, deep learning technology becomes important for Human-computer interaction (HCI) applications. The proposed system has two parts, real-time based facial emotion recognition system and also the image based facial emotion recognition system. A Convolutional Neural Network (CNN) model is used to train and test different facial emotion images in this research work. This work was executed successfully using Python 3.7.6 platform. The input Face image of a person was taken using the webcam video stream or from the standard database available for research. The five different facial emotions considered in this work are happy, surprise, angry, sad and neutral. The best recognition accuracy with the proposed system for the webcam video stream is found to be 91.2%, whereas for the input database images is found to be 90.08%.

***Keywords*: Convolutional Neural Network, Deep Learning, Human Computer Interaction, Machine Learning, Python.**

I. INTRODUCTION

Deep learning is one of the booming and most electrifying areas in machine learning. With recent advancements in graphics processing unit, it is possible to use Deep Learning for real-time applications. Emotions are an incredibly important aspect of human life, and play an important role in human interaction. Facial expressions represent the emotion of a person and it can give an indication of the emotional response of a person to the interaction with a computer. So detecting facial expressions can help create a better user experience. As computers become increasingly worldwide and their relationship with user changes, they need new tools to obtain feedback from their interactions with those users, and respond accordingly. Nowadays, there are different alternatives to extract feedback from users such as heart rate, tone of voice, body movement, body language, etc. However, some of those alternatives are obtrusive to users; or do not provide enough or accurate feedback in order for a system to be reliable.

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Feedback, in the form of user's emotions, offers valuable information that could have a positive impact in different areas such as e-marketing, robotics, smart products, etc. For instance, developers could create a music application that moderately adjusted the kind of music that is being played accordingly to the emotions detected in order that people feeling a negative mood like sad or anger could change those emotions and feel them better.

One unobtrusive alternative that gives a sensible amount of feedback is that the face and particularly the facial expressions. Facial expressions have been considered a good source of information to determine the true emotions of an individual [1]. Even before Charles Darwin conducted "studies on how people recognize emotion in faces" [2], ancient thinkers, such as Aristoteles, already knew the importance of facial expressions. However, it was until Paul Ekman conducted cross cultural experiments around the world that a set of universal emotions, namely surprise, happiness, sadness, fear, anger, and disgust; were finally accepted [4, 5].

In the past, automation of face emotion recognition accurately was unimaginable not only because the computational power was short and costly, but also because of the techniques used executed poorly on image recognition from raw pixels [6]. Although, with the advances in faster Graphic Processing Units (GPUs) and parallelization, the growth of special-purpose machine learning models, and therefore the availability of significant amounts of information, the unimaginable has become possible. To a certain extent, faster GPUs and parallelization are helpful, but getting to a specific answer faster does not guarantee that it is the correct response. Finding the answer which is closer to the correct one or, in other words, learning from data is the purpose of machine learning models. Recently, deep learning that is a part of machine learning is has become popular. Deep learning models have achieved better accuracy than traditional approaches such as SVM or kNN. In the 21st century, HCI products, such as Siri from Apple, Echo from Amazon and Cortana from Windows, became more and more popular in the world. The recent successes of AlphaGo brought machine learning to the world. AlphaGo uses a Monte Carlo tree search algorithm to find its moves based on the knowledge gathering from a pre-train data, which trained by artificial neural network (ANN) [7]. The successful use of machine learning in Go (game) encourages us to sketch a facial emotion recognition system that could be used for HCI and solve facial emotion recognition problem with machine learning. This project is concerned with developing a facial emotion recognition system using a deep learning model, i.e. Convolutional Neural Networks (CNN) in the facial expression domain.

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Information Security using Cryptography and Image Steganography

G. Mallikharjuna Rao

Abstract*: Typically, hackers are ready to hack the confidential documents for their vested interests. The main challenge is to construct a secure relation between the secret message and image quality. To avoid dangerous illegal attacks by the third person, a scheme is proposed to have a combination of cryptography and image steganography techniques. This scheme will enable the security, secret message and image cannot be extracted. The International Data Encryption Algorithm (IDEA) cryptographic algorithms and Discrete Cosine Transform (DCT) based steganography algorithm is chosen for the functionality. Cryptography is used to encrypt and decrypt the document. Steganography to hide document inside an image with increasing payload for the secure transmission of confidential data across the internet. In this paper we present a single application to hide the information by the sender, which is so important document and confidential in the form of files, it will be invisible to unauthorized person. The results of a suggested scheme with respect to PSNR of 90.06 dB with a payload of 52,400 bytes of information in an image.

Keywords: **Data Hiding, cryptography, steganography, Image processing, DCT, IDEA.**

I. INTRODUCTION

In a computerized world, there is a rapid increase in digital data transmissions over the network. The sender and the beneficiary are the two important persons, where they are trying to communicate with each other. People are trying to communicate over the network. Therefore, millions of people are relying on digital world, in such a case, security is the foremost factor.

To overcome this overwhelming situation, data hiding techniques are used for the protection of the secret data [1]. In the means of communication, data hiding plays a key role to preserve the details of the host and the beneficiary. At the same time, while streaming the image on the network, it should not be hacked by the third person.

In the existing framework the extension is restricted to content of documents just without encryption. The current framework is to show a single application, having both cryptography and image steganography.

A. Information Security Techniques

Data Hiding techniques plays a key role to protect the data from the third person. In order to fix the security, authentication, authorization, data integrity is achieved by data Hiding techniques [2]. There are ways, where these techniques are classified into cryptography, steganography, and watermarking. In this paper work, we have proposed to use both Cryptography and steganography. Cryptography is to change the original data; Steganography is to hide original data in an image. We have different approaches to hide the information as shown in fig 1.

1) Cryptography

The cryptography technique is a mathematical model to change the plain text into cipher text using an encryption method. The applied methods are known by the intended persons only.

In cryptography, there are two methods of classification, one is symmetric key cryptography and another one is public-key cryptography methods. Symmetric key cryptography is an encryption standard, where both the parties use the same key for encryption and decryption of messages.

a) Block cipher

Block ciphers are widely used in cryptography algorithms for encrypting huge data into chunks. The plain text is divided into the fixed size of chunks, while the encryption process is generated with a fixed key size. The key length decides the algorithm strength, where IDEA is a symmetric key block cipher.

Stream cipher

There are methods like stream cipher, and block cipher to streamline the data. In case of stream cipher, the data bit is combined with a pseudo-random key to generator a ciphertext. In order to process the data, they are grouped into blocks.

The blocks are encrypted using a key, the normal key size may vary, typical block size is 64 bits. The execution of the block ciphers is much faster than the stream ciphers.

B. Steganography

Steganography is a split word, where stego is secret, graph is writing, it's nothing but secret writing of data into a cover file [3].

Usually, the key generation will depend upon the algorithm and based on the problem of effective security. Depending upon the cover file the steganography methods are classified as

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Iot Based Human Health Monitoring System

T. Aravinda Babu, K.S.R.S.Jyothsna

Abstract: ***IOT has plays important role in the upcoming technologies. It is connecting appliance each other over the internet. The main purpose of this paper is to give better services for remote place patient. Our plan is to design the Human Health Monitoring System based on IOT is measure the patient's Heart rate, temperature, drop down detection and giving the caution in critical situation. It can be used to promote basic nursing care in the hospital environment by improving the quality of care and patient safety. Rural area of India is lack behind from the proper patient monitoring system. The main objective is to give the awareness instruction and also remote monitoring by sharing proper information in an authenticated manner and decreases valuable time of doctors. They don't need to wait for the reports because sensors are giving real time data. It is useful rural areas people.***

Keywords**:** ***Android phone, ESP 8266 WiFi module, LM35 temperature sensor, MEMS sensor, Heart sensor, Arduino module.***

I. INTRODUCTION

Because of expanding work cost, medical institutions would constrain to decrease nursing staff for patients. This paper is to develop new innovations for the use of basic nursing care. In this paper, initiate reliable IOT based healthcare monitoring system. In order to achieve a robust and efficient IOT based communication model that will use strong crypto-primitives to design two communication systems for secure transmission. By designing a separate nursing system that will give a new proportions and each patient can be observe remotely. By this on the basis of derived data if a patient is in critical situation, an immediate instruction can be given to the one who is in charge. It may play a vital role to reduce labor cost, rather will be easy to assess from anywhere anytime and will be helpful to take immediate decision[1].

Wireless healthcare is playing a major role with the upcoming rate of senior citizens, these technologies are commercially available for physical and personal health care, fitness and activity awareness. Plus in addition to that researches have also claimed that applications of such technologies are also used in remote health care for a long term data and to access the medical data of patients .Currently wireless system is playing a important role for various requirements. Traditionally in health check-up Doctors play a major role[2]. As concern to this technique it'll consume a huge time for the process that deals with registration, appointment and check-up and later on reports are generated. The major drawback of this process is patients will mostly ignore or postpone the appointment because of the prolong process. So the overcome that the smart system is designed to reduce the time consumption[3].

The evolution in technology has emphasized the convenience for the people. Human health monitoring system is one of best example that uses IoT. In the past ten years, different technologies used in patients health monitoring system like GSM, RFID, Arduino, ZigBee, Accelerometer etc. IOT equipped the smart life with innovated technology IOT offers an encouraging technology to accomplish the aforementioned health care service[4]. This system is implemented for the old age and physically challenged people those who are cannot visited the doctor for day to day checkups. With the support of IoT, the above system is monitors the health condition without going to the hospital by the patient. This is a wireless, cheaper, reliable, movable system which can be used more easily and also gives a fast response.

Firstly for this paper, we need an Arduino Uno because it is the controller board which is a heart-whole system for the device. As we have three analog input sensors that is LM35 Temperature sensor, MEMS sensor and Heart rate sensor which should be connected to the analog inputs of the Arduino. LCD screen should also be connected to the Arduino to display the output because an Arduino has an Analog to Digital Converter and as usually power supply is given to it. In this health monitoring system we use ESP8266 Wi-Fi module to connect the whole system to a Wi-Fi network. By using this ESP8266 Wi-Fi module, data from the sensors are uploaded to the LCD screen and Android application in mobile as it provides network and we use a step down transformer of 230 volts input which results 12 volts A.C output which is not pure. So to remove harmonics we used CAPACITOR section as a Filter. We use 7805 Voltage regulator which provides 5 volts for the entire whole system. To intentionally increase the heart beat rate we have used momentary switch. To receive pulses from the comparator we used driver circuit which consists of Transmitter, receiver and comparator. As receiver receives pulses from the transmitter and sends these pulses to the comparator. To receive data in Android phone we have used Telnet Android Application.

In this paper, Section1 contains the introduction of the "IoT based Health Monitoring System". Section2 explanation of the proposed method. The components used for developing the proposed system in section3. Section4 presents the working of the proposed System along with flowchart. Section5 summa -rizes the report and explains how the patient health data will be displayed in LCD screen and TELNET Android application with a detailed explanation that will be used to fulfill the objectives of the project with appropriate results. Finally, section6 concludes the work and with a brief note on future scope of the work.

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IoT Based Low Cost and Ageing Healthcare Monitoring System

K. Navya Sree, G. Mallikharjuna Rao

Abstract*: The world's older population needs social care, healthy life, and assistive living. The health consciousness, persons care are major challenges for both researchers and industry. Health monitoring systems afford alternatives to the traditional supervision of aged patients. To reduce admissions to hospital for treatment and the cost of recognized health care. To enable disease prevention and associated lifestyle changes. Therefore, the technology has to play a key role to achieve the aspiration. In order to achieve the real-time intensive care challenge of an individual's health, early interventions and identifying the health conditions are required. In this paperwork, it is proposed to have the knowledge as soon as it causes a heart attack, it is the first step to prevent heart attack or stroke. Usually the fixed health monitoring systems are available only when the patient is lying on the bed in the hospital. This project showcases the implementation of the heartbeat, respiration, blood pressure check, pulse rate, and temperature sensing interfaced to ESP8266. This system development is for the patient at home need to be monitored by family doctor in emergency. Here, the real time patient health information is updated onto the cloud continuously. The data is for further analysis and to monitor the status of health information is retrieved to home devices and to a family doctor in critical conditions. Thus, the system can run effectively and brings a cost-effective design and implementation of data acquisition and manipulation.

Keywords: Internet of Things, ECG, Respiration, biomedical, blood pressure.

I. INTRODUCTION

Technology is becoming essential in our daily life and it is influencing the way we work. Internet of things playing a key role to manage and control our daily life routines. The treatment of medical health data imposes stringent requirements on the system. Health is one of the global difficulties for mankind. In the last 10 years, healthcare has given a prominent role. The primary aim was to develop a system for monitoring patients by health experts, who are either in need or accomplishing their everyday life. Recently, patient health monitoring systems [1] became one of the advanced because of its upgraded technology.

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Nowadays, there is a need for a technologies approach. Among these traditional approaches, healthcare experts play a prominent role [2]. They need to visit the patients for necessary examination and advise. There are two problems related to this approach. Firstly, the healthcare experts must be available at the patient always and secondly, the patient should be admitted to a hospital, all the medical instructions should be followed from time to time [3,4]. To solve these problems patients should be given knowledge and information about disease identification and avoidance. Then a reliable and easily available patient health monitoring system is needed. So, we need to use advanced technology to develop the above-needed system. In recent years, health care sensors along with controller play an important role. Modern health care system introduces new technologies like wearable devices parameters which will monitor physical parameters. We can use different sensors that are available in the market now a day's such as pulse sensors, temperature sensors, pressure sensors, etc. The cost of the sensors varies depending on their size, flexibility, and accuracy.

The parameters monitored in the system are Heartbeat, Temperature, Blood Pressure and Respiration of a patient. Heartbeat is also called Pulse. Pulse is the number of times human heart beats per minute. Normally a heartbeat varies from person to person's heart in beats per minute. The average temperature of the Human body is 98.6º Fahrenheit, but it may slightly vary in the range of 97.8 degrees to 99.1 degrees Fahrenheit or even may a bit higher.

The amount of the blood force against the walls of artery is Blood pressure. Blood pressure readings are expressed as a ratio of two numbers in millimeters of mercury (mm Hg). The systolic gives the pressure in the artery, when the heart beats and pushes blood in the circulatory system. The diastolic gives the pressure in the artery when the heart rests between heart beats.

The respiratory rate is given by the counting number of breaths taken per minute. When a person inhales, then oxygen enters lungs and passages to the organs. If exhale, carbon diox-ide leaves the body. A normal breathing rate plays a key role in balancing of oxygen and carbon dioxide correctly. The threshold levels with respect to the above discussed parameters are shown in the Table - I.

The Internet of Things (IoT) is the associated network between portable devices [5-7], wearable devices and house-held devices, with the controllers to the cloud servers and transfers data over a net without any necessity of human to human or human to computer interaction for the purpose of the communication between patient and the doctor.

ARCHIVES

Detection and Analysis of Closely Spaced Multiple Targets Using Modified Music Method

B. Neeraja, N.V. Koteswara Rao and B. Rajendra Naik

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Abstract

Modern radars not only intercept and track targets but also differentiate and distinguish between multiple targets. The detection capabilities of the radar could be improved even in the presence of noise by using spectral estimation methods such as ARMA (Autoregressive moving average) models, Prony"s method, MUSIC (Multiple signal classification) and novel MUSIC algorithms. The MUSIC algorithm uses eigen value decomposition method to separate noise subspace and signal subspace based on eigen values. Signal subspace contains echoes of multiple targets. In general, the real time signals always operate in the presence of noise. But either the closeness between the frequencies further increases or noise level increases, these methods fail to identify closely spaced targets. In this work, high resolution spectrum estimation method called Modified Music method is developed to improve the detection capability of mutiple targets upto -10dB SNR.

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Design and Verification of AMBA AHB Lite Customized Slave Memory using Vivado

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Abstract— **One of the design aspects of an System on Chip (SoC) includes how different blocks in it are interconnected. Advanced Microcontroller Bus Architecture(AMBA) is an open standard interconnect specification for the blocks to interface with other and used in the design of high performance 32-bit embedded processors and microcontrollers. Advanced High Performance Bus (AHB) Lite protocol which is part of AMBA is intended for high clock frequency and high performance system design.The speed of fetching data from memories is unable to match the speed of processors by using lower version protocols like APB.In this paper, an AHB Lite slave memory IP block is designed to increase memory efficiency and reduce response time.The design is simulated, synthesized in Xilinx Vivado tool and compared its performance with that of the APB protocol memory interface.The customized AHB Lite slave memory IP design achieves significant improvement in response time,throughput and bandwidth.**

Keywords— **System on Chip (SoC),Memory,Intellectual Property(IP), Advanced Microcontroller Bus Architecture**

I. INTRODUCTION

In recent years due to the miniaturization of semiconductor process technology and calculation for endurance in the current market conditions, constant customization is required. The semiconductor process technology is changing rapidly from 10µm to 10nm. Intel, Toshiba and Samsung have reported that the process technology would be further reduced to 7nm in the future. So with increasing design constraints and reducing process technology SoC has been developed, where all the units of a system are designed on a single chip. SoC is an ensemble of different IP cores. There is a unique language where all the blocks talk to each other. All these units or IP blocks communicate easily based on the standard. In this way maintenance ,updating the design and adding the modules will be much easier because all the modules are communicating in a similar language or standards. When these sub modules are connected and all of these sub modules are obeying a specific way of interfacing with the outside world, one biggest advantage is that a library can be created and reuse the designs easily.

Integrating such IP cores in an SoC often requires the addition of substandard logic. Standards of on-chip bus structures were evolved to avoid this problem. SoC buses[1] are used to interconnect an IP core to the surrounding interface. At present, there are few available On chip bus architectures from leading manufacturers such as AMBA from ARM, CoreConnect from IBM, Silicon Backplane from Sonics, etc. Manufacturers offer cores enhanced to work with these bus architectures, therefore require minimal additional interface logic. Bus architecture enables applications spanning the low end to the high end of the embedded SoC space. At the high end, these buses should support multiple processors on bus,DDR2/DDR3 memory controllers[6,8], PCI Express Gen 2/Gen 3, Gigabit and 10-Gigabit Ethernet, and other high speed I/O devices or bridges. At the low end, these buses should support devices like UARTs, I2C, USB, Universal Interrupt Controllers, General Purpose I/O, etc.On chip bus is the backbone of an SoC. Data and control messages are sent through on chip bus to peripheral devices and all computational unit connected to the bus. Use of different bus protocol depends on the architecture of the core. On introduction of RISC architecture, on-chip buses soon became a key component of the 32bit embedded systems and hence there was a need for new interfacing standards [3] for connecting high performance ARM processor to low performance peripheral. On chip communication standards for high performance embedded microcontrollers are defined in Advanced Microcontroller Bus Architecture (AMBA) [7].

Monitoring of Patient Critical Health Parameters by using a Low-Cost IoT based System

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***Abstract*—As population of India increasing, simultaneously patient to doctor ratio has been increased, and doctors have become much busier day by day. Hence, patient monitoring has become difficult. Hence there is a necessity of internet enabled machines and devices for monitoring of health. In this paper, an attempt is made to develop a prototype which does the monitoring of patient critical health parameters by using the IoT technology. In this system, doctor and nurse can monitor several patients at a time from anywhere in the world. The proposed system uses the wearable sensors to measure the health parameters such as pulse signal using pulse sensor, body temperature and body movements can be measured by using MPU6050 sensor and a NodeMCU is used to gather the data from sensors, process it and then send processed data to the web server using esp8266. Doctor and nurse can monitor the health parameters of patients by using the web application, which collects the data from webserver. The authorized person can also monitor the patient health parameters by using mobile application. The proposed system also provides a service of emergency emails to doctor, nurse and authorized person by using IFTTT application.**

***Keywords*— Internet of Things (IoT), Health monitoring, Critical parameters, NodeMCU, MPU6050, Pulse sensor**

I. INTRODUCTION

According to the world census the world population is above 7.2 billion. Past, current and projected the future population growth is figured in [1]. And the projection is said to increase from 8.8 to 10 billion by mid-century. South Africa population is forecasted to increase double in next 40 years and also a rise of 23% in Asia's population [1].As growth of population is increasing rapidly, a major decline in the doctor to patient ratio has been observed. According to World Health Organization (WHO), over 45% of WHO Member States report to have less than 1 physician per 1000 population [2]. India being the second highest population country in the world faces the shortage of doctor. According to the 2017 report of economics time, India has less than one doctor for every 1000 population which is less than the World Health organization standard [3]. According to the 'Doctor Population ratio for India- the reality article', India has a shortage of doctor to population ratio and a very less facility of public health in rural areas [4].

Due to this doctor presence patient monitoring has become difficult. To avoid the chances of severe conditions, an embedded system is developed using internet of things (IoT). IoT is the technology where the indefinite number of things gets connected to the webserver to provide facilities like controlling, monitoring etc. Because of its feature, it is used in many applications like in biomedical, industries etc. Hence, The IoT technology is used in the system.

A prototype is implemented, which monitors the patient health critical parameters like pulse signal, body temperature and body movements. Wearable sensors like Pulse sensor, MPU6050 are used to measure the health parameters whereas NodeMCU is used as a controller of system for gathering, processing and sending the data to the webserver. Thingspeak and blynk are the open source IoT service platforms, where monitoring of data can be done by receiving the data from the webserver. An email emergency sending facility is provided in the system using thingspeak via IFTTT (if this then that).

Section 2 describes about the related work done to implement the health monitoring system. Section 3 deals with the system structure, its behavior etc. Section 4 explains about the various components i.e., hardware as well as software components of the system. Section 5 shows the results obtained during the observation and its discussion. Section 6 finally deals with the conclusion and future scope.

Development of Voice Assisted Application for Real-Time Refrigerator Door control

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***Abstract*— Alexa is a voice-assisted application developed by Amazon and is a popular technology in various voice-enabled applications like smart home automation. Current developments are becoming rapidly important in many implementations in the area of remote voice assistants to boost the consumer experience and also increase screen scale. Internet of Things (IoT) allows connections among various devices through voice. Voice assistants are found in applications from phones to individual computers, in which the assistant is combined with autonomous apps. In this paper, Alexa aided, an IoT based system is designed aiming to modernize the conventional refrigerator by controlling its door (open/close). This system is a low cost and can be efficiently used by all users including physically challenged. The Microcontroller Unit (MCU) interfaced with the motor controller receives a command from the Alexa device, for which the input is a human voice. Upon receiving the command from the device the refrigerator door opens and closes accordingly.**

Keywords— **Voice Assistants, Smart Devices, IoT, Alexa, Refrigerator, MCU.**

I. INTRODUCTION

Voice Assistants have come a long way from doing basic roles to listening to the users' main queries. Additionally, natural teaching algorithms, their fields of operation and thus the reach of automation have expanded with the growth and convergence of speech reconnaissance. The tools with wireless communication capabilities are being rapidly used in tandem [2]. Their expertise is growing, which allows them to meet increasingly complicated consumer demands. The common on the market are:

- Amazon's Alexa.
- Microsoft's Cortana.
- Apple's Siri.
- Google's Google Assistant.

With its skills, Alexa carries out its duties, consisting of a range of skills to react to each request submitted. Each skill has its own sentence for mapping function to Alexa's specific capacity. The skill proceeds to carry out the function on the basis of its instances of, either meet the endpoint on an Amazon Web Service (AWS) Lambda platform or a local consumer network node [1]. The Alexa-enabled app communicates with users via voice interfaces. ECHONET is an accessible networking framework to allow mobile connectivity, power control, remote maintenance, home care connectivity, home protection, and utilities to facilitate a secure life for efficient and low-cost home communications networks [7].

II. LITERATURE SURVEY

C. Z. Yue and S. Ping [3] has introduced an intelligent home network that manages electronic devices at home utilizing the Reverb and Telegram smartphone applications. The reverb framework is used to submit Alexa Voice Services' voice commands in AWS that communicate with a local raspberry pi to activate/disable a computer. The Telegram software is used for text messaging and related functions. Functionality was reduced, however promising findings were obtained, which showed strong potential.

The fundamental premise for a smart home network is that Amruta S Et Al. [4] suggests a computer-based smart home framework for wireless and spoken control and tracking household appliances. The program being suggested is an automated speech recognition tool that identifies and translates words to text commands from MATLAB. The text instruction is transmitted via a ZigBee Remote Control Device to the microcontroller unit. Electrical household devices are operated through its relays. Sonali Sen et Al

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Research article

Smart water quality monitoring system with cost-effective using IoT

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ABSTRACT

Wireless communication developments are creating new sensor capabilities The current developments in the field of sensor networks are critical for environmental applications. Internet of Things (IoT) allows connections among various devices with the ability to exchange and gather data. IoT also extends its capability to environmental issues in addition to automation industry by using industry 4.0. As water is one of the basic needs of human survival, it is required to incorporate some mechanism to monitor water quality time to time. Around 40% of deaths are caused due to contaminated water in the world. Hence, there is a necessity to ensure supply of purified drinking water for the people both in cities and villages. Water Quality Monitoring (WQM) is a cost-effective and efficient system designed to monitor drinking water quality which makes use of Internet of Things (IoT) technology. In this paper, the proposed system consists of several sensors to measure various parameters such as pH value, the turbidity in the water, level of water in the tank, temperature and humidity of the surrounding atmosphere. And also, the Microcontroller Unit (MCU) interfaced with these sensors and further processing is performed at Personal Computer (PC). The obtained data is sent to the cloud by using IoT based ThinkSpeak application to monitor the quality of the water.

1. Introduction

Freshwater is a world resource that is a gift of nature and important to farming, manufacturing, and the life of human beings on earth. Currently, drinking water facilities face new real-world problems (Shafi et al., 2018) (Siregar et al., 2017). Due to the limited drinking water resources, intensive money requirements, growing population, urban change in rural areas, and the excessive use of sea resources for salt extraction has significantly worsened the water quality available to people (Chen & Han, 2018) (Meng et al., 2017). The high use of chemicals in manufacturing, construction and other industries, fertilizers in farms and also directly leaving the polluted water from industries into nearby water bodies have made a huge contribution to the global water quality reduction, which has become an important problem (Cloete et al., 2014). Even due to containment water various water born are increasing day by day, due to which many human beings are losing their lives.

Traditionally, detection of water quality was manually performed where water samples were obtained and sent for examination to the laboratories which is time taking process, cost and human resources (Das & Jain, 2017) (He & Zhang., 2012). Such techniques do not provide data in real-time. The proposed water quality monitoring system is consisting of a microcontroller and basic sensors, is compact and is very useful for pH, turbidity, water level detection, temperature and humidity of the atmosphere, continuous and real-time data sending via wireless technology to the monitoring station (Sugapriyaa et al., 2018) (Barabde & Danve., 2015).

2. Literature survey

Lambrou et al. (2014) discussed the development and implementation of a portable, mobile, cost-efficient and reliable water level control system. Here the authors used two transceivers of radio frequency (RF) and a transmitter mounted on the tank and sump at the place where they wanted to check the quality of water. The RF transceivers used for wireless communication to the internet server. With the help of a microcontroller, the system is fully programmed of the user unless the water the bottle is drained or overflowed. The sensor array is used to measure various parameters such as dissolved Oxygen, Tumble, pH, Temperature, etc. Sensor array. Costs of installation are reduced because of the wireless system.

Prasad et al. (2015) the smart Water Quality Monitoring (WQM) device for Fiji using IoT and remote sensing technologies is shown in this

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Vertical-Horizontal Binary Common Sub-Expression Elimination based FIR Filter using XOR and MUX based Adder for DWT Applications

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***Abstract*— In recent technology, Digital signal processing application will have more priority in the filtering part. In this case, in the digital domain we have n number of filters such as electronic filter, finite impulse response filter, infinite impulse response filter, z-transform filters and so on. In a VLSI domain, the different filter will take a lot of power consumptions and area power products, thus it depends upon arithmetic operations, such as adders and multipliers. Therefore, this proposed work will present a novelty in vertical-horizontal based common sub expression elimination algorithm with using finite impulse response in discrete wavelet transform architecture, and it is integrated with XOR-MUX full adder. This XOR-MUX full adder will have two logic gates and one multiplexer, instead of five logic gate conventional full adder, it will reduce huge area and power consumption in the proposed architecture. Therefore, this architecture of DWT-VHBCSE will integrate on same basic in Xilinx FPGA with using Verilog HDL, and it will prove the performance of area delay product and average power consumptions.**

Keywords : DWT (Discrete Wavelet Transform), FPGA (Field Programmable Gate Array), VHBCSE (Vertical Horizontal Binary Common Sub-expression Elimination).

I. INTRODUCTION

In a digital application gadgets, there will have a lot of features in the recent digital world, for example, audio processing, video processing, data encryptions, software defined radio and so on. Due to population increases in this world, the number of gadgets, mobile phones and digital traffic also increase. For these reason it will take more signal noises, signal interference and fluctuations to cause more power and area in hardware. Therefore, this proposed work will introduce a reconfigurable FIR with dynamically programmable filter coefficients, interpolation factors and a portable computing platform which uses vertical horizontal based binary common sub-expression elimination algorithm. In this algorithm, we will have two existing features: 2-bit BCSE and 3-bit BCSE algorithm respectively. Thus the algorithm of proposed work earlier to implement with multiple constant multiplication (MCM) with more efficient FIR filter design, it can be categorized in two main groups, 1) graph based algorithm and 2) common sub-expression elimination (CSE) algorithm, these two groups will support particular (fixed) set of coefficients on highly efficient computing platform at 3.2 GHz processing features. However, this kind of filtering features running with a fixed set of coefficients with two reasons such as being dynamically programmable based on the requirement of different standards and a highly computationally efficient platform with unaffordable software defined radio (SDR) systems. In this case some of the technique of reconfigurable constant multiplication with real time filter co-efficient updated with multi standard up/down converter. These vertical and horizontal based binary common sub expression elimination algorithm introduced a efficient constant multiplication by reducing the adder step and hardware cost as a replacement for existing features [1].

Since this digital signal processing based application of additions, subtractions is a more priority one, it reduces signal noise, fluctuations in all types of gadgets because the addition and subtraction process will build a multiplications and division in arithmetic operations. Here, this proposed methodology will concentrate on resourceful arithmetic operation on the priority method of Digital Wavelet Transform (DWT). This wavelet transform based applications will have a number of filter banks in the level basics, thus all the filter banks will have a number of adders and multipliers due to coefficients decompositions of low and high pass filters. On this scale, repeated filter logic will take more logic sized and power consumptions. In this digital signal processing applications adders are most important in all arithmetic operations. You will have many with conventional / parallel adder, parallel pre-fix adder in such as ripple carry adder, carry look-ahead adder, carry select adder, carry save adder, carry by-pass adder, kogge stone adder, brenk kung adders, lander fischer adder. Here, this proposed work will present a novel approach of DWT using vertical horizontal based binary common sub-expression elimination with replacing conventional adders and multipliers to XOR-MUX adders, it will reduce 2n logic size to n-size logic and compare this XOR-MUX adder to parallel conventional adders and prove the efficiency of area delay product and average power consumptions [2].

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MQTT Protocol based Smart Greenhouse Environment Monitoring System using Machine Learning

G. Sai Teja, P. Sathish.

Abstract: ***Internet of Things (IoT) allows connections among various devices using the internet with the ability to gather and exchange data. IoT has various connecting protocols like HTTPS, MQTT, CoAP, SMCP, etc. A lightweight protocol of all these protocols is the Message Queuing Telemetry Transport (MQTT) protocol. Agriculture is the backbone of India it plays a significant role in the growth of the economics of the country. The majority of the population in India focused on developing a good yield of the crop at their available space which is leading to the development of various greenhouse and smart farming methods. The technology developments will be enabling to design and develop a simple intelligent system for smart farming and maintaining the greenhouse environment. The proposed system is designed using an ARM Cortex processor with the other supporting peripherals for monitoring and constantly updating and controlling environmental parameter values to achieve optimal growth and yield of plants. In this paper, the proposed system consists of several sensors for measuring different parameters including temperature, humidity, soil moisture, air pressure, and fertilizer content. Further, the obtained data is sent to the cloud by using IoT based ThingSpeak with the secured MQTT protocol to monitor the parameters. An efficient Machine Learning algorithm is developed to predict the parameters like soil moisture, fertilizer content sprayed and weather data i.e., humidity, and temperature. The accuracy obtained using Machine Learning algorithm i.e. Decision Tree method is 97%.***

Index Terms: ***Machine Learning, MQTT, IoT, ARM, ThingSpeak.***

I. INTRODUCTION

Among all the sectors, there is rapid growth in the agriculture sector. The increase in the farming sector is due to the introduction of a smart agriculture concept using IoT devices, digitalization, and greenhouse. The term greenhouses mean a controlled environment space or area to grow plants [1]. To increase the yield production of the crops different environmental parameters including temperature, air pressure, humidity, soil moisture, fertilizer content in the farm, etc. needs continuous surveillance and control are necessary for a greenhouse system.

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Even the population in the world is growing day by day so the need of food and limitation of space or land as an agro-economic activity make smart farming and greenhouses are becoming popular and has become one of promising solution for securing the food supply. Apart from that, extreme weather changes and climates affect the production of the crop, thus increasing their prices and lowering the quality of the crops produced [9]. The Internet of Things allows for clear linkages between various computers, apps, and internet infrastructure, and this system often enables people to operate easily. As claimed by the government of INDIA the IoT policy, the government plans to invest 15 billion in the IoT domain by the year 2020. Besides, in the Indian Government's policy, IoT helps automate solutions to the problems facing different industries, such as shopping, disaster management, farming, vehicles, mining, banking, and so on. There is a huge and wide range of IoT equipment designed by various organizations are market available for services such as quality of water monitoring, crop growth patterns tracking, smart routes for field sprinkling pesticides and fertilizers, high-tech laser-assisted precision land leveling, plants, and human health monitoring, and various other applications. But most sections available in the market are inexpensive and the procurement of this commodity is economically unnecessary in a nation such as India still has low and marginal 80% of farmers [7].

II. LITERATURE SURVEY

Hamza, Mounir, Khaoula, designed a smart irrigation system based on Arduino and ThingSpeak for Algeria. The system is based on the IoT platform ThingSpeak cloud and Arduino to control the irrigation by using smartphones. The authors used the ESP8266 Wi-Fi module to communicate with the cloud and the sensors networks. Few gaps observed in the like in this system there is no SMS alert related to the farmer. They did not measure the air temperature and air pressure of the farm. Any prediction methods are used by the authors in their design [1]. The authors developed an IoT based greenhouse model for traceability and monitoring of seedlings and other agricultural products in the germination and growth stages of a crop. The crop they used for the greenhouse system is the cherry tomato. The proposed method helps to monitor variables include luminosity, humidity, temperature, and use of water, showing the cumulative utilization of water by field, field trends, and time for production.

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Design of IRNSS Tracking System using 1.5 bit ADPLL and Correlator

M. Udaya, D. Sony, D. Krishna Reddy

Abstract*: IRNSS is an indigenous satellite navigation system consisting of 7 satellites that provide accurate positioning in the Indian sub-continent region. Each IRNSS satellite transmits a signal which contains information regarding satellite orbital and clock parameters (known as navigation message). The purpose of the receiver is to demodulate the satellite signal and extract navigation message, the receiver must know certain parameters of the signal like its doppler shift and code offset. However, in real-time, due to relative velocity of the satellite and ionospheric interference, these parameters vary with time. Therefore, the receiver must continuously perform the tracking operation to update the varying parameters. Existing tracking systems are based on SDR and SoC's, which require high-performance processors and iterative algorithms to perform both carrier and phase tracking. Though they are highly accurate, these designs are complex and expensive. In this paper, 1.5-bit ADPLL is used to track the carrier. This design does not require numerous computational loops to perform tracking of the carrier, thus reducing the complexity of the design. This work includes simulation results for 1.5-bit ADPLL. In this work, 2-bit, 1.5-bit, and modified 1.5-bit correlators are simulated and synthesized. It was found that modified 1.5-bit correlator architecture is less complex compared to 2-bit correlator and offers better SNR compared to 1.5-bit correlator. Therefore, modified 1.5-bit correlator is used for code tracking. The IRNSS signal tracking is performed in ModelSim. The system utilizes 77 standard LUTs and exhibit maximum settling time of 714µs and 31.28ms for carrier tracking and code tracking, respectively.

***Keywords*: Receiver, ADPLL, correlator, satellite navigation.**

I. INTRODUCTION

The satellite navigation systems have become an essential infrastructure of major prominence in national security, information security, and economy. The research and development of satellite navigation receiver have gained much significance in the past decade. Indian Regional Navigation Satellite System (IRNSS) is an indigenous satellite navigation system developed and maintained by Indian space research organization (ISRO). This satellite system provides continuous, accurate, and reliable location, speed, and time information. The IRNSS offers two kinds of services Standard Positioning Service (SPS) and Restricted/Authorized Service (RS) at L5 band (1176.45MHz) and S-band (2472.5 MHz) frequencies, respectively. Each IRNSS satellite transmits a highly phase-coherent, frequency-stabilized continuous wave signal. It is encoded with binary data containing satellite orbital information and on-board clock parameters (known as ephemeris). The purpose of the receiver is to detect and demodulate the signal transmitted by IRNSS satellite. For the receiver to demodulate the navigation signal and extract navigation message, the receiver must know certain parameters of the signal. These parameters include the carrier frequency, code chip delay, and satellite visibility. These parameters are determined at the start-up of the receiver in a process called acquisition. However, in real-time, due to the relative velocity of satellite and ionospheric interference, these parameters vary with time. Therefore, the receiver continuously performs tracking operation to update the varying. The work by E. Schmidt presented in "Development of a Real-Time Software-Defined GPS Receiver in a LabVIEW-Based Instrumentation Environment" [5] describes GPS receivers based on software defined radios (SDR). Although SDR is most used method in navigation trackers due to their flexibility and short development time, based receivers usually use higher order bit quantization like 32 or 64 bits. As GPS algorithms must run in real time, faster processors are required. These incorporate highly parallelized architecture which makes the design power hungry, bulky, and expensive. The other implementations of GPS tracking are based on SoC platform. One such implementation is presented by E. Wang in "Implementation of an Embedded GPS Receiver Based on FPGA and MicroBlaze" [6]. This paper describes implementation of GPS tracker on a FPGA using Microblaze soft processor which uses 1167 LUTs. Although soft processor-based systems offer high flexibility at chip level as compared to SDR, the soft processors are very complex and expensive.

II. SIGNAL STRUCTURE

A. Transmitted Signal

Each satellite continuously transmits ephemeris (binary data containing its position and time). At the transmitter end, this data is multiplexed by CDMA scheme and then BPSK modulated onto L5 and S-band carrier signals [4].

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LWTSM-IoT: Light Weight Trust Sensing Mechanism for Internet of Things

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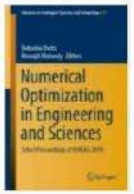
Abstract: In Internet of Things (IoT), secure communication is a prime concern since the open internet source and vast heterogeneity offers several challenges to the network. To achieve an enhanced security, an effective trust evaluation model is required through which the abnormal nodes can be detected and isolated. Towards this objective we have proposed a Light Weight Trust Sensing (LWTS) mechanism for IoT routing. Several factors like Packet Forwarding Factor, Packet Consistency Factor and Packet Repetition Factor are employed to analyze the behaviour of IoT nodes. Along with these factors, the proposed model also checks for energy efficiency to achieve an improved network lifetime. Trust Calculation process is accomplished in two phases; they are direct and indirect fashion. Finally based on obtained total trust, each neighbour node are categorized as No Trust, Average Trust, Fair Trust and Good Trust and the node with good trust is selected as next-hop forwarding node. For the proposed approach extensive simulations are carried out and the performance is measured through Packet Delivery Ratio, Malicious Detection Rate and Average Energy Consumption. The obtained results prove the effectiveness when compared to existing approaches.

Keywords: Security, Trust sensing, Internet of things, Energy cost, Consistency, Malicious detection rate.

1. Introduction

Recently, Internet of Things (IoT) has emerged as an important and most effective communication paradigm in the field of wireless communications [1]. IoT architecture uses widespread heterogeneous technologies, systems and evolved as an effective connectivity paradigm for several physical devices using TCP/IP protocols [2]. Due to the possibility of flexible connection through internet, IoT has found a widespread applicability in almost all areas, for example Smart Cities, Water Grid Management, Smart Grid Systems, Automation Management, building automation, smart agriculture, smart transportation systems, health care systems are some of them [3]. It was found in the survey conducted by Federal Trade Communication (FTC) that the total number of people working in the workstations is much less than the totals number of devices those which are working by connecting through Internet [4]. As a result, the IoT is trying to transform the real world into virtual world by connecting the wide variety of non-traditional computing devices.

One of the basic driving forces of IoT is routing, which makes the devices kept connected to each other and get communicated. In IoT routing, the major concerns which need to be considered are efficient resource (energy, bandwidth etc.) utilization, secure and autonomous communication and scalability [5]. Among these concerns, security is the major hurdle faced by the IoT architectures. According to the standard definition of IoT, it is defined as "the connectivity between the internet and everyday objects and the ability to exchange the data between them" [4]. The flexibility of opened connection to internet made the IoT to face several security problems, broadly ranging from internet to physical devices and there was a possibility to harm people. For instance, a compromised node may led to attack on the other IoT devices. Moreover, some attacks lead the devices to leak or misuse the personal information. Hence there is a need to design an efficient securing paradigm to protect the IoT from several threats and risks.



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Predictive Data Optimization of Doppler Collision Events for NavIC System

Authors | Authors and affiliations

P. Sathish, D. Krishna Reddy

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Abstract

Navigation with Indian Constellation (NavIC) is satellite-based navigation system developed by Indian Space Research Organization (ISRO), India. It consists of seven satellites, among them, three are geostationary (GEO) satellites, and the rest are geosynchronous satellites. There are several factors that effect the positional accuracy of the NavIC system, and among them, one of the important parameter is Doppler collision (DC). The occurrence of the DC depends upon the usage of geostationary (GEO) satellites in position estimation. The DC may occur when the relative Doppler shift between two satellites is less than the bandwidth of receiver code tracking loop. To analyze the DC events, the required navigational data are collected from IRKS-GPS-

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Comparative Analysis of Texture Patterns on Mammograms for Classification

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texture patterns, classification, machine learning algorithms, accuracy, local binary pattern variants, mammograms, local directional order pattern, local wavelet pattern

ABSTRACT

Breast cancer is a cancerous tumor that arrives within the tissues of the breast. Women are mostly attacked than men. To detect early cancer medical specialists, suggest mammography for screening. Algorithms in Machine learning were executed on mammogram images to classify whether the tissues are deleterious or not. An analysis is done based on the texture feature extraction using different techniques like Frequency decoded local binary pattern (FDLBP), Local Bit-plane Decoded Pattern (LBDP), Local Diagonal Extrema Pattern (LDEP), Local Directional Order Pattern (LDOP), Local Wavelet Pattern (LWP). The features extracted are tested on 322 images from MIA's database of three different classes. The algorithms in Machine learning like K-Nearest Neighbor classifier (KNN), Support vector classifier (SVC), Decision Tree classifier (DTC), Random Forest classifier (RFC), AdaBoost classifier (AC), Gradient Boosting classifier (GBC), Gaussian Naive Bayes classifier (GNB), Linear Discriminant Analysis classifier (LDA), Quadratic Discriminant Analysis classifier (QDA) were used to evaluate the accuracy of classification. This paper examines the comparison of accuracy using different texture features. KNN algorithm with LDEP for texture feature extraction gives classification accuracy of 64.61%, SVC with all the texture patterns mentioned gives classification accuracy of 63.07%, DTC with FDLBP, LBDP gives classification accuracy of 47.69, RFC with LBDP and AC with LDOP and GBC with FDLBP gives 61.53% classification accuracy, GNB and LDA with FDLBP gives 60% and 63.07% classification accuracy respectively, QDA with LBDP gives 64.61 classification accuracy. Of all the Algorithms support vector classifier gives good accuracy results with all the texture patterns mentioned.

1. INTRODUCTION

The quick advancement of lifestyle, hormonal, environmental circumstances there is an uptrend in breast cancer cells [1] in the body grow, double and change the shape. In women, the 2nd most common cancer [2] is breast cancer annually about 16 lakh women are identified. Detection and medication in the early stage improve survival rates.

Though manual screening is used for the detection of cancer tissues, Computer-aided examination [3] has been used in today's medicinal practices. In computer vision, the effective active area of research is feature detection and description from medical images. There are multiple feature extraction techniques based on shape, colour, edges, color histograms, texture [4-9], etc. Texture characteristics of images are more important than color and shape as it contains the core in identifying the tissues. Features are extracted by using texture properties for image classification. Image classification is a task to categorize different situations in breast cancer. The efficiency of analysis and classification relies on describing features from the images.

Local Binary Pattern (LBP) proposed by Ojala became well-liked due to its reduced difficulty for extracting features. Later on several variants of LBP like Local derivative pattern [4], Local Tetra Pattern [5], Local Mesh pattern [6], Local Line binary pattern [7], Random Sampling LBP [8], Quantised FLBP [9], Elongated quinary pattern [10] and many more came into existence. These patterns are used to improve the classification rate.

This article presents the comparison of different texture patterns like FDLBP, LBDP, LDEP, LDOP, and LWP were executed on mammogram images to predict accuracy with the help of different machine learning algorithms.

Most of the existing local descriptors are generated over the raw input images to increase the discriminative power of the local descriptors by converting the raw image into multiple images with high and low pass frequency filters. The local descriptors from filtered image output are concatenated into a single descriptor. This approach does not utilize the inter frequency relationship which causes less improvement in the discriminative power of the descriptor. This disadvantage can be solved by using FDLBP which uses two decoders. Each decoder works with one low frequency pattern and two high frequency patterns. At last, the descriptors from both decoders are concatenated to form a single descriptor. LBDP transforms the local neighbourhood in bit planes and then encodes the relationship between the centre pixel intensity value and transformed value to generate the LBDP binary pattern. This method depends on the bit depth of the image and also it is also invariant to the number of local neighbours under consideration. LDEP finds the values and indexes of the local diagonal extrema's to exploit the relationship among the

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Local Derivative Vector Pattern: Hybrid Pattern for Content-Based Medical Image Retrieval

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Keywords:
Local Binary Pattern (LBP), Local Derivative Pattern (LDP), Completed Local Binary Pattern (CLBP), Local Tetra Pattern (LTrP), Local Vector Pattern (LVP), Local Anisotropic Pattern (LAP)

ABSTRACT

This paper examines a hybrid pattern i.e. Local derivative Vector pattern and comparasion of this pattern over other different patterns for content-based medical image retrieval. In recent years Pattern-based texture analysis has significant popularity for a variety of tasks like image recognition, image and texture classification, and object detection, etc. In literature, different patterns exist for texture analysis. This paper aims at forming a hybrid pattern compared in terms of precision, recall and F1-score with different patterns like Local Binary Pattern (LBP), Local Derivative Pattern (LDP), Completed Local Binary Pattern (CLBP), Local Tetra Pattern (LTrP), Local Vector Pattern (LVP) and Local Anisotropic Pattern (LAP) which were applied on medical images for image retrieval. The proposed method is evaluated on different modalities of medical images. The results of the proposed hybrid pattern show biased performance compared to the state-of-the-art. So this can further extended with other pattern to form a hybrid pattern.

1. INTRODUCTION

Current research work Content Based Medical Image Retrieval (CBMIR) attempts to capture and utilize the semantics of the image to achieve more reliable retrieval which is a challenging task. Image database management retrieval has continued to be an active research area after the 1970s [1]. In 1992, the word, Content-based image retrieval (CBIR) was originated, used by T. Kato to explain experiments into automatic retrieval of images from a database, based on the shapes and colors present. CBIR systems derive characteristics from the raw images themselves and determine an association (similarity or dissimilarity) measure among a query image and database images. CBIR is growing very familiar because of the high demand for searching image databases of ever-growing size. As accuracy and speed are essential, we need to generate a system for retrieving images of both efficient and effective. Textures [2, 3] are defined based on image features extracted and analysis methods. Though texture, is thought of as reconstructed patterns of pixels over a spatial domain, concerning the addition of noise to the patterns and their repetition frequencies results in textures that can appear to be random and unstructured. Image texture, in computer vision, defined as a description of image structure, granularity, randomness, linearity, and roughness. Image feature is considered for describing the innate surface properties of a selected object and its relationship with the surrounding regions [4]. Texture characteristics are remarkable in pattern recognition, image retrieval tasks, as they are present in many real images. Drawbacks of texture-based image retrieval systems are computation complexity and retrieval accuracy. Considering a wide range of different situations, local descriptors or local patterns are advantageous above conventional global features as they are invariant to image scale and rotation and provide robust matching [5]. We will exhibit and review the most popular and recent algorithms with their variants [6], as the research attention in the field of medical images have adapted to use these local features.

The remainder of this paper is organized as: Section 2 introduces about related work, section 3 describes the methodology implemented, section 4 gives the results obtained and section 5 describes the conclusion and future scope.

2. RELATED WORK

2.1 Local Binary Pattern (LBP)

LBP [7] is one type of visual descriptor which is used for image retrieval. This pattern got reputation from 2002 for its simplicity in computations and performance with its variants. LBP computes the local representation of texture. While computing LBP two parameters to be considered are 'P' pixels which control the quantization of angular space, 'R' radius determines the spatial resolution. LBP is robust as it is invariant against any monotonic transformation of the grayscale. LBP descriptor generates binary code by comparing P neighbor pixel with the center pixel. Figure 1 shows different pixel values with different radius.

LBP pattern is formed by taking a particular grey pixel and compared with center pixel by using Eq. (1)

$$\begin{aligned} LBP &= 1 \text{ if } g_p \geq g_c \\ &= 0 \text{ else} \end{aligned} \quad (1)$$

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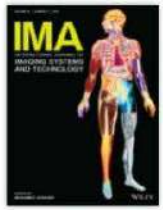

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RESEARCH ARTICLE

Optimal weighted hybrid pattern for content based medical image retrieval using modified spider monkey optimization

Nagadevi Darapureddy ✉ Nagaprakash Karatapu, Tirumula Krishna Battula

First published: 13 September 2020 | https://doi.org/10.1002/ima.22475

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Abstract

The current approaches for image retrieval are more concentrating on numerous image features. Texture, shape, spatial information, and color are the fundamental features to deal with flexible image datasets. This paper aims to develop new Content-Based Image Retrieval System based on Optimal Weighted Hybrid Pattern. Two relevant patters like Local Vector Pattern and Local Derivative Pattern are intended to develop a novel Content-Based Image Retrieval system. The optimal weighted hybrid pattern is implemented to derive a new feature vector, so that the weight is optimized by a modified optimization algorithm called Improved Local Leader-based Spider Monkey Optimization to maximize the precision and recall of the retrieved images. The retrieval of the image is done by measuring the similarity based on Mean Square Distance

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Image Mining and Content-Based Image Retrieval
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Content-based retinal image retrieval

Brain Tumor Detection by Using Convolution Neural Network

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Abstract—Nowadays, Biomedical technology plays a vital role in diagnosis and treatment of small to dangerous life-threatening diseases and one of the most life-threatening disease is Brain Tumor, which is the mass growth of abnormal cells in brain. Early detection and treatment of it can save the human life by preventing the further growth of abnormal cells. Detection of it can be done by analysing the Magnetic Resonance Imaging (MRI) Scans. Accurate analysis of MRI Scans needs to be done to detect the brain tumor and it can be achieved by using the algorithms of artificial neural networks, although human can detect manually but possibility to human errors is more and is time consuming. This paper proposes an effective algorithm model to predict brain tumor probability by using convolution neural networks. The algorithm includes image pre-processing in which noise is reduced using Gaussian filter and morphological operations. After that, images are normalized to scale fit. Batch normalization is added to the network to speed up the training. BRATS and Kaggle image dataset are used to train and evaluate the model to get maximised accuracy. Confusion matrix is used to evaluate the performance of the maximised model.

Keywords—Convolution Neural Network (CNN), TensorFlow, Keras, Brain tumor detection, Deep learning, Magnetic Resonance imaging (MRI)

1 Introduction

The Brain tumor is a collection of abnormal cells grows in the brain which is a dangerous disease that impacts human life. It affects person stability and mental health. Different types of brain tumors affect in different ways, in which some can be dangerous to life. In the study, it is observed that the incidence of brain tumors in the last 20 years is increasing in all ages; however, it has grown more than 40 percent in an adult person. Global findings indicate a wide variation in the incidence of tumors of the nervous system that the standardization of age in different countries is between 0.01 and 12.7 in males and 0.01 and 10.7 in women, per 100,000 people. The lowest incidence is in Africa while its highest level is in northern Europe. As a consequence, the difference in the diagnosis of the disease and the registration and reporting system in different countries can be due to these disparities [1].

Articles

A Sturdy Nonlinear Hyperspectral Unmixing

M. Venkata Sireesha, P. V. Naganjaneyulu & K. Babulu

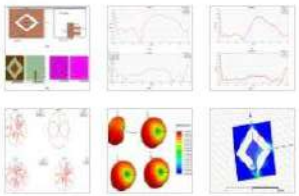
Published online: 10 Nov 2020

ABSTRACT

Hyperspectral unmixing (HSU) is a way to process the prediction of the existing endmembers and the fractional abundances (FA) available in all pixels in the hyperspectral images. However, in a practical scenario, hyperspectral image is frequently corrupted due to many types of noises at the time of acquiring phenomenon such as dead-lines, impulse noise (IN), Gaussian noise (GN), and stripes. This type of complicated noise leads to mitigation in the quality of the acquired HSI, by making them to lose the precision process. To address these issues, this article presents a sturdy

Outline

Figures (9)



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Wideband rotated square slot microstrip antenna with tuning stub

Manikya Krishna Chaitanya Durbhakula [a], N.V. Koteswara Rao [b]

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https://doi.org/10.1016/j.matpr.2020.09.633

Abstract

Microstrip line fed slot antenna is proposed for use in space craft, satellite and mobile applications with improved bandwidth characteristics to support evolving wireless communication standards. In this paper, a printed rotated square shaped wide slot antenna is designed along with a pair of tuning stubs attached to the antenna structure to enhance the bandwidth and its operational performance. Experimental results show that antenna can be operated from 2.4 GHz to 9.2 GHz giving rise to an impedance bandwidth of more than 6.8 GHz with less values of reflection coefficient, i.e., −22 dB. The bandwidth can be varied by making the changes in the line feed and even become double by attaching tuning stubs. The design of the antenna is carried out by using Ansys-HFSS simulation tool and the results are then compared with the measured values of fabricated structure to evaluate the performance of the proposed structure. It is found that the results are closely and are presented.

Progress In Electromagnetics Research C, Vol. 106, 271–283, 2020

Design of Triple Band U-Slot MIMO Antenna for Simultaneous Uplink and Downlink Communications

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HAND DETECTIONAND TRACKING USING OPENCV AND PYTHON

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ABSTRACT

Man, always strived to do things differently using artificial technology which is trending in the present-day scenario. One among such wonderful ideas there born this "hand gesture recognition and finger counting". In this, see how a human hand will be detected when and how to finger counting takes place. Hand gestures play a vital role in human-computer interaction. In this article, presented a method for hand recognition, detection and the finger count will be done and displayed. Moreover, it is not only meant for fun and entertainment but can also be used in our daily life for various applications. The proposed method is a very efficient method and easy to use for Human-computer interaction. The logic present behind its detection is new and showing robustness over the existing method.

Key words: hand detection, finger counting, hand gesture recognition, human-computer interaction.

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https://iaeme.com/Home/issue/IJARET?Volume=11&Issue=12

1. INTRODUCTION

As it know, the vision-based technology of hand gesture recognition became an important part of human-computer interaction. Over the past few decades, we have been communicating to the computer using a keyboard and mouse. In today's generation, we are using voice-to-text (Speech recognition) methods to interact with computers. But we all know that gestures play an important role in communicating whether it may be a person or a machine. Every gesture has its unique way of expression. So, gestures can be used as a tool for human-computer interaction. That's how the concept of communicating to the computer using handmade gestures was born[1], [2]. The existing methods can detect the hand and count the fingers only when they are placed in the selected region of the area. Moreover, they use other programming languages that involve larger coding which makes it complex[3]–[5]. But the proposed model is capable of detecting and counting all the hands and fingers that are placed in front of the camera and it is made of python programming language which is easy to understand. So, the

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Iterative Channel Estimation for GFDM System Based on MAP Algorithm

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Abstract: In this paper an iterative Maximum a Posterior (MAP) probability channel estimation method is proposed for Generalized Frequency Division Multiplexing (GFDM) system. The decoder uses the channel estimation values to form the soft information for decoding module, which is fed back to the channel estimation module through interleaving, so that the external information is cyclically iterated between the channel estimation module and the decoding module. The channel estimation module uses a linear minimum mean square error (LMMSE) algorithm to estimate the channel parameters. Through the cyclic iteration of soft information between the channel estimation module and the decoder, the effective external information is fully utilized to reduce the bit error rate and improve the performance of the GFDM system.

Keywords: GFDM, Channel Estimation, MAP, LMMSE

I. Introduction

In recent years, a new generation of broadband wireless communication systems, GFDM technology has replaced orthogonal frequency division multiplexing (OFDM) technology and has become the mainstream basic transmission technology. In addition to wireless LAN standards 802.11a, HiperLAN/2, it is also used in Broadband Wireless Access (BWA). GFDM technology uses the carrier waves of each sub-channel to be orthogonal to each other, and their spectrums overlap each other, making the GFDM technology's spectrum utilization rate very high, nearly double that of the serial system. The GFDM system disperses the data on many subcarriers, greatly reducing the symbol rate of each subcarrier and weakening the effect of multipath propagation. Therefore, it has a strong ability to resist multipath and frequency selective fading.

Turbo code [1] is widely used in mobile communication due to its superior characteristics close to Shannon's theoretical limit. The Turbo code adopts a cascade or product coding method and uses an iterative decoding method for coding and decoding schemes. Soft input soft output iterative decoding is the core idea of Turbo decoding. The basic idea is to decompose a complex long decoding step into multiple relatively simple iterative decoding steps and the transfer of information probabilities or the transfer of soft information between iterative decoding steps ensures almost no information loss. Turbo code uses the maximum posterior probability algorithm for decoding.

Literature [2] analyzes the performance of Turbo codes in GFDM system. Through Turbo coding, the bit error rate performance is significantly improved. In this paper the MAP criterion used for Turbo decoding, and at the same time iterates the external information of the MAP algorithm between the channel estimation module and the decoding module. Through external iteration of bad iteration method, the channel parameters can be estimated quickly, which further improves the accuracy of channel estimation.

II. System Model

The Turbo-coded GFDM system, is as shown in Fig 1.

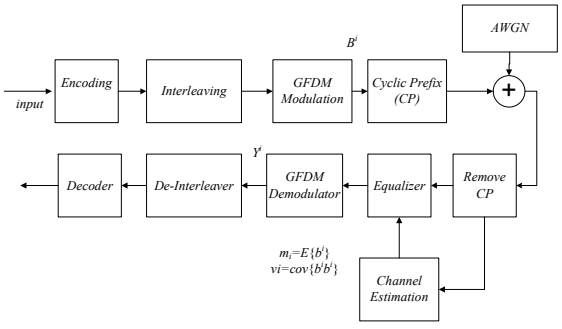

Fig. 1: GFDM Block diagram

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Analysis of Ionospheric Scintillations of NavIC L5 and S -band Signals over Low Latitude Indian Region

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Abstract

The NavIC (Navigation with Indian Constellation) system's performance degrades significantly in equatorial low latitude region due to ionospheric effects. Ionospheric scintillation (IS) is one of the major problems to NavIC system. IS occurs due to the random fluctuations in amplitude and phase of the signal. It also depends on solar cycle, latitude, seasons, time and elevation angle of the satellite. Not much significant amount of work is reported on ionospheric scintillation effects on NavIC signals. In this paper, ionospheric scintillation effects on NavIC L5 band (1176.42 MHz) and S1 band (2492.08 MHz) signals due to (1B,1C,1D,1E,1F,1G) are investigated. Amplitude scintillation index S4 is computed based on Carrier to Noise ratio (C/N_0) measurements from ISRO IGS (IRNSS/GPS/SBAS) receiver for Kurnool station (Lat:15°47′49″N, Lon:78°4′39″E) and Hyderabad (Lat:17°23′31″N, Long: 78°19′10″E) station. The analysis is carried out for Kurnool station (June and September months) and Hyderabad station for Equinox Months (March & September) and Solstice Months (June & December) for the year 2017. IS effects of L5 and S1 band signals are analysed. It is observed that scintillation effects are severe for L5 band compared to S1 band signals. This work will be helpful to improve the user position accuracy.

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E-mail address: kaithapraveena@gmail.com

Keywords: Ionospheric Scintillation; NavIC; Amplitude Scintillation index S4; Carrier to Noise ratio

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International Journal of Engineering and Advanced Technology (IJEAT)
ISSN: 2249 – 8958 (Online), Volume-9 Issue-4, April, 2020

Design and Analysis of an Energy Efficient 4-bit Barrel Shifter Circuits in 45nm Technology

Neeraja B, Ramya K

Abstract*: In the design of any ALU, shift registers are generally used to perform addition (for carry movement), multiplication and for any floating point arithmetic. The shift registers currently used are made up of flip-flops which require n clock pulses for n shifts which can increase the delay. So, the aim is to design a high speed shift register i.e., barrel shifter which needs a single clock pulse for n shifts. In this paper, three types of Barrel shifter circuits called left rotator, right rotator and bidirectional rotators are designed in Cadence Virtuoso tool for 180nm and 45nm technology using universal gates (conventional model) and transmission gates. Compared to conventional design, the circuits of barrel shifters with transmission gates in 45nm technology require less power and reduced transistor count.The designed barrel shifter circuits are showing improved performance than conventional models already presented in the literature.

Keywords* : Transmission gates, Multiplexer (MUX), Barrel Shifter, Logical left shifter, logical right shifter.

I. INTRODUCTION

An ALU (Arithmetic Logic Unit) is one of the main components that perform arithmetic operations in the math processor using shift registers within the DSP chip. In order to improve the performance of the ALU, shift registers can be replaced by high speed barrel shifters in Arithmetic and logic units (ALU), RISC processors, Digital signal processors [1]. There are various papers published on adders and their comparison. Some of the papers include implementation of 4-bit barrel shifter with different logics (universal gates, CMOS logic, adiabatic process)[2][3]. Using Verilog, it is easy to write code for smaller circuits, whereas it becomes lengthy for bigger circuits. Design of reversible logic gates is famous for its less information loss with reduced power consumption in some of the previous papers [4][5]. In MAC unit, last stage is accumulator circuit and that can be designed with barrel shifter circuit to improve the performance of the unit instead of using shift registers. In this paper 2X1 MUX circuit is designed using universal and transmission gates.By using the model of 2X1 MUX, 4X1 MUXes are implemented.

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Various types of four bit barrel shifter circuits are implemented using 4X1 multiplexer and the performance is analysed on the basis of speed, consumption of power and the transistors required to implement in 180nm and 45nm technology.A shift register is designed using D flip-flop. Its disadvantage is that it takes n clock pulses to shift n bits which intern increases delay and results in more power consumption. This can be eliminated by using barrel shifter where it requires only one clock pulse to shift n bits for n bit register using a control word[6]. In the floating-point arithmetic operations, barrel shifter circuits like shifters and rotators for shifting the data either left or right are used.Various types of shift operations like rotator ,shifters are shown in Fig.1. A rotater is a cyclic shifter, which shifts the input data to the either left or right. If the bit is shifted from the left to right of the input data ,again that bit inserted into input data on the other side from right to left. Bidirectional shifter shifts the data bits to either left or right side. The shift left logical operation is similar to the shift right logical operation. The difference, of course, lies in the direction of the shift, which in this case, is to the left. The empty space created in the low order region is then filled with zeros.

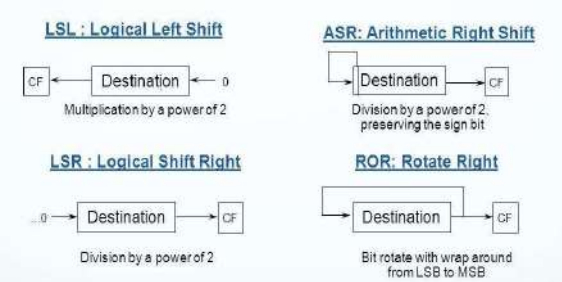

Fig.1. Various shift operations

II. MUX DESIGN USING TRANSMISSION GATE IN 180NM AND 45NM

A transmission gate is a CMOS-based switch, in which both the transistors pmos and nmos work together to pass a "strong 1" but "weak 0" and "strong 0" but "weak 1" respectively. The circuit diagram of transmission gate is shown in Fig.2. The schematic of a transmission gate is shown in Fig.3. It has pmos and nmos transistors connected back to back with an inverter. In schematic diagram, input is given at Vin, selection line as ctrl and output as V_{out}[9].

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Implementation of Double Threshold Based Re-Sensing for Spectrum Energy Detection in Cognitive Radio

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Abstract— A cognitive radio is defined as a radio that can change its transmitter parameters based on the interaction with the environment in which it operates. It has the ability to sense and gather information such as the transmission frequency, bandwidth, power, modulation from the surrounding environment as well as has the ability of reconfigurability to swiftly adapt the operational parameters, for optimal performance, according to the information sensed. In cognitive radio network, the secondary users are allowed to utilize the frequency bands of primary users when these bands are not currently being used. To support this spectrum reuse functionality, the secondary users are required to sense the radio frequency environment, and once the primary users are found to be active, the secondary users are required to vacate the channel within a certain amount of time. In order to detect effectively the existence of primary user various techniques of spectrum sensing have been followed such as waveform, cyclostationary, entropy detection etc. But the adopted method for spectrum sensing is by using energy detection because of its less complexity in the primary user detection. Single, conventional double threshold techniques are proposed using energy detection, these are the existing methods. But in this scenario double threshold with re-sensing is implemented, for the effective detection of the primary user. Effective modulation technique has to be chosen for the implementation and resensing of the spectrum has to be performed if the detected energy lies between the two thresholds considered by increasing the number of samples, re-sensing has to be continued until the energy detected is greater than the highest threshold.

Keywords—Double Threshold, Resensing, Cognitive Radio

1. INTRODUCTION

Spectrum sensing is the method used in Cognitive Radio (CR) to find the unused spectrum. Based on spectrum sensing only other functions of CR can be implemented. So for Cognitive Radio, efficient spectrum sensing is compulsory and Spectrum sensing is an important aspect that maximizes the opportunistic usage of available spectrum. The cognitive/ secondary users have to sense the spectrum repeatedly to prevent interference to licensed users. In recent years, the rapid growth in wireless service increases the demand for the frequency spectrum. As a precious resource, the radio spectrum must be perfectly managed to maximize the utilization and minimize the interference. To meet the growing demand, new broadband communication technologies have been introduced to utilize the radio spectrum effectively. The spectrum use is intense on certain portions while a significant amount of spectrum remains underutilized. High utilization is common in the cellular and FM radio bands, while other bands indicate low usage levels. Most of the licensed users do not transmit all the time in all geographic locations where the license covers [1]. Records from the FCC indicate that spectrum allocated in the bands below 3GHz have a utilization range of 15% to 85%. The available spectrum is underutilized due to the static allocation of the spectrum. In the conventional spectrum management method, each operator is allocated with a certain frequency band and the licensed user operates in that particular band.

Hence it is tedious to find the vacant bands to deploy new services. Consequently, techniques that provide new ways of exploiting the available spectrum are required. As a result, Dynamic Spectrum Access (DSA) was proposed to solve the inefficiency caused by the static allocation of spectrum [2]. With this concept, use of existing radio spectrum is enhanced by opportunistic spectrum access (OSA) of the frequency bands that are not occupied by the licensed or primary user. Hence an efficient solution to overcome the underutilization of the spectrum band is obtained by the Cognitive Radio (CR) technology. Spectrum sensing by far is the most important component for the establishment of cognitive radio.

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VOL. 15, NO. 3, FEBRUARY 2020 ISSN 1819-6608
ARPN Journal of Engineering and Applied Sciences

CONFIGURING APPROPRIATE ARTIFICIAL NEURAL NETWORK WITH MONARCH BUTTERFLY OPTIMIZATION FOR SPEAKER RECOGNITION

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PERFORMANCE COMPARISON OF TECHNIQUES FOR INTERFERENCE COORDINATION IN HETNETS OF LTE-A

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ABSTRACT

In mobile communication, the concept of heterogeneous networks has recently attracted significant importance as a way to optimize the performance of the network, especially for unequal user or traffic distribution situations. A heterogeneous network is poised of multiple radio access technologies, architectures, transmission solutions, and base stations of varying transmission power that can interoperate, thus creating a multilayer structure. Due to the different operating modes of the nodes, some of them work in open access mode but others work in closed access mode, and the unbalanced transmission power of the different base stations of the network, select the appropriate server station can be challenging for the users equipment. A wrong cell selection process can lead to the under-utilization of low power nodes; so that, range extension technique is proposed to allow more users to be attached to low power nodes. Management of interferences caused by the macro station to the low power nodes and vice versa is one of the biggest challenges in the deployment of heterogeneous networks. In this paper, the performance of convention techniques is evaluated and compared against the advanced techniques of LTE-A.

Key words: HetNet, LTE, intra frequency interference, interference coordination

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http://www.iaeme.com/IJEET/issues.asp?JType=IJEET&VType=11&IType=4

1. INTRODUCTION

In very recent years, mobile broadband traffic has grown exponentially, exceeding voice, thanks to the new generation of mobile terminals, such as smartphones, tablets and laptops, and to the new services and capabilities they offer. Mobile users have also increased and, with them, the number of connections. Furthermore, cellular operators have in general reported non-uniform traffic distributions in their networks, stating that for instance 50% of the total traffic volume is carried on only 30% of the macrosites. The number of wireless subscribers have increased exponentially with time and telecommunication companies are perennially

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Implementation of Accident Detection and Alert System for Emergency Medical Asassistance using Mobile Application with MIT App Inventor

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[1]*Assistant Professor,* [2, 3, 4]*Student, Department of ECE, CBIT Engg college, Telangana, INDIA*

Abstract: ***Nowadays accident rates on roads are very high, especially using two wheelers. Timely medical help needed to save the lives on the road A system is proposed to provide immediate medical aid to detect an accident and alert friends and relatives about the accident. The system is designed to understand the seriousness of the accident. In this, attached accelerometer in the vehicle senses the tilt of the vehicle and the abnormality of the heartbeat known by the heartbeat sensor on the user's body. The accelerometer and heartbeat sensor connected to Smartphone. The system will make the decision and sends the information to the Smartphone through Bluetooth. The mobile phone with android application will send text message to the friends and relatives. With this application, the exact location of accident occurred also be shared that can save the time.***

Telematics model has been proposed in this research field that contains three main modules. This method is proposed to confine the site of the vehicle with GPS receiver. SMS sends the captured location information to vehicle owner's mobile and same information shared to the telematics operator server with GPRS. An added design method proposes to detect and make available earlier help to traffic accident sufferers. Prototype architecture is designed to get well the chances of survival for people met in car accidents. The proposed system designed with vehicle to vehicle communication technologies that offer automated detection, reports, and assistance to passengers involved in road accidents.

The proposed design uses a low cost alert system to provide immediate medical aid to the accident victims. The exact place of accident and the details of the patient sent through SMS in order to alert the victim's friends and relatives. The design of proposed system also takes the medical condition of the injured party by checking the heartbeat to know the seriousness of the accident and inform the people whose contacts are saved.

Keywords: Raspberry Pi, Android, ,MIT

I. INTRODUCTION

Now days, use of motor vehicle populace increasing on an exponential rate than the population as well as economic growth. Accidents and the death rate increasing at an alarming rate because of road accidents, particularly two wheelers [3]. According to WHO reports, road traffic accidents account for more than 1.25 million deaths worldwide every year

The majority of the accidents deaths that occur on the roads mainly express highways happen are due to the lack of instantaneous medical assistance. Facilitating immediate medical assistance to the accident area can decrease the fatal accident to a greater level [1].In this cost an idea of an alert system used that senses the accident and its seriousness to alert the victim's friends and relatives for providing ambulance or medical aid to the accident area.

Fig: 1.1A person met with an accident (image taken from imagesbazar.com)

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Nl km—Ring Laser Gyroscopes (RLGs) are widely used in many airborne and navigation systems for accurate measurement of the true rotation of the body movement. But the RLG's suffer a serious problem at low frequencies known as Lock–in frequency. To avoid lock-in problem, the RLG is vibrated mechanically to a high frequency which is known as Dithering. In order to get the true rotation of the body the dither signal has to be removed. Single stage, multistage and multirate filters are suggested to remove the dither signal. These filters have the disadvantage that either the FIR filter length is too large or the phase characteristics are nonlinear. In this work, multiresolution Wavelet Transform (WT) techniques are used to remove the dither signal. Five level multiresolution analysis is carried out with various types of wavelets like Discrete Meyer and Daubechies 45 (db45) etc. With none of the standard wavelets, the original and reconstructed signals are matched. A new wavelet is designed to remove the dither signal. The required signal can be reconstructed back using the approximation coefficients at level 5. The dither signal is attenuated by 107.0 dB, and the phase characteristics are found to be linear in the pass band. The computational complexity is also less compared to the three stage combined filter reported earlier.

Ni uwhx: ring laser gyroscope (RLG), sagnac effect, wavelet transform, scaling function, wavelet function, multiresolution, low pass filter (LPF), high pass filter (HPF), band stop filter (BSF)

Sc VL 10.1134/S2075108719040047

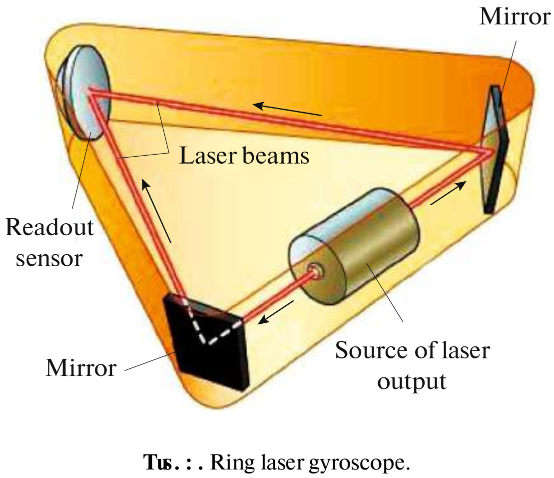
I. INTRODUCTION

A Gyroscope is basically a rotation sensor which is used to measure the absolute angular rotation of any rotating system [1, 2]. This instrument is an essential requirement for navigation and control of a moving vehicle. The advantage of RLG is that it is less sensitive to environmental conditions and its performance does not depend on gravity of the earth, *l*. It is also less sensitive to thermal conditions and magnetic fields. Hence it is more accurate and more stable. The RLG is essentially a Sagnac interferometer with an active laser medium in the ring cavity to generate two propagating laser waves-one in clockwise (CW) and the other in counter clockwise (CCW) within the cavity as shown in Fig. 1 [3].

A reflector prism is used to collate the counter propagating beams to produce a stationary spatial interference pattern. The CW and CCW path lengths are same when no rotation is applied. When the laser cavity rotates, a path difference exits between the two counter propagating waves and this is proportional to the difference in frequency which is called the beat frequency [4, 5]. The beat frequency *k* is proportional to the rate of angular rotation as given in equation (1a)

$$k \text{ or } N k, \quad (1a)$$

where is the rate of rotation along the sensitive axis and *N* is a constant that depends on the path length of the RLG, area of the ring cavity and wavelength of the laser source.



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Design of Static CMOS 16 Bit High Speeds and Low Power Consumption Hybrid Adder Circuit using Brent Kung Adder

M. Ramana Reddy

Abstract: *This paper presents a static sixteen Bit CMOS Brent kung adder shape was designed, which famous a higher pace and decrease strength intake in comparison with those of the ripple deliver adders. The pace enhancement changed into done through modifying the shape through thru adding a Brent Kung adder, complete adders the usage of (28 transistor, Boolean exact judgment) that is masses speeder whilst in comparison to ripple supply adder and These pace adders will bring about growth in DSP processors. The time delays and power consumptions are lots much less with unique adders with the aid of implementation of 180nm Cadence device.*

Keywords : *Brent Kung adder, full adders, CADENCE, Time delay, Power Consumptions*

I. INTRODUCTION

The adders are building blocks and also critical path for of microprocessors and digital signal processing chips. Adders are useful not only for addition, but also used for subtraction, multiplication and division in design criteria. In the fundamental arithmetic operations an addition is one of the funadamental. Rapid and correct operation of a digital system is strongly influenced by the performance of resident delay employees. The most important for measuring the standard of summing method in the past were delay and propagation area. There are many model of additives with different delays, energy consumption and uses of the area. Examples include the ripple carry adder (RCA), the carry increment adder (CIA), the carry jump adder (CSKA), the carry selection adder (CSA) and employees of the parallel prefix (PPA). RCA has the best structure with the less space and energy consumption, but with the least life delay. In the CSA, the speed, energy consumption and uses of the space are considerably more important than those of the RCA. The dependence of capacitance and performance on the supply voltage served as a motivation for the style of circuits with the characteristic of dynamic scaling of voltage and frequency. In these circuits, to reduce energy consumption, the system can adjust the voltage and frequency of the circuit based on the required workload. In order to achieving higher speeds with lower supply voltages for computer blocks, with the addition as one of the most important components, can be crucial when designing high-speed processors.

A. Half adder*:*

The half adder circuit has two inputs one output. The half-adder is added to the one-bit binary numbers (AB). The output is the sum of 2 bits (S) and the carry (C). Note in Fig. 1, but equal square measurement of 2 inputs directed to two different gates. The half-adder input and output is shown in truth table 1.

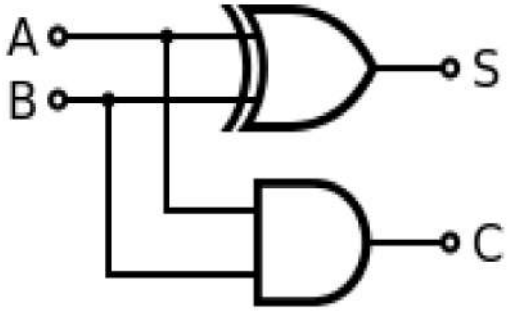

Fig 1: The Half adder Schematic

Table-1: Truth table of half adder (1Bit)

Input		Output	
A	B	Sum	Carry
0	0	0	0
0	1	1	0
1	0	1	0
1	1	0	1

B. Full adder:

The full adder adds 3bit binary numbers and takes into account the values that are always output. The single bit full adder adds 3 single bit numbers, usually written as A, B and C_{in} ; The operands A and B, and as indicated in Finn Two, Cin can be slightly transferred to the previous step, more modestly. The entire adder is part of a cascade of adders that sometimes add binary bits of eight, 16.32, etc. The circuit gives a two-bit output, an output hold and a quantity.

The sum and carry equations are

S = A EXOR B; ---------- (1)

C_{out} = A AND B; ---------- (2)

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IoT BASED AIR AND SOUND POLLUTION MONITIORING SYSTEM USING MACHINE LEARNING ALGORITHMS

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Abstract: Air pollution is the largest environmental and public health challenge in the world today. Air pollution leads to adverse effects on human health, climate and ecosystem. Air is getting polluted because of release of Toxic gases by industries, vehicular emissions and increased concentration of harmful gases and particulate matter in the atmosphere. In order to overcome these issues an IoT based air and sound pollution monitoring system is designed. To design this monitoring system, machine learning algorithms K-NN and Naive Bayes are used. K-Nearest Neighbour and Naive Bayes are machine learning algorithms used to predict the status of pollution present in the environment. In this system, analog to digital converter, global service mobile communication, temperature sensor, humidity sensor, carbon monoxide and sound sensors are interfaced with raspberry pi using serial cable. The sensor data is uploaded in thinkspeak (IoT) and webpage. This data is compared with the trained data to check accuracy. To calculate the accuracy of both algorithms, Python code is developed using python software tool.

Keywords: IoT, Temperature, Humidity, Carbon Monoxide, Sound, Raspberry Pi.

1. Introduction

Air and sound pollution monitoring system is IoT (Internet of Things) based application, used to detect the pollution using machine learning algorithms[1-2]. The temperature sensor, humidity sensor, carbon monoxide sensor and sound sensor interfaced with raspberry pi to detect pollution in the environment. GSM SIM800L is a miniature cellular module which allows for GPRS transmission, sending and receiving messages. The system proposed a comparative study between various techniques for prediction. This work focuses on developing an optimized system model which predicts future weather. There are some models that predict weather during real time, or monthly period. This system that carries out weather prediction using previous or historical weather data having attributes (Date, Temperature, Humidity, Carbon monoxide and Sound). In machine learning, K-Nearest Neighbour and Naive Bayes algorithms are used for the purpose of weather forecasting. Comparison based on evaluation parameters to identify which model has more accurately performed the predictions. The main objective of the project is to design and implement a real-time monitoring system for pollution applications. The system

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Mathametical Modelling of Full Adder using Carbon Nanorods

A.Krishna Kumar, D.Deepika

Abstract:Nanomechanical computational systems proposed by K.Drexler is one of the approaches to molecular scale electronic circuits for memory and logic applications. The nanomechanical rod logic proposed is distinguished by its small size and very low energy dissipation, compared to transistors. it has been found from the sources available to us, that presently the idea was highly unexplored and still remains in its nascent stages This paper presents the use of nanorods as variant to the existing silicon technology for the design of a full adder circuit along with the speed, power and energy dissipation characteristics. The full adder circuit is then extended to an n-bit adder (which forms the basis of an ALU circuit). The paper also addresses the use of parallel architectures to overcome the limitations of switching speeds.

Keywords: nanomechanical logic rods, full adder circuit, energy dissipation .

I. INTRODUCTION

Today the driving force for microelectronics is information technology. With the exponential growth of data and knowledge, the future will demand sophisticated microelectronics, probably nanoelectronics[8]. Evolutionary changes in CMOS have inspired research on several important topics including wire dominated designs, power dissipation and fault tolerance. A revolutionary technology change such as replacing a CMOS device, is a potentially disruptive event in the design of computing systems. Emerging technologies for further miniaturization have capabilities and limitations that can significantly influence computer architecture and require rebuilding abstractions originally tailored for CMOS. Even though such alternative technologies to silicon based technologies do not show any economic or computational importance as of now, they are still interesting research areas[8]. The paper discusses one such specific nanotechnology of "Nanomechanical computational systems"

Digital systems in nanomechanical computers are represented by displacements of solid rods and logic gates in combinational circuits can be built by using interlocks in nanomechanical systems. These interlocks can resemble CMOS transistors, in that interlocks can make the mobility of the rod dependent on the displacement applied to gate knob, either permitting motion when the gate knob is at a large displacement and blocking it at low displacements, or vice versa [1,2,3,4].

In this paper we build upon the logic suggested by K.Drexler and propose an approach for realizing a classical full adder circuit and its implementation using logic rods. In section 2 we present the architecture of an classical full adder circuit and then its extension to n-bit adders (multi-bit adder). This is followed by speed, packaging density and energy dissipation considerations based upon bounded continuum models, in section 3. Some of the problems arising from the use of these methods are also briefed. The concluding remarks are provided in section 4.

II. ADDER ARCHITECTURE

One of the challenges for nanoelectronics is the development of integrated circuits on the basis of emerging alternative technologies. For this purpose, we propose a full adder implementation using nanomechanical rods. There are several different ways to implement a such a circuit. In this section we consider the design of a basic full adder circuit using the equations (1) and (2) given in the references [9,10].The equation for the Sum S of traditional 1-bit full adder is:

$$S = A\overline{B}\overline{C_i} + \overline{A}B\overline{C_i} + \overline{A}\overline{B}C_i + ABC_i \qquad (1)$$

Where A and B are the inputs and C_i is the carry input.

The equation for output carry is:

$$C_O = A\,B + B\,C_i + A\,C_i \qquad (2)$$

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Chat Application via UDP Protocol in C

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Abstract: ***User Datatgram Protocol (UDP) is a connectionless and light-weight protocol. It is fast and efficient. It is also easy to be used in a network. Socket network programming is one of the most popular technologies used to build a chat application and establishing network communication between systems. Socket programming helps to implement the bottom level of network communication, using Application Programming Interface (API). In this paper, we present a chat based application implemented in 'C' via UDP protocol by Windows Socket Programming based on Client-Server model. Visual Studio Ultimate 2010 software is used. Wireshark software is also used in the background.***
Index Terms: UDP, Windows Socket Programming, Client-Server model.

I. INTRODUCTION

THE User Datagram Protocol (UDP) belongs to the Transport Layer of OSI model. In computer networking, UDP is one of the core members of the Internet protocol suite. The protocol was designed by David P. Reed in 1980 and formally defined in RFC 768. With UDP, computer applications can send messages, in this case referred to as 'datagrams,' to other hosts on an Internet Protocol (IP) network, In order to set up communication channels or datapaths, prior communications are not required.

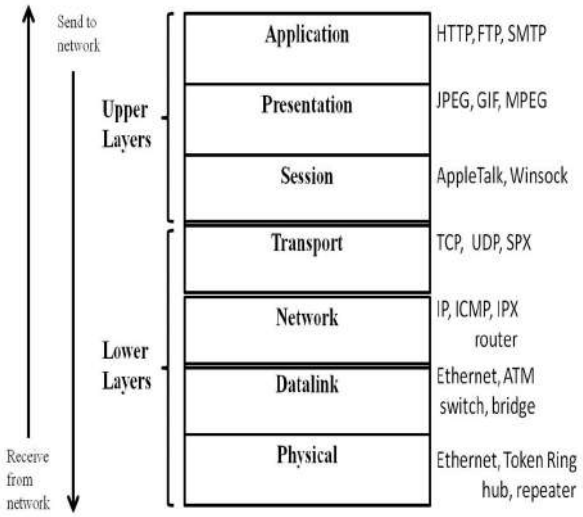

Fig 1 OSI Model

The characteristic features of UDP are it is connectionless, fast and efficient, low overhead, header length of 8 bytes, error-checking capacity and light-weight. It is also used in other protocols, namely, DNS (Domain Name Service), DHCP (Dynamic Host Configuration Protocol), SNMP (Simple Network Management Protocol) and VOIP (Voice Over Internet Protocol). The UDP header format consists of the fields - source port, destination port, length and checksum. Source and destination port numbers are communication end points for sending and receiving devices. The length field indicates the total size of the datagram including both header and data. The checksum used for data integrity allows receivers to cross-check incoming data.

Compared to other protocols, UDP is unique in that it does not establish end-to-end connections between communicating end systems. UDP communication consequently does not incur connection establishments and teardown overheads. Because of these characteristics, UDP can offer very efficient communication transport to some applications. On many platforms, applications can send UDP datagrams at the line rate of link interface, which is often much greater than the available path capacity.

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Analysis and Recognition of Bilingual Handwritten Scripts

Panyam Narahari Sastry, G. Akhil, Vaishnavi Suthram

Abstract: ***In this work, offline handwritten character recognition (HWCR) is involved, which is an open area of research for Indian languages. The recognition accuracy for HWCR is around 60% as per the literature survey. The main obstacle for the research in this area is the non-availability of a standard database. Character Recognition (CR) is an application of pattern recognition. Pattern recognition has many applications like security services, defense organizations, banking, post offices, archeological field, weather forecasting, library automation, reading aids for the visually challenged, etc. There are very less number of users for Indian languages when compared to English and hence the research for HWCR is at early stage. In this work, transform based recognition techniques are used on two languages namely Hindi and English. The best recognition accuracy obtained for the bilingual handwritten scripts is 73.33% which is in line with the existing research publications.***

Keywords: 2D-FFT, 2D Correlation, Bilingual Characters, Nearest Neighborhood Classifier, Optical Character Recognition (OCR).

I. INTRODUCTION

Character recognition and pattern recognition are two important fields where extensive research is taking place almost every day. It can be broadly classified into online and offline character recognition. Online character recognition is one where the system identifies the character when entered from an input device like keyboard. Several algorithms are already in place for online character recognition. Offline character recognition is one where the system must identify the characters which are already written on the medium. This is relatively a challenging task because handwriting varies from person to person, which creates confusion while teaching the machine about a certain handwritten character. This is also a very challenging task where one is teaching a machine to understand a letter which essentially can be written in several ways by each individual. In this work [1], more stress is given on various methods of offline handwritten CR. In this work considerations regarding slant, size and skew normalizations are taken which makes it more efficient. Erratic errors due to hand movements are eliminated here as well. Also, representing and recognizing data is done in many methods.

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In the work [2] as well major concentration again has been given to offline handwritten CR where the recognition extends to words as well as sentences. This work also stresses on signature verifications and writer identification which forms the core of many applications in character recognition. Character recognition is important because it helps us interpret any written material like ancient scripts, palm leaves or simple hand-written notes on the paper.

The options in this area of research are so extensive and individualistic that a same algorithm may not prove to be that accurate when applied to other languages. This is because there are several ways in which a character can be written. Also, a character can either be simple or complex. A complex character is one where a consonant gets mixed with a vowel and it assumes a new pattern which can be very different in pattern from the individual vowel or consonant. These complex characters can be challenging for a machine to understand. In recent times, a lot of research has taken place in English, Chinese, Arabic and Devanagari scripts and more research is taking place in identifying them with improved accuracies. Various Indian languages and scripts like Devanagari, Gurmukhi, Tamil, etc have been worked on using OCR methods which can be seen in this work [3].

A diverse dataset is used in the work [4]. Multistage recognition using appropriate MLP architecture is used here to provide better accuracy. In the proposed work, the languages to work upon has been chosen to be on Hindi, English small and English capital letters. This database has been opted because the machine must be able to recognize pattern among a pool of different languages and at the same time small and capital letters of English has been incorporated in our database because the machine should be able to tell the difference between them even though they belong to the same language. No standard database for HWCR of Indian scripts/English are available and so a database has been generated in the laboratory environment [4, 5, and 6].

Currently, character and pattern recognition finds its application in decoding some preserved age-old manuscripts, recognizing signatures, in banks, etc.

Identification between small and capital letters can be essential for further studies where one can identify the beginning of a new sentence or to identify proper nouns. Identification among Hindi and English can be further extended to more languages in order to decode multi-lingual notes or scripts. This kind of work on CR on South Indian languages can be seen in work [4]. PCA (Principal Character Analysis) method combined with Fourier Transform is used here to identify characters from a pool of multilingual characters.

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Recognition of Offline Handwritten Characters using 2D-FFT for English and Hindi Scripts

Panyam Narahari Sastry, Syed Sameer, Mohammed Sameer Syed

Abstract*: The Handwritten Character Recognition has been a challenging task for the past many decades. This is an old application related to the area of pattern recognition. Handwritten character recognition (HCR) can be classified into two types namely, Online and Offline. As per the literature survey, there are no standard databases for HCR [1] [2] [3] since there are very less number of speakers for any Indian language compared to English. Hence, the database of Indian scripts both for testing and training are to be developed in the laboratory environment. The recognition accuracy for printed / typed characters is more than 99 percent, whereas for the HCR it is around 60 percent. Hence the area of HCR is an open area of research. HCR for Indian languages is at nascent stage compared to English since they contain alphabets and also matra's / sandhi are complex which make the recognition tougher. The freedom of the scriber in writing the script is also another challenge for achieving the better recognition accuracy. This work describes the handwritten character recognition of both Hindi and English scripts by extracting features using 2D FFT and using the Nearest Neighborhood Classifier. The best recognition accuracy for handwritten character recognition of English and Hindi languages obtained is 70%.

***Keywords* : 2D FFT, Handwritten Character Recognition, Nearest Neighborhood Classifier, Pattern Recognition.**

I. INTRODUCTION

Optical Character Recognition goal is to identify characters in images of printed or handwritten text, in order to encode the text in a format which is more convenient to be edited, copied on papers, or may be distributed electronically across world-wide networks. One of the most popular natural ways of generating paper documents is handwriting. Most paper documents are handwritten because it is a natural means with convenience and speed. Wide spread acceptance of digital computers seemingly challenges the future of handwriting as the keyboard is becoming the most popular means of generating text. But the convenience of paper and pen is the reason that still handwriting persists in the age of digital computer and hence seen as a more natural way to enter text into a computer, provided computers can decode the handwriting. In offline HCR systems, the recognition is done only after all the writing is complete. The input is the raw handwritten data, usually in the image form and involves analysis of the two-dimensional image. The major advantage of the offline systems is to allow previously written texts to be processed and then to be recognized.

To construct more precise results, the following needs to be utilized.

- Minimize the Noise effect. The input image is usually noisy due to a number of factors like writer, paper, pen, ink and scanner quality and has a high influence on the recognition.
- Segment the text. The input text image may be of a page of a document, a word or a character at a time. To convert an image with a page of document to soft form, the lines of text are to be first segmented. From the line, the words are to be segmented. The words can be used as a whole for its recognition or it can be further segmented into characters.
- Handle ambiguity. There is no opportunity for feedback or user interaction in case of ambiguity or dead end as completed writing is available as an image and the recognition happens often in the absence of the writer's involvement.
- Improve the recognition quality. Even 99% accuracy of HCR system translates to 30 errors on a typical printed page of 3000 characters and correcting such random errors requires enough time and an alert proofreader. Hence for off-line systems, the recognition speed may not be an issue, but the recognition quality, definitely is an issue.

The drawbacks of these systems are:

- Need for robust preprocessing techniques to make the data suitable for recognition.
- The temporal information is absent and hence stroke level processing needs complex steps to extract strokes from the image, but, the sequence in which these strokes are generated cannot be regenerated.
- Segmentation of the characters in case of overlapping, cursive or mixed scripts is difficult.

II. METHODOLOGY

In the literature it is evident and very clear that there are no standard databases for Indian languages for the purpose of handwritten character recognition [1] [2] [3]. Further, it is recommended in the literature to develop handwritten characters in the laboratory environment [1] [2] [3].

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A STURDY NON-NEGATIVE MATRIX FACTORIZATION FOR NONLINEAR HYPERSPECTRAL UNMIXING

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Abstract

To depict the hyperspectral data, here a sturdy mixing model is implemented by employing various perfect spectral signatures mixture, which enhances the generally utilized linear mixture model (LMM) by inserting an extra term that describes the potential nonlinear effects (NEs), which are addressed as additive nonlinearities (NLs) those are disseminated without dense. Accompanying the traditional nonnegativity and sum-to-one restraints underlying to the spectral mixing, this proposed model heads to a novel pattern of sturdy nonnegative matrix factorization (S-NMF) with a term named group sparse outlier. The factorization is presented as an issue of optimization which is later dealt by an iterative block-coordinated descent algorithm (IB-CDA) regarding the updates with maximation-minimization. Moreover, distinctive hyperspectral mixture models also presented by adopting the considerations like NEs, mismodelling effects (MEs) and endmember variability (EV). The extensive simulation analysis by the implementation of proposed models with their estimation approaches tested on synthetic images. Further, it is also shown that the comparative analysis with the conventional approaches.

Keywords : Hyperspectral images, spectral unmixing, linear mixture models, nonlinear mixture models, nonlinear spectral unmixing.

I. Introduction

Hyperspectral image investigation, which renders significant and comprehensive gathered measurements description in several areas of application like spectro-microscopy [XXXIV], remote sensing [XXI], food monitoring [II] and planetology [XXX] is done by a prefaced concern problem named as spectral unmixing (SU),

34.Secure Route from Fabrication Attack through Authentication Mechanism in MANET”

Secure Route from Fabrication Attack through Authentication Mechanism in MANET

T. Shekar Reddy, Dr. Y. Rama Devi

PDF

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Abstract

Wireless networks are increasingly well-liked in telecommunications systems presently, as consumers desire to have wireless connections despite their geographical location. However, the nature of wireless connection enhances the risk for secure routing in many network contexts, specifically in MANET kind of network. Route Fabrication (RF) is one of the types of attacks that enter the network by disseminating information and generating fake IDs. It is highly challenging to identify false in a fictitious behavior of the node after giving the impression of a normal action and also in the case of RF attacks the alteration of the routing message during route discovery or data, communication leads to a high number of packet losses. This paper proposes an authentication mechanism utilizing a

35. An Interaction Based Influence Propagation Model for Detecting Active Communities in Social Networks

An Interaction Based Influence Propagation Model for Detecting Active Communities in Social Networks

Anusha Parupudi, M. Venu Gopalachari, Y. Rama Devi

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Abstract

Social Network Community Detection (SNCD) is one of the main challenges in social media analytics which is defined as a collection of people who share common interests. Since the volume of data produced everyday by social networks is growing enormously, the challenge is finding active and dense communities demonstrate constant interactions among its members. The existing SNCD techniques had focused mostly on the static nature of the communities and weightage is concerned for the number of connections but in order to understand the real behavior of the communities it is worthwhile to consider interactions among users in a network along with the friendship/followership. In this paper, an Interaction based Influence Propagation Model (IIPM) is proposed which makes use of

36 Inspection Of Various Diagnostic Tools And Machine Learning Algorithms To Perform Data Analytics On Autism Spectrum Disorder

Dr.Y.Ramadevi
Professor

INSPECTION OF VARIOUS DIAGNOSTIC TOOLS AND MACHINE LEARNING ALGORITHMS TO PERFORM DATA ANALYTICS ON AUTISM SPECTRUM DISORDER

Authors Y.Ramadevi karre Kusumalatha

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37.An Architecture to Mitigate DDoS Attacks in Cloud Web Services

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An Architecture to Mitigate DDoS Attacks in Cloud Web Services

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ABSTRACT

Distributed Denial of Service (DDoS) attacks are often overlooked because they represent only a temporary interruption in the normal functioning of a system. With the advent of paradigms like the cloud, the mitigation of this type of threat with the increase of resources for the applications becomes viable, but it causes a problem called economic DDoS. This paper presents an architecture proposal to mitigate DDoS attacks directed at an application hosted in a cloud. Such architecture is based on the instantiation of a replication of the application - simple operation in a cloud - and the redirection of only legitimate requirements for this reply. The proposed architecture does not need to identify attacking customers and, even so, it is able to filter only legitimate traffic without the load and possible errors resulting from the need for identification.

Key words : Cloud, DDoS, Security, Response Time

1. INTRODUCTION

Several researches have been developed to address issues of the current Internet, which can spread to the Internet of the Future. Such problems can be broadly categorized in the areas of mobility, quality of service and security, which still move towards acceptable solutions, aggravated by the emergence of new architectures. Today, both data and applications are offered in different and unknown physical locations. Another major change occurred in the way of administering a system, which used to be more local in scope, with its characteristic users and servers, and now these systems are hosted in environments built by the sharing of resources of several autonomous systems (AS) and heterogeneous [1],[18].

Despite many research efforts, Denial of Service (DoS) attacks still pose serious threats to many servers on the Internet and constitute one of the main security challenges currently propagated for Future Internet, which will interconnect many more devices and individuals. A DoS attack is not intended to hack into a computer to obtain confidential information, nor to alter information stored on it. Its objective is the unavailability of a service provided, using the routing of large amounts of traffic to the service host. This issue becomes even more severe when several traffic generators intensify the traffic routing in a distributed manner, featuring a Distributed Denial of Service (DDoS) attack [2]. Although such a load is only a momentary problem, when it comes to applications intended for electronic commerce, a service outage represents major financial losses.

With the new network and application architectures that configure the Internet, complex and robust systems such as clouds have emerged, where the challenge of mitigating DoS attacks becomes even more necessary. Although most solutions commonly offered to mitigate DDoS in the cloud is based on the increased allocation of resources [3], these approaches become inadequate because the premise of the possibility of greater allocation of resources is not always feasible because it is too expensive [4], [5]. This behavior characterizes the economic DDoS (eDDoS) [6],[19].

This work proposes a reactive and fault-tolerant architecture to mitigate DDoS attacks executed against applications hosted in a cloud. Such architecture is based on the instantiation of a replication of the application and the redirection of only legitimate requirements to this reply.

The architecture monitors the traffic of an application and when detecting a possible anomaly, that is, the occurrence of a DDoS attack, it establishes a new instance of this application, ensuring that no malicious traffic can be reached. The differences of this solution for other proposals are that the

38. Question Duplication using Deep Learning

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Artificial & Computational Intelligence

Question Duplication using Deep Learning

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Abstract

Questionnaire platforms like Quora, Stack-overflow who are based on functionality of allowing users to ask questions and allow them to respond to questions revolve around a frequent and well raised problem of semantic matching or question duplication. We often tend to write a sentence or two which are definitely influenced by the linguistic nature we live around to the accent we use to the environment we live in. These habits might tend to produce a major drawback for users to ask questions which mean the same but are not identified as duplicate questions. We have come up with a pattern which may not completely provide a solution to this problem but may help in increasing the efficiency of the model to predict the delicateness' among several question pairs. We propose to use a Deep Learning approach LSTM, long short term memory as the base model in a layer of subsequent sequential model with a combination of five layers like dropout layer, embedding layer, dense layer. We just tried to prove that a machine learning model like Random forest did not perform well when compared with a Deep Learning model LSTM mainly because of non consideration of order of words. We tend to propose some basic data preprocessing techniques which pave the way to increase the efficiency of the input data thereby increasing the efficiency of the model in identifying the delicateness of the question pairs in the form of accuracy.

Keywords - *Long* Short Term Memory, RNN, Question Matching, Natural Language Processing.

1. INTRODUCTION

For a well sustainable platform, maintaining the data accurately is the fundamental task. With increasing loads of data every day Questionnaire platforms seem to stumble upon main concern of duplicativeness in Questions or the answers present .This may lead to scattered information into different branches leaving the user to access only one of the nearest question/answer and making them completely unaware of the answers divided across duplicate questions leading to insufficient outcome. The whole agenda of these questionnaire platforms is to make the data available for every question which is lost by this major problem of Question Duplication. For example, we'd consider questions like "strategy of 2015 elections", "trumps strategy of winning 2015 elections", and "how did trump win 2015 elections" are the questions which intent the same but are considered as different questions. To solve this problem of question duplication, we've proposed a Deep learning algorithm to automatically identify the probability of duplicativeness among the question pairs.

We have considered several reasons which may lead to Question Duplication problem , one such problem which has constituted the majority of effect in the question duplication problem is considering ordering of words placed in a question, which is not considered by machine learning algorithms like Random Forest etc . For example:"Man bites

39 Approval prediction from improvement requests based on sentiment analysis

An International Open Access, Peer Reviewed, Refereed Journal

APPROVAL PREDICTION FROM IMPROVEMENT REQUESTS BASED ON SENTIMENT ANALYSIS

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Abstract: Even after delivering the product by implementing all the features as per customers requirements, the improvement or enhancement requests are frequently proposed by the users. For a product if more numbers of stakeholders are there, then the improvement requests are more in number and also frequency of receiving requests is high. Though the received requests are high in number, all are not suitable to implement. It is very time consuming for a developer to manually go through each and every request and to differentiate them between implementable and un-implementable requests. So, to overcome this problem, sentiment-based analysis can be used to predict the most likely requests which will be approved for implementation. This approach makes the software applications competent in the market by helping in implementing the features at a rapid rate and thus meeting the deadlines. In this approach, the first step is to pre-process improvement requests using natural language pre-processing techniques. Second is to calculate the sentiment of each improvement request by identifying the words having positive and negative sentiments in the summary attribute of the data collected. Third is to train the machine learning based classifier to predict whether a given improvement request would be approved. The proposed approach is evaluated with the sample history data from real software applications by using the algorithms SVM (Support Vector Machine), Naive Bayes, Logistic Regression and Random Forest. A comparison among these algorithms is done to decide on the best algorithm for the kind of the data considered.

Index Terms **- Improvement requests, Sentiment Analysis, SVM, Random Forest, Naive Bayes, Logistic Regression.**

I. INTRODUCTION

All the software applications related to desktop, laptop, mobiles and other electronic gadgets have become very dynamic in nature. Many requests are received to upgrade each of these applications. Unless and until they are upgraded, their existence in the market is difficult. The number of improvement requests may be large for software applications for which the number of users are high. The management of these requests and dividing them into implementable and unimplementable is a challenging task. It is a very time consuming process for the Developers to go through each of these requests manually and resolve the requests into add on features for the applications. Among these received requests, many of them are rejected due to different reasons like for eg. Few requests are not feasible, improper or incomplete description of the request, few requests are very time consuming to implement etc. Studies have shown that up to 75% of the requests are rejected. But though, majority of the requests are rejected, developers have to go through each of these requests, to insure not missing on any of the implementable request. This manual procedure causes unnecessary wastage of time. This wastage of time can be avoided by automating the approval prediction of each of the requests. With the automated and accurate approval prediction of requests, developers may first concentrate on implementing the most likely approved requests instead of wasting time with the most likely to be rejected requests. Two advantages are achieved with this. One is, a rank based inspection may help to find large number of useful suggestions from the user requests. Another one is that developers may quickly implement the useful requests thus increasing the efficiency and reputation of the software application in the market.

In this paper, we propose Approval Prediction from improvement requests based on sentiment analysis. We used the data related to Mozilla ecosystem which was extracted by tuzanani (2017)[11] were used. Each request was pre-processed. Pre-processing was done in several steps like Tokenization, spelling correction, lower case conversion, removal of punctuation marks, stop words removal, white space removal, Parts-of-speech tagging, lemmatization. In tokenization, a sequence of strings, here requests are broken into pieces of words. In spelling correction, the misspelled words are corrected. In lower case conversion, the text is converted to lower case which helps with consistency of the expected output. In removal of punctuation marks, all the punctuation marks like comma, full stop, exclamation marks are removed. Stop words are the words which are used very frequently

40.Dynamic Trade Variant of Time Dependent Scheduling in Cloud Compute Based on Parallel Load Balancing

Dynamic Trade Variant of Time Dependent Scheduling in Cloud Compute Based on Parallel Load Balancing

Nagaraju Animoni, Dr. Y. Rama Devi

PDF

Abstract

Cloud computing may be a mainly recent new computing model within the exertion, dates' and IT service layout to corner of effective and physically isolated group. The way to improve the worldwide through put and avail oneself of Cloud computing riches expertly and expand the utmost profits with jobs organize structure is solitary among the Cloud Computing maintain source' vital aim.

In this inspiration of the article is to start a schedulings machine which track the Lexicographic search approach to seek out an optimal achievable assignment in three dimensional. Assignment scheduling is handling as time dependent assignments problems to seek out the minimum optimal cost . now cost template is create from possibility aspect supported some most significant circumstances of efficient assignment scheduling like task arrivals, task wait time and therefore the most vital task time interval during a source at particular periods. the value for assignment a task into the resource is probabilistic result considerable on top of conditions.

How to Cite

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Section

Articles

41.A Distributed Environment with Rough Set Theory Based Image Processing Approach for Analysis of Facial Disorders for Better Cosmetic Product Recommendation

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A Distributed Environment with Rough Set Theory Based Image Processing Approach for Analysis of Facial Disorders for Better Cosmetic Product Recommendation

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Keywords:
image processing, rough set theory, facial disorders, product recommendation, feature selection

ABSTRACT

Producers and Consumers are getting progressively open to the use of cosmetic beauty care products. This can be found in them utilizing an assortment of regular Cosmetic resources and materials. This reality is additionally upheld by the pattern of natural and health awareness. This experience can be found inside both the Producers and Consumers behavior. Fast development of beauty care products industry, the improvement of new advances and the style for wonderful and youthful skin caused that fashion became basics for present day society. As the growth of cosmetic industry increases, the number of cases related to side effects of the products are also getting increased. According to Central Drugs Standard Control Organization, nearly 8% of the customers are facing side effects because of unsuitable products. There is no proper model used by the cosmetic product producers to suggest suitable cosmetic product to the customers. To reach the requirements of the various customers, the cosmetic industry needs to manage enormous features of skin, extract from the face images of the customers, out of which not many are required to recognize the skin issues and fundamental item stimulation. The proposed work mainly concentrates on designing a model for better cosmetic product suggestions to the customers to reduce the side effects and to have a healthy and shining skin. Advanced image handling and examination of clinical face images can successfully strengthen medical diagnosis with important plans including automatic prediction and analysis, image segmentation and estimation of obvious features in images. Rough set theory is one of numerous techniques that can be utilized to break down and analyze images, less regular than progressively customary strategies for probability, statistics and set theory. In this manuscript a distributed environment with rough set theory based image processing method is used for analysis of facial disorders for better cosmetic product recommendation that cannot cause any harm or disorder to the customer with use of cosmetic products that improves the safety of the customers. The proposed model performs product recommendations based on local and global features based on the customer locality. The proposed method is compared with the traditional methods and the results show that the proposed method exhibits better accuracy in prediction of skin disorders in cosmetic industry.

1. INTRODUCTION

The usage of Cosmetic items and the markets manufacturing such products are increasing in recent decades as customers are taking very much care about their beauty in present lifestyle. Customers purchase beauty care products for purging, improving or changing the appearance, skin, hair and nails especially face tone improving products. Cosmetic items incorporate excellence arrangements, for example, make-up and face cream products that helps, for example, cleanser and antiperspirant [1]. At the point when herbs are utilized for their fragrant and cosmetic usage in makeup, they are known as home developed or green entity consideration items.

The historical backdrop of cosmetic products has experienced radical changes during the previous decades. The worldwide cosmetic market was around 590 billion USD in 2019 and it is assessed to arrive at 750 billion USD by end of 2020, developing at a rate of 20 percent [2]. The Beauty advertisements has developed by 15 percent a year on a normal with a yearly development rate running from 8 percent to 10 percent. During the 20th century, India built up a fabrication procedure to replace the scent, cosmetic products made by regular and with chemical techniques [3].

The Indian cosmetic industry experienced quick development rate since the monetary Liberalization in 1991. All through the main decade of 21st century, the offer of Cosmetic products became consistently arriving at the degree of 9 percent Compound Annual Growth Rate (CAGR) in the

42.A Survey to Build a Movie Recommender System Using Hybrid Filtering

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A Survey to Build a Movie Recommender System Using Hybrid Filtering

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Abstract:

Now a days, machine learning algorithms are playing a very important role recommender system. In this paper, we propose a survey to build a movie recommender system using Hybrid Filtering.

Keywords: Machine Learning Algorithms, Recommender System, Hybrid Filtering.

1. Introduction

In today's world, due to the continuous development of the internet technology, overload of the information has become a serious issue. Huge amount of data is being generated each hour. To get the information that we need, the search engines are useful up to some extent. But when we do not know what exactly we are looking for, they cannot provide the results which satisfy the user. The recommender systems help in regard to this problem by providing the user with the information based on his preferences, search patterns, etc. These help the user to find the information which is otherwise anonymous to him. Recommender systems are now playing a major role in various online applications like Amazon, YouTube, etc. During this survey we got to know how a recommender system works, what methods are used for the generation of the recommendations and we also have gone through some of the existing systems.

Recommender Systems

Recommender systems are used to provide personalized recommendations based on the users past behavior and his preferences. The services like YouTube, Amazon continuously monitor their users' actions, keep a record of them, mine the data to find any patterns and use this information to generate recommendations which are unique to each and every user. There are several ways to mine these patterns. These are called the filtering techniques, which are generally of three types-

a) Collaborative filtering
b) Content Based Filtering
c) Hybrid Filtering

1. Filtering Techniques

Collaborative Filtering:

This filtering technique is totally based in the users' previous history, that is, the movies that he has already watched and rated are taken into consideration. Now these ratings are stored. Similarly we have the ratings given to the movies by thousands of users. Now for a particular user a set of similar users are found based on the similar movies that they have watched and how similar their ratings are. Simply put, the logic here is that if an User A and another User B like an item then the item that are liked by user A may also be liked by the user B and vice versa[1].

Content Based Filtering:

In this technique, the attributes of the movies such as their genre, cast etc. are used to find the similar movies. That is if the user watches a movie then based on this movie's attributes a list of similar movies is generated. This may include the movies that are of same genre or include one or more of the cast members. Since the attributes are being used, the recommendations that are generated maybe repetitive and limited in scope[2].

Hybrid Filtering:

To overcome the disadvantages of a single method, two or more methods are combined together which may result to generation of better recommendations. These methods maybe combined in any manner. If two methods are being used then they both maybe applied separately and the combined result may be presented or after applying one method, the results of this method can be taken and the second method can be applied to these results[3].

Any of the methods above can be chosen to generate the recommendations but the final goal is to give the recommendations that may be useful to the user.

2. Finding Similarities

There are several methods to find the similarities among the users or the movies-

43. A review: secure routing protocols for mobile adhoc networks(manets)

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A REVIEW: SECURE ROUTING PROTOCOLS FOR MOBILE ADHOC NETWORKS (MANETs)

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ABSTRACT: Mobile Ad-hoc Network is a multi-hop wireless networking of mobile nodes that have restricted resources by the conditions of battery life, memory, and processing power. The stream of traffic to the receiver nodes that are beyond the reach of sender devices will be routed by intermediate nodes. The routing in the MANETs is distinct from the traditional broadcasting network because the nodes not just serve as end machines although serve as routers. Because of the resource limitation of the nodes, the routing protocols for MANETs will need to be light-weight and presume a reliable environment. Protection in the Mobile Ad-hoc Network is a huge task since there is no centralized authority that can monitor the specific nodules that operate in the network. The attacks may also come from the outside and inside the network. This attack may result in either denial of services or misdirection of data traffic.This study organizes a safe and secure routing protocol in MANET and also examining the currently suggested method of alleviating such attacks. MANET routing protocols sent data packets to another node, certain intermediate nodule obtains valuable information about packets and sometimes cannot route the packet to the next node. Several nodes may change the contents of packets throughout the data transfer session. So that every single node can influence the initial data.

KEYWORDS: Ad-hoc Network, Routing Protocols, Security Attacks, SRP

I. INTRODUCTION

A MANET(mobile Ad-hoc Network) comprises a collection of mobile hosts that perform fundamental networking features such as routing, packet forwarding,without any assistance from a recognized organization. Nodes of an ad-hoc network depend on several intermediate nodes to send a data packet to the target location, because of the restricted scope of every mobile that is broadcast to the host. Security in MANET is an important element for fundamental network capabilities like packet routing and forwarding [1,2].

Figure1: Mobile ad-hoc network

Network functions may be conveniently endangered if the messages are not embedded within the underlying network capabilities during the early stages of their planning.Routing network utilizing dedicated nodes to provide support for essential functions like packet routing, forwarding, and networking management, in ad-hoc networks such tasks will be performed by all available nodes. This is extremely challenging for the central core of the security issues that are particular to ad-hoc networks. In contrast to the dedicated nodules of a traditional network, the nodules of an ad hoc network can no longer be trusted for the proper performance of key networking features.In wireless networks, there is a great requirement for security[3-5].The flexible performance of our wireless routing protocol network concentrated on the attack of the malignant agent. Table1[6] demonstrates the features and illustrations of passive and active attacks. Both passive and active attacks can be initiated on every layer of the network protocol stack. Table 2 [7] illustrates some instances of attacks on the various layers.

44.Particle Swarm Optimization for N-Queens Problem

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A REVIEW: SECURE ROUTING PROTOCOLS FOR MOBILE ADHOC NETWORKS (MANETs)

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45. Signifcant Learning Experiences – Activites and Assessments

Significant Learning Experiences - Activities and Assessments

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Abstract

Education provides significant learning experiences which help learners succeed in life. This kind of learning experiences are extensively researched by Fink and proposed six dimensions, namely, Foundational Knowledge, Application, Integration, Human Dimension, Caring and Learning How to Learn. This paper finds if the pedagogy of physical science course of NCERT practiced in regional institutes of education and teacher education institutions across India cater to the significant learning experiences. Review of related studies indicated that psychology, special education, biology and biochemistry laboratory courses were redesigned on significant learning experiences and prepare students to become competent scientific leaders of tomorrow. Through descriptive research assessment and activities of course objectives of pedagogy of physical science course, authors found that the taxa of significant learning experiences form an inverted pyramid. It is concluded that the learning goal of one taxon enables students connect and resolve them at the next taxa. The present paper places activities and assessments of pedagogy of physical science course into their respective taxa of significant learning experiences.

Keywords: *Significant learning experiences; Pedagogy of physical science; Educational goals; Course objectives; Activities; Assessment.*

1. Introduction

We won't meet the needs for more and better higher education until professors become designers of learning experiences and not teachers [1]

Education is meant to provide knowledge, attitudes and skills in the learners. This purpose is achieved through learning experiences. World today is replete with many instances where success in academics does not guarantee success in their lives. So, faculty, students and society felt a need to provide learning experiences which they will use in their day to day life. This means providing significant learning experiences. According to Fink current students are more focusing on courses than on life skills.