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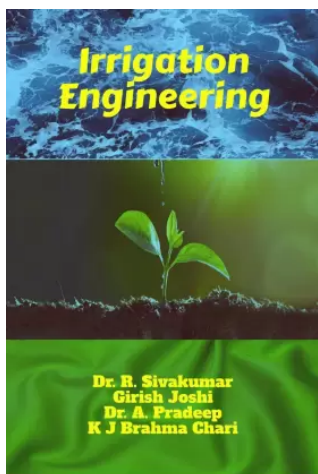
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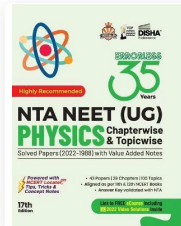3.7  (3)
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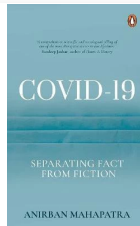
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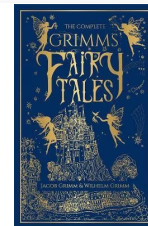
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# Modeling of a Commercial BLDC Motor and Control Using GA-ANFIS Tuned PID Controller

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*Abstract :*The applications of The BrushLess Direct Current (BLDC) are increasing day by day. In order to have proper utilization of these motors and to control them effectively it's important to have proper mathematical modeling of these motors. Similarly effective control these motors are also essential to have successful application of the devices across multiple domains. This work addresses both these important aspects. A mathematical model has been derived to represent a BLDC model and it has been subsequently used to represent a commercially available BLDC motor. Its utility can be gauged from the fact different motor can be analyzed easily using the proposed model. The mathematical model was subjected to open loop and closed loop analysis to study the stability and performance. This paper also presents an approach involving Genetic Algorithm (GA) for training the ANFIS. In order to validate the approach a simulink model having a PID controller is constructed to control the modeled BLDC. It can be observed from the results that GA-ANFIS has delivered a much improved performance when compared to traditional ANFIS.

*Keywords:* BLDC, GA, ANFIS, Open Loop, PID

## I.INTRODUCTION

DC motors provide a simple and precise means of control and has a long history of usage in different industries [1]. In addition to being efficient they exhibit high starting torque that helps in preventing random and sudden load rises [2]. In spite of all these advantages some typical deficiencies associated with these DC motors have given rise to some special type of DC motors. Some of the typical issues that have to be encountered in DC motors include acoustic noise, need for periodic maintenance, brushes effect etc... All these issues have forced researchers to look for alternatives and much of the effort has been directed towards Synchronous DC motors with brushless commutators. The Brushless DC motors (BLDC) have become the most suitable and able replacement for conventional DC motors. The applications for BLDC extend across different domains like production, medicine, industrial automation, consumer electronics and aeronautics. The name of the BLDC itself signifies the important difference between the conventional DC motors and the BLDC. In the case of the conventional DC motors brushes are attached to the stator, while in the case of BLDC it's not the case. BLDC also offers the advantage that commutation can be carried out using electronic circuits; this is not possible in the case of conventional DC motors. In the case of BLDC there is no physical contact between stator and the rotor, also in order to rotate the motor the stator windings have to be energized in sequence. The BLDC motors use Hall sensors which are embedded in the stators; they sense the rotation through Hall Effect [3].

Control of BLDC motor has always remained an active area of research. Especially the PID control of BLDC motor has been studied extensively for the optimization of different parameters of proportional gain, integral time and derivative time. Researchers have used different optimization approaches to optimize these parameters. Researchers have drawn inspiration from naturally occurring phenomena in solving these optimization problems. mimicking the behavior of natural systems (or) naturally occurring phenomena have given rise to multiple optimization approaches like Particle Swarm Optimization (PSO) [4] Ant Colony Optimization (ACO) [5] Genetic Algorithm (GA) [6] Bacterial Foraging Optimization Algorithm (BFOA) [7] Differential evolution (DE) [8] Immune Algorithm (IA) [9], etc. These algorithms have adapted from naturally occurring process. They can be referred using different names with the names like Evolutionary Algorithms and metaheuristic approaches being commonly used. In this work a mathematical model of BLDC motor has been designed and presented. This mathematical model has been analyzed using open loop and closed loop analysis to test for stability and performance. A GA trained ANFIS has been developed and deployed to tune the PID controller which is used for controlling the BLDC motor. A simulink test bed has been modeled for this purpose and suitable analysis carried out.

# Design and Implementation of a Novel Fifteen Level Multilevel DC–AC Inverter

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**ABSTRACT:** *A novel multilevel DC–AC inverter is proposed multilevel generates fifteen-level ac output voltage with the appropriate gate signals design. Also, the low-pass filter is used to reduce the Total Harmonic Distortion (THD) of the sinusoidal output voltage. The switching losses and the voltage stress of power devices can be reduced in the proposed multilevel inverter. The dc operating principles of the proposed inverter and the voltage balancing method of the multilevel inverter is controlled with Pulse-Width Modulation (PWM).The dc-ac converter design and implemented in MATLAB simulation.Finally to verify the proposed topology the desired result, also discussion on current source inverter is done in this paper. This paper contains theoretical analysis and simulation result of this novel multilevel inverter.*

*Keywords: DC–AC Inverter, Digital Signal Processor (DSP),Maximum Power Point Tracking (MPPT), Multi Level Inverter(MLI),Sinusoidal Pulse With Modulation(SPWM),*

## I. INTRODUCTION

Nowadays Multi Level Inverter (MLI) plays a vital role in the field of power electronics and being widely used in many industrial and commercial applications. Moreover the advantages like high quality power output, low switching losses, low Electro-Magnetic Interference (EMI) and high output voltage made multilevel inverter as a powerful solution in converter topology. Generally multilevel inverter configuration is classified into (1) Diode Clamped Multilevel Converter refer shown below [3],[4]-[5] (2) Flying Capacitor Multilevel Converter (FCMC) refer shown below[3].(3)Cascaded Multilevel Converter (CMC) refer shown below [7]-[6],[8].The operation of all these three configurations were compared and analysed in terms of reliability, feasibility and efficiency. The system reliability is not directly relative to the number of components used. Among the above said configuration CMC requires individual voltage source for each H-Bridge module for obtaining synthesised ac output whereas FCMC and DCMC requires more number of capacitors and diodes respectively for their operation and

these multilevel inverter also requires complex PWM control refer shown below [11]-[5].

A result of high-technology development, the demand and the quality of electric power are higher than before. Although an Insulated Gate Bipolar Transistor (IGBT) has features of high power rating and high voltage stress, it cannot operate at high frequency. And the design of IGBT gate driver is complicated. A MOSFET is the appropriate component to operate at high frequency, but power rating is not as good as IGBT. To solve the problem, many different topologies of multilevel use low rating component at high-power application. Because of the advancement of semiconductor, refer shown below [1]-[2] the specification of power device and power conversion technique is promoted. One of the power converters which can transform dc– ac is called inverter. Inverter is the inter medium which transmits power to other electrical equipment such as uninterruptible power supply, servo motor, air-conditioning system, and smart grid composed of renewable energy. To satisfy different demands and characteristic of loads, the output frequency and voltage have to change with different load. The purpose of the multilevel topology is to reduce the voltage rating of the power switch. Therefore, it usually is used at high-power application. By combining output voltages in multilevel form, it has advantages of low dv/dt, low input current distortion, and lower switching frequency.

## II. GENERALISED H-BRIDGE TOPOLOGY

### Multi Level Inverter Topology

The proposed novel topology used  the seven level inverter. An input voltage divider is composed of three series capacitors C1, C2, and C3. The divided voltage is transmitted to H-bridge by four MOSFETs, and four diodes. The voltage is send to output terminal by H-bridge which is formed by four MOSFETs. The proposed multilevel inverter generates seven-level fig 2.1shows below ac output voltage with the appropriate gate signals design. Refer shown below [9]-[10].

# A Multiple Target Tracking Method with Optical Flow and Multi Hypothesis Kalman Filter

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*Abstract*— In recent days, Multiple target tracking (MTT) is an active and challenging problem in the field of computer vision, motion-based recognition, automated surveillance, traffic monitoring, augmented reality, object based video compression etc. Especially, the particular objects are tracking in an environment of multiple objects. However, it is difficult to track a particular object because many problems are occurred in an environment of multiple objects such as merging and splitting. Videos are a collection of sequential images with a constant time interval. So video can provide more information about our object when scenarios are changing with respect to time. This paper proposes an efficient moving object detection technique based on optical flow method and multiple hypothesis kalman filter to reduce the tracking of non target objects in the video. Morphological method is used for further processing to remove noise and to preserve the shape of moving object. The proposed algorithm tracks the targets in outdoor and indoor scenes well.

*Keywords—Moving object, Frames, Object detection, Intensity, Centroid.*

## I. INTRODUCTION

Detection of moving objects in video images is one of the most important and fundamental technologies to develop the real world computer vision systems, such as video monitoring system, intelligent-highway system, intrusion surveillance, etc. Traditionally, the most important task of monitoring safety is based on human visual observation, which is a hard work for watchmen. Therefore, the automatic detection of moving objects is required in the monitoring system that can help a human operator, even if it cannot completely replace the human's presence. To facilitate a monitoring system, efficient algorithms for detecting moving objects in video images need to be used. The usual method for detecting moving objects is simple background subtraction that is to subtract current image from background image. However, there exist gradual illumination changes, sudden changes in illumination and other scene parameters alter the appearance of the background. Simple background subtraction is susceptible to these changes. And when the brightness difference between moving objects and the background is small, it cannot detect the difference. In order to resolve these problems, some algorithms such as blob analysis technique and the technique based on optical flows have been proposed. In our method Moving objects are detected from the difference of two consecutive frames. This approach uses the motion to distinguish moving objects from the background. So it is more efficient than the previous approaches. Furthermore, the algorithm is robust to the changes of lighting condition and camera noise method and algorithm. Section II describes the system overview. Section III, IV, V and VI describes the Video sources, Preprocessing stage, Object detection and Feature extraction. Section VII describes how the objects are tracked and its application. Finally, Section VIII presents experimental results and section IX describes the conclusion.

## II. METHODOLOGY

The proposed algorithm which depicted in figure 1 consists of three stages: preprocess video frames, detect moving objects, and track detected objects. In first stage, video frames are preprocessed, and in second stage moving objects are detected from the background scene based on background subtraction method. In tracking stage our aim is to simultaneously track all moving objects from frame to frame. To do this, the tracker determines when an object enters visual field of view, computes the correspondence matching between objects in previous frame and objects currently being tracked and estimates the position of each object to trace its trajectory during sequence.

# A Single-Phase Buck-Boost Matrix Converter without Commutation Problem for Single Phase Asynchronous Motor

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**Abstract:** This project presents novel single-phase Pulse Width Modulation (PWM) ac–ac converters that can solve the commutation problem in single-phase direct PWM ac–ac converters without sensing the input voltage polarity. Conventional matrix converter requires six switches for buck and boost conversion. By using a basic switching cell structure and coupled inductors, the proposed ac–ac converters can be short and open-circuited without damaging the switching devices with less number of switches. By replacing the conventional phase-leg of the PWM ac–ac converters with the switching cell structure and the coupled inductor, three novel buck, boost, and buck-boost type PWM ac–ac converters are developed.Our work also describes the PWM strategies to control the speed of single phase asynchronous motor.matlab Simulink model used to evaluate performance of single phase motors for speed control.

**Keywords:** Buck-Boost Operation, Commutation Problem, Single Phase Matrix Converter, PWM ac-ac Converter, asynchronous motor.

## I.INTRODUCTION

FOR AC–AC power conversion, the conventional approach is to use a diode or PWM rectifier followed by a PWM voltage-source inverter with a DC link. Other approaches include phase-controlled ac–ac converters employing thyristors, matrix converters, and so on. The output voltage and frequency can be varied with these structures. However, for applications where only voltage regulation is required, direct PWM ac–ac converters are a more practical choice in terms of cost and size. Fig.1.1 shows the basic single-phase direct PWM ac–ac converters or ac–ac choppers

The ac–ac circuits shows in Fig.1.1 have a common commutation problem. For example, for the buck-type converter shown in Fig.1(a), the switches $S2$ and $S3$ are both turned ON and OFF simultaneously, and they are complementary to the switches $S1$ and $S4$ in an ideal case.

However, due to the different time delays and limited switching speed of the switching devices, there inherently exists a short dead-time or an overlap-time between switches. During the dead-time, there is no current path for the output filter inductor ($Lo$), so the switches may be damaged by excessive voltage. Similarly, the switches may be damaged by excessive current when there is an overlap-time between switches $S1$ and $S2$ (or $S3$ and $S4$), because the input voltage will be short-circuited. The MCs can also provide variable output voltage and frequency with directly connected input power supply to load without intermediate dc-link capacitor. Therefore, they are best alternative to conventional indirect ac-dc-ac converters with dc-link.
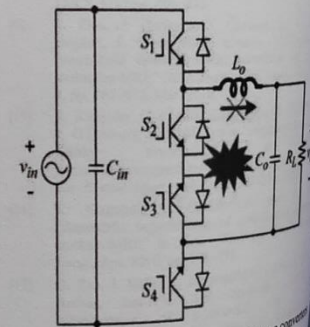


Fig.1.1 basic single-phase direct PWM ac–ac converter with commutation problem

Owing to their attractive features and huge demand in industrial applications, the MCs have become a hot topic in power electronics with various studies on their modeling and control, topological development and applications. However, most of them solve the commutation problem by sensing the voltage or the

# Three Phase Grid Connected Transformer Less MOSFET Inverter for Photovoltaic System

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*ABSTRACT: The unipolar sinusoidal pulse width modulation (SPWM) full-bridge transformer less photovoltaic (PV) inverter can achieve high efficiency by using latest super-junction metal oxide semiconductor field effect transistor (MOSFET) together with silicon carbide (Sic) diodes. However, the MOSFETs are limited to use in transformer less PV inverter due to the low reverse recovery characteristics of the body diode. In this paper, a family of new transformer less PV inverter topology for single-phase grid-tied operation is proposed using super-junction MOSFETs and Sic diodes as no reverse recovery issues are required for the main power switches for unity power operation. In addition, dead time is not necessary for main power switches at both the high frequency commutation and the grid zero crossing instant, results low current distortion at output. The dc operating principles of the proposed inverter and the voltage balancing method of the multilevel inverter is controlled with Sinusoidal Pulse-Width Modulation (SPWM).. This paper contains theoretical analysis and simulation result of this novel multi level inverter. Finally, a 1kw prototype is built and tested to verify the theoretical analysis. The experimental results show 98.5% maximum efficiency and 98.32% European efficiency. Furthermore, to show the effectiveness, the proposed topology is compared with the other transformer less topologies.*

*Keywords: DC–AC Inverter, Digital Signal Processor (DSP),Maximum Power Point Tracking (MPPT), Multi Level Inverter(MLI),Sinusoidal Pulse With Modulation(SPWM)*

## I.INTRODUCTION

Recently transformer less inverter has been found a one of the excellent solution for grid-tied PV application because of its higher conversion efficiency, lower cost, smaller size, and light weight[1]. Due to the loss of galvanic isolation between the PV module and the grid, a direct path is formed to flow leakage current which generally depends on the non-negligible parasitic capacitance between the PV module and the ground[2], and the amplitude of fluctuating CM voltage.

Another important concern of transformer less inverter is the efficiency that can be improved by optimal design. These two issues (efficiency and leakage current) are the major force in pushing progressive development of transformer less grid-tied PV inverter[3]. Voltage sag is defined by the IEEE 1159 as the decrease in the RMS voltage level to 10%-90% of nominal, at the power frequency for duration of half to one minute.

Voltage swell is defined by IEEE 1159 as the increase in the RMS voltage level to 110%-180% of nominal, at the power frequency for duration of half cycles to one minute. Voltage fluctuations, often in the form of voltage sags/swells, can cause severe process disruptions and result in substantial economic loss. So, cost effective solutions which can help such sensitive loads ride through momentary power supply disturbances have attracted much research attention [4]. In order to reduce the leakage current, a lot of in-depth researches have been conducted in the literature, where a new freewheeling path has been introduced to decouple the PV module from the grid during freewheeling period. However, due to poor reverse recovery of MOSFETs slow body-diode, it is limited to use in transformer less inverter[5]. In the MOSFET based transformer less topologies for grid-tied PV application will be reviewed and discussed based on their circuit structure, efficiency and CM voltage clamping capability. Some studies have been implemented to simplify the circuit and improve the balance speed by multistage equalization [6]–[7]. Some zero voltage and zero current switching techniques are also used to reduce the loss of the equalization circuit [8].

A fluctuating CM voltage could also be observed because the freewheeling path potential is not clamped at the mid-

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## A COMPREHENSIVE REVIEW OF IMAGE SEGMENTATION TECHNIQUES

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Image segmentation is a wide research topic; a huge amount of research has been performed in this context. Image segmentation is a crucial procedure for most object detection, image recognition, feature extraction, and classification tasks depend on the quality of the segmentation process. Image segmentation is the dividing of a specific image into a numeral of homogeneous segments; therefore, the representation of an image into simple and easy forms increases the effectiveness of pattern recognition. The effectiveness of approaches varies according to the conditions of objects arrangement, lighting, shadow, and other factors. However, there is no generic approach for successfully segmenting all images, where some approaches have been proven to be more effective than others. The major goal of this study is to provide summarize of the disadvantages and the advantages of each of the reviewed approaches of image segmentation.

Keywords:  Image segmentation ,object detection, image Reconginition

## The spectrum of big data analytics

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Big Data governance requires a data governance that can satisfy the needs for corporate governance, IT governance, and ITA/EA. While the existing data governance focuses on the processing of structured data, Big Data governance needs to be established in consideration of a broad sense of Big Data services including unstructured data. To achieve the goals of Big Data, strategies need to be established together with goals that are aligned with the vision and objective of an organization. In addition to the preparation of the IT infrastructure, a proper preparation of the components is required to effectively implement the strategy for Big Data services. We propose the Big Data Governance Framework in this paper. The Big Data governance framework presents criteria different from existing criteria at the data quality level. It focuses on timely, reliable, meaningful, and sufficient data services, focusing on what data attributes should be achieved based on the data attributes of Big Data services. In addition to the quality level of Big Data, the personal information protection strategy and the data disclosure/accountability strategy are also needed to achieve goals and to prevent problems. This paper performed case analysis based on the Big Data Governance Framework with the National Pension Service of South Korea. Big Data services in the public sector are an inevitable choice to improve the quality of people's life. Big Data governance and its framework are the essential components for the realization of Big Data service.

# LOAD BALANCING IN CLOUD COMPUTING

Mrs.A.HEMA

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Cloud computing is the emerging internet based technology which emphasizes commercial computing. Load balancing helps in improving the performance of the centralized server. In the present work, various algorithms are analyzed using an analysis tool, namely, cloud analyst. Comparison is also made for algorithms load balancing.

*Keywords: cloud computing, load balancing, cloud analyst simulation, round robin algorithm, AMLB algorithm,*

## PERFORMANCE AND POWER MANAGEMENT FOR CLOUD INFRASTRUCTURES

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A key issue for Cloud Computing data-centers is to maximize their profits by minimizing power consumption and SLA violations of hosted applications. In this paper, we propose a resource management framework combining a utility-based dynamic Virtual Machine provisioning manager and a dynamic VM placement manager. Both problems are modeled as constraint satisfaction problems. The VM provisioning process aims at maximizing a global utility capturing both the performance of the hosted applications with regard to their SLAs and the energy-related operational cost of the cloud computing infrastructure. We show several experiments how our system can be controlled through high level handles to make different trade-off between application performance and energy consumption or to arbitrate resource allocations in case of contention.

KEYWORDS: Cloud Computing, SLA, Energy, Virtualization

## CLOUD COMPUTING FOR ENERGY MANAGEMENT IN SMART GRID - AN APPLICATION SURVEY

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The smart grid is the emerging energy system wherein the application of information technology, tools and techniques that make the grid run more efficiently. It possesses demand response capacity to help balance electrical consumption with supply. The challenges and opportunities of emerging and future smart grids can be addressed by cloud computing. To focus on these requirements, we provide an in-depth survey on different cloud computing applications for energy management in the smart grid architecture. In this survey, we present an outline of the current state of research on smart grid development. We also propose a model of cloud based economic power dispatch for smart grid.

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## INTERNATIONAL CONFERENCE ON ADVANCES IN SCIENCE, ENGINEERING AND MANAGEMENT (ICASEM-2018)

**Invitation**

Date: 27/04/2018 @ 9.30AM                     Venue: Board Room, SJ Block

## Agenda

1. Tamilthai Vaazhthu

2. Welcome Address:        Dr.M.Chinnadurai, Controller of Examinations

3. Lighting Kuthuvilakku

4. Presidential Address:        Chev. Shri. S. Paramesvaran, Secretary, EGSPGOI

5. Felicitation by:        Dr. S. Ramabalan, Principal

        Dr. V. Mohan, Vice-Principal

        Dr. V.Sivaraman, Dean - R&D

6. Introducing Chief Guest: Dr. S. Chockalingam, Assoc. Prof/Mech

7. Keynote Presentation by Chief Guest:  Dr. S. G. Ramkumar, Central University of Tamil Nadu, Thiruvarur

8. Summary Report and Vote of Thanks: Dr. P. Vijayalakshmi, Professor/IT

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# LIFETIME BY THE WSN NODES FORMING THE CLUSTERING HEADS USING HEURISTIC ALGORITHM

Dr. A. Sundar Raj1, M. Sivaranjani2

Associate Professor, Department of Electronics and Communication Engineering1

PG Student2

E.G.S. Pillay Engineering College, Nagapattinam, India1,2

**Abstract:**

WSNs are an emerging technology that consists of large number of low cost, low power sensor nodes; a sensor node, an electronic device that is capable of detecting environmental conditions. Those sensor nodes can be deployed randomly to perform many applications such as monitoring physical events, for example environmental monitoring, battlefield surveillance, disaster relief, target tracking, etc. and they work together to form a wireless network. During last few years many unequal clustering algorithms have been proposed for Wireless Sensor Networks as an efficient way for balancing the energy consumption and prolonging the lifetime of the networks. In Existing proposal we achieved full throughput by using AODV algorithm. We have slight power loss during data transmission. To overcome that power loss here we are using the heuristic algorithm. a heuristic is a technique designed for solving a problem more quickly when classic methods are too slow, or for finding an approximate solution when classic methods fail to find any exact solution. This is achieved by trading optimality, completeness, accuracy, or precision for speed. In a way, it can be considered a shortcut. A heuristic function, also called simply a heuristic, is a function that ranks alternatives in search algorithms at each branching step based on available information to decide which branch to follow. Cluster head selection and rotation were done based on highest residual energy. The important feature of our proposed unequal clustering technique in transmitting data to the base station was analyzed and emphasized. The proposed unequal clustering technique shows better results when the network's lifetime is compared to the equal clustering. Its concept can be effectively used to design energy efficient routing protocol in WSN. In our approach, the clusters are formed unequally into different sizes to analyze how it could affect the network lifetime of WSN by using heuristic algorithm.

# To Improve the Lifetime of the WSN Nodes Lifetime by Forming the Clustering Heads using Heuristic Algorithm

Dr. A. Sundar Raj and M. Sivaranjani

## Abstract

WSNs are an emerging technology that consists of large number of low cost, low power sensor nodes; a sensor node, an electronic device that is capable of detecting environmental conditions. Those sensor nodes can be deployed randomly to perform many applications such as monitoring physical events, for example environmental monitoring, battlefield surveillance, disaster relief, target tracking, etc. and they work together to form a wireless network. During last few years many unequal clustering algorithms have been proposed for Wireless Sensor Networks as an efficient way for balancing the energy consumption and prolonging the lifetime of the networks. In Existing proposal we achieved full throughput by using AODV algorithm. We have slight power loss during data transmission. To overcome that power loss here we are using the heuristic algorithm. a heuristic is a technique designed for solving a problem more quickly when classic methods are too slow, or for finding an approximate solution when classic methods fail to find any exact solution. This is achieved by trading optimality, completeness, accuracy, or precision for speed. In a way, it can be considered a shortcut. A heuristic function, also called simply a heuristic, is a function

node, supplied from non- rechargeable batteries, with no form of recharging after deployment is one of the most crucial problems in WSN. Many routing protocols have been proposed for WSNs. Most of the hierarchical algorithms proposed for WSNs concentrate mainly on maximizing the lifetime of the network by trying to minimize the energy consumption. Researchers agreed that clustering of nodes in wireless sensor networks is an effective program of energy conservation. Clustering is defined as the grouping of similar objects or the process of finding a natural association among some specific objects or data. In WSN it is used to minimize the number of nodes that take part in long distance data transmission to a BS, what leads to lowering of total energy consumption of the system. Clustering reduces the amount of transmitted data by grouping similar nodes together and electing one node as a cluster head, where aggregation of data is performed to avoid redundancy and communication load caused by multiple adjacent nodes, then sending the aggregated

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8. Summary Report and Vote of Thanks: Dr. P. Vijayalakshmi, Professor/IT

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# A STUDY ON EMPLOYEE- EMPLOYER RELATIONSHIP TOWARDS SMART-AG FARM SERVICES AT AADUDURAI

[1]J.Legapriya, MBA & [2]P.Balaishwarya, Assistant Professor
[1&2]Department of Management Studies
[1&2]E.G.S.Pillay Engineering College, Nagapattinam-61002, Tamilnadu, South India.

*Abstract:* This study sought to determine the Employee Employer relationship in Smart-Ag Farm Services at Aadudurai, Kumbakonam. Employee-employer relationship is the one of the important topics which every organization has to consider. The main objective of this study is to find out the harmonious relationship between workers and management, to find way of improving the level of industrial peace by providing better working condition. The descriptive research design is used for the purpose of fact finding enquiries. 117 samples data collected from 200 respondents by using the method of simple random sampling. The statistical tools like chi-square, correlation co-efficient and ANOVA are used to analyze the data. From this analysis, it is found out that the employee-employer relationship is in neutral level and some more suggestions are given to improve.

*Keywords: Harmonious Relationship, Motivation, Productivity, Industrial peace*

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in International Conference on Advances in Science, Engineering and Management held

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Co - Authors : ___G. GANESAN @ SUBRAMANIAN, R. ANANDARAJ.___

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Co - Authors : Dr. V. MOHAN, Mr. R. ANANDARAJ

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## ICASEM - 2018

# SPARSE VECTOR ALLOCATION BASED ENERGY EFFICIENT MULTIHOP MIMO-AF SYSTEMS

M. Abinaya, A. Sundar, R. Lakshmirekha, P. Scholar, E. G. S. Pillay  less  ·  Published 26 May 2016  ·  Computer Science  ·
International Journal of Modern Trends in Engineering and Research

In any communication system, the emphasis is on estimating the channel impulse response so as to retrieve the transmitted input signal accurately at the receiver's end. This work addresses a problem of pilot allocation for joint channel massive multiple-input multiple-output (MIMO) systems. The conventional wireless communications design has major challenges in spectral efficiency and reliability issues. In this work, pilot reduction in Time Frequency Training (TFT) strategy is implemented for… Expand

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## ELECTRICAL AND ELECTRONICS ENGG. & ELECTRONICS AND COMMUNICATION ENGG.

CONTENT

# Modeling of a Commercial BLDC Motor and Control Using GA-ANFIS Tuned PID Controller

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*Abstract* :The applications of The BrushLess Direct Current (BLDC) are increasing day by day. In order to have proper utilization of these motors and to control them effectively it's important to have proper mathematical modeling of these motors. Similarly effective control these motors are also essential to have successful application of the devices across multiple domains. This work addresses both these important aspects. A mathematical model has been derived to represent a BLDC model and it has been subsequently used to represent a commercially available BLDC motor. Its utility can be gauged from the fact different motor can be analyzed easily using the proposed model. The mathematical model was subjected to open loop and closed loop analysis to study the stability and performance. This paper also presents an approach involving Genetic Algorithm (GA) for training the ANFIS. In order to validate the approach a simulink model having a PID controller is constructed to control the modeled BLDC. It can be observed from the results that GA-ANFIS has delivered a much improved performance when compared to traditional ANFIS.

*Keywords:* BLDC, GA, ANFIS, Open Loop, PID

## I.INTRODUCTION

DC motors provide a simple and precise means of control and has a long history of usage in different industries [1]. In addition to being efficient they exhibit high starting torque that helps in preventing random and sudden load rises [2]. In spite of all these advantages some typical deficiencies associated with these DC motors have given rise to some special type of DC motors. Some of the typical issues that have to be encountered in DC motors include acoustic noise, need for periodic maintenance, brushes effect etc... All these issues have forced researchers to look for alternatives and much of the effort has been directed towards Synchronous DC motors with brushless commutators. The Brushless DC motors (BLDC) have become the most suitable and able replacement for conventional DC motors. The applications for BLDC extend across different domains like production, medicine, industrial automation, consumer electronics and aeronautics. The name of the BLDC itself signifies the important difference between the conventional DC motors and the BLDC. In the case of the conventional DC motors brushes are attached to the stator, while in the case of BLDC it's not the case. BLDC also offers the advantage that commutation can be carried out using electronic circuits; this is not possible in the case of conventional DC motors. In the case of BLDC there is no physical contact between stator and the rotor, also in order to rotate the motor the stator windings have to be energized in sequence. The BLDC motors use Hall sensors which are embedded in the stators; they sense the rotation through Hall Effect [3].

Control of BLDC motor has always remained an active area of research. Especially the PID control of BLDC motor has been studied extensively for the optimization of different parameters of proportional gain, integral time and derivative time. Researchers have used different optimization approaches to optimize these parameters. Researchers have drawn inspiration from naturally occurring phenomena in solving these optimization problems. mimicking the behavior of natural systems (or) naturally occurring phenomena have given rise to multiple optimization approaches like Particle Swarm Optimization (PSO) [4] Ant Colony Optimization (ACO) [5] Genetic Algorithm (GA) [6] Bacterial Foraging Optimization Algorithm (BFOA) [7] Differential evolution (DE) [8] Immune Algorithm (IA) [9], etc. These algorithms have adapted from naturally occurring process. They can be referred using different names with the names like Evolutionary Algorithms and metaheuristic approaches being commonly used. In this work a mathematical model of BLDC motor has been designed and presented. This mathematical model has been analyzed using open loop and closed loop analysis to test for stability and performance. A GA trained ANFIS has been developed and deployed to tune the PID controller which is used for controlling the BLDC motor. A simulink test bed has been modeled for this purpose and suitable analysis carried out.

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Dr. A. Sundar Raj

## INTEGRATED ENERGY EFFICIENT MIMO – AF SYSTEM

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|---|---|
| Authors | Sundar Raj. A |
| Publication date | 2016 |
| Conference | International Conference - E.G.S. Pillay Engineering College |

# QUANTUM DOTS- SMART SEMICONDUTOR NANOMATERIALSLIGHTENING THE OPTOELECTRONIS FIELDS
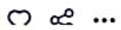
Irshad Ahamed. M[1],Sundar Raj[2]

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### HIGH PERFORMANCE AND ENERGY EFFICIENT SRAM BASED ARCHITECTURE FOR TCAM

Dr. A. Sundar Raj

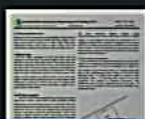| | |
|---|---|
| Authors | Sundar Raj. A |
| Publication date | 2016 |
| Conference | International Conference - E.G.S. Pillay Engineering College |

# Tri-Rotor UAV Stabilisation and Control

[1]A.Sundar Raj, [2]V. Muthumani, [3]V. Anusuya

[1]Associate Professor,

[1]E.G.S. Pillay Engineering College, Nagapattinam, India

[2,3] E.G.S. Pillay Engineering College, Nagapattinam, India

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**Abstract-** In the present times unmanned vehicles are commonly used for remote Ariel surveillance especially in the field of military application. One of the major advantages of a Tri-rotor UAV is its Vertical Take-off and Landing (VTOL) capability. The aim of our project is to develop a Tri-rotor UAV and its control mechanism that can be used for remote Ariel surveillance. The project thus involves designing and implementation of an effective communication mechanism between a ground station and the UAV and an effective flight control algorithm to control the flight of the UAV. The control signals are transmitted from the ground station to the UAV by using ASK modulation. A wireless camera attached to the UAV transmits the live video of the terrain and this video can be viewed directly on an LCD display or monitored using a PC. This video enables a controller to continuously monitor the path of flight of the UAV.

**Keywords**— Tri-Rotor UAV, Stabilisation, Surveillance.

tilting the main rotor blades is necessary. In this way hover is an ongoing and complex process. Similar is the case with a Tri-rotor UAV.

This paper primarily describes the UAV stabilisation and control mechanisms. Section II gives a brief overview of the UAV system. Fig. 1 shows the architecture of the surveillance system within our UAV system. The UAV is the mobile unit in which a wireless camera is attached. The wireless camera takes live video and transmits the video from the UAV to a receiver located on the ground. These video can be used for live monitoring of a militant active region in military application and other spy works. The position of view of the camera can be adjusted using the signals from the camera position control circuit which is monitored by a controller. The proposed processor for our application is PIC 18F4550. The processor processes the

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Dr. A. Sundar Raj

**AUTOMATED SYSTEM DESIGN FOR METRO TRAIN USING WIRELESS SENSOR NETWORK**

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## Building a Metro Ethernet Network to Deliver High Band Width Internet Protocol Television and Internet Access

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|---|---|
| Authors | Sundar Raj. A, Dhanya. K Jayasree. R |
| Publication date | 2017 |
| Journal | International Research Journal of Engineering and Technology |
| Volume | 4 |
| Issue | 02 |
| Pages | 211 |