EMERGING TRENDS IN
Non Conventional
Energy Resources

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AARGON PRESS

Emerging Trends in
Non Conventional Energy Resources

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Physics & Electrical Engineering

Integral University, Lucknow (U.P) INDIA

Emerging Trends in Non Conventional Energy Resources
Integral University Publication

© Edition, 2021

Published by
Aargon Press
EG-130, Inderpuri,
New Delhi-110012, India
Tel.: +91-11-9958121300
Email: info.aargonpress@gmail.com
Website: www.aargonpress.com

Disclaimer:

ISBN: 978-81-95188-45-1

Printed at: Aargon Press, New Delhi

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Renewable Energy Technologies, Sustainable Development and Environment

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ABSTRACT

The move towards a de-carbonised world, driven partly by climate science and partly by the business opportunities it offers, will need the promotion of environmentally friendly alternatives, if an acceptable stabilisation level of atmospheric carbon dioxide is to be achieved. This requires the harnessing and use of natural resources that produce no air pollution or greenhouse gases and provides comfortable coexistence of human, livestock, and plants. This article presents a comprehensive review of energy sources, and the development of sustainable technologies to explore these energy sources. It also includes potential renewable energy technologies, efficient energy systems, energy savings techniques and other mitigation measures necessary to reduce climate changes. The article concludes with the technical status of the ground source heat pumps (GSHP) technologies.

Keywords: Renewable energy resources, technologies, sustainable development, environment

INTRODUCTION

Over millions of years ago, plants have covered the earth converting the energy of sunlight into living plants and animals, some of which was buried in the depths of the earth to produce deposits of coal, oil and natural gas [1-3]. The past few decades, however, have experienced many valuable uses for these complex chemical substances and manufacturing from them plastics, textiles, fertiliser and the various end products of the petrochemical industry. Indeed, each decade sees increasing uses for these products. Coal, oil and gas, which will certainly be of great value to future generations, as they are to ours, are however non-renewable natural resources. The rapid depletion of these non-renewable fossil resources need not continue. This is particularly true now as it is, or soon will be, technically and economically feasible to supply all of man's needs from the most abundant energy source of all, the sun. The sunlight is not only inexhaustible, but, moreover, it is the only energy source, which is completely non-polluting [4].

Industry's use of fossil fuels has been largely blamed for warming the climate. When coal, gas and oil are burnt, they release harmful gases, which trap heat in the atmosphere and cause global warming. However, there had been an ongoing debate on this subject, as scientists have struggled to distinguish between changes, which are human induced, and those, which could be put down to natural climate variability. Notably, human activities that emit carbon dioxide (CO_2), the most significant contributor to potential climate change, occur primarily from fossil fuel production. Consequently, efforts to control CO_2 emissions could have serious, negative consequences for economic growth, employment, investment, trade and the standard of living of individuals everywhere.

ENERGY SOURCES AND USE

Scientifically, it is difficult to predict the relationship between global temperature and greenhouse gas (GHG) concentrations. The climate system contains many processes that will change if warming occurs. Critical processes include heat transfer by winds and tides, the hydrological cycle involving evaporation, precipitation, runoff and groundwater and the formation of clouds, snow, and ice, all of which display enormous natural variability. The equipment and infrastructure for energy supply and use are designed

Comparative Study of Solar and Conventional Energy Resources

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ABSTRACT

Electricity generation is the process of generating electric power from the energy sources such as Renewable and Non-renewable, conventional and non-conventional methods. Renewable and Non-renewable power generation includes electric power generated by renewable and non-renewable (which can renewed and which cannot be renewed) energy sources such as solar, wind, tidal, thermal etc. Conventional and Non-conventional power generation includes electric power generated by conventional and non-conventional methods such as coal, petroleum, natural gas etc. Renewable Energy considers the primary energy from recurring and non-depleting indigenous resources. The reference scenario is projecting the world primary energy demand expands by almost 60% from 2002 to 2030, and the average annual increase percentage is 1.7% per year. The demand will be reaching 16.5 billion tons of oil equivalents (toe) compared to 10.3 billion toes in 2002. There is the projected rate of growth, but it is slower than over the past three decades when it grew by 2% per year [1].

On the other hand, the fossil fuels will keep monopolizing the global energy use. They will take up around 85% of the increase in world primary demand over 2002–2030. Furthermore, the share in total demand will increase slightly from 80% in 2002 to 82% in 2030 [7]. The share of renewable energy sources will remain the same which is at around 14% whilst the nuclear power will drop from 7% to 5%.Hence, the negative effects of fossil fuel combustion on the environment with limited stock can force many countries seeking environmentally friendly alternatives to sustain the increasing energy demand [1]. In this condition, the improvement in the quality of life is raising with the indigenous energy resources. The growth of scarcity in fossil fuels has raised the global interest in the harnessing of solar energy [7].Solar power is a renewable energy while currently covering and assisting in merely a small portion of global energy demands. However, Photovoltaic (PV) power generates less than 1%of total electricity supplies since solar power has been considered as one of the most expensive sources of renewable energies [1].Solar energy is radiant light and heat from the Sun harnessed using a range of ever-evolving technologies such as solar heating, photovoltaics, solar thermal energy, solar architecture and artificial photosynthesis.[1][2]

It is an important source of renewable energy and its technologies are broadly characterized as either passive solar or active solar depending on the way they capture and distribute solar energy or convert it into solar power. Active solar techniques include the use of photovoltaic systems, concentrated solar power and solar water heating to harness the energy. Passive solar techniques include orienting a building to the Sun, selecting materials with favorable thermal mass or light dispersing properties, and designing spaces that naturally circulate air.

Review on Renewable Energy for Rural Development and Impact of Solar Energy in Rural Development in India

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ABSTRACT

Solar energy is one of the most cost-effective and readily available renewable energy sources in the world. Currently, the world has engaged its scientific and industrial acumen in the development of various technologies that tap solar energy and one such area where the solar energy has been extensively experimented is Electrification, which is particularly essential in a country such as India where the rural and underprivileged population outnumbers the urban and the resourceful population. Many states in the country such as Gujarat, Karnataka, Rajasthan, etc have come up with various electrification models that impressively make use of photovoltaic and other related technologies. Gradually these models are becoming role models for other states that are yet to venture into solar energies or have already ventured into it but not produced any substantial developments.

Keywords: Solar energy, electrification, photovoltaic technology, renewable energy

INTRODUCTION

In this new era, every country is more concerned about there power and economical growth. "More than 80% of the world population is of developing countries but only 30% consume commercial energy. With the increase in population the need for consumption also rises due to better living standards.. As Wilison stresses that if each person currently alive would attain the U.S level of consumption,it would require four more Earths (Wilson, 2002:150)" There is a growing concern on the issue of renewable energy all over the world that has been building interest among those in government, multilateral organizations, industry, and nongovernmental organizations (NGOs) pursuing energy, environment, and development agendas at local, national, and global levels. At the same time, commercial markets for renewable energy are expanding, shifting investment patterns away from traditional government and international donor sources to greater reliance on private firms and banks (Martinot, et al., 2002).

Despite several policy initiatives by the Government of India (GoI) and progress in extending the national grid, 56 percent of rural households still do not have access to electricity. And even when they do, many have opted not to connect because of poor reliability and inadequate supply (World Bank). According to Global Network on Energy for Sustainable Development (GNESD, 2007) without adequate supplies of affordable energy, it is impossible to improve health, education and reduction of poverty. About 1.6 billion of world populations have no access to electricity of which about 80 per cent of these people live in rural areas of developing countries of South Asia, Central America and South America. In 2001, the 9th session of the Commission on Sustainable Development (CSD-9) gave special attention to energy. It concludes that "Energy is the central in achieving the goal of sustainable development' [1,2].

There is a serious need of use of renewable energy. India is a country where the climate change for a long period of time. With about 300 clear, sunny days in a year, India's theoretically calculated solar energy incidence on its land area alone, is about 5,000 trillion kilowatt-hours (kWh) per year (or 5 EWh/yr)[1]. "The sun emits a tremendous amount of energy. At Earth's distance from the sun, about

Google Mouse

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ABSTRACT

The basic idea of the projects is to build goggle by using human machine interface which can be used to control mouse using head-tilt and eye-blink. This mouse-emulating device can be found to be most useful by physically handicapped and paralyzed people who can no longer control the computers using their hands. Since the device relies on user's head and eye movement, it can be used even by patient who are paralyzed from shoulder downward. Simple head movement doesn't require too much energy and neither does eye blinking. Therefore user won't get tired from using this device. In this device or goggle we are using 2D-accelerometer for detecting the movement of the head according to this, the movement of the cursor has been done. A photo sensor detects eye blinking. The Infrared transceiver consists of a 935nm IR transmitter and a phototransistor mounted on the same unit. This detects a strong increase in the reflected signal upon intentional long blink as compared to normal eye blink. Artificial hands and legs have been proven to be quite effective and satisfactory for a limited number of activities. Now-a-days, a computer is a common thing at home. The failure of these artificial limbs in enabling the amputees to successfully handle a computer is evident since one can exercise a limited control on the mechanical limbs attached. Moreover many amputees have a job and work in offices wherein they have to use a computer. Hence device should be thought of which would allow easy and smooth control over computer.

Keywords – Handicapped, Mouse, Goggle, Accelerometer, MicroController

INTRODUCTION

To develop a human machine interface emulating function of a mouse for disabled or paralyzed persons. Since the device relies on user's head and eye movements, it can be used even by the patient who is paralyzed from shoulder downward. Simple head movement doesn't require too much energy, and neither does eye blinking. Therefore user won't get tired from using this device. We use accelerometer to detect the movement. When the head of the user is tilted up/down or left/right, the reading from the accelerometer is subtracted from the value of a pre-define reference point. The difference determines the level of head tilt. A photo sensor detects eye blinking. The Infrared transceiver consists of a 935nm IR transmitter and a phototransistor mounted on the same unit. This detects a strong increase in the reflected signal upon intentional long blink as compared to normal eye blink. The output of both the sensor are given to the ADC input and after on the microcontroller. After the signals are interpreted by the microcontroller, mouse instructions are sent to the computers. The processed digital information is transmitted to the PC through the serial port. Since many years, various

Artificial Limbs and services are offered worldwide to people who have permanent or long term impairment. Artificial hands and legs have been proven to be quite effective and satisfactory for a limited number of activities. Now-a-days, a computer is a common thing at home. The failure of these artificial limbs in enabling the amputees to successfully handle a computer is evident since one can exercise a

Voice Over Wi-Fi Employing SIP
(Session Initiation Protocol)

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ABSTRACT

In the recent years VoIP and SIP based calling has been emerging as a new innovation and a master technology in reducing all over cost of communication and secure calling among various MNCs and other Management based Calling Centres. Voice over Wi-Fi (VoWi-Fi) emerged after Voice over IP (VoIP) and manifest to be a useful technology. It acts as a substitute to usual coaxial cable phone system. The purpose of this research is to design and implement a telephony program that uses WiFi in a end to end link or WLAN (Wireless Local Area Network) as a means of communication between mobile phones at zero cost. The breakthrough in VoWi-Fi may severely alter the cell phone business in the upcoming future due to its lower cost, flexibility and portability. We have briefly discussed on each aspect including, virtualization, SIP, CentOS, softphones and WiFi which are very much engaged in designing the layout as well as in implementation of the idea behind this research. We have also given the future prospectus of VoWiFi and deployment in the various companies.

Keywords: SIP, VoIP, IP phones – phones with logical IP address, WiFi, Virtualization.

INTRODUCTION

Voice over wireless LAN (VoWLAN) is a practice of wireless broadband network specified under IEEE 802.11 standards for the objective of vocal conversation. The early stage during the initiation of work was electing Oracle VM Virtual Box as a Hypervisor. A hypervisor or virtual machine monitor (VMM) is a component of computer software, firmware or hardware that is responsible for creating and running virtual machines. CentOS ver.7.2, is taken as an Operating System and is installed within the virtual machine. A General Purpose Licensed(GPL) source code Asterisk, is used as a source code that runs on the OS. After compilation process the parameters (SIP endpoints(users), Codec designation (ulaw, alaw, GSM), Dialling pattern designs) were configured. Finally the Source code as well as the virtual machine is provided with the common internet IP address line. The end users are linked up using a softphone and access same IP Address. As soon as the connections are made calling is possible. Some of the biggest enterprises have successfully depreciated the overall communication cost using SIP based method of communication.

A Review Paper on Renewable Energy Power Generation

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ABSTRACT

Wind is one of the most useful sources of energy. This energy can be utilized in various manners to obtain desired results. The device discussed here utilizes wind energy for generation of power sufficient enough to charge mobile phones and other low power devices. The wind flowing past by motion of locomotives and vehicles is generally lost due to lack of equipment to utilize it. This device meets the property of such equipment to a desired extent.

Keywords: Solar energy, Wind, Magnetic Flux, Electric Field

INTRODUCTION

I In the past 20 years, the application of wind energy has increased steadily in the United States and throughout the world. With continued research and development and improved manufacturing processes, wind turbine performance has improved. More significantly, wind power costs have dropped to the point where, on a cents-per-kilowatt-hour (kWh) basis, they are very close to being competitive with those of traditional fossil-fuel generation. With the aid of various state policies and the emerging green power market, several large- and medium-scale wind power plants with modern wind turbines have been built in the United States in the past few years. As a result of these developments, more utilities today are seriously examining the wind option. Nevertheless, some utilities have expressed concern over short-term power fluctuations and their possible effects on the electric power system. Power fluctuations might also affect wind powerís participation in the bulk-power market by affecting its ancillary-services requirements in a competitive business environment. Ancillary services are interconnected operations services identified by the U.S. Federal Energy Regulatory Commission (Order No. 888, issued April 24, 1996) as necessary to effect a transfer of electricity between purchasing and selling entities, and which a transmission provider must include in an open-access transmission tariff. They include energy imbalance, operating reserve, reactive power supply and voltage control, regulation and frequency response, and scheduling. Wind power developers and wind plant operators need to know the realistic economic impacts of ancillary services requirements for wind power that are derived from real wind power data. Real wind power data would also allow researchers to investigate the extent of the spatial and temporal diversity of wind power, as well as capacity credit issues. The modern era,which is full of advancement of technologies,utilization of technologies for betterment of livelihood is no doubt best era is for modern scientific and engineering careers but is facing the challenge of efficient use in as much better way as possible.

The major challenges include the use of renewable resources, low cost availability and ecofriendly utilization of technologies.The device discussedhere fulfills the need of utilization of renewableenergy,which is in fact the modeling of an innovative idea to utilize the power of fluid flow to

A Novel Design for Highway Windmill through Reengineering

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ABSTRACT

The purpose of the project was to design a wind turbine to recapture wind energy from vehicles on the highway. Wind energy is considered the fastest growing clean energy source; although it is limited by variable natural wind. Highways can provide a considerable amount of wind to drive a turbine due to high vehicle traffic. This energy is not only unmeasured in potential but also being witnessed going to waste. This energy is unused and could prove to be a boon for power related problems. A preliminary investigation of the characteristics of this VAWT has been done, and a data set has been collected. The motivation for designing a highway wind turbine is to contribute towards the global trend in wind energy production in a feasible way. Wind turbines are traditionally employed in rural areas, the goal of this project is to design a wind turbine that can be used in cities. In particular, the turbines will use the wind draft created by vehicles on the highway to generate electricity. The idea is to offset the amount of pollution created by burning fossil fuels by introducing a potential source of clean energy.

Keywords: Wind Power, Reengineering, Highway, Windmill.

INTRODUCTION

From the advent of 21st century, the need of power rose to levels like never before. As much as new ways were developed still billions of people are living without electricity. According estimates that number is about a quarter of total population living on the planet which is both shocking and disturbing [1]. In India only 78.7% of population has access to electricity which translates to thousands of villages still living without even a bulb [2]. With ever increasing population and depleting natural resources it is an alarming situation especially for country likes ours, India and other developing nations as well. The reason being our primary sources for generating electricity are fossil fuels [3-4].

Last year we worked on a paper assessing the prospects of wind energy in India which motivated us to take up a challenging project in this field. This project or design started as an exploration about ten months back. Here I would like to stress on the word – 'reengineering', by reengineering we targeted to make a model which was unlike any made before, using materials which were usable and lying in machines that were not usable. This concept later led us to conclusion how useful such small windmills could be in rural coastal areas [6-7].

Why Wind Energy

Wind is a source of energy which is extracted from the blowing wind and is then converted into electricity. This conversion is carried out by the help of wind turbines, wind pumps etc. which are connected with blades which rotates when moving air apply force on it.

GPS and GSM Based VTS
Using Web Based Mapping Application

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ABSTRACT

Now a days GPS is used in large number of applications. One of the applications is tracking vehicles and getting exact locations of your vehicles. This tracking system is used to get you the location and route traveled by the vehicle, and that information can be observed from any other remote location. It also includes the use of web application, generally a mapping application that provides you exact location of target by entering the latitude and longitude. This system enables us to track target in any weather conditions. The system uses GPS and GSM technologies. The paper includes the hardware part which comprises of GPS, GSM, Atmega 168 microcontroller, 16x2 LCD and software part is used for interfacing all the required modules and a web application is also developed at the client side. The design uses RS232 protocol for serial communication between the modems and the microcontroller. The main objective is to provide a system that can easily track vehicles at low costs.

Keywords: GPS, GSM, Tracking System, VTS

INTRODUCTION

Now a day's transportation is very important need. A lot of problems occur on the road every day .Therefore the need of security and monitoring is developed. The solution to such problems is developed by using GPS and GSM technologies and web based mapping application. Various problems that we face:

a) Vehicle theft

b) Real time tracking of vehicles

c) Finding different available routes

This system uses a Global Positioning System (GPS) which receives the coordinates from the satellites among other critical information. The system is based on a micro controller along with a global positioning system (GPS) and global system for mobile communication (GSM) modules. This project uses only one GPS module for acquiring locations and GSM module to send the received locations to a remote device. GSM module, provided with a SIM card uses the same communication process as we are using in regular phones.

Tracking system is very important for this modern world. This system can also be used in Courier tracking, soldiers monitoring, tracking of the theft vehicle and various other applications. This system is user friendly, easily installable, easily accessible and can be used for various other purposes. After installation system will locate target by the use of a Web application (HTML based application) in Google map. The system allows to track the target anytime and anywhere in any weather conditions.

Fuzzy Logic Based Control of Indirect Field Oriented AC Motor Drives

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Abstract- This article proposes a Fuzzy Logic Controller for Indirect Field Oriented Control of AC Motor. Due to the usage of the Fuzzy Logic Controller, the efficiency, reliability & performance of the AC drive increases. The suggested method improves the working performance of the induction machine compared to the traditional speed control of AC motor drives & has got a improved response time.

Index Terms: Traditional PI controller, Fuzzy PI controller

I. INTRODUCTION

The application of induction motors has increased very much since the day of its invention by Nicolas Tesla.

They are being used as actuator unit in various industrial processes, robotics, house appliances (ceiling fans). The reason for its day by day increasing popularity can be primarily attributed to its robust construction, simplicity in design and low cost. These have also proved to be more reliable than DC motors due to their less maintenance cost. Apart from these advantages, they have some unfavorable features like their time varying and non-linear dynamics. The field of power electronics has contributed immensely in the form of voltage-frequency(V/F) converters which has made it possible to vary the speed over a wide range [8] [9]. However, the highly non-linear nature of the induction motor control dynamics demands strenuous control algorithms for the control of speed. The traditional controller types that are used for the aforementioned purpose may be numeric, neural or fuzzy. The controller types that are regularly used are: Proportional Integral (PI), Proportional Derivative (PD), Proportional Integral Derivative (PID), Fuzzy Logic Controller (FLC) or a blend between them.

The traditional control methods possess the following difficulties depends on the exactness of the mathematical model of the system:

1. Desired performance not being met due to the load disturbance, motor saturation and thermal deviations.

2. Decent performance exhibited only at one operating speed when classical linear control is employed.

3. Adopting the right coefficients for acceptable results.

Fuzzy logic control is a good solution for control system applications encompassing rapidly developing complex and challenging fields with great practical importance and potential which attempts to emulate important characteristics of human intelligence.

Fuzzy logic control methodologies are being applied to robotics and automation, communications, manufacturing, traffic control, to mention but a few application areas. Neural networks, fuzzy control, genetic algorithms, planning systems, expert systems and hybrid systems are all areas where research work is taking place.

II. INDIRECT FIELD OREINTED CONTROL (IFOC)

Indirect vector control is very popular in industrial applications [15]. The $d^s - q^s$ (direct and quadrature) axes are fixed on the stator, but the $d^r - q^r$ axes, which are fixed on the rotor, are moving at speed ω_r . Synchronously rotating axes $d^e - q^e$ are rotating ahead of the $d^r - q^r$ axes by the positive slip angle θ_{sl} corresponding to slip frequency ω_{sl}. Since the rotor pole is directed on the d^e axis and synchronously rotating axes speed,

$$\omega_e = \omega_r + \omega_{sl}, \tag{1}$$

one can write

$$\theta_e = \int \omega_e dt = \int (\omega_r + \omega_{sl})dt = \theta_r + \theta_{sl} \tag{2}$$

Where,

θ_e = Angle between stator mmf relative to the rotor flux vector

θ_r = Angle between $d^r - q^r$ axes

θ_{sl} = Slip angle θ_{sl} corresponding to slip frequency ω_s

The phasor diagram [15] suggests that for decoupling control, the stator flux component of current, i_{ds}^e should be aligned on the d^e axis, and the torque component of current, i_{qs}^e should be on the q^e axis, as shown. For decoupling control, one can make a derivation of control equations of indirect vector control with the help of $d^e - q^e$ dynamic model of induction machine (IM),

Voltage equations are:

$$v_{qs}^e = p\lambda_{qs}^e + \omega\lambda_{ds}^e + ri_{qs}^e \tag{3}$$

$$v_{ds}^e = p\lambda_{ds}^e - \omega\lambda_{qs}^e + ri_{qs}^e \tag{4}$$

$$v_{qr}^{'e} = p\lambda_{qr}^{'e} + (\omega_e - \omega_r)\lambda_{dr}^{'e} + ri_{qr}^{'e} \tag{5}$$

$$v_{dr}^{'e} = p\lambda_{dr}^{'e} - (\omega_e - \omega_r)\lambda_{qr}^{'e} + ri_{qr}^{'e} \tag{6}$$

An Arduino UNO Based Control System for Efficient Power Saving

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ABSTRACT

This paper deals with the option on how we can save electricity by employing a simple counter based device. The device operates by housing an ATMEGA 328 micro-controller as the main component, embedded on Arduino Uno board. The main purpose of this project is to save electricity and not to do automation. The device also houses two IR sensors which are used for counting number of people who enter or exit the room or hall. The device works most efficiently in public places like schools and offices.

Keywords: Arduino Uno, Electricity saving, Counter, IR sensor.

INTRODUCTION

India's population consits of approximately 1.25 billion people i.e. 17.5% of the total world population. This makes India the second most populous country in world. Having one of the fastest growing economy, the demand for electricity is also increasing at an alarming rate .We see a lot of wastage of electricity in today's digital world, especially in public places like schools , colleges , offices etc.[8-9]

This wastage is no less than worth crores when calculated on an annual basis , all over India and only for degree colleges . We can imagine or calculate the amount of power resource wastage for every public place all over India and rest of the world. It will be a huge amount which can easily serve the villages and poor people of our country to grow or lead a better life. Considering this huge amount of electricity wastage we designed a counter based automatic room power saver which does not involve any human intervention to save room power and can be installed easily at any door. The device is quite small and power friendly and can be installed easily and does not waste any extra electricity.[3]

PROJECT DESCRIPTION

Often we see visitor counters at stadium, mall, offices, class rooms etc. How they count the people and turn ON or OFF the light when nobody is inside? And we are here with An Arduino Uno based Control System for Efficient Power Saving with bidirectional visitor counter by using Arduino Uno.[1] It is very interesting project for saving the electricity mainly in public places in a very simple and cost effective manner. The main purpose of this project is not to do automation of appliances for luxury but to save electricity automatically.[1-2]

Major Components Used

Energy Efficient Motion Based Message Conveyer for Paralytic/Disabled People

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ABSTRACT

The paper presents an energy efficient motion based message conveyer for disabled/paralytic people. When people become disabled by birth or as a result of a traffic accidents, stroke or another condition, they may often lose their ability to control their environment and communicate with others by conventional means. In such a situation we propose a system that helps disabled person to convey message by simple motion of any part of his body. Our proposed system works by reading the tilt direction of the user. This device needs to be mounted on user finger of hand. The user now just needs to tilt the device in a particular angle to convey a message. Tilting the device in different directions conveys different message.

Keywords: Disability, Accelerometer (ADXL335), TWS 434 RF Transmitter, RWS 434 RF Receiver, LCD

INTRODUCTION

Motion (gesture) based message conveyer kit are used by the people who cannot talk due to physiological or physical illness, injury or any disability. We come across hospitals and NGO's serving disabled people. Now these people are not capable of full body movement as compared to a normal person. In such a situation we propose a system that helps disabled person display a message by just simple motion of any part of his body. Our proposed system works by reading the tilt direction of the user part. This device needs to be mounted on user finger of hand. The user now just needs to tilt the device in a particular angle to convey a message. Tilting the device in different directions conveys a different message.

Here we use accelerometer in order to measure the statistics of motion. It then passes on this data to the micro-controller. The micro-controller processes the data and displays the particular message as per input obtained. The micro-controller now displays the associated message on the LCD screen. It also sounds a buzzer along with message as soon as it receives motion signal from the accelerometer. The patient motion recorder device consists of an RF transmitter in order to transfer the data signal. An RF receiver on the other side receives the data and then decodes it before passing it to the micro-controller for processing the input and responding to it.

GSM Based Alarm System for Temperature, LPG Leakage & Spark Detection in Industrial Applications

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ABSTRACT

This paper proposes the design of sensor based Fault detection & Remote monitoring system for over in temperature, leakage of gases (LPG) and increase in intensity of light measurement using ATMEGA 168 microcontroller by using GSM based module system. This project has 3 sensors. These three sensors are LPG gas sensor to detect the gas leakage, Temperature sensor for overheat detection and light sensor to detect sparking. This module also turns on siren if 3 sensors give high output. If any fault is detected then siren is turned on and SMS will sent. GSM modem is used to send the SMS whenever there are changes in any of the three modules Temperature, light and gases are an important industrial parameter that needs to be monitored continuously. An entire system may fail; if the sensor fails. The failure of any system may cause losses such as economical, equipment damage and even risks the life of an individual. The purpose of the fault detection system is to ensure that simple faults can be detected at an early stage and necessary actions could be taken so that they do not develop into serious failure or cause any harm and increase plant availability. The fundamental design of fault detection is presented with help of temperature sensors (LM35), light sensor (LDR) and gas sensor (MQ6), ATMEGA 168 development board (Arduino IDE) by using GSM based module system with siren alarm. To demonstrate the concept of sensor fault detection, the system comprises of a variable intensity light source, leakage of gases (LPG) and temperature sensors. The temperature data is acquired by GSM module and is transmitted to Mobile application system. Any failure in sensor will be annunciated locally and shall be notified remotely in the mobile system through SMS. The host program on the GSM based module platform is responsible to publish the data on mobile via SMS. The detection of fault data generated by using GSM based module system using multiple sensors will be display on screen (16×2 bit LCD) display.

Keywords:

INTRODUCTION

LPG consists of mixture of propane and butane which is highly flammable chemical. It is odorless gas due to which Ethanethoil is added as powerful odorant, so that leakage can be easily detected [1] Fault in any system causes its performance to degrade or leads to unacceptable changes. Faults in automated processes will often cause undesired reactions and shutdown of a controlled plant [2] Equipment damage, economical losses and fatal injuries to individuals can be few of many possible consequences of a system failure. Some people have low sense of smell, may or may not respond on low concentration of gas leakage. In such a case, some high security systems become an essential and help to protect from gas leakage accidents [3].

Bhopal, Chernobyl, Okishima gas tragedy was an example of gas leakage accident in India, Russia and Japan. This was world's worst gas leakage industrial accident. Gas leakage detection is not only important but stopping leakage is equally essential. We designed a system which measure the LPG leakage, over temperature and sparking of light by the sensor such as MQ6, LM35, LDR SMS, and Beep sound, This paper provides a cost effective and highly accurate system Different types of faults can occur in any system such as faults due to sensors, actuators, etc. In a sensor based system the output of the sensor is constrained between two points if it exceeds or goes below these two

Solar Energy, The Energy Source for the Future

Saman

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ABSTRACT

The electricity requirements of the world including India are increasing at alarming rate and the power demand has been running ahead of supply. It is also now widely recognized that the fossil fuels (i.e., coal, petroleum and natural gas) and other conventional resources, presently being used for generation of electrical energy, may not be either sufficient or suitable to keep pace with ever increasing demand of the electrical energy of the world.

The recent severe energy crisis has forced the world to develop new and alternative methods of power generation, which could not be adopted so far due to various reasons. The magneto-hydro-dynamic (MHD) power neration. The other non-conventional methods of power generation may be such as solar cells, fuel cells, thermo-electric generator, thermionic converter, solar power generation, wind power generation, geo-thermal energy generation, tidal power generation etc.

This paper elucidates about solar energy and their applications ,why we are going for non-conventional energy sources, different non-conventional methods of power generation and their efficiencies,about system integration and their applications.

CLASSIFICATION OF ENERGY

It is broadly classified into

1.**Conventional energy:** is in practice for long duration of time and well established technology is available to tap and use them. e.g. Coal, oil, natural gas, hydro power, nuclear power etc.

2.**Non-conventional energy:** source can be used with advantage for power generation as well as other applications in a large number of locations and situations. These energy sources cannot be easily stored and used conveniently. e.g. Solar, wind, tidal and geothermal etc.

Based upon nature, energy sources are classified as

1.**Renewable energy** sources are inexhaustible and are renewed by nature itself. Solar, wind, tidal, hydro and biomass are few examples.

2.**Non-renewable energy** sources are exhaustible within a definite period of time depending upon its usage. Fossil fuels (coal, oil, gas) and nuclear fuels are few examples.

Keywords: Solar Energy, Solar Water Heating,Solar Thermal Conversion, System Integration

Study of Cooperative Spectrum Sensing Techniques in Cognitive Radio Networks

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ABSTRACT

Cognitive Radio is key enabling technology that enables next generation communication networks, also known as dynamic spectrum access network, to utilize the spectrum more efficiently in an opportunistic fashion without interfering with the licensed user. Its roots came from the discovery by regulatory bodies in various countries, which found that most of the radio frequency spectrum was inefficiently utilized. This was the reason for allowing unlicensed users to utilize licensed band; whenever it would not cause any interference [4]. Over the past decades various spectrum sensing techniques have been proposed in cognitive radio networks. In this paper, a brief survey of all the major contributions in the field of cooperative spectrum sensing for cognitive radio network have been discussed. This paper will also provide an overview of the elements used in cooperative sensing.

Keywords: Cognitive Radio, Spectrum Sensing, Cooperative Sensing.

1. INTRODUCTION

Spectrum scarcity is one of the biggest challenges that are being faced by modern communication system. Different regulatory bodies in the world like: FCC(US), OfCom(UK) found that most radio frequency spectrum was inefficiently utilized. Cellular network bands were overloaded but other frequency bands are inefficiently utilized. Hence, there is a need arises to develop a single intelligent hardware that can cater all the demands imposed by user. Cognitive Radio Technologies has been presented as one of the most tempted solution for the spectrum scarcity problem by permitting the unlicensed user to access the ideal frequency band opportunistically without causing interference to licensed user[3]. Cognitive Radio is a network aware, channel aware, spectrum aware, policy aware and also user aware technology which senses its environment and reconfigure itself according to the need of user and application, using its past experiences. The spectrum sensing aspects of cognitive radio has been discussed in this paper, providing a brief survey on all the major techniques involved in cooperative spectrum sensing. The next section will provide cooperative sensing technology and elements necessary for cooperative sensing. Last section concludes the paper.

2. SPECTRUM SENSING

Spectrum sensing incorporates the capability in a cognitive radio to sense, learn and beware of the operating environment. If a secondary user finds unoccupied spectrum by adapting to the radio environment, it can continue its transmission, if it is not interfering to primary user.

The detection performance can be primarily determined on the basis of two matrices: probability of false alarm and probability of miss detection. Miss detection will cause interference with primary users and false alarm will reduce the spectral efficiency. Many factors in practices such as: multipath fading, shadowing and uncertainty problem [8] may significantly compromise the detection performance in spectrum sensing [9]. Reduced hidden node problem, less falls alarm can improve the overall detection performance.

Performance Comparison of SVC and STATCOM controlled Wind farm Energy System

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ABSTRACT

This paper deals with performance comparison of a Static VAr Compensator (SVC) and Static Synchronous Compensator (STATCOM) controlled Wind Farm Energy System. Stability of wind form distribution system is one of the important issues of renewable energy system. The simulation of Fixed Speed Induction Generator (FSIG) is done using MATLAB SIMULINK, and functioning of SVC and STATCOM controlled system has been analyzed for different fault conditions. It is found that during fault condition, the performance of STATCOM controlled system provides better results.

Keywords:); Fixed Speed Induction Generator (FSIG); Static Synchronous Compensator (STATCOM); Static VAr Compensator (SVC; Wind Farm Energy System.

INTRODUCTION

Renewable Energy is one of the alternative sources of energy that has become very important and relevant at present day. Renewable energy can be used without using fossil fuels and can be renewed and sustained but were as it is not possible through non-renewable energy. Renewable energy sources are being used in agriculture, industry and social service sector. Renewable energy can be used again and again without depleting. These sources preserve the nature, reduce the health problems and are cost effective, economic and eco friendly. Hence renewable energy sources are crucial for sustainable human life as they do not emit carbon dioxide. Renewable energy has positive effect on the environment, house owners and businesses [1].

Wind energy has confirmed its viability for generation of electricity. Wind farm located in rural areas, which are far away from the grid, generally experience problem in interconnection with grid. Earlier it was a common practice to isolate the wind energy sources on the occurrence of transient disturbance but now a days fault ride through is possible in which they remain connected with power system if a fault occurs near wind farms [2].

The fast development of distributed generation (DG) technology is gradually reshaping the conventional power systems in a number of countries. Wind energy is among the most actively developing distributed generation. Capacity of grid connected wind farm is undergoing the fastest rate of growth of any form of electrical power generation, reaching global yearly growth rates on the range of 20 - 30%.The presence of wind power generation is likely to effect the operation of the existing power system networks. Dynamic changes of wind speed make amount of power injected to a network highly variable. Based upon the intensity and rate of changes, fluctuations in frequency, stability and voltage regulation, could make a visible impact to quality level of electrical energy delivered. In this condition, connection of wind turbine generator with disseminated generation of electricity, calls for an elaborated technical analysis. Majority of the wind power based DG technologies utilize induction generators rather of synchronous generators, for the technical specifications of induction machines like: reduced size, enlarge robustness, decrease cost, and enhanced electromechanical damping [3].

Performance Improvement of Wind Farms Equipped with six SCIG generators using STATCOM

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ABSTRACT

The integration of wind energy into existing power system presents a technical challenges and that requires consideration of voltage regulation, stability, power quality problems. The purpose of this paper is to analyze and study stability of a wind farm based on conventional fixed speed Induction generator when it has been integrated with a weak grid. An analysis of the stability improvement of a FSIG wind plant has been done, when it is supported with FACTS like STATCOM. The simulation evaluation of stability of allotted device with WTIG is accomplished using MATLAB/SIMULINK.

Keywords: power system stability, reactive power compansator, induction generator, STATCOM, wind farm.

INTRODUCTION

With the enhance in demand of electric power and decrease of fossil fuels, mankind has been forced to search alternative sources for the generation of electrical power. Wind power in spite of being stochastic in nature has proved itself as a viable solution to this difficulty. As the wind turbine technology is developing at a good pace, more and more wind power plants are being integrated with the conventional form of generation. With the increase in the ratio of wind generation to conventional generation, several problems related with integration of wind farms have emerged. These problems are due to distinct properties of the generators used with the conventional form of generation and wind based generation. In thermal and hydro power based generation synchronous generators are used while in wind based generation mostly induction generators are used[1].

Induction and synchronous generators do not show similar behaviour during electrical power system stresses. Moreover, increase in wind power based generation requires a reliable transmission system for power evacuation to the load centres. As the wind farms are mainly concentrated in far flung and rural areas their interconnection with the grid becomes a problem. This problem is mainly due to the existence weak transmission power grids in the rural areas[2].

Wind energy system converts the obtainable kinetic energy in the wind into mechanical energy that can encourage an electrical generator. Predominantly, wind power generators are self excited induction generators. The massive reactive power absorbed during their normal operating conditions which effects induction generators characteristics. This reactive power trouble may engender dynamic voltage instability in the system. The needed reactive power of induction generator can be provided either by the power grid or self capacitor bank in parallel with the generator stator terminals[3].

The stability of a system determine whether the system can settle down to the original or close to the steady state after the transients disappear. Transient stability refers to the capability of a system to maintain synchronous operation in the event of large disturbances such as multi-phase short-circuit faults or switching of lines. The resulting system response involves large excursions of generator rotor angles and is influenced by the nonlinear power angle relationship. Stability depends upon both the initial

Nano-Engineered Materials for Solar Panels

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ABSTRACT

A photovoltaic system, also solar PV power system, or PV system, is a power system designed to supply usable solar power by means of photovoltaic. It consists of an arrangement of several components, including solar panels to absorb and convert sunlight into electricity, a solar inverter to change the electric current from DC to AC, as well as mounting, cabling and other electrical accessories to set up a working system. It may also use a solar tracking system to improve the system's overall performance and include an integrated battery solution, as prices for storage devices are expected to decline. Strictly speaking, a solar array only encompasses the ensemble of solar panels, the visible part of the PV system, and does not include all the other hardware, often summarized as balance of system (BOS).

The materials currently in use for photovoltaic system have low efficiency, so this is hampering the large scale deployment of photovoltaic system into our society. Thus in order to have large scale deployment and to have benefits of renewables from environmental and economical point of view, there is a need of alternative materials for solar pv systems which have high efficiency, low cost, ease of development, etc.

In this paper, nano-engineered materials for solar pv systems are discussed as they have high efficiency, high reliability, etc. If these materials are produced on large scale it will bring down the unit cost of the solar panels thus large scale deployment of the system would be possible which inturn beneficial to national economy and the people.

Keywords— Solar PV, nano-engineered materials, efficiency, environmental effect, carbon nano cell.

1. INTRODUCTION

Conventional solar cells based on photovoltaic technology have come a long way in recent years, but they're still missing a big chunk of the electromagnetic spectrum. The silicon semiconductors in a solar cell are geared toward taking infrared light and converting it directly to electricity. Meanwhile, the visible spectrum is lost as heat and longer wavelengths pass through unexploited. A new nano-material being developed by a group of researchers spread across the country could act as a "thermal emitter," making solar power significantly more efficient by scooping up more of that wasted energy. The infrared part of light is relatively easy for conventional high-efficiency solar cells to convert to electricity, and the thermal emitter approach works within that framework. A thermal emitter isn't a parallel system for deriving electricity directly from the sun's rays. Instead, this is an application or so-called thermophotovoltaic principals. Thermophotovoltaic in this context refers to the production of heat from light. The thermal emitter consists of two parts, the first being a tungsten-based absorber that heats up when exposed to light. The emitter component takes that heat energy and uses it to output infrared light, which silicon semiconductor solar cells are already able to

Economical Feasibility of a Small Grid Connected Solar Rooftop System Design & Implementation in India - A Case Study

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ABSTRACT

This work presents the basic preplanning for installing a Grid connected PV system on the rooftop of Central Library at IU, Lucknow. The strategy undergoes as per economical facility & support provided by State & central Government. Also the technical feasibility is analysed with the help of solar industrial market. So we present an effective market survey report& government facilities aiming the design of an economical, beneficial, reliable& efficient grid connected solar PV system as per university requirement of electric load to provide robustness and faster convergence under environmental variations.

Keywords—Photovoltaic; grid, PV sytem, maximum power point tracking(MPPT).

I. INTRODUCTION

Historically the first grid-connected Photo-Voltaic (PV) plants were introduced in the 1980 and now a day's grid-connected systems are growing fast with the use of Photo-Voltaic technology. All these systems use an inverter to transform the DC electricity from the PV array into AC. Grid-connected inverters totally differ from stand-alone inverters.

Therefore, each grid-connected PV system has to perform two essential functions:

• To extract maximum power output from PV arrays

• To inject an almost harmonic free sinusoidal current into the grid.

Currently, grid-connected power converters are based on modern power semiconductor devices operating in switched mode, but we simulate/design its circuit for most basic concept of power electronics which is analysed using MATLAB or many more industrial simulation software is the field of electrical engineers.

Inspite of it for proper illumination of solar energy on rooftop, orientation of solar panel & physical designing on a particular site for fixed area is the part of mechanical engineering. While the work on economical facility & support provided by State & central Government including the market survey is shared between both electrical & mechanical engineers.

II. DESCRIPTION OF SMALL GRID CONNECTED SOLAR ROOFTOP SYSTEM

A. Basic components
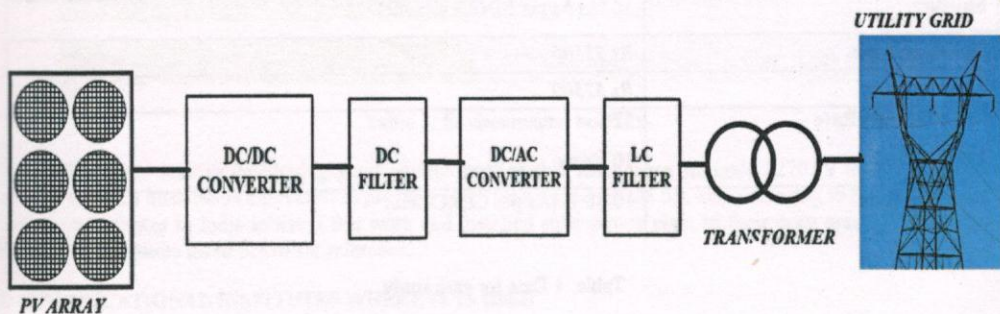
Fig. 1 Basic Component

Solar Cell and Its Maximum Power Point Tracking

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ABSTRACT

Abstract--- Global warming and energy policies have become a hot topic on the international agenda in the last years. Developed countries are trying to reduce their greenhouse gas emissions. Today we focus on greener sources of power. Photovoltaic has become an important source of power for a wider range of applications.The only emissions associated with PV power generation are those from the production of its components.

The efficiency of a PV plant is affected mainly by three factors: the efficiency of the PV panel,the efficiency of the inverter and the efficiency of the maximum power point tracking (MPPT) algorithm.Improving the efficiency of the PV panel and the inverter is not easy as it depends on the technology available, it may require better components, which can increase drastically the cost of the installation. Instead, improving the tracking of the maximum power point (MPP) with new control algorithms is easier. Maximum power point tracking (MPPT) is a technique used with photovoltaic (PV) solar systems to maximize power output.

In this paper,along with the operation of a solar cell, a fractional open circuit voltage (FOCV) based maximum power point tracker (MPPT) for photovoltaic (PV) arrays is proposed. The fractional open circuit voltage (FOCV) based MPPT utilizes the fact that the PV array voltage corresponding to the maximum power exhibits a linear dependence with respect to array open circuit voltage for different irradiation and temperature levels.

Keywords—Photovoltaic, maximum power point tracking, MPPT,solar cell, FOCV, irradiance.

I. INTRODUCTION

Renewable sources of energy acquire growing importance due to massive consumption and exhaustion of fossil fuel.[1] Among several renewable energy sources, photovoltaic arrays are used in many applications such as water pumping, battery charging, hybrid vehicles, and grid connected PV systems.

Solar cells are the basic components of photovoltaic panels. Most are made from silicon even though other materials are also used. The basic idea of a solar cell is to convert light energy into electrical energy. The energy of light is transmitted by photons, small packets or quantum of light. Electrical energy is stored in electromagnetic fields, which in turn can make a current of electrons flow.

As known from a (Power-Voltage) curve of a solar panel, there is an optimum operating point such that the PV delivers the maximum possible power to the load. The optimum operating point changes with the solar irradiation, and cell temperature. Therefore, on line tracking of the maximum power point of a PV array is an essential part of any successful PV system. PV solar systems exist in many different configurations. Regardless of the ultimate destination of the solar power though, the central problem addressed by MPPT is that the efficiency of power transfer from the solar cell depends on both the amount of sunlight falling on the solar panels and the electrical characteristics of the load. As the amount of sunlight varies, the load characteristic that gives the highest power transfer efficiency changes, so that the efficiency of the system is optimized when the load characteristic changes to keep the power transfer at highest efficiency. This load characteristic is called the **maximum power point** and MPPT is the process of finding this point and keeping the load characteristic there.

II. SOLAR CELL MODEL
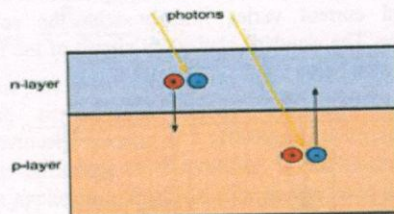
Fig 1: Solar Cell

Performance Comparison of MAGNET Routing Protocols in Hostile Battlefield Network Using Qualnet Simulator 6.1

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ABSTRACT

Abstract— In the Present days, the analyses of collecting information in a battle field area has been considered to be one important and difficult process as it constitutes important phases of experimentations. In these types of situations it becomes difficult for the rescue teams to provide reliefs on existing infrastructures which has high probability of bursting the whole communication backbone. Therefore the establishment of a temporary communication system is required for such purpose. In a temporary or ad-hoc communication system the mobility of the nodes plays a vital role in the proper collection of data. With the involvement of MANET infrastructure this problem can be solved to a higher extend. MANETs are expected to increasingly play an effective role in civilian and military environments. In this paper we have consider mobile ad-hoc network for battle field disaster management is focused, where proper medical facilities to the injured soldiers are difficult in providing. For this purpose various mobility models are considered for the movement of nodes (i.e. Ambulance) and the soldiers in a particular battalion. We have proposed a scenario which consists of soldiers in groups and mobile nodes i.e. ambulance in another group. The Performance of various MANET routing protocols in the considered scenario have been compared.

Key Terms— **MANET, AODV, ZRP, STAR, LANMAR, RPGM, RWP**

1. INTRODUCTION

Over past few years, the post disaster management problem has important and difficult situations. In these types of issues it becomes quite difficult to provide food relief and medical security by the rescue team in the affected areas, which is generally due to the shutdown of existing networks. With the use MANETs, [1] it is possible to securely manage the network to provide relief and medication by the rescue team. A rapid growth of wireless network has encouraged in the improvement of the network service performance. MANETs is a collection of wireless mobile nodes that communicate with each others. In the case of post disaster management, MANET solves the problem to provide the proper medication to the injured soldiers on the spot. For this purpose the consideration of various mobility models are determined for the movement of nodes in a particular military environment. A better depiction of nodes movement can be obtained through RPGM (Soldiers) and RWP (Ambulance) which have been used in our simulation.

This paper is an extended version of our previous work [12], in which we have analyzed and compared the performance of four popular routing protocols: One reactive (AODV), one hybrid (ZRP) and two proactive (LANMAR and STAR). The various mobility models simulate the environment of a battle field scenario, where the soldiers and ambulance (mobile nodes) are connected to each other by CBR and communicate. The soldiers and ambulance are almost always moving due to which the routing process complexity are maximum.

2. ROUTING PROTOCOLS

Routing protocol specifies how routers communicate with each other to selected routes between any two nodes on a computer networks. Routing algorithm determine the specific choice of route. MANET [2] routing protocols are basically classified in three categories and they are as follows: Proactive protocols: In proactive protocol, each node continuously maintains up-to-date routes to every node in the network. Routing information is periodically transmitted throughout the network in order to maintain routing. Reactive Routing protocols: Reactive routing protocol is a bandwidth efficient on-demand routing protocol for MANET. The protocol comprises of two main function of route discovery and route maintenance. Hybrid routing protocols: Hybrid routing protocol is a network routing protocol that combines Distance vector routing protocols (DVRP) and link state routing protocol features.HRP is used to determine optimal network destination routes and report network topology data modification. In this paper the performance of four routing protocols has been focused and they are as follows:

Ad-hoc on Demand Distance Vector (AODV) Protocol: -
AODV [3] routing algorithm is a packet routing protocol used for dynamic wireless network. It is one of most prominent reactive protocol. It is a collection of mobile nodes without any centralized access point or existing infrastructure. It provides loop-free, self starting and scale large number of mobile nodes. Where, every node maintains the routing information by using routing table which is maintained at every node of the network. In routing table destination address, next hop IP address and destination sequence number is stored. Route request (RREQ), Route reply (RREP) and Route error (RERR) are three types of messages used in AODV mechanism.

Performance Comparison of Routing Protocols under Random Waypoint Mobility Model for Long Distance MANET

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ABSTRACT

Abstract-*Mobile ad-hoc networks (MANET) are used widely in the areas of disaster management, war, emergency situations etc. It is a network which can be easily and quickly deployed. Due to this property many researchers use this network as it is a fast and reliable network too. This network works on different protocols which can be reactive, proactive or hybrid. Hybrid protocol contains the quality of both reactive as well as proactive protocol. MANET also contains different mobility models such as Random Wail, Manhattan grid, Random Waypoint (RWP), Reference Point Group Mobility (RPGM), etc. In this paper we have compared three different routing protocols i.e. DYMO, LAR and LANMAR with Random Waypoint mobility model. The performance of the considered routing protocols has been compared in the considered scenario. To simulate the considered scenario Qualnet 6.1 simulator is used.*

Keywords: MANET, AODV, DYMO, LAR, LANMAR.

I. INTRODUCTION

MANET is an autonomous collection of mobile nodes. It is self-configuring and infrastructure less network. MANET prepares each device to continuously maintain the information required to route traffic in a proper manner. These nodes may operate by themselves or may be connected in different topologies. Wireless networks are playing a major role in the area of communication. As they are easy to install these wireless networks are used in different fields. It is a peer-to-peer, self-forming and self-healing network. MANET consists of different topologies, algorithms and applications on which these nodes work. This paper presents the performance analysis of different routing protocols for MANET in a random waypoint mobility mode by varying the pause time.

II. ROUTING PROTOCOL

It can be divided into three different types, Proactive routing protocol, Reactive routing protocol and Hybrid routing protocol.

Proactive routing protocols- Proactive routing protocol is also known as table driven routing protocol. Each node has table containing information telling which route to follow and telling how to reach every other node and with the help of the algorithm it is updated. It choses shortest path to reach its next destination and periodic updates are needed to keep them going. Average end-to-end delay or the time taken by data to reach the destination from the source to destination is constant for a given Ad hoc network.

Implementation of MANET Routing Protocols
Hostile Battlefield Networks

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ABSTRACT

Battlefield situation have been considered for military safety unit in different phases of experimentation (i.e. war). Due to this fact that any type of infrastructure may have been destroyed because of bursting networks, its need a reliable communication networks. Therefore the evaluation of network performance aspects in a battlefield environment. With the deployment of MANETs infrastructure, communication can be solved to other battalion in higher extends of war or in emergency condition. In MANETs it can be safely assumed that the most communication required take place during emergency situation. In such purpose, the analyzing of MANET system depends on random (i.e. soldiers) motion of mobility model. We have proposed the scenario which consists of soldier in a group. In this paper, we have compared the four routing protocols i.e. FSR, STAR, LAR1 and ZRP for random waypoint mobility model based on attraction level.

Key Words: MANET, FSR, STAR, LAR1, ZRP, RWP

1. INTRODUCTION

In past years, the battlefield management problems have become very crucial and critical situation. In this type of management, it becomes difficult to help the other battalion in a dominant area, which is generally lack of infrastructure or networks. Now in present time, with the arrival of MANET it is quite believable to manage and secure the networks to provide relief and help to other battalion in a battlefield environment. It plays a significant role as it provides help to other battalions at distinct place. It is a collection of autonomous wireless networks without any infrastructures and centralized administration. For this purpose the mobility model has been considered which is examined for the random motion of nodes in a particular battlefield environment. A mobility model specifies the dynamic characteristics of node movement (i.e. soldiers) which is diamond in nature and it has been used in this paper.

In this paper, we compared the performance of four different routing protocols (FISHEYE, STAR, LAR1, ZRP). We have simulated performances of these routing protocols on Random Waypoint mobility model to affect the battlefield environment; whereas the soldiers (mobile nodes) are connected to each others.

2. ROUTING PROTOCOL

Routing protocol is a protocol that defines how the routers can communicate with each other. A routing protocol shares the information among the closest and then throughout the networks. Proactive routing protocols: It is also known as table-driven routing protocols. Each node sends a broadcast message to the entire network if there is a change in the network topology. The examples of proactive routing protocols are OLSR, DSDV and STAR etc. Reactive routing protocols: It is also known as on-demand driven

Analyzing the Significance of Various Routing Protocols in Changing Number of Nodes over Different Mobility Models in MANETs Using QualNet Simulator 6.1

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ABSTRACT

Due to the change in network topology and high mobility a suitable routing protocol and mobility model should be deployed carefully. In unmanageable and hostile situations the performance of Adhoc networks greatly depends upon the choice of routing protocols and suitable mobility models. Here we examine the performance of two mobility models i.e. Random waypoint and group over the increasing number of nodes using different routing protocols like AODV, DSR, DYMO and ZRP in realistic scenarios like earthquake prone areas or other disaster affected areas using performance metrics like average end to end delay, jitter, throughput and packet deliver ratio. For implementation of this approach we have considered windows 8 operating system as platform which is compatible with QualNet simulator 6.1. The recommendations of this research will provide better understanding of various routing protocols over varying number of nodes in various real time applications.

Key Words: MANET, AODV, ZRP, DSR, DYMO, RPGM, RWP.

1. INTRODUCTION

In recent times the development and growth in the areas of portable and wireless communications has increased considerably. Portable and wireless devices are required as the nature of computation has changed from personal to widespread levels. The growing wireless communication availability has created the requirement for supporting real time applications on highly mobile network environments.

MANETS (Mobile Adhoc Networks) are mobile and autonomous systems consisting of hosts and routers linked by random wireless connections. They can be installed anytime and anywhere. M ANET deployment covers a variety of applications (e.g. emergency response, disaster relief military applications) as well as providing wireless coverage network areas to inaccessible and remote places.

Mobile nodes in MANETs have limited battery power and bandwidth hence a suitable routing protocol producing low overhead is required. The on demand (reactive) routing protocol provides better results than proactive routing protocols in most infrastructure less situations. In the reactive routing protocols routes are discovered when needed so the choice of suitable routing protocol has a significant impact on the performance of Adhoc networks. Such Adhoc mobile networks have an issue of uncertainty and frequently changing network topology with changing mobility situations. The mobility model chosen must closely match the real time situations. Mobility models can be divided as entity mobility model where nodes are independent and group mobility where nodes are dependent on the movement of the whole group.

Performance Analysis of SOA-MZI Based All-Optical AND & XOR Gate

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ABSTRACT

Abstract- **In present day, semiconductor optical amplifier (SOA) are the key components of all-optical networks. By proposing the SOA-MZI configuration, all optical AND & XOR gate are designing for ultrahigh speed. SOA-MZI plays a significant role in the field of ultrafast all optical signals processing, here the non-linearity properties of the SOA are properly utilized. In this paper the performance analysis of SOA-MZI based all optical AND & XOR gate demonstrated. The performance of these two gates analysed through their quality factor and bit error rate (BER), recorded for different wavelength and the length of SOA.**

Keywords- Mach-Zehnder interferometer (MZI); Semiconductor optical amplifiers (SOA); Travelling-wave SOA; Cross phase modulation (XPM); Cross gain modulation

I. INTRODUCTION

In today's world huge amount of data is being generated, transported and processed. Optical fibre is the medium used for transportation of data at high rate. For electronic data processing, opto-electronic conversion of data takes place at the receiving end. High data rate signal processing result is increased consumption of power and heat generation from electronic integrated circuit.

The optical signal processing is increasingly important in future ultrahigh capacity telecommunication network. The development of all optical logic technology is important for a wide range of application in all optical networks including high speed all optical packet routing. For high speed optical network, it is required to developed the all optical gates to avoid power consumption in opto-electronics conversion.

These interferometric SOA-based configurations are compact. Mach-Zehnder interferometers (MZI) have been widely used to implement optical logic gates. The non-linear behaviour of the SOA makes it a good choice for all optical digital devices.

1.1 Semiconductor optical amplifiers-

SOA are used as transmission amplifier in specially 1300nm window which is used in cable TV transmission. In addition it been used as a switches, filter, modulator, wavelength converter and tapping devices. The main advantages of SOA, ability to operate at 1300nm as well as 1550nm simultaneously. It has wide bandwidth up to 100nm (much larger than EDFA). SOA can readily integrated along with other semiconductor and other photonic devices into one monolithic chip of opto-electronic integrated circuit.

1.2 Travelling wave SOA-

TWA is essentially an active medium without reflection facts so that an input signal is amplified by a signal passing through the active region and the reflectance is zero.

1.3 Non-Linearities of SOA-

SOAs application based on non-linearities is a reason it aids us in devising many network components. One such effort is to device logic gates based on the non-linearity. The parameters of SOA are varied according to the operation. Non-linearities effect that have been utilized XPM and XGM.

1.4 XPM (Cross-phase modulation)-

XPM appears in WDM system. In this case, the same devices from the fact that the refractive index non-linearity converts optical intensity fluctuation in a particular wavelength channel. Phase fluctuation in another propagation channel and in addition therefore the refractive index seen by a particular wavelength is influenced by both the optical intensity of that wave itself and also by the optical power fluctuation in the neighbouring wavelength. Self-phase modulation is always present when the XPM occurs.

1.5 XGM (Cross-gain modulation)-

The variation of SOA gain depends on the input power which is characterized as XGM effect. Depletion of carrier density due to increase in the power of input signal results the reduction of amplification. The dynamic process that take place in the carrier density of the SOA are very fast in the order of picosecond so it is possible to use this variation on the gain with bit to bit fluctuation of the input power.

II. PRINCIPLE OF OPERATION

2.1 AND gate based on SOA-MZI-

We know about the functionality of AND gate. This logic gate gives logic "1" only when the two input signals are same then logic "1". Otherwise the output is logic "0". SOA-MZI based AND gate shown in the fig.1. The principle of operation for the AND gate is basically the same than that for the XOR logic function.

An optical pulse will be obtained at the output only in the case that both signals are logic "1", otherwise gives 0. In this case (P=1, Q=1) the pulse of data Q enables the operation. The operation of AND gate can be seen as performing the XOR comparison between data P and a zero level signal. When Q=0 there is no output produce by gate

E-SDEEC: Enhanced Sonic Distributed Energy Efficient Clustering Scheme for Heterogeneous WSN

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Abstract—In a heterogeneous WSN higher energy nodes can become cluster heads more times than the nodes with low energy. This means that when cluster head is selected and assigned to task them then it can be greatly contribute to energy efficiency which result in increasing in network lifetime. Many protocols on clustering structure have been proposed in recent year based on heterogeneity. We proposed ESDEEC for four types of nodes in prolonging the lifetime and stability of the network. Hence it increases the heterogeneity and energy level of network. Simulation results show that ESDEEC performs better than LEACH, SEP with more stability.

Keywords- Wireless Sensor Network (WSN); Cluster; Multi objective; Energy Efficiency; Stability

I. INTRODUCTION

WSN is the network which consists of various tiny sensors nodes which senses the physical environment in terms of temperature, light, sound, humidity etc. These sensor nodes collect the data from the sensing field and then send information to the end user.

Hierarchical based routing is a cluster based routing in which high energy nodes are randomly selected for processing and sending data while low energy nodes are used for sensing and send information to the cluster heads. Clustering technique enables the sensor network to work more efficiently but in dense nature of this sensor create the situation when the redundant information is transferred to BS along with this the energy of nodes is also dissipated.

On the basis of energy distribution wireless sensor network are classified into homogeneous and heterogeneous network. For the homogeneous network some clustering protocols are power efficient gathering in sensor information system (PEGASIS) and hybrid energy efficient distribution clustering (HEED) whereas SEP and EDEEC deal with heterogeneous network.

To overcome from these problem various clustering algorithm were proposed. The whole network of nodes is divided into a number of cluster the data aggregation is performs within cluster and then transmitted to base station. SEP two types of nodes normal and advance nodes. Advance nodes have more energy than normal ones. In this paper ESDEEC follows the thoughts of EDEEC and adds another type of node called sonic nodes to increase the heterogeneity.

II. RELATED WORK

Based on the type of the sensor nodes used, researchers have classified routing protocols for a homogeneous and heterogeneous network. For heterogeneous wireless sensor network Hierarchical clustering algorithm for sensor network called low energy adaptive clustering hierarchy (LEACH).

LEACH is a cluster-based protocol which includes distributed cluster formation. It randomly selects a few sensor nodes as cluster heads (CH) and rotates this role to evenly distribute the energy load among the sensors in the network. A node can become the cluster head for the current round if its value is less than the threshold $T(n)$ where $T(n)$ is given by-

$$T(n) = \begin{cases} \dfrac{P}{1-P(r \bmod 1/P)} & \text{if } S \in G \\ 0 & \text{otherwise} \end{cases} \quad (1)$$

SEP stable election protocols was an improvement over LEACH is the way that it took into account the heterogeneity of network. In SEP, some of high energy nodes are referred to as advance nodes and probabilities of advance nodes to become CHs are more as compared to that of non-advance nodes.

EDEEC for heterogeneous WSNs is a routing protocols where CH selection on the basis of probability of ratio of residual energy and average energy of the network. In these nodes having more energy has more chances to be a cluster head CH it prolong the lifetime of the network. ESDEEC follows the same principle of EDEEC and add another type of nodes called sonic node.

EEHC is energy efficient heterogeneous hierarchical clustered scheme. EEHC takes into account residual energy of each node and its weighted probability to become CH. Here, not only consumption of energy resources of the sensor network enhanced, but also the process of CH election improved due to heterogeneity.

Failure & Reliability Analysis of DSP-210D Mono Crystalline SPV System with Comparative Study

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ABSTRACT

Abstract—This work presents the optimized & unoptimized output for DSP210D mono-crystalline SPV system by using PSO, P&O and GA technique with the help of practical hardware & simulation approach of MATLAB-07, aiming the development of various modern power semiconductor devices for SPV system. Under this aim we cover the Computation of output/solar power for different months of year 2015, failure rate and Reliability analysisofthis SPV system for different no of panels also this is compared with different types of solar panels for different no of panels. The initiative step is done by using the data sheet of manufacturer for the comparative study under elementary platform specially for DSP 210D and KS-M 280W solar models (Mono Crystalline), BP SX 150 and SPP 280-24 solar models (Poly Crystalline)& other different PV arrays.

Keywords—SPV, Photovoltaic; maximum power point tracking.

I. INTRODUCTION

As we know that the different solar panels available in the market are very less efficient and less reliable. Hence various possibilities of failuresare often occur to defect the reliability. Taking this concept under consideration we aim over the selection of PV array/system under the various ctiteria of atomosopheric conditions &locality by the specification analysis, comparative study, data sheets, simulation results & many more processes.For this purpose exported and the imported energiesaremetered, calculated & monitored here with respect to failure, reliability, stability & other factors to improve the SPV system so as to develop various modern power semiconductor devices for SPV system.

Different methodologies are adopted for the development of modern power semiconductor devices for SPV system but this is a new concept of this area to achieve the following goals by the developed array:

- To extract maximum power output from PV arrays
- To achieve better reliability & less failure possibilities
- To select the proper SPV array as per requirement

In this paper the DSP-210D mono crystallinesolar cell model is introduced and the problem of model parameter determination based on the five parameter model is addressed. So for diagnostic purposes itis followed by simplified formulas& simulation based analysis in five-steps.

Step 1: Solar PV Model

Step 2: calculation of Solar power & other important parameters

Step 3: Failure rate

Step 4: Reliability

II. SOLAR PV MODEL

The standard five parameter model of SPV module is shown in Figure.1.
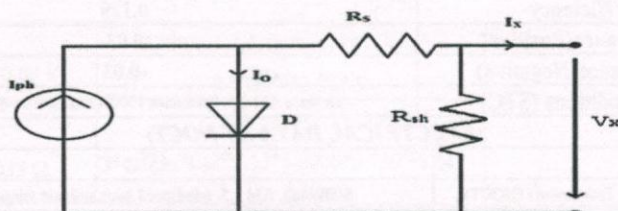
Figure.1: Electrical Equivalent Circuit model of single diode SPV module

Infrared Polymer Solar Cell

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ABSTRACT

Nanotechnology is the engineering of functional systems at the molecular scale. This covers both current work and concepts that are more advanced. In its original sense, 'nanotechnology' refers to the projected ability to construct item from the bottom up, using techniques and tools being developed today make it complete high performance products. The polymer is a large molecule, or macromolecule, composed of many repeated subunits. Because of their broad range of properties, both synthetic and natural polymers play an essential and ubiquitous role in everyday life. The polymer materials use nanotechnology and contain the first solar cell able to harness the sun's invisible, infrared rays. Solar cell plays an important role in today's world. It is a renewable source of energy. It is much more efficient than conventional solar cells. In this paper, by the use of nanotechnology we implemented the infrared polymer solar cell having more advantages over conventional solar cells.

KEY WORDS: Organic Polymer, Polymer photovoltaic, Organic solar cell, Mechanisms

INTRODUCTION

Infrared radiation is a type of electromagnetic radiation, as are radio waves, ultraviolet radiation, X-rays and microwaves. Infrared (IR) light is the part of the EM spectrum that people encounter most in everyday life, although much of it goes unnoticed. It is invisible to human eyes, but people can feel it as heat. IR radiation is one of the three ways in which heat is transferred from one place to another, the other two being convection and conduction. IR has frequencies from about 3 GHz up to about 400 THz and wavelengths of about millimeters (12 inches) to 740 nanometers (0.00003 inches) [1]. One of the most useful applications of the IR spectrum is sensing and detection. All objects on Earth emit IR radiation, or heat, which can be detected by electronic sensors, such, those used in night-vision goggles and infrared cameras. A simple example of such a sensor is the bolometer, which consists of a telescope with a temperature-sensitive resistor, or thermistor, at its focal point. If a warm body comes into this instrument's field of view, the heat causes a detectable change in the voltage across the thermistor. Night-vision cameras use a more sophisticated version of a bolometer. These cameras typically contain charge-coupled-device (CCD) imaging chips that are sensitive to IR light. The image formed by the CCD can then be reproduced in visible light [8].

Polymer solar cell is a type of flexible solar cell made with polymer, large molecules with repeating structural units that produce electricity from sunlight by the photovoltaic effect. Polymer solar cells include organics solar cell (also called "plastic solar cell"). They are one type of thin film solar cell, others include the more stable amorphous silicon solar cell. The mechanical flexibility of these materials are useful for all PV applications. By casting semi-transparent plastic PV thin films between insulating window panes, large unused areas (the windows) can be employed for power generation in addition to the limited roof areas of crowded cities. Even the color of such PV elements can be varied by sacrificing some parts of the visible solar spectrum [2][3].

The operation of a photovoltaic (PV) cell requires 3 basic attributes [5]:

- The absorption of light, generating electron hole pairs
- The separation of charge carriers of opposite types.
- The separate extraction of those carriers to an external circuit.

Operation of conventional solar cell

Conventional solar cell or photo voltaic (p v) solar cell works on the photo voltaic effects. Photo voltaic effect can be defined as, when dissimilar material (p and n type semiconductor) in close contact produce electrical voltage when struck by light. In Photo voltaic basically a PN junction is formed by selenium or silicon through gallium arsenide, indium arsenide and cadmium sulphide are used. When the sunlight strike on it photon hit the atom of silicon, photon transfer their energy to loose energy, knocking off the electron thus flow of current takes place [7] . The output current from a photo voltaic solar cell is proportional to the intensity of the light.

Railway Track Security System Using GSM Modem

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ABSTRACT

Railroads are substantial foundations and are the prime method of transportation in numerous nations. The railroads have turned into a prime method for transportation inferable from their ability, velocity, and unwavering quality. Indeed, even a little change in execution of railroads has critical financial advantages to rail industry. In this manner, an appropriate upkeep methodology is required to oversee advancement of examination recurrence and/or change in aptitude and proficiency. Mischances happening because of track breaking have been a major issue for railroads forever security and convenient administration of administrations. This breakage should be recognized progressively before a train really draws close to the broken track and get subjected to a mishap. In this paper, various types of rail imperfections examination and upkeep techniques are depicted and a fundamental calculation is readdressed that makes utilization of remote acoustic sensors for distinguishing splits and breakages in the railroad tracks.

INTRODUCTION:

Automation is playing a wideband role in today's technology. This can be an automatic detection system, control unit and many others. Automation is basically system design that adds on to the human comfort, provides the outputs without human interaction and makes the system user friendly with auto control schemes [1]. Automation is also now playing wide role in the design to make the system secure and safety. It provides the management system with automatic units so the user has simplicity to use it .The defects mainly include weld problems, internal defects worn out rails, head checks, squats, spalling and shelling, corrugations and rolling contact fatigue (RCF) initiated problems such as surface cracks. If these defects are not handled and corrected they can lead to rail breaks and accidents [2]. An innovative railway track surveying procedure is described that uses sensors and simple components like a GPS module, GSM Modem and MEMS based track detector assembly [3]. To do this, we have transmitted a small voltage at one and received the voltage at the other end. If proper voltage is not there, then there is discontinuity in the track. The overall operation is performed by microcontroller, if there is any discontinuity is found, a SMS is sent by the gsm modem to the registered user.

WORKING:

In this project circuits, sensors & motor are used which require +12V & +5V (DC) supply, to fulfil this requirement we have used following circuit of power supply which provides regulated +12V & +5V (DC). As shown above Transformer (15V/1A) is used to down convert the AC up to 15V

4 diodes (IN4007) are connected to secondary of transformer in bridge for rectifying AC into DC. Capacitor 1000 μf & 1μf are used as a filter

Red led shows that rectification and filtering is ok. 7812 IC is used as a 12V regulator it converts 15V into regulated +12V DC, yellow led shows that output of 7812 is ok. 7805 IC is used as a 5V regulator it converts 12V into

Regulated +5V DC, green led shows that output of 7805 is ok

Thus the microcontroller works on the voltage of 5V DC which is provided by the power supply from 230 AC mains to 5V regulated DC voltage. Hence, our project works starting from this conversion of 230v AC to 5V DC voltage for the running of our railway track crack detector machine [4].

Analysis and Testing Methods for Solar Thermal Evacuated Tube Collector – A Review

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Abstract

Evacuated tube receiver used with parabolic trough collector can be characterized in terms of their heat loss and their optical efficiency. The optical efficiency of the collector involves reflectivity, transmissivity, tracking accuracy, shading by receiver tube surface, shape and absorptance of the material used. On the other hand, receiver tube heat loss includes conductive, convective and radiative losses. Here, in case of evacuated tube, major losses are through radiation, the vacuum that surrounded the outside of the tube greatly reduces convection and conduction heat loss, therefore, achieving greater efficiency than other collector. If we subtract losses from input energy, we can reach towards approximate value of the output of the system. Hence, for obtaining the heat gain for a thermal system, heat losses play an important role. For estimating heat losses, there are several laboratories, developed methods for heat loss with respect to temperature.

This paper is focused on the heat losses of the evacuated receiver tube i.e. conductive or convective heat losses and radiative heat loss. A measurement set up for the heat loss of the single parabolic trough receiver components at steady state condition has been developed by the several research laboratories such as NREL (National Renewable Energy Laboratories), DLR (German Aerospace Centre), Schott, etc. Every methods have their limitation for the performance estimation of PTC receiver tube, with the deviation of <10%. At the National Institute of Solar Energy (NISE), we have tested ETC with different methods and we found the best suitable method for the testing of ETC which is developed by the German Aerospace Centre (DLR) in which the error is very low, at about ≤ 2 %.
The standardization of procedure in testing of solar thermal evacuated tube collectors is an important factor in the analysis of any concentrating and non-concentrating solar thermal systems.

Key words: Evacuated Tube Collector, Parabolic Trough Collector, Reflection, Transmission, Radiation

GSM Based Parents Tracking of the Student Attendance in College

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ABSTRACT

It is time consuming task for the parents to check regular presence of the student to the college. And also for the college administrative people it is time consuming task to check each and every student attendance and marks to inform to the parents. But this project An Intimation to theparents about the bunking of the student for the college through GSM SMS will give and easy,low cost and automatic solution In this project we are going to use ARM7 based LPC2148 Microcontroller. The transmitting section consists of RFID module and GSM modem receiving section is the GSM based mobilephone.

Keywords: RFID, REGULATOR IC, MICROCONTROLLER, LCD

INTRODUCTION

In this anticipate we get to the utilization of RFID as a result of different reasons. No "viewable pathway" prerequisites: Bar code peruses can at times be constrained or risky because of the need an immediate "observable pathway" between a scanner and a standardized tag. RFID labels can be perused through materials without viewable pathway. More mechanized perusing: RFID labels can be perused naturally when a labeled item comes past or close to a peruser, lessening the work required to output item and permitting more proactive, continuous following. Enhanced read rates: RFID labels at last offer the guarantee of higher read rates than standardized tags, particularly in rapid operations, for example, container sortation. More prominent information limit: RFID labels can be effortlessly encoded with thing subtle elements, for example, part and bunch, weight, and so forth. "Compose" capacities: Because RFID labels can be changed with new information as inventory network exercises are finished, labeled items convey overhauled data as they move all through the store network.

RFID

Radio-frequency identification (RFID) is an automation identification method, relying on storing and remotely retrieving data using devices called RFID tags or transponders. The technology requires some extent of cooperation of an RFID reader and an RFID tag. An RFID tag is an object that can be applied to or incorporated into a product, animal, or person for the purpose of identification and tracking using radio waves. Some tags can be read from several meters away and beyond the line of sight of the reader. An RFID tag is an object that can be applied to or incorporated into a product, animal, or person for the purpose of identification and tracking using radio waves. Some tags can be read from several meters away and beyond the line of sight of the reader. Electronically programmed with unique information. There are many different types of RFID systems out in the market. They are categorized according to there frequency ranges. Some of the most commonly used RFID kits are as follows:

The Study of Solar Energy as Futuristic Energy Sources

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ABSTRACT

Every generation is faced with new challenges and new prospects. In a constrained system like the Earth, however, prospects discovered and misused by a generation can cause challenges to the later ones. Fossil fuels have offered surprising opportunities during the 20th century, but now mankind has to face the challenges arising from fossil-fuel depletion. The confirmed assets of fossil fuels are gradually decreasing, and their continued use produces damaging effects, such as pollution that threatened human health and greenhouse gases linked with global warming. So for the betterment we have to switch to the non-conventional or Renewable Energy Sources. Renewable energy is the energy collected from resources that are naturally replenished on a human timescale. In the paper the important renewable energy i.e. solar energy is discussed. Solar energy is the radiant heat and light from the sun and is harnessed using the wide range of ever evolving technologies.

Keywords: Solar, Energy, Solar Cells, PV Cells.

INTRODUCTION

The conventional energy sources are depleting fast. Their usage at this pace will render their exploitation in the near future. So the alternative should be explored for the ever increasing demand of energy. We are lucky, however, to have an inexhaustible energy flow coming from the sun and deposited on the surface of the Earth: 174 000 TW of electromagnetic radiation. It is a measure of energy far beyond human requirements. Casing 0.17% of the totalland of the Earth with 13% efficient solar conversion systems would deliver 22TW of power, [1] nearly twice the world's consumption rate of fossil energy and the equivalent of 20 000 1-GWe nuclear fission plants. Solar energy has enormous potential as a clean, abundant, and inexpensive energy source, but cannot be engaged as such; it must be taken and changed into useful forms of energy. Since solar energy is verbose and irregular, conversion should involve focus and storage. Currently, none of the many routes used to change solar energy into heat, electricity, and fuel is competitive with fossil fuels. Nevertheless, if the "external" expenses of energy from fossil fuels were measured, the cost comparison would give quite dissimilar results. Some scientists believe that in the future it will be conceivable to collect energy from the space by solar power satellites (SPS) and then guide microwave power beams back to Earth.

Challenges and Opportunities in Non Conventional Energy Resources

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ABSTRACT

To meet the future energy demands and to give quality and pollution free supply to the growing and today's environment conscious population, the present world attention is to go in for natural, clean and renewable energy resources. these renewable or non conventional energy reources are-solar energy, wind energy, water energy, geothermal energy, biogas energy, nuclear energy, etc.

These energy resources have many developments.

Keywords: Fourth generation solar cell (4G Solar cell), Levelized costs of energy (LCOE), photovoltaic (PV) cell, Ocean Renewable Power Company (ORPC), Department of Energy's Office of Nuclear Energy (DOE-NE)

INTRODUCTION

Natural resources occur naturally within environments that exist relatively undisturbed by humanity, in a natural form. A natural resource is often characterized by amounts of biodiversity and geodiversity existent in various ecosystems. [6]

A. Renewable resources or non conventional energy resources[6]–

Renewable resources can be replenished naturally. Some of these resources, like sunlight, air, wind, etc., are continuously available and their quantity is not noticeably affected by human consumption. [6]

B. Non-renewable resources or conventional energy resources[6] –

Minerals are the most common resource included in this category. Of these, the metallic minerals can be re-used by recycling them,[1] but coal and petroleum cannot be recycled.[2]

Materials for Fabrication of Solar Cells: A Review

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ABSTRACT

The solar photovoltaic technology has gained momentum in the recent past in India and abroad. With the launch of Jawaharlal Nehru National Solar Mission, the emphasis is being laid on development of suitable materials for fabrication of solar cells. This review is aimed to investigate various materials used in the solar cell and photovoltaic applications. This study gives us an insight about the different materials required for different types of solar cells and gives us an idea about the materials required for encapsulation. The first generation solar cells, also called conventional solar cells or wafer based solar cells, are made up of crystalline silicon, which includes materials such as polysilicon and monocrystalline silicon. Second generation solar cells are basically thin film solar cells, made up of amorphous silicon. Other materials used in thin film solar cells are Cadmium Telluride (CdTe) and Cadmium Indium Gallium Sulphide (CGIS). Tandem solar cells are generally multi-junction solar cells made up of materials such as Gallium Arsenide (GaAs) and Gallium Phosphide (GaP). The organic solar cells, also called as polymerbased solar cells, are made up of a film of conjugated blend polymer and a small molecular based acceptor. Quantum dot solar cells are made up of Lead Sulphide (PbS) materials. The various polymer materials used in organic solar cells are Poly phenylenevinylene (PPV) and Polythiophenes (PTs). Fullerenes and its derivative are used as the acceptor in organic solar cells. Materials used in solar module encapsulation are Ethylene-vinyl acetate (EVA), Thermoplastic polyurethane (TPU), Silicones, Polyvinyl butyral (PVB), Fluoropolymers, Ionomers etc. The materials for grid connections, front and back contacts, etc. are also discussed in this paper.

Keywords: Solar Cells, Silicon, Mono-crystalline, Polly-crystalline, Amorphous, Organic Solar Cell.

INTRODUCTION

Over recent years, the photovoltaics market has been booming, with sales almost completely dominated by product based on the use of silicon wafers, similar to those used in microelectronics. Wafer costs account for over 50% of the total module cost. One way of eliminating this major cost component is by replacing wafers by thin-films of semiconductors deposited onto a supporting substrate (or, more commonly, a glass superstrate). The sustained boom (10 years of 40%/annum compounded growth) is causing demand for silicon wafers to outstrip the capacity to supply, creating a market entry opportunity for a number of competing thin-film technologies. These fall into two main classes; one based on silicon in amorphous, nanocrystallineand polycrystalline phases and on polycrystalline chalcogenide semiconducting compounds. A third class of emerging technologies is based on organometallic dyes and polymers.

The aim of this review is to guide the reader through the various materials used for fabrication of solar cells and allowing them for a judgement as to the suitability of a given material for the development of a solar cell. It is especially relevant for people involved in production of solar cells and it is my hope that it will serve as a motivation for addressing the unification challenge and that it will bring attention to the little explored area of processing materials for fabrication of solar cells on an industrial scale and enabling their production.

RFID Based Challan System with SMS Notification Using Solar Energy

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ABSTRACT

RFID is a sophisticated technology that has been used for many years in military, hospitals, airlines, security, animal tracking and alternative areas. The word RFID refers to Radio Frequency Identification. RFID is a tracking system which uses intelligent bar codes to trace items in a store. RFID finds many applications including Access management, tracking products in a store, Tracing human beings and animals, Non contact payment, Toll collection etc. In this type of system only authorized persons are allowed to enter in a particular area of an establishment. The authorized persons are provided with unique tags. By the use of these tags they can access that area. This project is an effort to designing a prototype challan system based on RFID where user vehicle/user can easily be identified and the SMS challan will be sent to the user via GSM modem. We use solar energy in place of local power source. Solar panels additionally need very little maintenance. Once installation and improvement they are terribly reliable because of the very fact that they actively produce electricity in precisely a number of millimeters and they do not require any form of mechanical components which will fail.

Keywords: RFID, GSM Modem, Solar Energy

INTRODUCTION

A RFID technology is the system which constitutes one or more tags storing data and transferring that data to one or more readers over a wireless interface. This technology basically depends on the interaction between the RFID tags and RFID readers. Its operational frequency decides the range of reader [1]. There are many types of RFID, but mainly RFID device are categorized into two classes: active and passive. Components of RFID include radio frequency tag(transponders) and RF tag readers(transceivers). Related to RFID technology we worked on one of its most eminent applications, which is automatic challan system. In this project all the RFID components were used that is antenna, tags, readers, etc. The whole system works very quickly and efficiently within a matter of seconds the challan money is deducted. This automated system will reduce paperwork and human effort in addition to the time saving aspect.
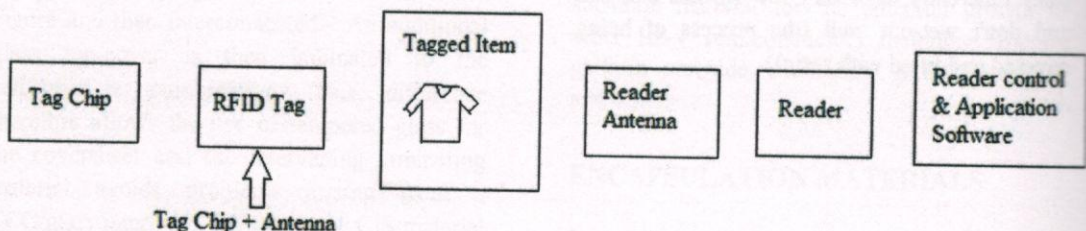
CREATING AN RFID SOLUTION

Fig.1 RFID System

Piezoelectric Flooring: Harvesting The Power of Footsteps

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ABSTRACT

The global electricity demand will grow by almost 80% during the period of 2012-2040 in the International Energy Agency's New Policies Scenario. Furthermore, the share of renewable sources in total power generation will rise from 21% recorded in 2012 to 33% by 2040 (source: International Energy Agency). The quickly expanding offer and significance of renewable sources in the force era segment have prompted improvements of a few supportable innovations. The interest for vitality gathering advances is developing as we keep on seeking out greener and more effective arrangements. Like a wind generator or sunlight based cells, piezoelectricity is likewise a sort of innovation utilized for vitality gathering.

Piezoelectricity is electrical vitality reaped from mechanical weight, for example, strolling movement. At the point when weight is connected on an item, a negative charge is made on the extended side and a positive charge is made on the packed side. As this weight is mitigated, electric current streams over the substance. In this paper we will discuss about the new man made renewable energy piezoelectric floor along with its implementation and a brief overview of how these floors can help India in reducing the growing power demand.

Keywords— Renewable Energy, Piezoelectric, Kinetic Energy, Charge, Current.

I. INTRODCUTION

Piezoelectricity is the electric charge that accumulates in certain solid materials (such as crystals, certain ceramics, and biological matter such as bone, DNA, and various proteins) in response to applied mechanical stress. A Piezoelectricity was discovered in 1880 by French physicists Jacques and Pierre Curie.

The piezoelectric impact is comprehended as the straight electromechanical collaboration between the mechanical and the electrical state in crystalline materials with no reversal symmetry. The piezoelectric impact is a reversible procedure in that materials displaying the direct piezoelectric impact (the inner era of electrical charge coming about because of a connected mechanical power) likewise show the opposite piezoelectric impact (the inside era of a mechanical strain coming about because of a connected electrical field). Piezoelectricity is found in valuable applications, for example,

the creation and recognition of sound, era of high electronic frequency generation, microbalances, ultrasonic nozzle and ultrafine focusing of optical It is also the basis of a number of scientific techniques with atomic resolution, the scanning microscopies such as STM, AFM, MTA, SNOM everyday uses such as acting as the ignition cigarette lighters, push-start propane barbecues watches.

II. PIEZOELECTRIC MATERIALS

There are many materials, both natural and man-made exhibit a range of piezoelectric effects. Some piezoelectric occurring materials include Berlinite quartz, Rochelle salt, topaz, tourmaline, and bone years, due to the growing environmental concern toxicity in lead-containing devices and the RoHS followed within the European Union, there has been develop lead-free piezoelectric materials. To this initiative to develop new lead-free piezoelectric resulted in a variety of new piezoelectric materials more environmentally safe.

III. APPLICATIONS

A. High Voltage and Power Sources

An example of applications in this area is the electric lighter, where pressing a button causes a spring hammer to hit a piezoelectric crystal, thereby producing sufficiently high voltage that electric current flows small spark gap, heating and igniting the gas. Most gas burners and ranges have built-in piezo-based systems.

B. Sensors

The principle of operation of a piezoelectric sensor physical dimension, transformed into a force, acts opposing faces of the sensing element. The detection pressure variations in the form of sound is the most sensor application, which is seen in piezoelectric microphone and piezoelectric pickups for electrically amplified guitars.

Analysis of Image Coders

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ABSTRACT

In this paper we work on the performance analysis of well known image compression algorithm i.e. wavelet based image compression which is Set Partition In Hierarchical Tree (SPIHT)[1] and also no list SPIHT (NLS)[2]. As SPIHT uses three variable lists[3] which require large hardware implementation and hence extra cost and high encoding and decoding time is required but NLS use marker[4] instead of list which are placed on lower nodes of insignificant tree hence it require less hardware and hence it is less complex then SPIHT and time of decoding and encoding is also inferior to SPIHT. The algorithm are implemented in MATLAB and compared using the parameter peak signal to noise ratio PSNR[5], encoding time and decoding time. Using the NLS technique the image obtained has less encoding as well as decoding time as compare to SPIHT but in context SNR[6] SPIHT is better.

Keywords : SPIHT, NLS, PSNR, Performance analysis, bits per pixel

INTRODUCTION

The SPIHT algorithm is a generalization of the embedded Zero Wavelet (EZW)[7] algorithm proposed by Amir Said and William Pearlman. In EZW we transmit a lot of information for little cost when we declare an entire sub tree to be insignificant and all the coefficient in it with a zero tree label zero. The SPIHT algorithms uses a partitioning of the trees in a manner that tends to keep insignificant coefficient together in large subset .The partitioning decision are binary decision that are transmitted to the decoder , providing a significance map encoding that is more efficient than EZW.

SPIHT uses three variable lists

- list of significant pixel (LSP)
- list of insignificant pixels (LIP)
- list of insignificant set(LIS)

NLS uses the same set structures and partitioning rules as SPIHT. The trees are tested for significance breadth first. Significance tests are relate in a different order than SPIHT because SPIHT performs significance tests roughly breadth first, while NLS performs the tests strictly breadth first. Because the set splitting rules are the same, each coder produces the exact same output bits, though in a different order

SPIHT ALGORITHM

Before describing the algorithm we need to get familiar with some data notation. The data structure is used by the SPIHT algorithm is similar to that used by EZW algorithm although not the same. The

Economic Viability of Solar Energy Systems in the Indian Context

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ABSTRACT

In this paper, the current Energy Resources are discussed, for example: Thermal energy, Nuclear energy, tidal energy, hydroelectric energy etc. The paper is about the Energy Resources which are currently used and why are they used, is there is any other Energy Resources which can be more reliable then these energy resources. Alternative Energy resources have been compared with the currently active energy resources, that is, a comparison of Coal energy and Nuclear energy to the solar energy, tidal energy and Wind energy has been made. The cost of per unit electricity produced by solar energy is estimated and the Economic Viability of Solar energy is pondered upon.

Coal Energy

Most people know coal as a fossil fuel which is used to produce around 40 percent of the world's electricity. It's a flammable black or brown sedimentary rock, and is made mostly of organic carbon.

However, there are actually two main types of coal: 'thermal' coal, which is mostly used for power generation, and 'metallurgical' coal, which is mostly used for steel production. Thermal coal is more abundant, has lower carbon content and is higher in moisture than metallurgical coal.

As well as generating power, coal is also commonly used in cement manufacturing and as a component of thousands of other products

Nuclear Energy

Nuclear technology uses the energy released by splitting the atoms of certain elements. It was first developed in the 1940s, and during the Second World War to 1945 research initially focussed on producing bombs by splitting the atoms of particular isotopes of either uranium or plutonium.

Today, only eight countries are known to have a nuclear weapons capability. By contrast, 56 countries operate about 240 civil research reactors, over one third of these in developing countries. Now 31 countries host some 440 commercial nuclear power reactors with a total Installed capacity of over 380,000 Mwe

Alternatives Available

Wind Energy

Wind is a form of **solar energy**. Winds are caused by the uneven heating of the atmosphere by the sun, the irregularities of the earth's surface, and rotation of the earth. Wind flow patterns are modified by the earth's terrain, bodies of water, and vegetative cover. This wind flow, or motion energy, when "harvested" by modern **wind turbines**, can be used to generate **electricity**.

How Wind Power Is Generated

The terms **"wind energy"** or **"wind power"** describe the process by which the wind is used to generate **mechanical power or electricity**. Wind turbines convert the kinetic energy in the wind into mechanical power. This mechanical power can be used for specific tasks (such as grinding grain or pumping water) or a generator can convert this mechanical power into electricity to power homes, businesses, schools, and the like.

Solar energy

Solar energy is the most readily available source of energy. It does not belong to anybody and is, therefore, free. It is also the most important of the non-conventional sources of energy because it is non-polluting and, therefore, helps in lessening the greenhouse effect.

Solar energy has been used since prehistoric times, but in a most primitive manner. Before 1970, some research and development was carried out in a few countries to exploit solar energy more efficiently, but most of this work remained mainly academic. After the dramatic rise in oil prices in the 1970s, several countries began to formulate extensive research and development programmes to exploit solar energy.

Home Appliances Control Using DTMF

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ABSTRACT

This paper deals with the application of the DTMF (Dual tone multi-frequency) technology used in mobile communication, in real time for controlling electrical appliances in our daily use. It uses a DTMF decoder along with a microcontroller to control appliances from a different location. We can operate our equipment from any distance or remote area. It is a wireless equipment but instead of using a separate wireless module (transmitter and receiver), we are using the cell phones for this purpose. The principle used for mobile controlled equipment is the decoding of DTMF tone.A microcontroller is used as a control unit which gets inputs (instructions, commands) from a mobile connected through GSM. To make the connection more secure, consumer authentication along with a password will be provided to switch on/off any appliances positioned at controller's part, the cellular phones are connected, the appropriate tone and password are entered. The tone entered is decoded via the DTMF decoder which further translates it into binary values. Binary values are the input to the microcontroller which verifies each tone individually and corresponding output is given at the output terminal. Thus, when the relay drive is activated by the microcontroller, the device either gets ON or is switched OFF as per the requirement. Our paper makes use of auto answer facility and hence eliminates the need of a ring detector circuit.

KEYWORDS: DTMF technology, Microcontroller, Embedded System, Mobile Phone , Home appliances.

INTRODUCTION

Applying the home appliances in the integration of wireless communication, and power-line communication to provides the user with mobile phone control of various lights and appliances within their home. As per our survey of literature various workers gained achievement in this field.

[1] explained the model for home appliances using Bluetooth via PC but that work lacks to support mobile technology because some mobile doesn't support bluetooth. [2] designed a different electrical device control system using web and the other thing is that they also set the server with auto restart if the server condition is currently down. [3] presented a design and java based automation system through world wide web(WWW).

Estimation of Parameters for Grid Connected Photo-Voltaic System using PVsyst: A Case Study

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ABSTRACT

Photo Voltaic systems are presented as an alternative source for production of electricity in a sustainable way. They give an optimal solution to growing green house emissions which are depleting ozone layer, one of the main concerns in today's world. Photo voltaic system in the form of grid connected system reduces carbon emission 13.33%. The analysis of grid connected system of 15 kW includes total energy output, detailed losses, annual loss variation, efficiency, total irradiance, transposition factor and performance ratio for the year 2014. In performance depends on orientation of PV array, horizon, irradiance, shading, the local climate, and inverter performance. From the results the feasibility of installing 15kW solar plant at two locations New Delhi and Hyderabad including the analysis is discussed as case studies.

Keywords: Grid, Photo Voltaic System, Seasonal Load Variation, Performance

INTRODUCTION

Photovoltaic systems convert solar energy which is derived from radiant light and heat from the Sun into Direct Current Electricity by Photo Voltaic effect. PV systems consist of solar panels which are composed of solar cells electrically connected and mounted on a supporting structure. The grid connected photo voltaic system consist of solar panels, one or several inverters, power conditioning unit and hardware in the form of grid. The solar energy collected by the solar panel is converted and regulated, and then given to inverter which is connected to the power grid. This inverter is placed between the solar array and the grid, draws energy from each, and monitors grid voltage, waveform and frequency. Grid connected photo voltaic systems are being used as residential and commercial rooftop systems with capacity ranging from 5 kW to 20 kW. The grid connected PV system supplies power as per consumer requirement and excess power is fed to the grid which can be used by other users. The daily loads such as lamps, computers, fans, domestic appliances and standby power are a part of a small commercial building. The energy consumed can be calculated on the basis of usage in hours per day. The maximum consumption is during summer whereas minimum during winter.

SOLAR POTENTIAL ASSESSMENT

The characteristics of grid connected PV system can be analyzed using PVsyst software which predicts the energy production taking into account the amount of irradiance and shading effects. The PVsyst software provides full analysis of project, accurate system yield computed using detailed hourly simulation. Different simulation variants such as orientation i.e., tilt angle, azimuth angle, sizing of PV array, inverters with number of MPPT features and number of strings and modules can be performed and compared. Horizon analysis for different places can be analyzed. Additionally economic evaluation with real component pricing can be done. Carbon balance is calculated on the basis of life cycle emissions of components being used in photo voltaic system. The simulation of grid connected system at New Delhi and Hyderabad is presented in this paper. The meteorological details of the plant are generated from the

Control of Home Appliances Using Cell Phone

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ABSTRACT

This paper deals with the automatic control of home appliances using cell phone Traditionally electrical appliances in a home are controlled via switches that regulate the electricity to these devices. As the world gets more and more technologically advanced, we find new technology coming in deeper and deeper into our personal lives even at home. Home automation is becoming more and more popular around the world and is becoming a common practice. The process of home automation works by making everything in the house automatically controlled using technology to control and do the jobs that we would normally do manually. Home automation takes care of a lot of automation utilizing Dual Tone Multi Frequency (DTMF) that is paired with a wireless module to provide seamless wireless control over many devices in a house. This user console has many keys, each corresponding to the device that needs to be activated. The encoder encodes the user choice and sends via a FM transmitter. The FM receiver receives the modulated signal and demodulates it and the user choice is determined by the DTMF decoder. Based upon this the required appliance is triggered. The working of model indicates that the control techniques work well.

INTRODUCTION

The aim of the proposed system is to develop a cost effective solution that will provide controlling of home appliances remotely and enable home security against intrusion in the absence of homeowner.[1]. The system provides availability due to development of a low cost system. The home appliances control system with an affordable cost was thought to be built that should be mobile providing remote access to the appliances and allowing home security. Though devices connected as home and office appliances consume electrical power [2]. These devices should be controlled as well as turn on/off if required. Most of the times it was done manually. Now it is a necessity to control devices more effectively and efficiently at anytime from anywhere. In this system, we are going to develop a cellular phone based home/office appliance. This system is designed for controlling arbitrary devices, it includes a cell phone (not included with the system kit, end user has to connect his/her cell phone to the system) which is connect to the system via head set.[3]. To active the cellular phone unit on the system a call is to be made and as the call is answered, in response the user would enter a two/three digit password to access the system to control devices [4]. As the caller press the specific password, it results in turning ON or OFF specific device. The device switching is achieved by Relays. Security preserved because these dedicated passwords owned and known by selected persons only [5]. For instance, our system contains an alarm unit giving the user a

Image Steganography - Using LSB Technique

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ABSTRACT

In this paper, a data hiding scheme by simple LSB substitution is proposed. LSB based Steganography embeds the text message in least significant bits of a digital image. Least significant bit (LSB) insertion is a common, simple approach of embedding information in a cover file. By applying an optimal pixel adjustment process to the stego-image obtained by the simple LSB substitution method, the image quality of the stego-image can be greatly improved with low extra computational complexity. Experimental results show that the stego-image is visually indistinguishable from the original cover-image. The obtained results also show a significant improvement with respect to a previous work. The Stegnography programming will be developed using MATLAB Software.Stegnography is applicable in the following areas: Confidential communication and secret data storing,Protection of data alteration,Access control system for digital content distribution,Media Database systems.

Keywords: Stegnography,LSB(least significant bit),cover-image,stego-image.

INTRODUCTION

Since the rise of the Internet one of the most important factors of information technology and communication has been the security of information. Cryptography was created as a technique for securing the secrecy of communication and many different methods have been developed to encrypt and decrypt data in order to keep the message secret. Unfortunately it is sometimes not enough to keep the contents of a message secret, it may also be necessary to keep the existence of the message secret. The technique used to implement this, is called steganography. The word steganography is derived from the Greek words "*stegos*" meaning "cover" and "*grafia*" meaning "writing" defining it as "covered writing".

The idea and practice of hiding information has a long history. In Histories the Greek historian Herodotus writes of a nobleman, Histaeus, who needed to communicate with his son-in-law in Greece. He shaved the head of one of his most trusted slaves and tattooed the message onto the slave's scalp. When the slave's hair grew back the slave was dispatched with the hidden message. In the past, people used hidden tattoos or invisible ink to convey steganographic content. Today, computer and network technologies provide easy-to-use communication channels for steganography [1].

Technical Report on Renewable Energy

**Jaydeep Kumar Verma , Bhaskar Singh Bisht,
Mangal Dev Sharma, Shailesh Verma**

ABSTRACT

: Solar energy is the most abundant stream of energy. It is available directly as solar isolation and indirectly as wind energy. Solar energy has the sources of renewable energy.

Its potential is 178 Billion MW, which is about 20,000 times the world"s demand. Sun sends out energy in the form of electromagnetic radiation.

In this project we use the solar energy for generation of electrical energy, by using the Solar cells. The solar cells receive the solar energy.

The solar cells operate on the photo-electric energy by using solar cells principle. The energy from the photo voltaic cells is used to switch on the lights.

At present solar electric power generation systems are having fixed solar panels whose efficiency of generation is less.

The aim of the project is to introduce the SOLAR TRACKING to the existing fixed solar panels. thus we are maintaining the constant maximum power output.

INTRODUCTION

Solar energy is referred to as the energy that comes from the sun's rays. There are many ways to use this power including heating a house, providing electricity, or desalination of seawater. Energy is a form of power that is used to do many different things. Energy is used to light our houses, run our vehicles, trains, planes, ships, rockets, and others. Energy also warms our homes, cooks our food, plays our music, and allows us to see images on the TV screen. Energy is what makes the world go around. It is what makes this world of ours work. Energy is not always outside. When we eat food, our bodies convert food to energy. This energy we burn is in the form of work or exercise. Energy comes in many forms one of which is solar energy. Solar energy is being used widely today and this is what will be discussed in this book. During the 1970s, there appeared to be oil shortfalls after the 1973 oil embargo struck. Because of the shortfall in oil, an alternative method had to be produced that would allow other types of energy sources to be used as a replacement for oil. Therefore, the federal government stepped in to resolve this 2 problem. They knew that if something wasn't done soon, the world would eventually run out of oil reserves. This is why they allocated $400 million per year for solar energy research. The reason solar energy was the most likely source of new energy was because it was clean and renewable. When we wash our clothes and hang them up to dry, we are in fact using the sun's rays to dry them. Plants use the sun's rays to make food. Even the human skin uses the sun's rays to produce vitamin D. Solar energy is widely available today, because the sun will always shine on the Earth. We only need the right instruments to capture the sun's rays and convert those rays into energy. Also a need must exist for solar energy to be stored for future use. The only problem with solar energy is that if a day happens to be overcast or it is night, you don't have power. A means of storing the energy has to be implemented. Solar energy has the ability to provide us with a much needed energy source,

System Integration: Smart Grid with Renewable Energy

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ABSTRACT

Abstract- As electricity demands are increasing day by day causing unbalance in the present grid system which results in various causes like load shedding, unbalance voltage etc which ultimately affects the consumers. Now to avoid all such situations the only option is to meet the demand by increasing generation but, we are also lagging with the conventional sources so generating more power is also not convenient by conventional ways. Thus, use of Renewable is quite important. The solar power reaching the earth's surface is about 86,000 TW. Covering 0.22% of our planet with solar collectors with an efficiency of 8% would be enough to satisfy the current global power consumption solar have tremendous potential for fulfilling the world's energy needs Smart grids promise to facilitate the performance of the grid system. The power industry has adopted "smart" grids that use information and communication technologies, which may make electric power systems more reliable and efficient.

Renewable technology enhances the available energy resources. These technologies also enable integration of higher levels of renewable energy and conventional energy sources. The renewable sources are not "dispatch-able"—the power output cannot be controlled. Future energy sustainability depends heavily on how the renewable energy problem is addressed in the next few decades.

Solar energy can be made more economical by reducing investment and operating costs and by increasing solar plant performance. Integration of solar system with the smart grid have to come up with the challenges put forward by solar systems like technology barrier, uncertainty, social impact, economical aspects, free acceptance etc. Several countries have adopted special programs to subsidize and promote solar energy. Among the most successful ones are the Feed-In-Tariff (FIT) programs and the Production Tax Credit (PTC) programs.

In this paper, we consider path from conventional grid towards smart grid, challenges against integration of renewable energy, i.e. solar system. And impact of solar on grid stability, reliability of supply. Failure of grid which leads to total blackout which may lead to renewable energy as one of the solution to reduce impact of blackout- case study of total blackout in North India on 29th& 30th July 2012.

The section of the paper will concentrate on Ways of assimilation of Solar system in Smart grid, challenges & benefits of integrated grid systems.

Keywords-System Integration, Electrical Grid, Renewable Energy, Smart Grid, Non-Conventional.

1. Introduction:

In recent years availability of power in India has both increased and improved but demand has consistently outstripped supply and substantial energy and peak shortages prevailed in recent years. The selection of an energy resource for electricity generation is growing concern about other aspects such as social, environmental and technological benefit sand consequences of the energy source selection. Adoption of System integration by utilities will help to find ways to maintain the functionality of their current systems while also riding the wave of innovative technology that keeps them ahead of the competition. the integration of smart grid and renewable energy system an a integrated system needs broad range of skills. These skills are likely to include advance technology, methods procedures, and general problem solving skills. They are likely to include new and challenging problems with an input from a broad range of engineers where the system integration engineer "pulls it all together."

2. Electrical Grid system:

An electrical grid is an interconnected network for delivering electricity from suppliers to consumers. The electrical grid has evolved from an insular system that serviced a particular geographic area to a wider, expansive network that incorporated multiple areas. India is geographically divided in five regions namely, Northern, Eastern, Western North Eastern and Southern. All the state and union territories in India fall in either of these regions. Except the Southern region all other regions are operating in syncrons mode. The Southern Region will be synchronized in 2014. All regional grids are interconnected through tie lines. so that the power across these regions can flow seamlessly as per the relative load generation balance.
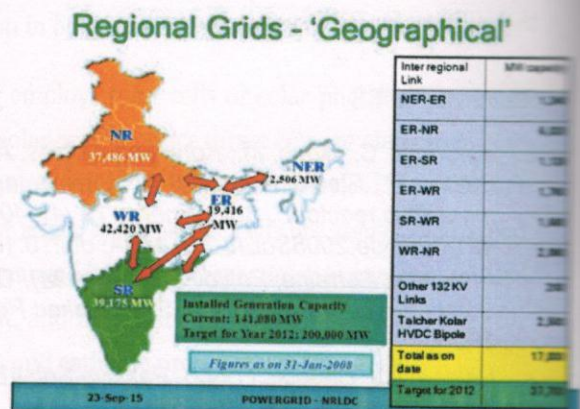
Fig. 1. Regional Grids

To meet the increased transmission capacity, to reduce the transmission losses (Technical & commercial) and to adopt Energy conservation techniques "Smart grid" phenomenon is been adopted by utilities in transmission levels. To enhance the generation capacity as well as to improve the performance of the distribution system local generation phenomenon has been included for which renewable energy is the key source. The ability to increase usage of intermittent energy sources by balancing them across vast geological regions provided an electrical market which will remove the congestion.

Hybrid Solar PV - Wind Energy System:
A Performance Study

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ABSTRACT

The Solar PV and, Wind Energy Hybrid Technology is based on the concept of a modular, scalable, distributed renewable energy system designed and optimized for on and off grid installations. This kind of systems are fully integrated hybrid systems that combines wind energy units with PV technology in a compact footprint, creating the greatest energy generation density The hybrid concept is unique and disruptive, seamlessly utilizing wind and solar energy generation in a single unit, leveraging smart electronics, MPPT (Maximum Power Point Tracking), installation costs, inverters, and batteries. The obvious benefits of a hybrid solution are the advantage of the increase of power available per square foot, combining both wind and solar renewable resources. But, perhaps the most important factor is that the energy availability of solar and wind are very complimentary, not only on a daily scale, but also through weather systems, and even seasonally. After an extensive search of academic and industry papers on turbine design, in this paper, a Savonius style turbine has been chosen for its low running speed and relative insensitivity to turbulence commonly found on rooftops. Made of galvanized metal, this type of system easily withstands extreme temperatures as well as harsh UV rays. The turbines incorporate a mechanical braking system to protect them from over rotation and the on-board electronics have temperature sensors that prevent the system from over voltage. This system takes advantage of areas of concentrated wind directly on the roof. The 1-meter high turbines begin rotating in the slightest breeze. This type of system requires less area in comparison to conventional photovoltaic power plant and also power generation is higher.

Keywords: Solar Photovoltaic, Wind Energy System, Hybrid System, Savonius Turbine.

INTRODUCTION

Solar panels are the medium to convert solar energy into the electrical energy. Solar panels can convert the energy directly or heat the water with the induced energy. PV (Photo-voltaic) cells are made up from semiconductor structures as in the computer technologies. Sun rays are absorbed with this material and electrons are emitted from the atoms.This release activates a current. Photovoltaic is known as the process between radiation absorbed and the electricity induced. Solar power is converted into the electric power by a common principle called photo electric effect. The solar cell array or panel consists of an appropriate number of solar cell modules connected in series or parallel based on the required current and voltage.

The wind energy is a renewable source of energy. Wind turbines are used to convert the wind power into electric power. Electric generator inside the turbine converts the mechanical power into the electric power. Wind turbine systems are available ranging from 50W to 3-4 MW. The energy production by wind turbines depends on the wind velocity acting on the turbine. Wind power is able to feed both

Insulation Test (Leakage Current Test) on 1kWp PV Array at Real Time Condition

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ABSTRACT

The study is based on the insulation test of 1kWp solar photovoltaic array on real time condition.

Four Modules having the same rating 250Wp are selected for the study. All the modules havefulfilled the criteria of IEC 61215, IEC 61646. Using an insulation tester, insulation test isperformed for 1 minutes at 1000V on the module which are mounted on the field. Modules aretested over a day with respect to humidity, temperature and intensity and variation on insulationresistance is studied. Insulation resistance is also tested on covered modules. The insulationresistance, leakage current is noted down at each interval over a day. Insulation resistance ismeasured in increasing the size of module form 250Wp to 1kWp in series and parallel. Sameexperiment has been done while covering the module through a sheet and various effects were studied.

Theoretically from the observation, it was found that the leakage current increased as the humidity increased in the environment. When Module is covered by a sheet there is a decrease inthe insulation resistance i.e. increase in leakage current. Insulation resistance goes on decreasing as the no. of modules is increased from 250Wp to 1kWp in series and parallel both.

Keywords- Insulation Test, Leakage Current, PV Array, Insulation Resistance

INTRODUCTION

The insulation resistance is the dielectric property of the module and is defined as amount of insulation material provided in between solar cells and metallic frame. While installing the solar photovoltaic module, we must consider about the safety criteria, since safety is the first key element for all type of systems. Since, module arrays work on a high voltage in power plants, hence, their behavior is sometime abnormal.So, it is necessary that the module should be perfectly insulated for safety purposes. If there is any leakage path between the current carrying parts of the module to the frame, it should be dangerous for the field workers on plant and as well as it may cause the tripping of inverter.

Insulation resistance tests are usually done with a high voltage tester to appraise insulation condition of the module.

Failure of electrical insulation of a PV module is the most severe fault when the modules are operating in the power plants. The modules with low insulation resistance (i.e. between frame and active cell area) working in high system voltage will induce leakage currents as it circulates in the frame and causing a severe threat to the operating personnel as well as inverters.

The insulation resistance depends on several parameters like irradiance, temperature, humidity, contamination, etc. In this work the focus is mainly on the short term effect of the temperature on insulation resistance and modeling of the dielectric equivalent circuit. The insulation resistance of a PV module

Energy Yield from Biomass
A Case Study of a Village in Uttar Pradesh

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ABSTRACT

Due to enormous rising demand of fossil fuel and environmental threat, there is a need to expedite the harnessing of renewable sources of energy for sustainable development. The renewable energy resources are vast sources for alternative energy production without endangering our environment and causing threat of climate change. Out of the several resources, the biomass resource is discussed in this paper. Biomass is one of the most potential sources of renewable energy which opens up enormous potential for sustainable economic growth. While bio-energy has always played a critical role in the world's energy mix, its role in the future will be a lot more prominent than now. Any credible energy scenario for the coming decades depends on the massive expansion of both energy efficiency as well as a broad mix of renewable energies, including bio-energy. Bio-energy poses large opportunities, but can also have very serious risks and side-effects if managed poorly. Biomass used as a sustainable fuel that stands out from other fuels because of many socio-economic benefits that can be achieved. It is also widely available and used in villages as well as cities easily. Here, the use of waste matter generated from day-to-day life from village can be handled and managed properly through energy conversion process.

A survey of Aldampur village in the Lucknow District has been undertaken by the authors to analyze the energy content of biomass resources of the village – agricultural waste, cattle waste, domestic waste and human wastes. There are several ways of utilization of biomass resources, namely direct combustion, thermo-chemical conversion and bio-chemical conversion. The paper discusses all the three routes of biomass resources in meeting the energy needs of the village. The route of biomass gasification for production of electricity in the village has also been explored. An attempt has been made to find ways to gain energy from biomass to improve the rural electrification condition in the village. The proper energy planning of rural waste utilisation can resolve the problem of waste generation and handling by use of various biomass technologies. An energy planning can be established and can be run a chain of rural energy services with various devices and technology within CDM (Clean Development Mechanism).

Given the range of issues bio-energy touches, standards are to be formulated in a multi-stakeholder process in very near future to ensure the sustainable development in the villages, particularly in Uttar Pradesh.

Keywords: Biomass, Electricity Production, CDM (Clean Development Mechanism), Sustainable Development.

INTRODUCTION

Renewable energy is the alternative source of energy. Fast depletion of energy sources made us to move towards the non-convectional sources, which leads renewable energy as a main energy source. Biomass is also an important source of renewable energy. Bio-energy is the sources by which we can meet all needs of rural areas. From the primitive era, bio-energy is an important source for meeting the energy demands. Bio-energy is as old as civilization itself. Solid bio-fuels like wood, dung and charcoal have been used ever since man

Cocktail Natural Dye Based Solar Cell for Enhancement in Solar Efficiency

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ABSTRACT

This study used natural dye as sensitizers in place of expensive and toxic synthetic dyes. Cocktail natural anthocyanin and chlorophyll dyes were obtained from flowers of petunia and leaves of spinach and used as sensitizers to fabricate dye sensitized solar cell. The short circuit current density and fill factor of the cell was enhanced using mixed dye which may be attributed due to synergistic sensitization by the dye mixture. The photo voltage and photo-current of dye coated TiO_2 based electrode is found to be 0.380 V and 5.2 mA/cm^2. The conversion efficiency and fill factor of cocktail dye coated TiO_2 photoanode are 0.92% and 47 % respectively.

Keywords: natural cocktail dye, anthocyanin, chlorophyll, TiO_2, conversion efficiency

INTRODUCTION

With the increasing demand for energy, renewable sources of energy proved to be an attractive alternative to conventional energy sources. Among all the renewable energy sources solar energy has gained lots of attention due to its abundance. Conventional silicon based solar cells though highly efficient yet to become popular for mass application as they involved lots of cost in fabrication [1]. Therefore developing low cost devices with environmentally friendly materials for harvesting solar energy is very much desirable. Since 1991, following the illustration of dye sensitized solar cell (DSSCs) by Micheal Gratzel at EPFL, have attracted the attention of researchers and industrials all over the world. Dye-sensitized solar cells (DSSCs) have been considered as one of the most promising photovoltaic technology due to its simple structure and low manufacturing cost [2]. A DSSC is composed of a nanocrystalline porous semiconductor electrode, sensitizer, counter electrode and an electrolyte containing iodide and triiodide ions.

In DSSCs dyes as a sensitizers plays a major role as the whole operating principle of DSSCs depends upon the dyes which is responsible for harvesting solar energy and converting into electrical energy with the aid of semiconducting photoanode [3]. Various types of metal complexes and organic dyes have been synthesized and used as photosensitizers. Ruthenium and osmium based dyes though efficient but suffers from the major drawbacks of rarity, high cost and the complicated synthesis of ruthenium and osmium complexes [4]. Therefore, alternative organic dyes such as natural dyes have been studied intensively. In nature, some fruits, flowers, etc. show various colors due to presence of several pigments that can be easily extracted and employed in DSSCs. Therefore, unlike artificial dyes, the natural ones are abundantly available, easy to prepare, low in cost, nontoxic, environmentally friendly, and fully biodegradable [5-6]. In this context Cocktail dye prepared by the mixture of different sensitizers like anthocyanin, chlorophyll etc represent an additional class of organic natural dyes of potential interest. The pigments are present in the different parts of the plant including flowers petals, fruits, leaves, stems and roots.

To date, TiO_2 is indeed one of the most widely used nanoscale materials for the photoanode of DSSC with wide band gap of 3.2 eV. The main purposes of the main electrode layer are to attach as many dye

Layered Filler Based Nanocomposite Polymer Electrolyte for Solar Cell Application

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ABSTRACT

In the present work we fabricated natural dye sensitized solar cell using PVA based nanocomposite polymer electrolyte with MMT Clay (Montmorillonite) as layered filler in order to improve the conductivity of polymer electrolyte. In this work, we applied TiO_2-WO_3 to natural dye sensitizer solar cells as a photoelectrode to reduce the recombination rate by providing energy barrier and we also explore the use of natural dyes, betacyanin obtained from the beetroot which are characterized by a high content of red pigments with a high absorption coefficient in the visible part of the solar spectrum. The properties of the Polyvinyl alcohol based natural solid state dye sensitized solar cell have been studied by measuring their short-circuit photocurrent density (Jsc), open circuit voltage (Voc), fill factor (ff) and conversion efficiency.

Keywords: Nanocomposite polymer electrolyte, MMT Clay (Montmorillonite), polyvinyl alcohol, TiO_2, WO_3,

INTRODUCTION

The conventional solid-state silicon based solar cells, though highly efficient, are yet to become popular for mass applications as they are highly expensive. The necessity for developing low cost devices for harvesting solar energy was, therefore, very much desirable [1]. Dye sensitized solar cells (DSSC) have been widely investigated as a next generation solar cell because of their simple structure and low manufacturing cost [2]. For ideal performance and excellent efficiency in DSSCs, electrolyte should have high ionic conductivity so that it can transfer oxidized/reduced species to respective electrodes efficiently and should prevents back electrode reactions completely but some drawbacks such as leakage and evaporation of solvent. Therefore several attempts have been made to replace liquid electrolyte with solid or quasi solid polymer electrolytes (SPEs), polymer gel electrolytes and organic hole transport materials [3]. SPEs have received considerable attention in recent decades because of their potential applications in electrochemical devices such as solid-state batteries and separation membranes [4]. Polyvinyl alcohol (PVA) has being most extensively studied as a polymer solvent, It has carbon chain backbone with hydroxyl groups attached to methane carbons; these OH groups can be a source of hydrogen bonding and hence assist the formation of polymer composite [5]. To further increase the ionic conductivity and mechanical strength of solid polymer electrolyte inorganic layered filler like MMT clay have been studied in DSSCs. We have also investigated the effect of adding WO_3 in the TiO_2 photoanode of dye sensitized solar cell (DSSC) to improve the photovoltaic efficiency.

Another key material issue in DSSCs is the photo sensitizer which can exhibit high efficiencies in the conversion of solar energy to electricity, and is based on the sensitization of wide band gap semiconductors using dye molecules. Numerous metal complexes and organic dyes have been utilized as sensitizers by far; the highest efficiency of DSSCs sensitized by Ruthenium complex and Osmium complex compounds absorbed on nanocrystalline TiO_2 reached 11–12% [6]. The major drawbacks of

Present Scenario of Energy Management in India A Study of Non-Conventional Energy Sources

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ABSTRACT

Energy is a pre-requisite to economic development for any country. Energy is a key input in the economic growth and there is a close link between the availability of energy and the future growth of a nation. Power generation and energy consumption are crucial to economic development. Energy management is a growing concern for rich and emerging nations alike. Many companies and nations are increasing attention to the issue of energy management because they fear that the world is quickly using up the vast but finite amount of fossil fuel extraction and production. Energy management is neither a new concept nor complicated. Energy should be regarded as business cost similar to other business cost including raw material and labor. India heavily depends on fossil fuels for meeting its power demand. Fossil fuels are biggest source of green house gases, which creates pollution. India depends heavily on import for meeting its crude oil requirement. Growing import of fossil fuels would ever greater economic burden in the future and also created an energy crisis in power sector. Fossil fuel dependency and wasteful use of resources will worsen climate changes which already threaten to endanger many of world's ecosystem raise sea levels and affect food production possible leading to resources scarcity driven instability and conflict. The only practical options for enhancing energy management and reducing coal consumption as well as oil import and protecting environment with investment in alternative energy sector. The non-conventional sources are capable of solving the problem of energy supply in a decentralize manner and helping in the sustaining cleaner environment. Energy management has assumed considerable importance in the recent years owing to the global energy crisis, high pilferage of electricity in country and privatization of universal energy resources. An attempt has been made in the present study to examine the role of Energy management in Indian context. The basic objective of this paper is to analyze the scope of non-conventional energy sources in fulfilling the future energy requirement. The research methodology adopted for this paper is desk review. In this desk review relevant existing documents were reviewed. These documents include reports, program of concern ministry of government, statistical data of companies and the Internet. Thus, the study is mainly based on secondary data. Hence, the discussion of this paper is related with the energy management function to see that the current energy needs of the country are satisfactory met at minimum cost at present and in future to extend possible.

Keywords: Energy Management, Energy Crisis, Energy Policy, Energy Saving, Non-conventional Energy Sources.

NIR Emission and $Eu^{2+} \rightarrow Nd^{3+}$ Energy Transfer in $KSrCl_3$:Eu^{2+},Nd^{3+} phosphor

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ABSTRACT

Solar energy is the most promising energy resource for its advantages of being inexhaustible and pollution-free. The most commonly used, commercial photovoltaic solar cells are fabricated with crystalline silicon. However, mismatch between the incident solar spectrum and spectral response of solar cells is the main reason to limit the cell efficiency presently 29% . The efficiency can be improved up to 38.4% by modifying the solar spectrum using phosphors. Phosphors can convert the high energy part of the solar spectrum into low energy in the near-IR (NIR) region which can be efficiently absorbed by the solar cells. also the removal of UV component from the incident radiation is expected to improve the stability. In this paper we report synthesis and efficient $Eu^{2+} \rightarrow Nd^{3+}$ energy transfer in $KSrCl_3$:Eu^{2+},Nd^{3+} phosphor which can be suitable as a spectrum modifier for the solar cell.

Keywords: c-Si solar cell, phosphor, $Eu^{2+} \rightarrow Nd^{3+}$ energy transfer, $KSrCl_3$

INTRODUCTION

Solar energy is the most promising energy resource for its advantages of being inexhaustible and pollution-free [1]. The capacity of photovoltaic cells to convert sunlight into electricity makes them prime candidates for this task. The most commonly used, commercial photovoltaic solar cells are fabricated with crystalline silicon with an E_g 1.12 eV. However, mismatch between the incident solar spectrum and spectral response of solar cells [2] is the main reason to limit the cell efficiency presently 29% [3]. Photons of low-energy are not absorbed (transmission losses) while absorption of high-energy photons with the energy excess is transformed into kinetic energy of a generated electron-hole pair, and subsequently converted to heat (thermalization loss). Moreover, high energy photons are also responsible for the degradation of several types of solar cells. Even though the UV component is as low as 4% in the solar radiations, the prolonged exposures in the field lead to degradation of solar cells through various mechanisms. Effective harvesting of solar energy from ultraviolet and near infrared photons is a necessary condition for improving the efficiency of solar cells [4] which indirectly reduces the cost of electricity compared to the conventional means [5,6]. At present the contribution of photovoltaic energy is limited due to its relatively high cost per kilowatt-hour. A reduction in price may be achieved by either lowering the production cost or increasing the conversion efficiency. The efficiency can be improved up to 38.4% by modifying the solar spectrum using phosphors. Phosphors can convert the high energy part of the solar spectrum into low energy in the near-IR (NIR) region which can be efficiently absorbed by the solar cells, also the removal of UV component from the incident radiation is expected to improve the stability

There are many reports on downconversion luminescence processes in rare earth codoped systems, such as $Tb^{3+} \rightarrow Yb^{3+}$, $Tm^{3+} \rightarrow Yb^{3+}$, and $Pr^{3+} \rightarrow Yb^{3+}$, in which Tb^{3+}, Tm^{3+}, and Pr^{3+} act as the absorption centers, respectively. However, the narrow absorption bandwidths of rare earth ions Tb^{3+}, Tm^{3+}, and Pr^{3+} characteristic of the *f-f* transitions and the low oscillator strengths due to forbidden nature

Investigations on a Novel Rotating Media Liquid-Air Contacting Device without Liquid Pool

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ABSTRACT

Contacting device is a system that bring air and water in contact with each other in evaporative cooling systems while it brings liquid desiccant and air in contact with each other in case of liquid desiccant based air conditioning systems. They should provide high surface area density for heat and mass transfer and also provide high heat and mass transfer rates in smaller volume with lower electrical power consumption. A novel design of contacting device is presented in this work, where plastic porous cylindrical contact media is used and unlike previous designs, the liquid pool in lower part of the device is eliminated. This would help to utilize the contact surfaces more effectively and reduce power consumption of motor used for rotation of the media as compared to earlier designs in literature. The novel contacting device and the experimental set up were developed and preliminary testing was done. The contact media is 230 mm long with diameter equal to 145 mm, providing surface area density equal to 445 m2/m3. In a preliminary experiment, the device provided evaporative cooling rate up to 288 W and effectiveness of 33.1%. The performance can be further improved by increasing mass flow rate of water for better wetting, increasing surface density by decreasing porosity and increasing path length of air.

Keywords: Air conditioning, Contacting device, Evaporative cooling, Heat and mass transfer

INTRODUCTION

Air Conditioning demand has increased sharply in recent times due to increased comfort expectations and development of economies in various parts of the world [1]. Rapid rise of electrical power consumption is not sustainable due to steep rise in consumption of fossil fuels given their limited reserves and climate change due to greenhouse gas emissions caused by their use [2, 3]. Energy efficiency and eco-friendly technologies of air conditioning need to be developed and promoted. Evaporative cooling, desiccant cooling, absorption and adsorption cooling are some of the alternative air conditioning technologies [4-6]. In case of evaporative cooling and liquid desiccant based air conditioning systems, liquid is brought in contact with air in a liquid-air contacting device for required heat and mass transfer. Spray tower, packed bed and falling film configurations are conventional configurations for such contacting devices [7, 8]. Higher pressure drop on liquid or air side, higher liquid flow rates, difficulty in uniform distribution of liquid etc. are some of the limitations of above conventional devices [9, 10]. Rane and Reddy developed a rotating disc type contacting device, which has a trough partially filled with liquid [11]. Rane et al. used such a device for drying purpose using liquid desiccant [12]. Multiple discs are mounted on a shaft and partially submerged in the liquid pool. The disc assembly is rotated slowly, at a few rpm and brought in contact with air and liquid alternatively. This device has lower air side pressure drop and does away with liquid distribution and carryover problem. But the path of air is very short and in cross direction to liquid flow in trough. So, the effectiveness can be low for single device and achieving uniform distribution of air can be difficult.

CURRENT DEVICE

Mehta et al. modified the rotating disc type of contacting device and used counter-flow of air and liquid with liquid pool at the bottom of the cylindrical envelope [13, 14]. It was tested for evaporative cooling,

Energy Efficient GSM Based Multi Layer Security System

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ABSTRACT

-Security is the main problem of the homes, buildings, offices and industry now days. Proposed model is compact, needs less power and provide double layer security as compared to old and bulky system which are not energy efficient and are not much secured.

The project uses a Onetime password feature being used in internet based bank transactions. This feature adds one more level of security in the system and an automatic alarm at every attempt. As soon as the user enters the predefined password with the help of matrix keypad provided at the lock the system automatically sends a onetime password which automatically changes at every attempt. This onetime password is sent through the GSM network with the help of GSM modem dedicated to the system.

The same OTP has to be entered to unlock the electromagnetic lock. The system automatically sends an alarming message If the wrong OTP or predefined password is entered. Thus the user can rely on the system completely. We are using the popular 8051 family microcontroller AT89C51 with this project which will work on the Embedded 'C' Language program

Keywords— Microcontroller, GSM 300 Module, One Time Password (OTP)

INTRODUCTION

Home security is important for everyone who uses it. Many times we lost or forgot to carry the key of our home, in these cases it gets really difficult to open the home. Main concept behind this project is of a door latch opening using two passwords which are entered through keypad matrix. System will have a GSM modem connected to it. When owner of the house wants to open the door of home then he/she has to enter default password. Then microcontroller connected to GSM modem reads the contents of password. If contents are correct then sim connected to GSM module will send a one time password to registered mobile number. Now user has to enter second password sent to his cell phone using keypad. If second password is correct then system allows user to open the door. We have provided a solenoidal lock which will operate when both passwords are correct. Message will be sent to authentic user if otp entered at the first place is wrong. In this manner this system provide a double security layer, due to presence of otp based mechanism used by gsm300 module , thus provide a system that cannot be hacked easily.

2. DESCRIPTION

2.1 EXPLANATION

The system is built around a microcontroller AT89C51 which takes the password input from matrix keypad. User will enter the predefined password with the help of matrix keypad. As soon as the four digit unique password is entered the system will send an OTP to the preregistered number through a SMS. For SMS facility we are using a GSM module which will have a SIM card installed on it.

The password can be seen on the 16x2 Alphanumeric LCD installed on the project which gets the printing commands from microcontroller. If the user enters the same password received on the mobile phone the system will actuate the electromagnetic lock.

In case of wrong entry another message will be sent on the same mobile number indicating the failure of attempt. This will also alert the user if any unauthorized person attempts to intrude the system with wrong passwords[1].
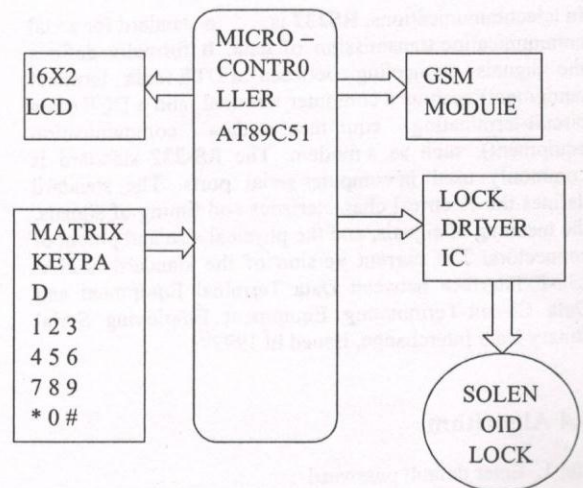

Fig. 1 : Block diagram

Organic Solar Cells – A Technological Review

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ABSTRACT

In today's technologically advanced era, our society needs an eco-friendly technology which is efficient and at the same time have low manufacturing cost. Solar energy is one of the major sources of renewable energy entering the earth's atmosphere in bulk. It's a fact that the amount of solar energy lighting up the earth's mass over a year is around 3000 times the total amount of annual human energy use. Fossil fuels are very limited and we would not be able to use it in upcoming future.

Among many materials used for fabrication of solar cells in the current and past century, the organic solar cells are good solution to low cost energy production. So, new photovoltaic energy conversion technology will contribute to environment friendly renewable energy production and reduction of CO_2 emission associated with fossil fuel and biomass. Organic photovoltaic solar cells deal with conductive polymer or small organic molecules. This type of solar cell has attracted attention of the photovoltaic industry in past few years because of its flexibility in usage, low manufacturing cost and abundance in material than first and second generation photovoltaic technology. Many researchers have investigated on the various materials of the organic solar cells. In 1986 when first organic solar cell was fabricated, it had the efficiency of 1.1%. Now the laboratory efficiency of solar cell has been reported of the order of 11%.

This paper reviews the technological progress of organic solar cells as a cheap and eco-friendly conversion of solar energy to electricity.

Keywords: Photovoltaic Energy Conversion, Organic Solar Cell, Solar Cell Fabrication Materials.

INTRODUCTION

Energy is the basic need of today's world. All technological researches are mostly done for harvesting energy. The basic requirements for energy harvested is from fossil fuels which are also called traditional energy sources. During 20th century, a new source of energy was introduced which is called nuclear energy. But, by the end of 20th century it has become evident that the huge production and consumption of energy from traditional source has a negative side too. It was realised that a massive consumption of fossil fuels leads to deterioration of environment. So a sustainable source of energy is required to fulfil global energy need and which is also eco-friendly. The urge of challenge led to introduction of new source of energy called *renewable energy sources*. These energy sources include solar (both photovoltaics and solar thermal), wind, hydro, geothermal, tidal, and biofuels. Here we will just be focusing on solar energy in the form of photovoltaics.

Light's ability to generate electric current was first observed in 1839 by *A. E. Becquerel*. Then in 1906 anthracene became the first organic compound in which photoconductivity was observed. Then inorganic materials entered the field when Bell Laboratories developed the first inorganic solar cell in 1954. The photovoltaic effect was first observed in an organic material in the 1960s after it was discovered that some common dyes had semiconducting properties. A major breakthrough in the field came in 1986 when *Tang* discovered that the output power could be greatly increased if two materials were used instead of just one. This concept, known as hetero-junction, is now the fundamental idea behind the theory and design of organic

The Grid of Future

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ABSTRACT

The paper deals with the approach towards operational efficiency by developed regions and by developing economies. Changing markets, new technologies, and an emerging society focus on emissions has moved the industries in a new direction. Wind and solar power have proliferated, creating new challenges and opportunities. Advancements in energy storage technologies have revolutionized the consumer electronics industry. This paper basically deals with the problems and solutions regarding the American economy and a stronger case for an investment towars building a stronger, resilient and sustainable U.S. grid.

Keywords: Coal plant Retirements, Wind and solar power, Gas-fired generation, Electric vehicles.

INTRODUCTION

Electricity is the foundation for America's economic success. Our digital economy, our national security, and our daily lives are highly dependent on reliable, safe, abundant, affordable, and secure electricity. Over the past several years, the electricity industry has experienced fundamental changes on a scale not witnessed since the creation of the electric system more than 100 years ago. New technological advances are providing new grid capabilities, prices for clean energy sources are becoming more affordable, our digital economy is even more dependent on electricity, and consumers are demanding fewer outages and faster response times when outages do occur.
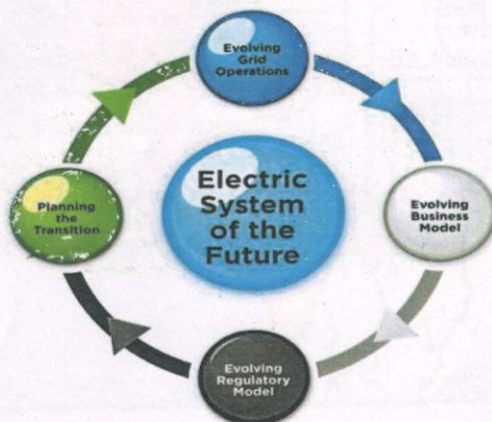
Compress Air Energy Storage: A Technological Review

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ABSTRACT

As the time passes, there is a paradigm shift from the conventional source of energy to renewable sources of energy. Conservation of natural resources has become a necessity in today's world. The energy storage has become a critical factor on utilization of renewable sources of energy due to their daily, seasonal and annual variations.

Compressed air energy storage (CAES) is one energy storage technology which can create a difference in the near future. Compressed air energy storage is the term given to the technique of storing energy as the potential energy of a compressed gas. Usually it refers to air pumped into large storage tanks or naturally occurring underground formations by an electric compressor. Later, when there is a higher demand of energy during the peak hour from the grid, the compressed air is released from the cavern and energy stored in air can be retrieved to drive an air turbine whose shaft would drive a generator, thus, supplying the power needed by the grid. Basically whole system works as a large auxiliary battery. The system mainly consists of air compressor, salt cavern and gas turbine. Huntorf Plant is the world's first compressed air storage power station. The plant has been operational since 1978, the 290 MW plant is located in Bremen, Germany, thus making a reliable option for us in near future. The main advantage of CAES is that it uses air which is free and can be synchronized with conventional power plants and renewable energy power plants. While conventional batteries can also be used to store energy, but they are expensive to make, use hazardous and toxic metals and compounds and can't hold energy for very long. The main disadvantage of CAES is geological structure reliance and site dependence. If wind power is used to generate electricity during non-peak times, less money is paid for it. But when it is combined with CAES and generates power during peak times becomes economical.

Now a day, we are suffering due to load shading. Therefore, the energy storage is going to become more and more important. This paper reviews the technological progress on the CAES which is likely to be major energy storage technology in near future.

Keywords: Energy Storage, CAES, Conventional Sources of Energy, Renewable Energy Sources

INTRODUCTION

Renewable energy sources, such as wind and solar, have vast potential to reduce dependence on fossil fuels and greenhouse gas emissions in the electric sector. Both solar photovoltaic (PV) and wind energy have variable and uncertain (sometimes referred to as "intermittent") output, which are unlike the dispatchable sources.

The variability of these sources has led to concerns regarding the reliability of an electric grid that derives a large fraction of its energy from these sources as well as the cost of reliably integrating large amounts of variable generation into the electric grid. Because the wind doesn't always blow and the sun doesn't always shine at any given location, there has been an increased

A Review on Future Aspect of Renewable Energy Resources for a Clean and Green Energy Production

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ABSTRACT

This paper shows the problems existing in conventional methods for producing electricity and presents an overview of various renewable energy producing technologies that are being developed to encourage renewable energy. A concise overview of the India and world power scenario is stated and its benefits and limitation of conventional generation are outlined. In addition the development of renewable energies in India and world has been examined. Also the present and future scope of elaboration inIndia and world on renewable energy scenariois briefly overviewed. Micro-grid control is elevating technology in the operation of advent micro-grid into regular grid. Since solar, wind and gas-fired energies mostly based on statistical criterion with respect to changing environment Therefore favorable combination and sizing design of amalgamcreation system considering the energy storage battery has a very important role in the use of renewable energy effectively and economically. At present we have the technologies of generation and implementation of these renewable sources to overcome the limitation of conventional energy resources.

Key words: Limitation of petroleum, Coal plant retirements, Fossil Fuels, Wind and solar power, Gas-fired reproduction, Electric drives, Energy storage, Renewable Energy Storage, Maintaining grid resiliency with micro grids.

INTRODUCTION

The main thingof the power generating industry has been to make a reliable and efficient grid system. Last few decades, developed regions have mainlyconcentrated on increasing operational efficiency,while apparent economies have concentrated onevoking capital to grow their grid system. The conventional sources of energy are all mostly non-renewable sources of energy. Their large usage has caused their known reserves to be depleted rapidly [1].Micro-grid mainly classified in two categories that isislanding mode andthe grid-connected mode. Grid-connected mode statefacilitate and saving the fossil energy when the common micro-grid performs well [2]. The smart grid system includes transmission, distribution and creation of electricity. In a smart grid, the performance of power systems has developed gradually into a dynamic design in place of a static design.As smart grid technology ismore extensivethroughout the world, appreciation in smart grid protection is important. Protecting plays a great significant role to ensure realization of power grid security and efficiency in generation, transmission, supply and control network. The gradually becoming ofmodern power electronics and low-cost communicationstechnologies develop scope. Wind and solar power have reproduced rapidly,complaining new challenges and opportunities.The working and maintenance required for the wind and photovoltaic power generation systems is small in comparison to the other power generation systems like diesel generation system[3].

Industrial Tank Temperature, Pressure and Humidity Controller Using Microcontroller

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ABSTRACT

This paper presents a PC based temperature, pressure and humidity watching and control system-using microcontroller. A document gaining is an imperative role in industry in order to insure the quality of service. Temperature sensor measures the temperature, humidity and pressure sensor measures humidity and pressure respectively and produces corresponding analogy signal, which is further processed by the microcontroller. The data will be displayed on the LCD in microcontroller and palmtop monitor. Computerization and rheostat can be completed with the help of regulator circuitry.

Keywords: Temperature Sensors; Liquid Crystal Display; Microcontroller

1. INTRODUCTION

Industrial parameter monitoring is very important. In the earlier days it was done manually but that was dangerous and difficult for person in units like furnace boilers etc. With the rise of revolution in electronics the friendly and automatic system has been designed that provide solution to this with minimum error and better efficiency. This project is also design of temperature monitoring of large boiler using multiple sensor network and regulation of the control heater on/off as per the defined threshold.

This project is based on Dallas's one wire temperature sensor. The interesting feature of one wire devices is that, it works on a single wire and also bidirectional. Also virtually infinite number of one wire devices can be connected only on a single wire. For a large boiler, we need multiple no of temperature sensor to sense the temperature of multiple locations within the boiler. All the temperature sensors are connected on the same one wire bus and data is given to the microcontroller. The controller displays data on LCD and also sends it to the PC to be logged. The controller also regulates the heaters as per the threshold set by the user that is on and off.

Various Renewable Energy Resources in Indian Scenario

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ABSTRACT

Since the discovery of the electricity in the 19th century, the industrial era has exponentially increased and with the invention of transformer, the growth has been seen increasing too. During the twentieth century, the researchers focused well on the low emission technologies and the power consumption revealing a new innovation known as renewable energy resources. Such types of resources were seen fruitful in accordance with the various things that dealt with non-renewable energy resources. Wind energy technology, solar thermal power systems, solar heating, photo-voltaic electricity production etc. to mention a few are considered as the backbone renewable resources throughout the world. India being a developing country and having very broad resources for such purpose has been well in the progress of spreading and implementing the renewable energy resources. In this paper, we are presenting an overview of the fundamental renewable energy resources in India.

Index terms: renewable energy resources, wind energy, solar energy, photovoltaic technology

INTRODUCTION

Energy generation from the natural resources that can be renewed is termed renewable energy sources. The sources like the sun, wind, water, heat etc. are the fundamental resources of the said energy. The utilization of these resources has proven fruitful to the small as well as the large scale industrial needs. For a developing country like India, it has boosted the domestic as well as the industrial sectors. The main advantage of the renewable energy resources is one time cost and less unwanted residues. In this study, we are showing the detailed description of the fundamental resources and their utilization in the country India like Photovoltaic Electricity production, Solar thermal power systems, solar heating systems, wind energy system, & marine energy resource conservation system.

PHOTOVOLTAIC ELECTRICITY PRODUCTION

The concept of the photovoltaic technology was given by Antoine Becquerel in 1837. Later Albert Einestine has got Nobel prize for explaining this effect in 1905. In the similar fashion, the production of electricity from the light with the aid of the photovoltaic cell is generally termed as photovoltaic electricity production. Last 30 years have seen considerable increase in photovoltaic energy production along with reduction in its generation/production cost. Generally, silicon crystalline base cells are used for the solar cell fabrication like raw silicon, monocrystalline silicon, polycrystalline silicon etc. Several other emerging materials like cadmium–telluride base and iCopper indium gallium (di) selenide (CIGS), organic solar cells, quantum dot solar cells & hybrid solar cells have been found very impressive. The principle of the photovoltaic cell is quite explainable from the figure 1 [1].

A Concise Review on Maximum Power Point Trackers in Solar PV Systems

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ABSTRACT

Maximum power point trackers (MPPT) are important to get an energy efficient solar photovoltaic system. There exist many automatic MPP Trackers for improving the energy efficiency and stability of solar photovoltaic system. Main differences in these techniques are based on their design, sensor requirement, speed, effectiveness, cost and their implementation. These existing techniques have their own pros and cons. This paper presents concise analysis of few important MMP techniques.

Keywords: Photo voltaic (PV) panel, Maximum power point tracking system, System efficiency.

INTRODUCTION

Energy sources with capacity to renew are need of time to fulfill ever increasing demand of energy. To meet this increasing energy demand, researchers in world community have focused on production of energy from renewable energy sources. There are so many renewable energy sources such as solar, wind, bio-mass, thermal energy etc. Solar energy is one of the most popular renewable energy which is used to generate power. Solar energy is an unlimited source of energy which is available. Solar energy becomes more popular in last few years because of its own advantage like noise free, pollution free etc.

Solar photovoltaic system has a non-linear relationship between voltage & current and its output is function of solar irradiance and operating temperature. Therefore, maximum power point also dependent on these operating parameters and it put the requirement of automatic maximum power point trackers. MPP trackers continuously track maximum power point to deliver it to connected load [1]. There are many MPPT techniques by which maximum power point can be achieved to get more efficient solar system. These MPP trackers are essential part of standalone and grid connected solar PV systems.

In this paper, we have discussed commonly used MPPT techniques like perturb and observe technique (P&O)/ hill- climbing technique, adaptive hill-climbing technique, incremental conductance technique, fractional open circuit voltage technique, fractional short circuit current technique, ripple correction technique, fuzzy logic technique and artificial neural network (ANN) technique.

VARIOUS MPPT TECHNIQUES

There are so many MMPT techniques are available. Suitable MPPT techniques can be selected according to the suitability of technique for that particular application based on different parameters. These parameters include hardware and software implementation, voltage and current sensor, convergence

Study and Implementation of Concentrated Solar Power Technology for Remote and Hilly Regions of the Country

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ABSTRACT

With the advent of technology, the researcher aimed in developing power resources from the renewable sources of energy like solar, wind, water etc. Concentrated solar power (CSP) energy being one of the most and latest technologies, the researchers are working on it at its peak. The concept behind the CSP is that, it harnesses the sun's energy potential and has the capacity to deliver reliable renewable energy to the numerous households, even though, when the sun is not shining. A distinctive characteristic of CSP is that, an arrayed with thermal energy storage can harvest electricity on demand. CSP are employed on technologies like power tower, thermal storage and thermal trough. In this paper, we have focussed on the basic operating technology of the CSP and its corresponding employing technology.

Index terms-- CSP, Power tower, Thermal Storage, Thermal Trough

INTRODUCTION

Day after day the requirement for the solar energy is growing to meet the demand of power in our country. And it is not immediately solar panels popping up on the rooftops of homes. Americans are opening to accept other forms of solar energy in addition. Concentrating solar power (CSP) is technologies that harness the sun's energy likely and has the ability to supply hundreds of thousands of consumers in the United States with steadfast renewable energy—even when the sun is not scorching. The United States is mostly well matched for CSP because it leverages the nation's plentiful solar energy capitals. Every day, more energy falls on the country in the form of sunlight— than the country use in an inclusive year[1].

Through constant, long-term funds by the united states Department of energy (DOE) and faithful industry partner, some of the most new Concentrating solar power (csp) plants in the world connected to the united states electricity grid [1] as shown in figure1.

CONCENTRATING SOLAR POWER TECHNOLOGY

Concentrating Solar Power (CSP) technologies shown in figure 2 use mirrors to concentrate (focus) the sun's light energy and change it keen on heat to produce steam to force a turbine that generates electrical power. CSP technology utilizes fixed sunshine. Concentrating Solar Power (CSP) undergrowth produce electric control by using mirrors to concentrate (focus) the sun's energy and change it keen on high-temperature heat up. That heat is next channelled through a conventional generator [2]. The undergrowth consists of two parts: one that collects solar energy and converts it to heat, and another that converts the heat energy to electricity. CSP plants have been operating reliably for more than 15

Over Speed Violation Control Based on IEEE 802.15.4 ZigBee Device and GSM Technology

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Abstract: Traffic Rules are every now and again broken by the drivers and over speeding of vehicles happen because of terrible driving conduct. Goal of the study is to plan and build up another framework that can adequately identify speed infringement out and about and underpins the driver to obey movement rules while driving by keeping up the pace as per as far as possible recommended by specific zone. The proposed framework has an alarming, recording and reporting framework for over speeding vehicles. It will utilize Zigbee innovation. The fundamental point of preference of this framework is that if over speeding vehicles don't get controlled physically, and afterward framework gets ON and will get controlled consequently.

Keywords: Zigbee, GSM, PIC microcontroller, Automatic speed control, Over speeding vehicles, monitoring.

1. Introduction

In today's fast moving world, As the rate of accidents is increasing day by day, speed of vehicles should be controlled as much as possible. Most of the accidents reported in India are results of lack of speed control and violating the road rules. For this reason, different speed limits are put to decrease accidents. Unfortunately, drivers usually do not take these speed limits seriously and ignore them (Wahid A, 2010). Again with growth in traffic, there is occurrence of bundle of problems too; these problems include traffic jams, accidents and traffic rule violation at the heavy traffic signals. This in turn has an adverse effect on the economy of the country as well as the loss of lives (Rajat & Nirbhay 2007). So problem given above will become worst in the future. Traffic congestion and tidal flow management were recognized as major problems in modern urban areas, which have caused much thwarting for the ambulance. Moreover road accidents in the city have been incessant and to bar the loss of life due to the accidents is even more crucial (K. Athavan 2012). Increasing the capacity of the roadways is expensive and, in some areas where land is scarce, is not an option. Improving the efficiency of the current transportation system through the implementation of advanced technologies may alleviate traffic congestion and decrease the vehicle crash-related fatality rate. Real-time traffic surveillance is one of the most important components of this approach (Masoud Hamedi 2012). Road accidents can be prevented by adopting measures such as Traffic management, improving quality of road infrastructure and safer vehicles. To Ensure decline in accidents and to improve road safety, speed control techniques such as speed control in school and college zones by using RF transceiver, automatic braking systems, Camera based detection, RFID technology based detection are implemented. The driving behavior of the driver is monitored based on which penalty amounts are calculated. A message is sent to the remote station where an immediate action can be taken. Speed limit information is sent with the help of Zigbee which uses wireless mode of communication, proves to be effective (Rubini. R 2013).

Vibrational Electronic and Optical Properties of 6-(2-fluorophenyle)-3-phenyl thiadiazole by Using DFT Method

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Abstract: In this paper using DFT-B3LYP/6-311G(d,p) calculations are performed on 6-(2-fluorophenyle)-3-phenyl thiadiazole to explore its vibrational structural and optical roperties. A good correlation is shown between experimental and calculated vibrational frequencies. The study of simulated spectra provides important information about the ability of the computational method to describe the vibrational modes. The equilibrium geometry, harmonic vibrational frequencies and HOMO-LUMO gap have been calculated by the density functional theory (DFT), employing 6-311G(d,p) basis set. The thermodynamic calculations related to the title compounds were also performed at B3LYP/6-311G (d, p) level of theory.

Keywords: Vibrational Spectra; Density functional theory; HOMO-LUMO

INTRODUCTION

In organic chemistry, the phenyl group or phenyl ring is a cyclic group of atoms with the formula C_6H_5. Phenyl groups are closely related to benzene and can be viewed as a benzene ring, minus a hydrogen, serving as a functional group. Phenyl groups have six carbon atoms bonded together in a hexagonal planar ring, five of which are bonded to individual hydrogen atoms, with the remaining carbon bonded to a substituent. Phenyl groups are commonplace in organic chemistry.[1] Although often depicted with alternating double and single bonds, phenyl groups are chemically aromatic and show nearly equal bond lengths between carbon atoms in the ring.[1][2]. Usually, a "phenyl group" is synonymous to C_6H_5- and is represented by the symbol Ph or, archaically, Φ. Benzene is sometimes denoted as Ph H. Phenyl groups are generally attached to other atoms or groups. For example, tri phenyl methane (Ph_3CH) has three phenyl groups attached to the same carbon center. Many or even most phenyl compounds are not described with the term "phenyl". For example the chloro derivative C_6H_5Cl is normally called chloro benzene, although it could be called phenyl chloride. Phenyl compounds are derived from benzene (C_6H_6), at least

Baby Incubators for Hospitals

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ABSTRACT

There are five million babies worldwide who die in the first month of life, one million die on their first day. Preterm birth is attributed, either directly or indirectly, to at least 25% of neonatal deaths, and low birth weight (LBW). About half of the worldwide total, or 2 million babies each year, die for lack of a consistent heat until they have the body fat and metabolic rate to stay warm. This project helps to prevent the death of such babies. The microcontroller based baby incubator helps to all peoples; the cost of this incubator is less than today's baby incubator which are used in big hospitals. So, everyone which belongs to economical backward or below also use of it. This project not only used for monitoring and controlling the temperature but also provide number of advantages such as controlling humidity, monitoring heartbeat, voice of baby, oxygen level, weight, etc.
Keywords: Microcontroller, Monitory Heartbeat, Humidity

INTRODUCTION

The project is designed keeping in mind the medical conditions available in rural areas. This Equipment can be effectively used by technicians in a small health care centre. It can be a life saving machine for low birth weight infants. The components can be easily fixed. The chamber is sufficient enough to accommodate the baby comfortably. As the electronic part is separated from the Baby's compartment baby can be assured safe. The temperature of the system can be understood. This project is simple and efficient in maintaining the temperature and humidity of the chamber irrespective of the outside temperature and humidity and is designed at a low cost.

NEONATAL INTENSIVE CARE UNIT

A neonatal intensive-care unit (NICU), also known as an intensive care nursery (ICN), is an intensive-care unit specializing in the care of ill or premature newborn infants. The first American newborn intensive care unit, designed by Louis Gluck, was opened in October 1960 at Yale–New Haven Hospital, Connecticut. A NICU is typically directed by one or more neonatologists and staffed by nurses, nurse practitioners, pharmacists, physician assistants, resident physicians, and respiratory therapists, dietitians. Many other ancillary disciplines and specialists are available at larger units. The term neonatal comes from neo, "new", and natal, "pertaining to birth or origin".

PROPOSED SYSTEM

Single Chip microcontroller, incubator monitoring system that can integrated with existing incubator monitoring system. The system consists of temperature sensor, humidity sensor, incubator temperature sensor. Temperature sensor is sensing the data from the incubator. Humidity sensor is sensing the data from the incubator. All the values are display on LCD.

Vertical Axis Wind Turbine Modeling and its Analysis Using ANSYS

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ABSTRACT

Research on Small wind turbine (SWT) is on the upswing in the last five years, as there is a need of energy producing machines to compensate with the fossil fuel based energy. The green technology wishes to create environment friendly energy producing devices based on wind or solar technology. In this Paper an attempt is made to make use of already existing waste wind energy produced by high speed moving vehicles on straight and curved roads and bridges respectively. The improved small wind turbine technology is easily put to both 'grid-tied' and 'stand-alone' system. The market for SWT technology is encouraging in India because of high rates of electrical units. Kitchen machines also depend on electricity for operation.

The model's central axis rests on pivot, and is so designed that it can accommodate divider space of the street. The model easily rotates with to and fro movement of vehicle, which provides necessary tangential force, from either sides of the road, to the rotor wheel of the model.

Keywords: small wind turbines, blades, renewable energy,

INTRODUCTION

The introduction decades the renewable energy is considered as a new emerging technology and an alternate source of energy for fossil fuel. Its continuous rising cost as an effect of climate change, such as global warming, generated by extensive use of vehicles and deliberate use of fossil fuels. The extensive use of fossil fuel for generating electricity is met by wind power, which has a key role in reducing greenhouse gas emissions [1] Today, the most commonly used wind turbine is the vertical Axis Wind Turbine (VAWT), where the axis of rotation is perpendicular to the ground.

The VAWT are used whenever cost or reliability is much more important than efficiency. Its Design is simple because, unlike Horizontal Axis Wind Turbines (HAWTs), no pointing mechanism is required to allow for shifting wind direction and thus the turbine is self-starting. A major advantage is VAWT could take the wind from any direction and rotate with the direction of wind flow [2, 3]. The hollow aluminium shaft would easily work with inertia forces created with wind flow [5], to develop torque to be transmitted to the dc motor, and for assembly, alignment and stability to rotate freely.

N.H. Mahmoud et al studied different geometries of Savonius wind turbine in order to determine the most effective operation parameters. It was found that, the two blades rotor is more efficient than three and four blades rotors. The rotor with end plates gives higher efficiency than those without end plates. Double stages rotor have higher performance than single stage rotor [6]. U. K. Saha has explored the feasibility of twisted bladed Savonius rotor for power generation. The twisted blade in a three-bladed rotor system has been tested in a low speed wind tunnel, and its performance has been compared with conventional semicircular blades (with twist angle of 0°). Performance analysis has been made on the basis of starting characteristics, static torque and rotational speed. Experimental evidence shows the potential of the twisted bladed rotor in terms of smooth running, higher efficiency and self-starting

Optical Studies of Dye Doped Nematic Liquid Crystal BKS/B07

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ABSTRACT

The present paper reports the effect of anthraquinone and rhodamine B dye on optical parameters of nematic liquid crystal BKS/B07. The refractive indices, birefringence and order parameter have been measured for dye doped nematic sample and behaviour of these parameters with variation in temperature has been discussed. It has been found that values of refractive indices for doped samples are higher whereas the values of birefringence and order parameter are less than that of pure nematic BKS/B07. The transition temperature also found to shift towards lower side with the addition of dye.

Keywords: Nematic liquid crystal, Refractive index, Birefringence, Order parameter

1 INTRODUCTION

Liquid crystals are very important materials and have been studied in the past few years because of their wide range of applications to the modern devices [1–4]. For practical applications, the LC should have a low birefringence and high order parameter. One of the approaches to modify the material parameters of the LCs is doping of dye into LC material [5-7]. Dyes have an elongated molecular structure similar to the molecules of liquid crystals. When dyes are dissolved in the LCs, they acquire an orientation such that all the long axes lie

Sustainable Architecture
A Step Towards Environmentally Conscious Design

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"Solutions to environmental problems will be found once humankind ceases its attempts to dominate nature and, instead, views it as a model. Architects must step forward to lead interdisciplinary teams in this newly reoriented problem-solving."

Kate Nesbitt

INTRODUCTION

The most overwhelming urgent crisis facing mankind globally is the concomitant problems of global warming and climate change. The most reasonable method to overcome this problem lies in the adaptation of concept of Sustainable development. Sustainable development was very well defined by Brundtland Commission of the United Nations in 1987 as *"the development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs"*. Sustainable architecture is framed by the larger discussion of sustainability and the pressing economic and political issues of our world.

Eco-housing, green development, sustainable design– environmentally sound housing has as many names as it has definitions, but the Rocky Mountain Institute, in its "Primer on Sustainable Building", flexibly describes this new kind of architecture as *"taking less from the Earth and giving more to people."* In the broad context, sustainable architecture seeks to minimize the negative environmental impact of buildings by enhancing efficiency and moderation in the use of materials, energy, and development space. The idea of sustainability, or ecological design, is to ensure that our actions and decisions today do not inhibit the opportunities of future generations. This can be framed in the context of a conscious approach to energy and ecological conservation in the design of the built environment. By the medium of this article a brief introduction is being given about the various techniques being employed in field for producing environment friendly design.

PASSIVE SOLAR BUILDING DESIGN

A more efficient building requires less heat generating or dissipating power, but may require more ventilation capacity to expel polluted indoor air. Passive solar building design allows buildings to harness the energy of the sun efficiently without the use of any active solar mechanisms such as photovoltaic cells o r solar hot water panels. Typically passive solar building designs incorporate materials with high thermal mass that retain heat effectively and strong insulation that works to prevent heat escape. Low energy designs also requires the use of solar shading, by means of awnings, blinds or shutters, to relieve the solar heat gain in summer and to reduce the need for artificial cooling. In addition, low energy buildings typically have a very low surface area to volume ratio to minimize heat loss.