Electrical Machines

- **Microcontroller Based Protection for Low Voltage Motors using Zigbee Technology:** The main aim of this project is to protect and control low voltage motors from low voltage, ground fault, thermal overload and unbalance conditions. Various sensors employed in this design continuously monitors the parameters of the motor. Microcontroller compares all these sensor data with respective set limits and accordingly the switches the relay. This information will be sent to the remote PC using Zigbee communication module.
- **Protecting Induction Motor From Phase & Temperature:**Over heating of a motor can decrease the life time of the motor, causes insulation failure etc. Hence it is necessary to protect the motor from single phasing and overheating. The present project shows the hardware setup for monitoring the phases and temperature of the motors. When there is any deviation in these two parameters, an SMS is sent using GSM.
- **A Numerical Analysis of Coupled Electromagnetic and Heat Transfer Phenomena in PM BLDC Electric Motor:**This paper focuses on thermal management of electrical motors. It study about , a coupled heat, flow (CFD) and electromagnetic (EMAG) model of the permanent magnet brushless electric motor with electronic commutation was formulated and then validated
- **Four-Quadrant Adjustable Speed Drive for Series Wound DC Motors:** In this project, a four quadrant adjustable speed drive is implemented for series wound DC motors which are mainly employed in electrical traction systems. PIC microcontroller is used in this project to control the speed as well as direction of the motor. This project also includes the current limiting as well as speed limiting protection circuits.
- **Four Quadrant DC Motor Control without Microcontroller:** This project deals with the implementation of four quadrant motor controller using 555 timer along with H-bridge driver. 555 timer produces the necessary PWM pulses to control the speed while relays are used for changing the polarities and also to apply the brakes to the motor.

Electrical Power Project

- **Role of Surge Arrestors in Electrical Power Systems:**Surge arrestors protect the electrical equipment against over voltage. This paper presents the design and characteristics of modern MO surge arrestors.
- **Power Generation Using Foot Step:**This paper shows non conventional way of generating the power. Unlike conventional ways here power is generated simply from foot steps in the train.
- **Production of electricity by the method of road power generation:**This project shows the method of generating electricity from the road power generation. The device proposed here converts the kinetic energy into mechanical energy ,there by producing electricity.

- **Wireless Power Transfer:**:A simple wireless power transfer device is developed in this project without any microcontroller. Nikola Tesla realized the concept of wireless power transfer. An efficient wireless power transfer system can eliminate the concept of current carrying cables. A small DC fan is operated wirelessly from a distance of 3cm in this project to demonstrate the working. Potential applications of the project are wireless charging of mobile phones, laptops, iPods, etc.

Control system

- **Design of Load Sharing control system using PIC Microcontroller:** The main aim of this project is to adjust the availability power with consuming load. This system measures the power using current and voltage sensing circuits for every energy source i.e., for wind, solar, grid and generator source. PIC microcontroller compares the load consumption and then optimally connects the respective load to the healthier source.
- **Energy-based Control of an Under actuated Crane System with a Flexible Cable and Large Swing Angle:**In this paper, an effective energy based control technique for an overhead crane system with a flexible cable with large swing angle is developed. The studied crane system is categorised as a multi-degree under actuated system whose characteristics can initiate challenges in control design.
- **Standalone Smart Solar-powered Streetlamp Light control System:**This project shows a solar powered street light control system. This light can be recharged using solar powered system and it is controlled based on vehicle detection and audio recognition technology.

SCADA

- **Cyber Security Analysis of Substation Automation System:**The automated substation uses SCADA for their implementation. It uses intelligent electronic devices for protection, controlling and monitoring. Mod bus protocol is used for communication. This paper explains about monitoring of substations and analyses cyber security issues of SCADA systems.
- **SCADA Based Monitoring and Controlling Using Zigbee:** This project implements the real-time SCADA system using Zigbee communication technology. Zigbee activated microcontroller unit along with set of sensors acts as a Remote Terminal Unit (RTU) while Zigbee transceiver based PC acts as Mater Terminal Unit.
- **Intelligent Automation System For Electrical Energy Distribution:**This research work to be aimed at developing indigenous know-how of full scale Distribution Automation system, which can cover from secondary substations to consumer level intelligent automation, the power distribution automation is expected into broad areas. At present, power utilities have to need full scale distribution automation to achieve real time system information and remote control system. In modern power systems, the monitoring and control of power

substations are based on the computerised Supervisory Control and Data Acquisition (SCADA) systems.

Electrical Projects on Control System

- **CS Based Power Analyzer:** This project uses PROTEUS AND VB.NETsoftware to measure and analyze the power quality parameters such as active and reactive power, harmonics, instantaneous power and power factor. In this a power analyzer VI is implemented using PROTEUS AND VB.NETsoftware along with DAQ board.
- **Implementation of PID and Fuzzy PD Controllers for DC Servo Motor:** This project implements fuzzy based PD and Ziegler-Nichols rule based PID controllers in order to control the DC servo motor position. A DAQ board along with PROTEUS AND VB.NETsoftware is used in this project to implement both controllers.
- **Real Time Data Monitoring of PV Solar Cell Using DAQ:** The data acquisition board (DAQ) along with the PROTEUS AND VB.NETsoftware is used in this project for monitoring photo voltaic cells in homes as well as industries. DAQ board acquires the various parameters of solar cells and sends to PROTEUS AND VB.NETsoftware where we can monitor those values in GUI.
- **Direct Torque Control of BLDC Motor :** In this project direct torque control technique for controlling the speed of brushless DC motors is simulated in order to attain faster response of torque. This project uses PROTEUS AND VB.NETsoftware to develop the fuzzy logic controller for this technique.
- **Simulation of Inverter Fed Induction Motor Drive with PROTEUS AND VB.NET:** This project simulates the mathematical model of inverter fed induction motor using PROTEUS AND VB.NETsoftware. This simulation is helpful for analysing the dynamic characteristics of motor.
- **Distribution Transformer Fuse Failure Detection and Information Passing System:** The main objective of this project is to detect the failure of fuse that employed at the distribution transformer. This failure information is intimated to the concerned person through GSM module. In this project PROTEUS AND VB.NETbased PIC microcontroller is used along with the voltage sensor to detect fuse failure.
- **Wireless Design for Power Theft Monitoring:** This project aims to implement anti-power theft monitoring system using wireless sensor networks. This wireless sensor device is a power metering device of the customer which sends the load information periodically to the controlling station. The controlling station aggregates all the user data and automatically detects the power theft user by comparing extra load consumed than that of actual value.
- **Implementation of Frequency Locked Loop DC Motor Drive System:** This project implements the PROTEUS AND VB.NETbased frequency locked loop control algorithm for controlling the speed of DC motor. This project describes capability to maintain the speed stabilisation and regulation in order to recover the rated speed from load change.

- **Power Quality Monitoring and Power Measurements by using Virtual Instrumentation:** This proposed project describes the design of power quality measurement and monitoring in PROTEUS AND VB.NETenvironment. Various power quality parameters of voltage, current and power are measured and analyzed in this project using virtual instrumentation techniques.

Electrical Projects using Arduino

- **Data Logger for Solar:** The aim of this project is to measure and store the solar energy parameters using Arduino controller. Sensors like LDR, temperature sensor, current sensor and voltage sensor monitors the respective parameters of the solar panel. The acquired data from Arduino controller is transferred to the PC where it is logged.
- **Implementation of an Omni Wheels Robot:** This project builds Omni-directional robot which can move in different directions. Arduino controller with motor driver circuit controls the motion of the robot in different angles.
- **Differential Transformer Protection using Arduino:** This project implements the Arduino based differential protection for the transformer in order to protect the transformer from various electrical faults. In this, current transformers along with Arduino controller measure the differential current and if any fault occurs, it operates the relay.
- **Design Automatic Meter Reading (AMR) Data Logger with Xbee:** This project demonstrates the design of Automatic Meter Reading (AMR) data logger to read, collect and store the energy consumption of various consumers remotely using Zigbee technology. This design is implemented using Arduino controller and Zigbee communication module.

PLC Based Electrical Projects

- **Control of Boiler Operation using PLC-SCADA:** This project achieves the automatic control operation of boiler using PLC and SCADA. Boiler temperature and pressure are continuously monitored using temperature and pressure sensor respectively. The PLC acquires these sensor values and depends on the control algorithm, it controls the actuators. SCADA system enables the remote monitoring and control of boiler operation.
- **PLC Based Intelligent Traffic Control System:** This project aims to implement an intelligent based traffic control system using sensors and PLC. Photoelectric sensors detect the presence of vehicles on various junctions of the road and give the signals to the PLC. Based on the program in the PLC, it controls the traffic signals.
- **PLC Based Robotic Arm Control System:** This project implements the robotic ARM control system using PLC for precise control. Programmable logic controller (PLC) is programmed to perform different ARM movements by giving the corresponding signals to motor driver circuit.

- **Implementation of PLC Based Elevator Control System:** This project describes the implementation of elevator control system using PLC. Hall Effect sensor detects the position of the elevator and gives the corresponding signal to the PLC. According to the program in the PLC, it generates the control signals to the DC motor to control the movements of elevator.
- **Design of PLC and SCADA Based Control Panel for Continuous Monitoring of 3-Phase Induction Motor:** In this, an efficient and versatile tool for controlling the induction motor is proposed which control and monitors the speed with high accuracy. A variable Frequency Drive (VFD) based PLC controls the speed of the motor at better regulation. SCADA system for this project is implemented for remote monitoring and control of the speed.
- **PLC Based PID Speed Control System:** This project deals with the design of intelligent drive controller for AC motor by implementing PID (Proportional-Integral-Derivative) control scheme. This project achieves the precise control by exactly tuning the PID parameters using Ziegler-Nichols methods.
- **PLC Based Induction Motor Starting and Protection:** In this project, slip ring induction motor starting, protection and speed control schemes are implemented using programmable Logic controller (PLC). Rotor resistance control method is implemented as starting method while over voltages, over current and over temperature protection schemes are implemented to protect the IM.
- **PLC Based Object Sorting Automation**
- This paper explains about automatic object sorting system that sorts the objects depending on the weight and height which is controlled by the programmable logic controller. This is a low cost ,low maintenance and long durability system.
- **Programmable Switching Control using 8051 Microcontroller :**This project develops system that functions similar to the PLC using 8051 microcontroller. Sequential switching of loads is achieved in this project.

Miscellenous

- **ARM 7 Based Controller Area Network for Accident Avoidance in Automobiles:**The project shows an accident avoidance system. Here this system measures various parameters like speed, distance from other cars, alcohol presence in the cars etc. It sends signal if any of the parameters were changed. This also detects the accident using bump sensor and sends an SMS using GSM.
- **Route Guidance For Blind People Using GSM & GPS Modems:**This paper presents a smart electronic aid for blind people. The proposed system uses and ultrasonic sensor for detecting the obstacles in the path.GSM, GPS modules were used to locate the blind.
- **Brushless DC Motor Design for Electric Traction System:** BLDC motor is used in residential ,commercial and aerospace systems due to its various features. This paper explains the designing of BLDC motor drive.
- **Switched Reluctance Motor for Hybrid Electric Vehicle:**Switched reluctance motor is a type of stepper motor that runs by reluctance torque. It is gaining popularity in application of hybrid electric vehicle. The present project aims at

reducing the torque and speed ripple to make it suitable for hybrid electric vehicle using non linear controller.

- **Micro Controller Based Ac Power Controller:** A single phase PWM inverter is designed in this project. It has features like simple, low cost, compatible size etc.
- **Design and Simulation of Novel Integral Switching Cycle Control for Heating Load:**There are two methods employed for solid state power controls. One is Phase control switching and the other is integral cycle control switching . These two have their own disadvantages. To overcome this a new method called integral switching control is proposed in this paper.
- **ATM Terminal Security using Fingerprint Recognition:**ATM's provide convenient banking to the customer. But these days there are security issues in using ATM's.This paper develops a method to overcome this security issue and provides more security to the customer banking. This system uses a finger print scanner for authentication of the customer.
- **Development of Anti rigging Voting System Using Finger Print:**Voting is practised on electronic machines now a days. This project provides a voting machine that is reliable and secured. It uses finger print scanner to provide unique identity to every citizen.
- **Fault Acknowledgement System for UPS using GSM:** This paper shows the designing of an UPS system that acknowledges faults in the System using GSM technology.
- **Touch Screen GLCD based Digital Devices Control System:**This project replaces the mobile devices that operate home appliances by touch screens. A touch screen based digital control of devices is shown here.
- **Real-time Posture and Activity Recognition by Smart Shoe:**In this paper, we discuss a method for performing automatic posture classification using Artificial Neural Networks operating with fixed point precision arithmetic. The computational time is optimised through application of forward feature selection for determination of the most significant predictors.
- **Load Frequency Control – An ELC based approach:**This project shows load frequency control of a micro grid control system. This system is tested in mat lab/simulink.
- **Internet of Things for Smart Classrooms:**This project uses internet of things for smart classrooms where the time of students and the teacher g were reduced in maintaining the queues and listening to the instructions.
- **E- Health Care Computing for better Health Monitoring :** This project shows an automatic health care system for monitoring the health of the patients. This system uses some wearable sensors and portable wireless devices. Condition of the patient is transmitted to the doctor and related people using GSM or Bluetooth.
- **Renewable energy based interleaved boost converter:** Renewable energy consumption is increasing day by day due to decrease in non renewable energy sources. Among them solar energy is the best source. Boost converters are required to increase the output. Here interleaved converter is such a converter that has a number of converters connected in parallel. It has very good advantages compared to others in efficiency, reliability etc.

- **Design and Construction of 33/11 KV Line & Substation:**This project shows the construction of 33/11kv line and substation.
- **Active Power Control of Grid-Connected Distributed Generation Unit:**Distributed generation using non conventional energy sources is increased .This paper shows simple and efficient a control technique to get desired power from DG to grid.
- **Three Phase Rectifier with Power Factor Correction Controller:**This paper shows power factor correction of a three phase rectifier using boost converter. Average current control technique is used in this .Results are verified in mat lab.
- **Remote Surgical Robotics: Control Systems and Human-Machine Interfacing:**Here is the remote surgical robot. The main aim of this robot is to detect the surface of gelatin brain using robot.
- **Simulation Of Three Phase Multilevel Inverter With Reduced Number Of Switches:**Multi level inverters can be used in many applications because of their flexibility, easy control, less cost. Though it has many advantages this multi level inverter (MLI) has number of power electronic components. Increased number of switches increases over all loss as switching losses increases. This paper mainly focuses on decreasing the number of switches in MLI.
- **Hybrid Solar Wind Charger**:Generally UPS uses supply from the main for its functions. This paper shows a UPS system that uses solar and wind power instead of mains supply as there is energy crisis.
- **Cyber Security in the Smart Grid:**The smart grid is revolutionary in the existing power grid. The smart grid system enhances the future power system. Due to number of inter connected devices, there is a problem in cyber security. This paper focuses on the cyber security in this smart grid.
- **Speed Control of Switched Reluctance Motor Using ANFIS and GA:**Switched reluctance motors are best for direct drive applications. But it has some draw backs like high torque ripple, acoustic noise, speed oscillations. This paper proposes a method for using ANFIS and GA u for Drive control.
- **Stability Analysis Using Power System Stabilizer:** This paper describes the operating performance of Power System Stabilizer (PSS) during different power system case studies. The functional blocks of PSS are developed in Simulink and simulation is carried out. The damping oscillation variation of PSS for the various power system conditions (light, nominal & high load and fault) is carried out and the voltage and reactive power variations are illustrated.
- **Sensor Fault Detection in Induction Motor Using Fuzzy Logic Controller with D-Q Transformation:**This paper proposes a method for speed and fault detection in current sensor. It provides isolation to protect the motor from speed and current sensor failures.
- **Intelligent Control Technique Based Zeta Converter Fed PMDC Motor:** This paper deals with the implementation of fuzzy-PI based Zeta converter fed PMDC motor with high efficiency, less total harmonic distortion and good power factor adjustment.
- **Captive Liquid Power SYSTEM:**The most known process for generating electricity from water is by storing the water in dams. This paper explains an

extension to this method. Initially water is held in captive in an enclosure. Then it is raised to high potential energy using wind or water.

- **Power System Design for an Electric Car:** This project shows the power generation and distribution system of electric car. This shows converting a gas powered car into battery powered and uses solar panels to recharge the battery.
- **Star Delta Starter using Adjustable Electronic Timer for Low power Induction Motor:** This project aims to provide cost-effective star delta starter for low power three phase induction motor in order to provide low voltage start. This project uses 555 timer in mono-stable mode which drives GTO (Gate Turn-Off) thyristors driver circuit so as to change the mains three phase supply from start to delta.
- **Programmable Switching Control for Industrial Automation in Repetitive Nature of Work:** This project implements the programmable load switching control using microcontroller for applications where repetition of nature of work involved. This project operates in three modes namely manual mode, auto mode and set mode. In manual mode, various loads are controlled by the input given by user by switches or remotely through GSM. In auto mode, loads are switched at regular default timings while in set mode loads are controlled based on the timings set by the user.
- **Automatic Induction Motor Starter with Delay Using Microcontroller:** This projects implements an automatic induction motor starter using microcontroller which works same as that of DOL starter. The microcontroller continuously monitors the three phases of input supply for over voltage and single phasing conditions and accordingly switches the relays to switch the motor.
- **Microcontroller Based Speed Control of Three Phase Induction Motor using V/F Method:** This proposed project implements the microcontroller based hardware design to control the speed of three phase induction motor using V/F method. By receiving the feedback signal of speed, microcontroller will give PWM signals to the IGBT inverter bridge in order to drive the motor at desired speeds.
- **Power Factor Correction Using PIC Microcontroller:** This project measures the power factor of the load using PIC microcontroller along with zero voltage and zero current crossing detector circuits. According to the set limits for leading and lagging power factors, microcontroller switches set of capacitors to improve the power factor.
- **Underground Cable Fault Distance Locator:** This project demonstrates a fault locating model which determines the fault that occurs in underground cables using microcontroller. This design uses the concept of Ohms law for detecting the change in voltage across the cable whenever fault or short circuit takes place in the cable.
- **Three Phase Fault Analysis with Auto Reset for Temporary Fault and Trip for Permanent Fault:** The objective of this project is to develop an automatic tripping mechanism for both permanent as well as temporary faults that are takes place in three phase system. This project uses 555 timer as a main controller which resumes the load when a temporary fault occurs in three phase system while it makes the load to be remain in tripping mode during permanent fault.

- **Automated Wireless Energy Meter Reading System using GSM:** This project implements an Automatic Metering Reading (AMR) System for energy meter without any human intervention for generating the electricity bill. This project uses ARM controller for measuring electricity consumption a given period of time. Further, this billing information is sends to utility companies as well as to the customers using GSM module.
- **BLDC Motor Speed Control with RPM Display:** In this project the speed a BLDC motor is controlled precisely using microcontroller unit along with the hall position sensor. The microcontroller is programmed in such a way that it compares the actual speed (get from hall sensor) with desired speed and accordingly genrates the PWM signals to the motor driver unit.
- **PC Based Electrical Load Control:** This project uses a personal computer to control various electrical appliances in homes by using microcontroller. Microcontroller acts as a data acquisition and control device which forms the bridge between PC and electrical appliances. Microcontroller receives the command signals from PC and appropriately controls the respective load.
- **Wireless Auto Power Trip during Gas Leakage:** This project aims to reduce the fire accidents that are takes place due to gas leakage in the presence electricity. In this project gas sensor monitors the gas leakage which gives the input to microcontroller when it senses the gas leak. Then the microcontroller activates the tripping mechanism to shutdown the power supply. RF module used in this project to transfer the information remotely to the alarm circuit and tripping circuit.
- **Solar Powered Auto irrigation System:** The main aim of this project is to implement solar based automatic irrigation system for switching the pumping motor depends on the signal from soil moisture sensor. By receiving the signals from the sensor, microcontroller performs the switching of pump using relay.
- **Zigbee Based Home Automation System:** The aim of this project is to implement a home automation system to control the home appliances remotely using Zigbee technology. Sensors like temperature, LDR and gas detection sensors connected to the microcontroller unit continuously monitors the weather parameters. The home appliances are automatically controlled when these parameters exceeds their set limits. Remote monitoring and control is also facilitated with Zigbee communication.
- **Photovoltaic Panels Monitoring and Solar Energy Measurement System:** This project monitors the parameters of photovoltaic cells and measures the solar energy generated. A set of sensors along with microcontroller unit continuously monitors the solar energy and also allows the user to access the remote monitoring of these parameters.
- **Smoke and LPG Gas Detection Robot with Wireless Control:** The objective of this project is to design an RF robotic vehicle to detect the LPG and smoke for underground mining applications. The RF communication module attached with robot sends the sensed data to the central monitoring area.
- **Remote Monitoring System for Three-Phase Distribution Transformer using Zigbee :** In this project, parameters of a three phase distribution transformer are monitored and controlled remotely using Zigbee communication. Transformer parameter like temperature of the oil, oil level, voltage, current, etc are

continuously monitored using various sensors. The sensor data is transmitted to the central controller using Zigbee module.

- **Solar Powered LED Street Light with Auto Intensity Control:** In this project, an energy efficient method for street lights is implemented to control the LED street lights. The power generated by the solar panels is stored in batteries during the day time and at the night this energy is supplied to the street lights. As the traffic on roads decreases from peak hours to late nights, this projects controls intensity of street lights based on timings.
- **Wireless Power Transfer System using Magnetic Resonant Coupling:** This project transfers the electric power from one circuit to the other without using any conducting medium between them. In this project, magnetic resonant coupling method is implemented to transfer the power from the source to a load.
- **Wireless DC Motor Control using DTMF Technology:** The idea of this project is to perform wireless speed control of a DC motor from a mobile phone using DTMF technology. DTMF decoder receives the DTMF signals from the remote mobile to control the speed of a DC motor.
- **Cable Inspection Robot using Microcontroller and GPS Tracker:** This project implements the underground cable fault detecting mobile robot that can navigate along the underground cable. This inspects fire accidents, obstacles, supply failures, presence of harmful gases, etc of the cable. GPS module facilitates finding of fault location and this information is further transferred to the main controller through the communication module.
- **Induction Motor Speed Control Using Android Application:** The objective of this project is to control the speed of a single phase induction motor from Android mobile application. Bluetooth module attached to the control circuit receives the control commands from user mobile. Microcontroller receives these signals and controls the motor speed by varying the triggering pulses to the TRIAC.
- **Wireless Automatic Railway Gate Controlling cum Traffic Signaling:** In this project, the level crossing gate as well as railway level crossing traffic lights are controlled using microcontroller unit along with IR sensors. IR sensors at particular positions on the track, gives the input to the microcontroller about the train arrival and departure information. According to these signals microcontroller controls gate operation as well as traffic lights.
- **Wireless Meter with Theft Monitoring and Control System:** This project aims provide the automatic energy meter reading and to prevent practice of power theft. In this project, the overloading resulted from power theft is detected and this information is conveyed to the authorities through communication network.
- **Patient Monitoring System using GSM:** In this project, human body vital parameters like pulse rate, body temperature and saline level are continuously monitored by various sensors using ARM microcontroller. Further, these monitored values will be sent to the remote mobile using GSM modem.
- **Design of a Low-Cost Contact-Less Digital Tachometer :** This project measures the RPM or speed of a moving object (say motor) without any direct contact with it. The microcontroller receives the IR sensor data, processes it and converts it into RPM. RF communication module transfers this data to remote PC where it is recorded and stored.

- **A Hybrid Wind-Solar Energy System:** The main aim of this project is to switch the loads to either wind or solar energy source depending on the maximum power generated. This circuit also uses MPPT system for maximum power generation.
- **Smart Phone Based Home Appliance Control :** This project uses the Smartphone to control the various household appliances such as fans, lights, kitchen appliances, etc. The microcontroller unit along with Bluetooth module receives the control signals from user Smartphone and then controls the home appliances.
- Automated Water Head Controller for Domestic Application**:** The aim of this project is to design a water level sensing device using ultrasonic sensor which measures the water level without any direct contact with water. Ultrasonic sensor gives the sensing information to the ATmega controller which further processes the data and indicates the level information.
- **Electric Power Management using Zigbee Wireless Sensor Network:** The main aim of this project is to implement a system which differentiates and controls the devices in a network on the basis of power consumption of individual appliance. Zigbee communication enables the monitoring the various load consumptions and accordingly controls the load depends on the availability of power.
- **Ultra Fast Acting Electronic Circuit Breaker:** This project demonstrates the ultra fast electronic circuit breaker that isolates the load circuit from mains supply at extreme faster rate as compared with bimetallic strip based circuit breaker. PIC microcontroller with current sensor unit detects short circuit or overload and appropriately turns the MOSFET in order to switch the load.
- **Design and Development of Microcontroller Based Solar Charge Controller:** This project implements the solar charge controller circuit which charges the battery with amount of charge coming from solar panel. This circuit also regulates voltage to protect the battery from overvoltage and do not allow the battery to go into deep discharge.
- **Interactive Voice Response (IVR) System for Educational Institution:**This project aims to build Interactive Voice Response (IVR) system for educational institution based on DTMF technology. Using this system, user can access the information stored in the database by pressing corresponding key on his/her mobile. DTMF decoder with microcontroller unit achieves this operation.
- **Solar Tracking Solar Panel Using ATMEGA8 Controller:** The purpose of this project is to generate the maximum solar energy from the PV panel depends on intensity detected by Light Dependant Resistors. Microcontroller adjusts the direction of solar panel towards the sun based on the signals from LDR.
- **Automated Toll Tax Collection Using GSM and RFID:** This project implements the automatic toll tax collection by facilitating advance registering through SMS. Microcontroller unit with GSM modem receives the request from vehicle owners and sends the acknowledgement including the password to user mobile. At the time vehicle reaching the toll plaza, microcontroller asks for password, upon authentication it deducts the amount from RFID attached to the vehicle automatically, and then opens the gate.

- **Transient Stability Analysis of Power System Using MATLAB:** The objective of the project is to design the stability analysis of power system as simulation model in simulink/MATLAB. For the assessment of transient stability, a multi-machine system is implemented in this project.
- **Data Logger and Remote Monitoring System for Multiple Parameter Measurement Applications:** This project aims to build an embedded system that performs data logging and remote monitoring of various parameters. The environmental parameters like temperature and humidity are monitored with sensors. AVR microcontroller acquires the sensor data and makes a record of it in EEPROM. This project also facilitates to monitor the acquired or logged data through GSM module.
- **Touch Screen Based Wheelchair System:** This project controls the direction and speed of DC motors which are attached to the wheelchair so that it moves in desired direction. This ARM controller with touch screen enabled design is very helpful for physically disabled persons to control their wheelchair.
- **Simulation Model of Hydro Power Plant Using MATLAB/Simulink:** This project implements the simulation model of hydro power plant with hydro turbine and synchronous generator on MATLAB platform. This work is useful for conducting operating tests as well as for analyzing the results.
- **Battery Monitoring System using Microcontroller:** This project implements a battery monitoring system for UPS, telephone communication and hybrid electrical vehicle applications. Battery parameters like voltage and temperature continuously monitored using slave microcontroller unit while master controller gathers all the batteries information.
- **Design and Development of a Parabolic Dish Solar Water Heater:** The main aim of this project is to develop the parabolic dish solar water heater for water heating applications. In this embedded electronic circuit is implemented for the parabolic dish to track the sun continuously in order achieve high efficiency.
- **Voice Operated Robotic Vehicle:** The main objective of this project is to control the movements of robotic vehicle through voice commands of the user. The Speech recognition module along with RF transmitter sends the voice signals to remote robot. RF receiver in the robot correspondingly receives the signals and controls the robot movements.
- **Design and Simulation of Fuzzy Controlled SVC for Transmission Line:** In this project Static VAR Compensator scheme is implemented for transmission line based on fuzzy logic. This system controls the reactive power by implementing the firing angle control scheme in MATLAB.
- **Maximum Power Point Tracking for Low Power Photovoltaic Solar Panels:** This project describes the enhancement of power generated by the solar panel using MPPT algorithm. This MPPT (Maximum Power Point Algorithm) implemented on microcontroller in order to maximize the output.
- **Android Mobile Phone Controlled Bluetooth Robot using 8051 Microcontroller:** This project involves in the designing of Android mobile application controlled robot using microcontroller. Android application based control commands received by Bluetooth module enables the microcontroller to control the DC motor speed and direction.

- **Street Light Glow on Detecting Vehicle Movement using Sensor :** The main aim of this project is to implement an energy efficient street lighting system which controls the street lights based on the movement of vehicles on the road. Microcontroller with set of IR sensor detects the vehicle movement and with this sensed data microcontroller switches the street lights.
- **Footstep Power Generation using Piezoelectric Sensors:** This proposed system presents the usage of piezoelectric sensors to generate the power from human foot pressure. The power generated from the piezoelectric sensors is stored in the battery and inverter converts the battery voltage (DC) to load operating voltage (AC). Microcontroller unit measures the power generated by these sensors and accordingly displays the amount of power generated.
- **Speed Synchronization of Multiple Motors using Microcontroller:** This project uses RF communication to synchronize the multiple motors in an industry. In this, all the motors are equipped with RF transceiver module along with microcontroller unit. This arrangement causes to change the speed of remaining motors if speed of the one motor is changed.
- **Head Movements based Wireless Device Switching :** The main aim of this project is to switch the electrical loads or devices based on the head movements of a person using MEMS sensor. This type of project is helpful for physically challenged and paralyzed persons.
- **Bidirectional Rotation of an Induction Motor with a Remote Control Device :** This project aims to control the speed and direction of induction motor using TV remote. IR sensors and microcontroller unit are used in this project to receive the signals from TV remote. A relay driver is connected to the microcontroller unit to change the direction of motor.
- **Hall Effect Sensor Based Portable Tachometer for RPM Measurement:** This project deals with the implementation of portable, accurate and contactless tachometer using linear Hall Effect sensor. This sensor produces the number of pulses per revolution which are given as input to the microcontroller unit. Microcontroller measures these pulses per minute in order to give the RPM display.
- **Wireless Load Control Device using GSM Module:** The intention of designing this project is to make more convenient and time saving method to control the loads from remote places. This project uses GSM module with microcontroller unit to receive user control commands to switch ON/OFF the particular load.
- **Design and Implementation of IGBT Based Single Phase AC Drive using PIC 18F452:** This project implements single phase AC drive to control the speed of induction using PIC microcontroller. A constant voltage per hertz technique is implemented in this project by generating PWM pulses to drive the IGBTs.
- **On-Line Monitoring and Analysis of Faults in Transmission and Distribution Lines using GSM:** This project uses the GSM technology to convey the fault information of transmission and distribution lines to utility department. In this project microcontroller unit along with sensors detects the faults that are takes place in power lines.
- **Wireless Temperature Data logger Using Zigbee:** This project develops a temperature data logger system using microcontroller and Zigbee communication

module. A temperature sensor with ADC enables the continuous acquiring of temperature data at the field side where Zigbee transmitter module is employed. At the receiver side, Zigbee receiver with microcontroller unit receives and logs the temperature data.

- **Microcontroller Based Active and Reactive Power Measurement:** This design aims to measure and indicate the active and reactive power of an electrical system using PIC microcontroller. With the help of input from zero crossing detector circuit, PIC microcontroller calculates these two parameters and stores the data in EEPROM.
- **Simulation of Extra High Voltage Long Transmission Lines:** In this project, simulation of EHV long transmission lines is performed in order to analyze various parameters and circuit condition under normal working conditions.
- **Microcontroller Based Modified SEPIC Converter for Driving Lamp with Power Factor Correction:** This project presents a topology of Single-Ended Primary Inductance Converter (SEPIC) with half bridge inverter to feed the electrode less fluorescent lamp. This project improves the power factor and reduces the total harmonic distortion.
- **Substation Monitoring and Control using Zigbee:** The objective of this project is to develop the remote monitoring and control system for substation using Zigbee module. Various parameters of the distribution transformer in substation are continuously monitored using Zigbee module. Zigbee receiver at the main station acquires these parameters and takes action accordingly.
- **A Transformer-less Voltage Quadrupler DC-DC Converter with Low Switch Voltage Stress:** In this project implements the interleaved quadrupler voltage DC-DC converter to achieve high voltage gain and to reduce current ripples and conduction losses. This design uses three stage interleaved boost converter with voltage quadruoler circuits.
- **Power System Stability Enhancement by Simultaneous AC-DC Power Transmission :** The main aim of this project is to present the simulation of simultaneous AC-DC power transmission by superimposing DC on AC. This project replaces the parallel AC-DC transmission by converting double circuit AC into composite AC-DC transmission line. This work is simulated in MATLAB platform.
- **Analysis of DC-DC Converters for Renewable Energy System:** This project analyses the selection of DC-DC converter with transformer to produce the desirable characteristics for electrolyser applications using MATLAB. In this, ripple-free regulated output is produced by the DC-DC converter.
- **Simulation and Comparison of SPWM and SVPWM Control for Three Phase Inverter:** This project deals with the modeling of Space Vector Pulse Width Modulation (SVPWM) technique which effectively uses the DC bus voltage and produce the less harmonic content as compared with Sinusoidal PWM technique. This model is simulated using Simulink/MATLAB and results are compared with SPWM technique.
- **Modeling of Induction Motor and Fault Analysis:** In this work, induction machine model is implemented in Simulink/MATLAB to analyze the motor

performance and for effectively diagnosing the rotor faults. This analysis is carried out for single, double and three bar broken rotor faults.

- **Improved AC-AC Converter For Induction Heating Applications:** This MATLAB based project simulates the single-switch parallel resonant converter (improved AC to AC converter) to produce high frequency currents for induction heating applications. The analyzed results are compared with existing half and full bridge inverter topologies.
- **Solar Powered Mobile Charger Using Buck Converter:** This project aims to build solar powered mobile charger circuit using synchronous buck converter. The DC power obtained from the PV array is synthesized and modulated using this buck converter in order to meet the load requirements.
- **Modeling & Simulation of Doubly-Fed Induction Generator for Variable Speed Wind Energy Conversion Systems :** The objective of this project is to model and simulate the double-fed induction generator in the MATLAB Simulink environment. Based on the vectorized dynamic approach, DFIG model is described in this project.
- **Automation of Coal Handling Plant of a Power Generation Unit using PIC Microcontroller:** This project demonstrates the automation of coal handling plant of a thermal power generation unit using proximity sensors and PIC microcontroller. Based on proximity sensors signal, microcontroller controls the speed of stepper motor which further drives the conveyor belt. This also implements the interlock facility in motors to provide the safety.
- **Speed Control of Universal Motor Using Microcontroller:** A TRIAC and microcontroller based circuit is implemented in this project to control the speed of universal motor. Microcontroller provides the phase angle control of TRIAC which varies the power through universal motor.
- **Conductor Temperature and Sag Monitoring System using Zigbee and GSM :** This project aims to measure and monitor the sag and temperature of high voltage overhead conductor using sensors without making any interruption to the continuous power supply. These sensed parameter values are send to the central monitoring station using Zigbee module and also to the authorized persons using GSM module.
- **Implementation of Programmable Automatic Voltage Regulator:** The main aim of this project is to implement Programmable Automatic Voltage Regulator (PAVR) using microcontroller. This project achieves the stabilization of output voltage with the deviation of input voltage from 100 to 340 volts.
- **GSM Based Automated Embedded System for Monitoring and Controlling of Smart Grid:** This project demonstrates the remote monitoring of smart grid parameters using GSM module. Electrical parameters like voltage, current, power and frequency are acquired by the data acquisition device. These real time values are periodically send to authorized persons through GSM network.
- **Measurement of Air Breakdown Voltage and Electric Field using Standard Sphere Gap Method:** In this project, air breakdown voltages and electric field of the high voltage equipment are measured by using sphere gap method for the measurement of high voltages.

- **Calculation and Analysis of Transformer Inrush Current of Transformer:** In this work, analytical formulas are implemented to calculate the inrush current in transformer. And then the effect of switching angle variation, remnant flux and energizing circuit impedances on inrush current characteristics are analyzed using MATLAB.
- **Inductance Capacitance and Frequency (LCF) Meter :** The main aim of this project is to implement a portable instrument to measure inductance, capacitance and frequency. This two probe device is implemented using PIC microcontroller with additional circuitry for accurately measuring and displaying these parameters.
- **Circuit Breaker Based Feeder Pillar with Over current and Earth-Fault Protection :** This project aims to design and simulate the 415V AC feeder pillar with earth fault, overload and over current protection using earth leakage CB, three phase overload relay and sequence relay. This design and simulation is performed on MATLAB platform.
- **A Domestic Robot for Security Systems Using Zigbee Technology:** This project aims to build a robotic vehicle that can enhance the security at homes. This project achieves the door locking system with active input from ultrasonic sensor and PIR sensors. A camera attached to this system enables the remote monitoring using Zigbee technology

Solar Projects

1. **Design of Solar Inverter Circuit for Homes**: The idea of this project is to aid hobbyist to design their own solar inverter to convert the power obtained (DC) from solar panel to operate the home appliances (AC Power) by using fewer components.
2. **Solar Tracking Solar Panel Using ATMEGA8 Controller**: Based on the light intensity detected by Light Dependant Resistors (LDR's), this project automatically adjusts the solar panel in the direction of maximum light from the sun using AVR ATMEGA controller.To buy this project
3. **Implementation of Solar Battery Charger Circuit:** The energy generated from the solar panel must charge battery in an appropriate way. So this implemented circuit regulates voltage and current to the battery with overvoltage cutoff facility.

Solar Arduino Projects

1. **Solar Arduino Snake**: This is fun project ,which utilises arduino board and solar panel.Step wise procedure is shown here for construction of snake.
2. **Telemetry with Solar Cell**: Telemetry with solar cells is being expalined here.It uses zigbee modules and arduino for transmitting and receiving the data.
3. **Arduino Solar Charge Controller**: Arduino is the main heart of the charge controller.It senses the voltages from solar panel and the battery. Accordingly it charges the battery and control the load.
4. **Development of Dual-Axis Solar Tracking using Arduino with Lab VIEW**: This project aims to track the sun and maximize the output produced by a solar panel using Arduino uno controller and LabVIEW HMI. This uses a set of light depend resistors to detect the maximum light source location.
5. **Flashlight Controlled Solar Powered Robot using Arduino**: This project implements a light gradient sensitive robotic vehicle which is powered by solar energy. This project can be useful for controlling the robot based on flash light sensing by using Arduino controller.

Solar Wireless Projects

1. **Wireless Solar Charger**: This project shows a wireless solar charger that can charge the mobile phones.
2. **Solar Based Advanced Water Quality Monitoring System Using Wireless Sensor Network**: This project monitors the quality of water using solar powered underwater wireless sensor network technology. The parameters like pH, oxygen level and turbidity at every node (powered by solar panel) of a wireless sensor network is sent to the base station.
3. **Forest Fire Detection Using Optimized Solar Powered Wireless Sensor Networks**: There is no availability of electricity in forests. Therefore, this projects implements solar powered Zigbee wireless sensor network with appropriate microcontroller based circuit to detect the forest fires.
4. **Solar Based Wireless Power Transfer**: This project presents the transfer of power wirelessly using a renewable energy resource i.e., solar power. Solar panels convert the light energy into electrical energy which will be stored in the batteries. Further this energy is transmitted to the receiving end in the form of electromagnetic waves.

Solar Battery Projects

1. **Solar Lipoly Charger**:This project shows the charging of a lithium polymer battery uisng a 5v or 6v solar panel.
2. **Effective Battery Charging System by Solar Energy using C Programming and Microcontroller**: This project shows the battery charging system which regulates the electricity flowing between storage battery and charging output.
3. **Solar Powered Fans**: This article shows the conversion of battery powered fans into solar powere fans.
4. **Solar Lantern**: This latern utilises solar energy to charge NiMH battery which can lit up 1 watt white LED in the night.
5. **Battery Charger For Wind And Solar Energy Conversion Conversion System Using Buck Converter**: The present paper proposes a basic method of improving the charging of battery banks.
6. **FPGA Based Battery Energy Storage System Using Solar Cells**: This paper explains a FPGA based battery energy storing system using solar cells.
7. **Solar Battery Charging Indicator**: This article shows the circuit that monitors the solar battery charging.It doesnot tell the state of solar panel.
8. **Solar Window Charger Circuit**: The window charger proposed here can be used to charge a LI ion battery.It can stick to glass window by placing the panel outside the window and a usb cable can be used to charge the battery.
9. **DIY Solar Boost Converter with MPPT Charge Controller**: Here is a simple solar boost converter & voltage limiter that charges a 12V battery from a 6V solar panel.
10. **Design of Simple Solar Charger Circuit for Mobiles**: This project aims to design a simple solar charger for mobiles by utilizing the solar energy from the sun. It uses simple regulator circuit with basic electronic components in order to supply the constant voltage to the battery.
11. **Solar Charging Handbag**: This project allows to charge electronic gadgets like mobile phones, ipods, etc. by a solar battery charger which is attached to the handbag or backpack.
12. **Lead-Acid-Battery Regulator For Solar Panel Systems**: This simple project design develops a circuit which regulates the power supplied from solar collector in order to divert the surplus energy in the event of much sunshine.

Solar LED Projects

1. **Solar-Powered Home Lighting System**: This system shows an efficient way of utilising the solar power and the LED lighting system.
2. **Solar PV Powered Energy Efficient LED Lighting System for a Class Room**: This paper shows a lighting system using solar PV energy.
3. **Solar LED Road Marker**: Roads are marked with reflective road-stud for safety.However on busy roads are harder to see. The road maker proposed here has automatic switching function, realized using the combination of a LED driver circuitry, re-chargeable cell, and small solar panel.

Solar Inverter Projects

1. **Solar inverter using sg3525**: Construction of solar inverter using pulse width controller sg3525 is explained in this project.
2. **Portable Solar Power Inverter**: A portable solar powered inverter that keeps away darkness all the time was proposed here.
3. **Quasi-Z-Source Solar Inverter Fed BLDC Drive**: A solar powered quasi Z-source inverter with PIC controlled brushless DC motor is implemented by this project which also includes MPPT controller to produce maximum energy from solar panel.

Solar IoT Projects

1. **Solar Tracker with Live Data Feed – Windows IoT**: This project is a solar tracker with live data feed which is powered by windows IOT running on raspberry pi-2.
2. **Solar Panel Dual Management System**: This project proposes an Iot based solar panel management system.Mainly the dust accumalation on the solar panel will reduce its efficiency,theft of soalr panels is also increasing these days.These two aspects were considered in this project.

Solar Microcontroller Projects

1. **Maximum Power Point Tracking for Low Power Photovoltaic Solar Panels**: The main objective of this project is to maximize the output produced by a solar panel by implementing MPPT (Maximum Power Point Algorithm) on a microcontroller unit.
2. **Solar Energy Measurement System**: The solar cell parameters like voltage and currents are constantly monitored and measured by this type of project design. Current and voltage sensors with appropriate ADCs are interfaced to the microcontroller unit in order to measure the solar energy.
3. **PIC Microcontroller Based Solar Water Heating System**: This design describes the implementation of solar energy exploitation system for solar water heating system by using PIC microcontroller based circuit.

Other Projects

1. **SCR Based SSS Solar Charge Control**:An SCR based solar charger circuit is proposed in this circuit.
2. **Off Grid Solar System**:The off grid solar system shows the installation of solar panel system at home.
3. **Solar Radio**:This is the simple project where the radio is powered by a solar panel.
4. **Solar Powered Air Conditioning Unit**:Here is the project that uses solar power for air conditioning unit.
5. **How to Make A Solar iPod/iPhone Charger**:This project shows the solar charger that can charge iPod/iPhone.This is a portable charger
6. **Solar Plane**: This DIY article shows the Construction of a plane that uses solar energy.
7. **Design and Cost Analysis of PV System Using Nano Solar Cell**: This paper shows the designing of PV system using nano solar cells.As the generation of electricity from light is

very costly ,this paper also presents the cost analysis of PV system using nano technology.

8. **Fabrication of Embedded System for Dust Removal on Solar Photo Voltaic Cell**:Many factors effect the solar panel from producing maximum energy.One of such factors I shadowing or dust on the panel.This project shows the designing of an embedded system for for dust removal on solar panel.
9. **Soil Erosion Prevention by Sustainable Phytoremediation Process using Solar Irrigation and Fertilisation System**: This paper proposes a system which monitors the PH level and soil moisture using soalr panel as power source.Thus it protects the soil errosion.
10. **Electric Energy Management and Engineering in Solar Cell System**:This paper on electrical energy management in solar cell system discusses about two topics i.e how to keep the system sustainable to supply electrical load and sustainability to deliver energy perspective.
11. **Fresh Water Production by Desalination Of Sea Water Using Solar Energy**: This paper shows the production of fresh water from the sea water desalination using solar energy.
12. **Remote Village Electrification Through Renewable Solar Energy**: This paper shows the case study of electrification of the village using renewable solar energy.
13. **Solar Energy as a Primary Source of Energy for a Cloud Server**: The aim of this paper is to offer and scientifically confirm a proposal of an accessibility solution of cloud by implementing of solar energy as a primary source.
14. **Virtual Prototyping of The Solar Tracking Systems**: A research in the field of improving the efficiency of the solar energy conversion by using tracking systems is presented here.Main aim is to change the position of the solar panel correlated to the sun position for maximising the radiation degree of use.
15. **Storing Thermal Energy from Solar Collectors for the Needs of a Detached House**: This paper evaluates the possibility of meeting a single family need for hot water and heat round the year using only solar energy.
16. **Design of Energy Efficient Sensors**: This paper focuses on generation of electricity through photo voltaic cells using dual axis system.
17. **DIY Solar Air Heater Boxes**: This Article shows step by step procedure of building a solar heater box for a home.
18. **Solar Bag**: This is simple Solar bag project.Using this bag one can charge all the devices with a removable power bank.
19. **Parabolic Solar Oven**: A parabolic shaped Solar voen is constructed here.It can boil one liter of water in 15-20 minutes and can cook for 3 people in 50 minutes.A step by step procedure for construction of this oven is hsown here.
20. **Programmable Smart Solar Oven**: A proggramable smart oven is shown here.It can turn towards the sun fro certain amount of time until the food is cooked.Then it turns away from the sun.
21. **Solar Lawn Mower**: This lawn mower proposed here uses solar energy for mowing the lawn grass.
22. **Solar Cockroach Virbobot**: This is simple DIY project that uses a vibrator and a solar cell.The are arranged in the shape of a cock roach.
23. **Solar Night Light**: Solar night lamp uses the solar energy to power up the night lamp.
24. **How To Make a Solar Car**: This project shows the making of a simple solar car.
25. **Solar Bug**: This project utilises a super capcitor and a solar cell for the bug
26. **Solar Roller**: This solar roller is a fun project which stores the power and discharges it with a movement.

27. **How To Build A Basic Portable Solar Power System**: In this video a basic portbale solar power system is shown which can be used for camping,boats,motor-homes etc.
28. **Solar UPS Controller/ Automatic Transfer Switch**: This project shows a small box which can utilise the solar energy in a small scale.I t has wifi and hooks into home automation.
29. **Study Of Solar Air Heater Energy And Efficiency Using Computational Fluid Dynamics**: Solar air heater a collection of solar energy from the sun and which in turn heats the room.This paper studies and analyse the details of flow field using computational fluid dynamics.
30. **Solar Power Water Pumping System**: Solar water pumping system consists of PV array,DC motor,helical rotor.This paper analyses the performance of this water pumping system.
31. **Efficient Conversion of Solar Energy to Biomass and Electricity**: The solar energy can be converted into biomass and electricity.The two methods were combined and full solar spectrum is utilised for producing the micro algae systems.
32. **Plasmonic Conversion of Solar Energy**: The plasmonic conversion of solar energy is proposed in this paper.This finds an efficient way of converting the solar energy into electricity.
33. **Application of Solar Energy for Lighting in Opencast Mines**: This paper explains about lighting system using solar panel in opencast mines. Illumination in mines is a major requirement but the there is a rapid increase in the price of fossil fuels and diesel.So this paper helps in improving the lighting system.
34. **Solar Light For A Portable Toilet**: This project shows the circuit of solar light for portable toilet.
35. **Solar Compass with Oled Display**: Here is the solar compass circuit with Oled display.This is not influenced by the magnetic field unlike regular magnetic compass.
36. **Solar Array Design**: This video shows the design of solar array design where mini solar panels are used.
37. **Portable Solar Tracker**: Here is the DIY project explaining the portable solar tracker.
38. **DIY Solar Birdhouse Light**: The circuit presented here is a mini solar based lighting system and is economical.
39. **Solar Powered Auto Irrigation System**: The proposed irrigation system uses photo-voltaic cell to produce the electrical energy by converting the solar energy from sun. This derived energy is further utilized for controlling the pump sets based on the soil moisture content.
40. **Solar Powered Coir Provostor**: The concept behind this design is to reduce the fuel required by heavy vehicles to dry the coir obtained from coconut. This project uses solar panel with MPPT controller to energize the DC motor in order to drive the vehicle.
41. **GSM Based Flexible Calling System for Coal Mining Workers**: The aim of this project is to help the coal mine workers in emergency situations to be able to contact with centralized control room even at power failure conditions due to the solar energy utilization for circuit working.
42. **Farmer Friendly Solar Based Electric Fence for Rural Agriculture**: Electric fences are practical as well as economical solutions for maximized field production. This idea of the project helps the farmers so that their fields, farmlands, etc are safeguarded. This project uses solar panels to charge the batteries.
43. **Beam Circuit Solar Engine**: This is a simple type of robot design that uses solar energy to drive the actuator system. The mounted solar panel charges the set of capacitor by utilizing energy from the sun and then capacitors discharge their energy to drive the robot or simply an actuator.

44. **Portable Solar Powered Radio**: This simple DIY project helps to build simple solar power circuit for operating the radio with use of small solar panel instead of replacing discharged batteries every time.
45. **Self-Powered Solar Data Logger**: In this project, solar insulation levels and temperature levels are continuously measured by the respective sensor and stored in flash memory. This logged data can be useful for future analysis.
46. **A Hybrid Wind-Solar Energy System**: This project allows two sources to supply load power depending on the availability of the source i.e., either solar or wind source. This circuit also implements MPPT algorithm for maximum power.
47. **Wearable Solar Based Cool Cap**: The main aim of this design is to prevent sunstrokes and to lower the temperature by attaching small fans to the wearable caps with small solar panel in order to supply the power to circuit.
48. **A Project on Solar Chimney**: The natural way of keeping the building cool is the usage of solar chimney. Until the sunlight availability, this chimney naturally keeps ventilation to fill the cold air inside of chimney.
49. **Solar powered Induction Motor Driven Water Pump Operating on a Desert Well**: This project uses a photovoltaic fed water pumping system which delivers the water from desert well by employing induction motor pump.
50. **Solar Based High Efficient Vacuum Cleaner**: This is an energy efficient model of vacuum cleaner which uses solar energy to create a partial vacuum in order to suck the dirt and dust particles.
51. **Solar Powered Path Finding Vehicle**: The main idea of this project is to implement a path finding robot which follows the desired path by avoiding obstacles in that path.
52. **Solar Power Based Industrial Boiler Controller**: This project controls the heating element of industrial boiler by sensing the temperature based on the requirement. Solar panels provide the necessary heating requirement of boiling.
53. **High Efficiency Photovoltaic Source Simulator with Fast Response Time**: This study presents the simulator tool for maximum power point tracking algorithms and solar power conditioning systems by a high efficient photovoltaic source simulator.
54. **Solar Powered Automated Fertigation Control System for Cultivation in Green House**: This developed system turns the ON/OFF injector for fertilizer mixing and also controls the irrigation pumps for setting regular irrigation frequency by using the power from solar panels.
55. **Sunlight Powered Steam Engine**: The concept of this project is to design a reciprocating engine powered with solar energy. The sunlight energy with sufficient heat fallen on to metal tube converts the water into steam.
56. **Design of Solar Energy Meter**: It is a simple project which determines the energy generated by the solar panel. If the solar power generated is sufficient to drive the load, this circuit doesn't allow the power from AC line otherwise remaining amount (in case of less power from PV cells) will be drawn from AC load.
57. **Series & Parallel Solar Circuit Modeling and Analysis**: The purpose of this theory is to perform the detailed analysis on dynamic behavior of the solar cells using simulations methods.
58. **Solar Powered Fans**: This article shows the conversion of battery powered fans into solar powere fans.
59. **Solar Lantern**: This latern utilises solar energy to charge NiMH battery which can lit up 1 watt white LED in the night.
60. **Solar-Powered Pedestal Lighting System**: The solar powered pedestial lighting system uses high powered LEDs.The solar energy is stored in the battery and used at night for pedestal lighting system.

61. **Turn Off Battery Charging from Solar Panel at Nightfall**: When the battery connected to the solar panel is charged in day time it starts discharging partially at night.The proposed circuit protects the panel from this voltage.
62. **Solar Powered LED Street Light with Auto Intensity Control**: This is an energy efficient method of street lighting which uses solar energy to power-up the LED Street light by storing electrical energy in battery during the day time. During nights the stored energy supplied to LED Street lights with auto intensity control based on timings.
63. **Design of Solar Powered Night Lamp Circuit**: This project implements a simple solar powered night lamp that turns OFF and ON automatically during sunset and sunrise respectively. During the day time it charges the battery and at night time it utilizes the stored energy to power the lamp (LED).
64. **Design of Solar Electric Bicycle**: The solar panel attached to the bicycle helps to charge the battery. So this project charges the battery from the solar panel, further this battery power can be utilized for glow-up the lamps, horns, etc.
65. **Solar Powered Automatic Rain Operated Wiper**: The main aim of this project is to operate the wiper of any vehicle by automatically sensing the rain. It uses a solar panel to charge the battery so that entire circuit is supplied with battery power.

Embedded Systems Projects Ideas:

- **Password Based Door Lock System using 8051 Microcontroller**: This system demonstrates a password based door lock system wherein once the correct code or password is entered, the door is opened and the concerned person is allowed access to the secured area. After some time, the door would be closed. Read this post completely to get more information.
- **Human Detection Robot**: Here is an IR Sensor based human detection robot designed using 8051 microcontroller. It is mainly used to save the people in accidents and explosions, to find the enemies, etc.
- **GSM Controlled Robot using Microcontroller**: This is an SMS controlled robot designed using 8051 Microcontroller and is used to control the robot directions like forward, backward, left and right by sending SMS from the mobile.
- **Password based Circuit Breaker**: This password based circuit breaker project is built using 8051 controller and is used to switch off the power supply to the line by entering a password.
- **Metal Detector Robot using 8051 Microcontroller**: This RF based metal detection robot is designed using 8051 microcontroller and is very useful to detect land mines, bombs, weapons, etc.
- **Fingerprint based Biometric Attendance System**: This biometric attendance system circuit is designed using AVR Microcontroller. It helps to take the attendance in educational institutions, industries, etc.
- **Bidirectional Visitor Counter using 8051 Microcontroller**: This Bidirectional Visitor Counter Circuit is helpful to count the number of persons entering or leaving a room and to display it on a screen.
- **Sun Tracking Solar Panel:** This article describes about circuit that rotates solar panel. This Sun tracking solar panel consists of two LDRs, solar panel, stepper motor and ATMEGA8 Microcontroller.
- **Line Following Robot using Microcontroller:** This line follower robot is a basic robot that follows a specific path indicated by a line having some particular width.
- **RFID based Attendance System:** This simple RFID based attendance system is designed using ATmega8 Microcontroller and is mainly used in educational institutions, industries, etc. where authentication is needed.
- **Auto Intensity Control of Street Lights:** This is a simple circuit that automatically controls the intensity of street lights which is designed using microcontroller and LEDs.
- **Street Lights that Glow on Detecting Vehicle Movement**: This article describes about the circuit that switches the street lights on detecting vehicle movement and remains off after fixed time. This system controls the street lights using light dependent resistor and PIR sensor.
- **Digital Temperature Sensor:** The main principle of this circuit is to display the digital temperature value. These are mainly used in environmental applications.
- **Bluetooth Controlled Electronic Home Appliances**: This article explains you how to control the electrical appliances using an Android device. Using this project we can control all the loads using a single remote and a control unit.
- **Wireless Electronic Notice Board using Microcontroller and GSM**: This wireless electronic notice board using GSM Technology and microcontroller circuit is used to display the data on LCD whatever we sent from the mobile.
- **Digital Tachometer using 8051 Microcontroller**: Here we designed a simple non contact tachometer using microcontroller which can measure speed with an accuracy of 1 rev/sec.

- **8 Channel Quiz Buzzer Circuit using Microcontroller**: We built the circuit using a microcontroller which scans the input from push buttons and displays the corresponding number on a display device.
- **5 Channel IR Remote Control System using Microcontroller**: This article is aimed to design and demonstrate a simple 5 channel remote control system to drive five loads. This circuit works on the principle of IR communication.
- **Density Based Traffic Signal System using Microcontroller**: In this system, we use IR sensors to measure the traffic density. We have to arrange one IR sensor for each road; these sensors always sense the traffic on that particular road. All these sensors are interfaced to the microcontroller. Based on these sensors, controller detects the traffic and controls the traffic system.
- **PWM based DC Motor Speed Control using Microcontroller**: Here is a simple DC Motor speed control circuit designed using AVR Microcontroller. Here we use a technique called PWM (pulse width modulation) to control the speed of DC motor.
- **Water Level Controller using 8051 Microcontroller**: Here we are designing the circuit which is used to detect and control the water level automatically in overhead tank using 8051 microcontroller. It is used in industries to control the liquid level automatically.
- **Temperature Controlled DC Fan using Microcontroller**: The main principle of the circuit is to switch on the fan connected to DC motor when the temperature is greater than a threshold value.This can be used in home applications and in cpu to reduce heat.
- **Digital Voltmeter using 8051 Microcontroller**: This is a simple digital voltmeter circuit designed using 8051 microcontroller. This circuit measures the input voltage from 0V to 5V. Here, the input voltage should be DC voltage to get the accurate output on LCD.
- **Ultrasonic Rangefinder using 8051 Microcontroller**: This circuit explains you how to measure the distance using 8051 microcontroller. This ultrasonic range finder system measures the distance up to 2.5 meters at accuracy of 1 cm.
- **Stepper Motor Interfacing with 8051 Microcontroller**: The main principle of this circuit is to rotate the stepper motor step wise at a particular step angle. The ULN2003 IC is used to drive the stepper motor as the controller cannot provide current required by the motor.
- **Interfacing 7 Segment Display to 8051**: This article describes you how to interface seven segments to AT89C51 microcontroller. This system displays the digits from 0 to 9 continuously with a predefined delay.
- **LC Meter using 555 Timer**: This is a simple LC Meter circuit designed using 555 Timer and 8051 microcontroller. It is mainly used to measure value of a reactive element like a capacitor or an inductor.
- **DC Motor Interfacing with 8051 Microcontroller**: Here is a simple but very useful circuit in our real life named interfacing DC motor with 8051 microcontroller. It describes you how to control the DC motor using AT89C51 controller.
- **LED Interfacing with 8051**: The main principle of this circuit is to interface LEDs to the 8051 family micro controller. Commonly, used LEDs will have voltage drop of 1.7v and current of 10mA to glow at full intensity. This is applied through the output pin of the microcontroller.
- **2 Digit Up Down Counter:** The main principle of this circuit is to increment the values on seven segment displays by pressing the button. This circuit can be mainly used in scoreboards.
- **DTMF Based Home Automation System Circuit**: This is a simple and very useful circuit in our real life named DTMF controlled home appliances system. It helps to control the home appliances using DTMF technology.

- **Bipolar LED Driver Circuit**: This bipolar LED driver circuit is very useful at the places where flashing of light is required, as in beacon flashing. This circuit can be mainly used for indication purposes.
- **Celsius Scale Thermometer using AT89C51**: This Celsius Scale Thermometer circuit is designed using at89c51 and lm35. This circuit works on analog to digital conversion principle. It can be used at homes, mobile places like cars to keep a track of the temperature.
- **Water Level Indicator**: This Water Level Indicator project employs a simple mechanism which helps to detect and indicate the water level in an overhead tank or any other water container. It can be used in Hotels, Factories, Homes Apartments, Commercial Complexes, Drainage, etc.
- **How to Interface Real Time Clock with PIC18F**: Get an idea about RTC, PIC Microcontroller pin diagram and how to interface RTC with PIC18F. RTC is an integrated circuit which keeps track of current time.
- **Automatic Railway Gate Controller with High Speed Alerting System**: The main aim of this project is to operate and control the unmanned railway gate in the proper manner in order to avoid the accidents in the unmanned railway crossing.
- **Boolean Algebra Calculator**: This Boolean algebra calculator is an interesting project which is more useful in our real life by working as a portable calculator to simplify the Boolean expression on the fly. In our circuit, we use Boolean algebra simplification methods like the Quine-McCluskey algorithm to simplify the Boolean expression and display the output on the display.
- **Interfacing GSM to 8051**: This interfacing of a GSM modem to AT89C51 microcontroller circuit can be used to control robots, in automatic accident detection and indication along with GPS, etc.
- **Digital Clock using RTC DS12C887 and 8051 Microcontroller**: This digital clock circuit is used in many applications like cars, railway stations, houses, offices, etc. in order to provide accurate time and date.
- **Random Number Generator using 8051**: This circuit helps to generate a random number in between 0 to 100 when push button is pressed and it may be used in the games like monopoly, snake ladder.
- **Interfacing GPS with 8051 Microcontroller**: In this interfacing of GPS with 8051 circuit, GPS module calculates the position by reading the signals that are transmitted by satellites.
- **Delay using 8051 Timers**
- **Interfacing GPS with 8051 Microcontroller**: In this interfacing of GPS with 8051 circuit, GPS module calculates the position by reading the signals that are transmitted by satellites.
- **Interfacing 16×2 LCD with 8051**: This is a simple circuit diagram which helps to describe interfacing of 16X2 LCD module to AT89C51 which is a 8051 family microcontroller.
- **Interfacing 16X2 LCD with PIC Microcontroller**: This is a circuit which helps in interfacing 16X2 LCD to PIC18F4550 microcontroller which is of family PIC18F.
- **Interfacing 16X2 LCD to AVR Microcontroller**: This is a circuit which helps in interfacing 16X2 LCD with AVR Microcontroller. The Atmega16 belongs to the AVR microcontroller family.
- **A PIC Sonar (Ultrasonic) Range Finder Using a Seven Segment Display:** A range finder or a distance detector is very useful device that is used to measure distance between two objects without physically measuring the distance. The system designed here uses Ultrasonic waves which are controlled by PIC microcontroller. The range of the system is limited but the areas of applications include finding liquid level, depth of snow, positioning of robots etc.

- **Auto Metro Train to Shuttle between Stations:** Public transport is an important mode to commute in big cities. All the major cities have an established metro train system. The aim of this project is to develop a system which enables to run the metro train automatically between stations. It is an ARM7 based design embedded with an H-Bridge controller that controls the motors. A successful implementation will result in reducing human intervention and hence reducing number of accidents.
- **Auto Power Supply Control from 4 Different Sources: Solar, Mains, Generator & Inverter to Ensure No Break Power:** The demand for electricity is always increasing. Black outs or power cuts is a frequent scenario if there isn't enough electricity to meet the demand. This situation will be a concern in industries, hospitals etc. Renewable energy is the main alternative source of electricity. The aim of this project is to design a system which efficiently controls power from four different sources viz. mains, generator, solar and inverter so that the source gets automatically switched between them to ensure that there is an uninterrupted power supply.
- **Automated Town Water Management System Using PIC:** Even though 70% of the EarthÂ's surface is covered with water, 97% of that water is salt water. Fresh water percentage on Earth is about 1% of total water, with other 2% being glaciers. Hence, water management is very important task. The aim of this project is to provide an automated water management and distribution system in towns so that there is no wastage. It is a PIC microcontroller based system with level sensors and GSM module to send information.
- **Automation of Cars Using Embedded Systems Technology:** The concept of automation of car can be achieved by embedded system technology. The proposed system is to develop an embedded system for automation of a car or making it autonomous. A huge collection of sensors and modules are integrated in this system. Some of them are: GPS for positioning, gyro & accelerometer to inform about incremental changes, a display system, finger print scanner for authorized ignition, etc. The concept of vehicle automation is huge and requires a lot of expertise.
- **Automatic Room light Controller with Visitor Counter (AT89S52):** A microcontroller based light controller system is designed, which helps in saving electricity. The system counts the number of visitors entering a room and switches ON or OFF the lights accordingly. It is useful in auditoriums and conference halls, where the count of people is required and the lighting conditions of the room are adjusted automatically.
- **Automatic Vehicle Speed Controller in Traffic Using RF Signal:** This project can be used to control the speed of the vehicle by reducing the acceleration of the vehicle near traffic signals. The light on the traffic signal will determine the speed of the vehicle. The microcontroller will reduce the acceleration in case of yellow light and completely stops the vehicle in case of red light. An RF transmitter is located near the traffic lights and a corresponding RF receiver is placed in the vehicle.
- **A Long-Range Computational RFID Tag for Temperature and Acceleration Sensing Applications:** In this design, an RFID tag featuring sensing and computation capabilities are used. The sensor-augmented RFID tag comprises an ultra-low-power microcontroller, temperature sensor, 3-axis accelerometer, non-volatile storage, and an I2C-RFID chip for communication.
- **Automated Irrigation System Using a Wireless Sensor Network and GPRS Module:** An automated irrigation system was developed to optimize water use for agricultural crops. It has moisture and temperature sensors placed in the root zone of the plants. A microcontroller is programmed with threshold values of temperature and soil moisture. The motor is turned on or off based on these values.
- **Bank Locker Security System:** Bank lockers and safety deposit boxes are a secure way of storing valuables. The system designed here is a microcontroller based security system

for lockers with RFID tag and GSM module. Only the authorized person with the correct RFID can have access to the locker and the GSM system sends notifications to the registered user.

- **Biomedical Monitoring SystemÂ using AT89S52:** A real-time biomedical parameter monitoring system is developed in this project. Several critical parameters like body temperature, heart rate and ECG are continuously monitored by the sensors and send that information to the microcontroller. The microcontroller compares the data and sends the required message to doctors and nurses with the help of GSM module.
- **Bluetooth Energy Meter:** A Bluetooth based energy meter data acquisition and billing system is proposed. It consists of a microcontroller, Bluetooth, RS232 connection to a PC and an LCD. The readings are acquired without ant human intervention and both the customer and the electricity board are notified so that future verification can be easy.
- **Bidirectional Visitor Counter Using IR sensors:** Visitor counter is an important task in large gatherings, auditoriums, clubs, seminars etc. Manual counting will often result in errors. A microcontroller based bidirectional counter is proposed here. The system uses two sets of IR transmitter Â– receiver pair and the count is based on the interruption of the transmission of the IR signal.
- **Cell Phone Controlled Robotic Vehicle:** The aim of this project is to develop a cell phone controlled robotic vehicle using DTMF technology. The advantages of DTMF control over RF communication are wide range, minimal interface and very robust. A microcontroller, a DTMF decoder and a motor driver are integrated in the system. Such robot has a huge number of applications in mines, military etc.
- **Car parking monitoring system:** Car parking in heavy business areas is a big hassle. Improper parking causes inconvenience to other cars. The aim of this project is to develop an intelligent car parking monitoring system. It is developed using a microcontroller and SCADA network. The advantages of this project are low cost, high efficiency and low maintenance.
- **Cell Phone Controlled Robot with Fire Detection Sensors:** A DTMF based robot with multiple sensors is built here. The cell phone on the robot will receive a DTMF tone when a key is pressed on the user's cell phone. The tone is decoded by a microcontroller and the motors are activated accordingly. It consists of obstacle detector, UV light sensor and fire sensor.
- **Dual Mode Robot: Obstacle Detector and RF Controlled:** A dual mode operating robot is designed in this project. In one mode, it can act as an obstacle detector robot and in other mode, it can act as an RF controlled robot. A PIC microcontroller is used as the main processing unit with obstacle detector, RF communication link and motor driver integrated to it. It has a wide range of applications like surveillance, tough environments like mines etc.
- **Density Based Traffic Signal System using 8051 Microcontroller:** Traffic congestion is a serious issue is major cities. Large red light delays can also cause congestion because the timing is programmed and not dependent on live traffic. The system developed here uses IR sensors, which are placed on all sides of a signal junction, to monitor the traffic density. All these IR sensors feed the information to a microcontroller, which then controls the traffic signals according to the traffic density on each side.
- **Embedded Web Tech in Traffic Monitoring System:** Traffic monitoring system enables in a smooth flow of traffic in critical junctions and crossings. In this article, an embedded web technology based traffic monitoring system is designed. The embedded web server consists of an ARM based embedded processor, wireless technologies like GSM, ZigBee, RFID etc. It is divided into traffic monitoring unit and signaling unit.
- **Embedded System Based Vehicle Speed Control System Using Wireless Technology:** One of the major cause for road accidents is over speed. An embedded

system is developed to monitor the speed of the vehicle and alarm the driver in case of over speed. It is a microcontroller based system with GPS integrated to it, so that live traffic updates can be received and displayed on the LCD. A speed control driver is also integrated to the system which automatically alerts the driver.

- **Embedded Automobile Engine Locking System Using GSM Technology:** A microcontroller based embedded system is proposed for automobile engine locking. The mode of communication is through GSM. The system is a low-cost and easy to implement anti-theft system for automobiles. The automobile can be ignited and locked via GSM by sending appropriate codes. In case of any unauthorized entry or ignition, an SMS is sent to the registered mobile number.
- **Embedded System Based Air Pollution Detection in Vehicles:** Embedded System Based Air Pollution Detection in Vehicles: Air pollution is one of the major concerns throughout the world. This system is used to detect air pollution. It consists of Carbon monoxide sensor and LPG sensor. The CO sensor is placed near the emission outlet of the vehicle and the LPG sensor is placed near pipe line in order detect any leakages. Whenever the emission is more than the threshold value, the buzzer alerts the user.
- **Embedded Surveillance System Using PIR Sensor:** Security against theft, crime, fire etc. is very important in urban life. Ordinary security systems use cameras and heavy data processing is required. A PIR (Passive InfraRed) based embedded surveillance system is developed in this project. It consists of microcontroller, PIR sensor, ultrasonic sensor and pressure sensor embedded as a system. The microcontroller can trigger a web camera to capture images and send it to the user via internet.
- **Four Quadrant DC Motor Speed Control with Microcontroller:** A microcontroller based embedded system for four quadrant DC motor speed control is designed in this project. The speed-torque relation in four quadrant operation can be controlled by the pulse width modulated signals that are produced by the microcontroller. Speed as well as the direction of the DC motor can be controlled.
- **Fingerprint Based Electronic Voting Machine:** Electronic Voting Machine (EVM) is a very innovative system which enables in efficient voting operation. But the disadvantage of the existing EVMÂ's is that there is no way to authorize the voter. The article proposes a PIC microcontroller based EVM with integrated fingerprint scanner. Such system allows the concept of authorization and can check for eligibility and also avoid false votes.
- **GSM Based Smart Surveillance System using PIR sensors:** Home surveillance systems are of growing importance in order to have a safe and secure home. A smart surveillance system is proposed in this project which uses PIR sensors and GSM technology. A PIC microcontroller is used to control the signal from PIR sensor and trigger the camera to capture an image and at the same time instruct the GSM module to notify the registered number.
- **Head Movement Controlled Human-Computer Interface:** We are living in a digital world where computers are a basic need. A head movement controlled human Â– computer interface system is developed in this project for people with disabilities. It is a wireless communication system with Xbee modules. The transmitter part, which is attached to the head, consists of tilt sensor, eye brow sensor and a micro phone. All these are integrated to a microcontroller along with voice recognition module.
- **IC Tester Using 89S52 Microcontroller:** Integrated circuits (ICÂ's) are a complex piece of equipment. They are very sensitive to severe external usage. The aim of this project is to design a microcontroller based IC tester. An 89S52 microcontroller is used along with a keypad, LCD display and a buzzer. The IC is connected to the microcontroller via a 20-pin socket and tested for any faults. All the 74 series ICÂ's can be tested at gate level.
- **Industrial Automation Using Speech Recognition with Wireless Monitoring:** Automation in industries helps in increasing the production and chances of

errors can be minimized. But even when the processes are automated, they have to be monitored. A wireless monitoring system for industrial automation system with speech recognition is proposed here. It is a microcontroller based system with RF transmitter and receiver to enable wireless communication.

- **Image Processing Based Toll Automation Using ANPR:** This is an automatic toll payment system based on automatic number plate recognition (ANPR). A camera is used to capture the number plate and using image processing techniques it is converted in to text. A microcontroller based system will analyze the text and deducts the amount based on the information already present in the database. The user is alerted with a text message.
- **Integrated Mine Safety Monitoring and Alerting System Using ZigBee & Can Bus:** Coal mines are getting deeper day by day. There are many monitoring blind areas which are dangerous. A wireless sensor network based monitoring system is developed. Sensors of temperature, humidity and methane are integrated with a microcontroller. ZigBee and CAN technologies are used in order to reduce the cost of implementation and improve the speed of communication.
- **Library Automation Using RFID:** RFID can be used in library automation. An ARM7 microcontroller will control the RFID reader and also a keypad and an LCD display are integrated to it. The RFID tag for student and the book are scanned when approach to a control point. Such automation will reduce queues and waiting at libraries.
- **Microcontroller based Digital Over voltage Protection system for Home Use:** The project describes a system capable of providing low voltage and under voltage protection for electrical appliances. It is a simple and low cost system based on PIC microcontroller. It can be used to protect sensitive consumer apparatus like T.V., refrigerator, etc. from voltage surges. The designed system is capable of withstanding a load up to 2KVA.
- **Power Saver for Industries & Commercial Establishments:** The usage of power in industries, corporate offices and other commercial establishments is huge. The aim of this project is to implement a system which helps in reducing the power usage substantially. The embedded system consists of microcontroller, several relays, zero crossing voltage and current detectors, a shunt capacitor bank etc. A display is also integrated so that vital parameters are displayed.
- **Pattern Recognition Using IR:** The security in touchscreen based devices is less as the pattern is visible. With the increasing risks of security breaching, it is very much necessary to find an alternative to increase security of devices/safes. For this application, the IR based pattern recognition system is proposed that can be very useful in improving security protocols. A microcontroller, infrared based touchscreen, photodiodes, and an LED display are integrated in the system. So, by using this system security can be enhanced.
- **PIC Based Greenhouse Monitoring and Controlling System:** Greenhouse gases are a serious concern as they are the main cause for Global warming. Modern buildings are equipped with advanced systems, which help in reducing the emission of greenhouse gases. A PIC microcontroller based embedded system is developed which helps in monitoring and controlling greenhouse conditions. Sensors like temperature, moisture, humidity and light intensity help the microcontroller in the greenhouse environment.
- **Railway Track Security System:** Railways is one of the major means of transportation in many countries. Railway tracks are frequently inspected for any faults so that major accidents can be avoided. An embedded system is developed here which is used to identify any faults in railway track and send that information to the nearest station via ZigBee protocol. A track sensing device is integrated to a microcontroller along with ZigBee and motor driver.

- **Rotary Automated Car Parking System:** Almost all major cities face a similar problem when it comes to car parking: lack of proper parking space. The project described here illustrates a method for efficient parking in limited parking space by employing a rotary automated car parking system. It consists of a microcontroller, RFID tags, IR sensors, relay driver and a voltage regulator.
- **RFID based Secured Access system:** Automatic Identification (Auto-ID) has become a significant system in control and security applications, in industries where a product has to be tracked in the process of supply chain or identification of products during sales or services. A microcontroller based secured access system is developed using RFID tags.
- **RFID and GPS Combination Approach Implementation in Fisher Boat Tracking System:** In this project, a Fisher Boat Tracking System using RFID and GPS techniques is developed. RFID is used for indoor tracking and GPS is used for outdoor tracking. Combining both these tracking systems will allow a cost effective fisher boat tracking system and is much simpler to implement than wired system. It can be used to communicate with and localize fisher boats.
- **Real Time Patient Monitoring System Based On ECG Signals:** Cardiovascular diseases are one of the major causes of death in the world. In this project, a cell phone based monitoring for cardiovascular diseases is designed. The ECG signals are continuously monitored and can detect abnormal cardiovascular disease conditions.
- **Sound Localizing Camera:** The iPhone camera platform designed in this project can turn its direction to face wherever a nearby hand-clapping or other similar sharp impulse comes from. If a person claps hands for more than once in the same direction in reference with the mobile phone, this platform will instruct the camera to take a picture for each clap detected. If the person moves to a different location and claps his hands, the camera platform will adjust its direction accordingly. The system can distinguish between hand claps and most surrounding background noise such as normal talking. A microcontroller with servo motor will control the camera. Apple remote ear pod will control the shutter.
- **Smart Water Tank Pump Switcher:** This system reads the water level in overhead tank and switches the pump (motor) on or off depending on the water level. Magnetic float switches are used in order to activate the sensors that detect low level and high level. An additional sensor can be installed in the basement tank (if any) so that the motor can turn off when there is no water and prevent any damage from over running an empty motor.
- **Smart Card for Banking with Highly Enhanced Security System:** Banking fraud is a major areas of crime. High security system for both online and offline banking transactions are being implemented. To control bank frauds, a highly enhanced security system for banking with a smart card is proposed in this article. A smart card or ATM card with high secure password is integrated with finger print scanner for authentication and GSM module for notification is integrated with a microcontroller.
- **Smart Metering and Home Automation Solutions for Next Decade Using ZigBee Technology:** Electricity is a primary need in our day to day life. The usage of electricity has substantially increased in the recent times. This project is to enable a smart meter which updates the user about the energy consumption. The user can set a value of power and when it reaches the preset value, the line gets tripped. The meter information is sent to the electricity board via ZigBee protocol.
- **Safety Timer for Home Appliances:** There is always a chance of voltage fluctuations in the main power supply. Electrical and electronic appliances like T.V., personal computer, refrigerator etc. require a safe range of voltage supply in order to function properly. This project ensures that the voltage fluctuations i.e. low and high voltages are cut off. It also displays the present voltage and the temperature. The lower and upper ranges can be programmable as they are not unique to all the appliances.

- **Speed Control Unit Designed for a DC Motor:** In this project, a system for speed control for DC motor using PIC 16F877A microcontroller is designed. High performance DC motors are a huge necessary in several industrial operations. All these motors require a speed controlling mechanism. Precise speed, torque and direction are very important for a process to be successful. The system is also integrated with a temperature sensor so that live temperature can be displayed on LCD.
- **Solar Powered Auto irrigation System:** The article illustrates a solar powered auto irrigation system. Plants in gardens, crops infields etc. have to be watered when there is enough sunlight. A microcontroller, humidity sensor, temperature sensor, water level sensor for water storage unit, light sensor etc. are embedded into a single system. A motor driver is used to operate the motor that is powered by a battery charged from solar power.
- **Solar Tracking System for Optimal Power Generation Embedded System Project:** Renewable energy sources are very useful Alternative sources of electricity. Solar and wind are the two main sources. The purpose of this project is to develop a solar tracking system so that the solar panels can be oriented in the direction of maximum sunlight. A microcontroller is integrated with a tracking system and motor driving block. An LCD is used to display different stats like time, voltage etc.
- **Speed Synchronization of Multiple Motors in Industries:** Industries use a lot of motors: both AC and DC. Synchronization of several motors is major requirement in certain process operations. The aim of this project is to develop a system which helps in speed synchronization of multiple motors in industries. A microcontroller is used to monitor the speed of multiple motors using speed sensors and controls the speed of all the motors to synchronize them. An RF based communication is used between the main controlling unit and individual motors.
- **Temperature Controller Using PIC Microcontroller:** Temperature is a deciding factor in many industrial processes. A slight variation in temperature may change the output and the finished product might not be the desired product. The design of a temperature controller for industries is illustrated here. The design is based on PIC and it controls a relay based on the temperature. This system can be used in industries and laboratories.
- **Touch Screen Based Remote Controlled Robotic Vehicle for Stores Management:** A wireless robotic control with touch screen as the input device is designed here. A microcontroller is used to control the system which has an RF transmitter and receiver. The touch screen is associated to the transmitter section and the microcontroller at the receiver section controls the motor for forward, backward, left or right turns. The range of the RF communication link is 200 meters.
- **The Design of the Scene of the Accident Alarm System Based on ARM and GPS:** This system implements a GSM based communication method to transmit data to the preset of treatment centers whenever an accident occurs. The vehicle is equipped with a GSM and a GPS module. The treatment center process the data received from the GSM module of the vehicle and identifies the location of the vehicle. The GPS module helps in tracking the location and state of the vehicle.
- **Tumor recognition Using Matlab and PIC:** Image processing is one of the important features used in medical applications. The aim of this project is to process the images using MATLAB and the position of the tumor can be detected.
- **Using TV Remote as a Cordless Mouse for the Computer:** Mouse is an important input device for computers. In this project, a T.V. remote is made to work as a mouse for the computer/laptop. 8051 microcontroller is used to control the operation and a RC-5 protocol enables the remote control operation. It can be operated in two modes: normal mouse and remote for windows media centre.

- **Underground Cable Fault Distance Locator:** Underground cables have less visual and environmental impact. Internet, telephone and even power cables are installed as underground cables. The aim of this project is to implement a fault detection system in underground cables. The system measures the distance between the base station and the faulty location and displays it on an LCD. It is based on Ohm's law and a microcontroller is used to control the operation.
- **Ultra-Fast Acting Electronic Circuit Breaker:** Circuit breaker is a very important electrical equipment that is used to protect the circuit from overload and short circuit. A PIC microcontroller based electronic circuit breaker is designed which acts as an ultra-fast acting switch. A current transformer is used along with a MOSFET and relay. The preset current and the load current are compared and relay is switched by the PIC accordingly.
- **Utilization of ZigBee Transceiver in Agriculture and Structural Analysis:** It is a microcontroller based system with ZigBee transmitter and receiver. Temperature, moisture and humidity sensors are integrated to the microcontroller and are wirelessly transmitted with the help of ZigBee and GSM technologies. This system helps farmers in understanding field conditions like temperature, soil moisture and humidity. This can also be used as a structural analysis system and for this we need to integrate an accelerometer sensor.
- **Wireless Home Automation System with Multiple Sensors:** This project integrates different sensors to build a wireless home automation system. The first sensor is a motion sensor which uses passive IR sensor. The second sensor is a smoke detector that can detect propane, hydrogen, methane, butane and smoke. Finally a temperature sensor along with a thermoelectric device is used. All these sensors are connected to a microcontroller which can communicate with the user through RF transmitters.
- **Wireless Control of Pick and Place Robotic Arm Using an Android Application:** It is an Android application controlled pick and place robotic arm. It is designed with soft catching grip in order to avoid extra pressure on the suspended object. Four motors are used: two for the movement of the robot and two for arm and gripper movement. These motors are driven by a microcontroller which is connected with a Bluetooth device.
- **Wireless Gesture-Controlled Robot:** A robot that is wirelessly controlled by hand gestures is built in this project. Similar conceptual robots are used in robotic arms that can be used in hazardous environments, medical surgeries, etc. An accelerometer is used to keep track of the position of the hand.
- **Wireless Sensor Networks Based Monitoring and Controlling of Food Storage System using ZigBee & Bluetooth Modules:** Temperature and humidity are the two main parameters that are to be maintained in a food storage system. The aim of this project is to implement a wireless sensor network consisting of temperature and humidity sensors in order to monitor and control food storage systems. The data from these sensors is collected by PIC microcontroller and is transmitted to a remote control unit via ZigBee and Bluetooth protocols.
- **ZigBee Based Remote Monitoring of Temperature and Relative Humidity Using PIC:** Temperature and humidity are two major climatic parameters which have an impact on human comfort. The aim of this project is to design a system for remote monitoring of temperature and relative humidity over ZigBee network. A PIC microcontroller is used to communicate with all the sensors and control the data that is transmitted via ZigBee.
- **ZigBee Technology For Home Automation and Security:** A ZigBee based wireless home automation system is proposed here. A ZigBee transmitter is associated with a PC via RS232 and the required signals or commands can be sent from PC using its hyper terminal. An Atmega 128 microcontroller is used in this project, which decodes the signals from ZigBee network and activates the respective relays accordingly.

- **Embedded System Based Submersible Motor Control for Agricultural Irrigation Using GSM:** An embedded system is designed for submersible motor so that it doesn't dry run or over load or single phase. A PIC microcontroller is integrated with voltage sensing circuit, comparator circuit and phase sequence checking circuit. A GSM module is used which sends and receives messages from the user and can automatically turn ON or OFF the motor.
- **FPGA Based Embedded System for Industrial Power Plant Boiler Automation Using GSM Technology:** The aim of this project is to develop an embedded system for power plant boiler automation. It uses an FPGA as the main controlling system and GSM technology for communication. A set of temperature sensors are used to continuously monitor the temperature of the boilers and drives the relays accordingly. There is a flame detector and water level sensor for each boiler.
- **Missile Detection by Ultrasonic and Auto Destroy System:** An embedded system for missile detection and auto destruction is developed in this project. It uses an ATmega32 microcontroller with ultrasonic sensors (SONAR) for detection of missiles. It uses RF communication and also has a camera for wireless video transmission.
- **Industry Based Automatic Robotic Arm:** The use of robotics in industries will help in automation of the process and speeds up the production / manufacturing. An industry based robotic arm is designed as an embedded system. The functionalities of a robotic arm can be similar to that of a human arm. A microcontroller is embedded with a robotic arm that consists of motors. There is an obstacle sensor so that accidents can be avoided. The end of the robotic arm can be used for anything like gripper, welding, painting, surgery etc.
- **Advanced Embedded Wireless Robot With Motion Detection System And Live Video / Audio Transmission:** In this project, a wireless robot with motion detection and live transmission of audio and video is proposed. RF based communication is used for wireless transmission and the microcontroller decodes the signal and drives the robot's motors. A camera with microphone is mounted on the robot and the video and audio signals are transmitted that can be viewed on a T.V. Such robots can be very useful in hazardous environments and dangerous locations.
- **Gesture Recognition Based Wireless control Using MEMS:** Human Â– computer interaction has rapidly evolved with the growth and advancements in technology. An embedded system for wireless control using gesture recognition is developed. The system uses a PIC microcontroller and a MEMS accelerometer mounted on a glove along with an RF / ZigBee transmitter. The receiver decodes the signals and drives the motors according to the gesture.