Master 01 : Embedded systems

Module: Etudes et réalisation des projets

AU: 2023/2024

Projects list

Project 01: Design of a Wireless Medical Monitoring System

The main aim of this project is used Monitoring Terminal and it can detect the patient's real-time body temperature, heart rate and other physiological informations, and transmit them to the control center.

Projects list

Project 02. Multi Functional Water Level Controller

This project is developed for the users to control the overflow of water in the Tank. The device will automatically switch off the pump when the highest level is reached and also switch on the motor when the lowest level is reached.

Projects list

Project 03. Voice Aided System

The goal of this project is to design a useful and fully functional real-Time world project that efficiently translates the movement of the fingers into the American Sign Language.

The American Sign Language (ASL) is a visual language based on hand gestures. It has been well-developed by the deaf community over the past centuries and is the 3rd most used language in the United States today.

Projects list

Project 04. Metal Detector

The aim of this project is to construct our own metal detector. It is used to hunt hidden treasures such as metal coins, iron ore, aluminium or even silver and gold buried under the earth.

The instrument can be used by hobbyists and treasure hunters alike. It can also be used to detect buried cables and concealed wiring.

Switch on the device and place a metallic object near the search coil. Adjust the 2J gang condenser till beat note is heard loud and clear through the headphone. The beat can also be heard through a MW receiver placed near the metal detector.

Projects list

Project 05: Wireless Temperature Analyser and Controller

This project is developed for the users to analyze and control the temperature of devices in wireless manner using microcontroller.

It consists of two modules. One module is connected with PC(PC module) and the other module is connected at the particular area where the temperature is controlled(Sensor unit).

Three temperature sensors are connected with three boilers(sensor module). The sensor senses the temperature and sends signal to the microcontroller. Accordingly the microcontroller controls a multichannel RF Transmitter. The RF transmitter transmits RF signals accordingly.

Projects list

Project 06: Remote Sleep Monitoring And Medical Alarm System

Monitoring sleep state and sending out alarm signal according to the state and acute disease

The advantages of this system is to transmit "sudden acute disease" signal by the wireless way through the wrist pulse- monitoring devices and to avoid the inconvenience of wired connections .the signals of sound or telephone voice alarm can be produced by the bedside wireless receiving device

Projects list

Project 07: Wireless Voting Machine

This project is developed for the users to conduct election in a easy manner. If the particular voter is not able to come to the voting place, the device can be taken to the particular place. The vote given by the voter will be registered in the voting place in a wireless manner.

The main part of this project is Microcontroller PIC16F73 and Multichannel RF Transmitter and Receiver.

A group of press to on switches(equal to the number of candidates) connected to the portable wireless electronic circuit. All the candidates names and symbols are displayed near the switches.

The voters can easily identify the switch corresponding to the particular candidate and press. When the particular switch is pressed, the corresponding signal is transmitted through RF wave.

The receiver is connected with the microcontroller unit which automatically puts a vote to the particular candidate and a beep sound is produced to confirm the vote.

This process can be continued throughout the election.

At the time of counting, when the switch for the particular candidate is pressed, the display displays the number of votes given to the particular candidate.

This is very accurate and can be implemented very easily

Projects list

Project 08: Car Overspeed Detector

This project is developed for the users to detect the speed of a car and to stop if it exceeds the particular speed.

It consists of two transmitters and two receivers. One transmitter is connected first and a receiver is fixed just opposite to the transmitter. The other transmitter is connected at the same side but something away from the first transmitter.

The second receiver is connected just opposite the second transmitter.

When the vehicle passes the first transmitting and receiving unit, it senses that one vehicle is crossing. When it crosses the second unit, it also senses.

The microcontroller unit calculates the speed=displacement/time taken. If the speed exceeds the particular level, the buzzer produces sound.

The administrator can set the speed limit of the device using the key pad. According to the settings, the device senses the speed of the vehicles

This project is very much used in traffic controller. It is very accurate and cost effective.

Projects list

Project 09: Authenticated And Access Control System For Device Using Smart Card Technology

The main aim of this project is providing authenticated and access control system for device using smart card technology

The purpose of this project is to provide a security based accessing system.Now a days we can provide at most security by using technologies.In this project the technology called smart card is used.And Smart cards are becoming increasingly more popular for security and personal identification applications.

The smart chip included on a smart card provides a means for secured electronic transactions and a means for identification. And using thios technology we can access and control devices

Description:

The main objective of this project is Authenticated device control system which is implemented using smart card . This project is designed around a Microcontroller which forms the Control unit of the project.

A smart card is used as an authentication for device control. According to this project the person who wants to access a device needs to carry his Smart Card with him. Whenever he wants to access the device, he needs to insert his smart card into the smart card Reader.

The hardware involved in the project is Microcontroller, Power supply, Smart Card, Smart Card Reader, Card Reader Driver and Devices to be controlled. This project finds its place in places where one wants to provide authentication over device control.

Projects list

Project 09: Authenticated And Access Control System For Device Using Smart Card Technology

Smart cards are secure tokens that have provided security services to a wide range of applications for over thirty years. Along with other technology advances, smart card technology has changed dramatically as well.

For nearly a decade, researchers have sought to connect smart cards to the Internet. The benefits are more including providing services over the Internet and eliminating smart card specific infrastructure.

A smart card is an integrated circuit card that forms a part of a circuit or system when engaged with a smart card interface. Smart cards are becoming increasingly more popular for security and personal identification applications.

Smart cards have one or more microcontrollers embedded in them which manage access to, and storage of, sensitive data that is actually stored in memory devices on the smart card

Projects list

Project 10:Multi Channel Fire Alarm

This project is developed for the users to sense the occurance of fire in different areas using smoke detecting method. The smoke indicator indicates the location of fire and produces alarm.

The heart of the circuit is microcontroller PIC16F73. The microcontroller has three ports that can be used for Input and output. The signal from the LDR is given as input to the microcontroller.

The output is derived at PortB of the microcontroller. According to the signal, the microcontroller sends signal through the output pins.

The output of the microcontroller is given to the LED location indicators and driver section. The driver section operates the siren.

Since microcontroller is used in this project, the operations are very accurate

Projects list

Project 11:Computer Controlled Car

Computer Controlled Car project is developed for the users to control a car through Computer. The user can control all the movements like forward, reverse, left and right etc.

When the user presses a specific button of the computer, a digital signal is generated and sent through a particular pin of the parallel port. This signal is thus used to drive a corresponding relay in the external electronic circuit.

The relay is used as a switch to operate the particular motor in the car. By this way the user can control any of the operations of the car.

The design and port programs are written in C-Language. In future, this can be implemented by using embedded systems.

The Computer controlled car can be used in mines and areas where human cannot enter

Projects list

Project 12:Intelligent Lighting System For Exhibition Applications

This paper presents the design and the implementation of a lighting system which is able to detect the approach of the visitors and then turn the lighting onto the normal intensity to let the exhibition be bright enough.

All lightings are equipped with the energy-saving function which will turn itself to the dimming level automatically after the visitors' leaving. PIR (Passive Infrared) sensors are utilized in the system instead of a video camera for the purposes of both cost-down and privacy issue.

The lightings are also designed to have network interface to let them be able to be connected together to form an intelligent lighting system which can not only collect the exhibition information but also help the administrators to secure the exposition

Projects list

Project 13:Remote Fan Regulator

This project is developed for the users to control the operations of a fan using remote control.

The remote control system works by the use of infrared signals. The transmitter section of the system produces and transmits infrared signals. These signals are received in the receiver section that is placed in the receiver circuit of the device.

Four relays are connected with the receiver circuit and are connected with a wire wound variable resistor. The fan is connected with the N/O of the relays.

When the user presses the button in the hand set, the transmitter transmits IR signal. The receiver receives the signal and sends to the Flip flop IC. The IC controls the driver section to operate the relays for the operation of the fan. By this way, the user can control the speed of the fan in wireless manner

Projects list

Project 14: Vehicle Security System

Safety places a major role in today's world and it is necessary that good safety system be implemented in places of travelling in a car. The project aims to modify an existing safety model employed in automotive field.

The aim of this project is designing a microcontroller based alcohol leakage ,smoke ,fire ,accident detection. and if the alcohol, smoke ,fire has detected, it automatically alert the driver and also your car door it will automatically be opened then it gives the alarm sound by buzzer to the driver.

This project ensures high level security for the vehicle by its unique way. This safety system can be used in any vehicle like car ,van, bus etc..,The microcontroller (PIC16F877A) is used for processing various sensors output

Projects list

Project 15: AC Motor Speed Monitoring & Controlling Through Telephone

This project is developed to monitor and control a the speed of an AC motor through Telephone. It consists of a Microcontroller unit, LCD Display, Telephone tone converting module, Motor etc.

The speed sensing unit senses the speed of the AC motor. The sensor sends signal to the microcontroller. The microcontroller performs the speed calculation accordingly with the speed of the motor. The speed is displayed in a LCD display. The microcontroller also controls the telephone circuit.

The department can track the unit value through telephone. When the administrator calls, the microcontroller unit attends the call and waits for particular code. The microcontroller sends corresponding data through the telephone line.

It receives the signal and sends to the microcontroller through DTMF decoder. The data is displayed in a PC. The administrator can control the speed of the motor through telephone line. The Microcontroller programs are written in assembly language

Projects list

Project 16: Door Control Using Finger Print Scanner

Door Control Using Finger Print Scanner project is developed for the users to control a door through Finger print scanner. It consists of a finger print scanner, PC, microcontroller unit and door controlling system.

The scanner is connected with the main door. As soon as a employee places his finger on the scanner, it evaluates the finger print and sends signal to the computer through serial port. The computer searches the employee from the list and displays the full details of the employee.

If he is an authorized person, it sends signal to the circuit and the circuit generates analogue voltage to the door. Thus the door opens automatically. It he is not an authorized person, the door does not open and it generates a siren and the computer displays the message..

This is very much used in companies where security and authentication are required.

Projects list

Project 17: Device Control with Password Protection

Device Control with Password Protection project is developed for the users to control Electric and Electronic devices with password protection. The user can control all the domestic appliances for example, Light, TV, Fan, Fridge etc using different password.

The user can on and off the devices by giving password through keypad. A LCD display displays the settings and other details given the user. The details set by the user are stored in the microcontroller.

As soon as the user enters the code, the microcontroller receives the signal and accordingly controls the controlling section. The controlling unit drives a corresponding relay in the external electronic circuit. The relay is used as a switch to operate the particular device. By this way the user can control any of the Electric or Electronic devices.

Projects list

Project 18: Electronic Letter Box

Electronic Letter Box project is developed for the users to find out whether any letter is inside the letter box and also to display the number of letters inside the letter box.

An IR Transmitter and Receiver are connected at the opening of the letter box. In normal operation, the rays transmitted from the transmitter falls on the receiver.

When anyone puts letter inside the letter box, the letter hides the rays and thereby the receives no signal at the particular instance. Thus it senses that there is a letter inside.

The microcontroller connected with the sensor counts that there is one letter inside. When the next letter is put inside the letter box, the sensor senses the letter and the microcontroller counts two. The same way it counts all the letters inside.

A display and buzzer is connected inside the house. The owner of the house can identify the number of letters inside the letter box.

When the letter box is opened, the microcontroller resets and the count goes to zero

Projects list

Project 19: Fridge Door Alarm

Fridge Door Alarm project is developed for constructing a fridge door alarm. This project mainly consists of a IR transmitter, IR sensor, driver section and buzzer.

The IR transmitter is connected at the frame of the fridge and the IR sensor is connected at the door.

When the door is closed, the IR rays transmitted from the transmitter falls on the IR sensor. When the door is opened, the IR rays are deviated and therefore the rays do not fall on the sensor. The signal from the sensor is given to the driver section.

The driver section drives analogue voltage and the analogue voltage is given to a relay. Thus the relay operates a buzzer as long as the door is opened. Thus when the fridge is opened, the buzzer produces sound and therefore the user will not forget to close the door

Projects list

Project 20: Emotion Monitoring System

Emotion Monitoring System project is developed for the users to check the emotion, heart beat rate and temperature of a patient and to display it in a LCD display.

The main parts of the Unit is Microcontroller, LCD display, Emotion sensor, Temperature sensor and Heart beat sensor.

The three sensors are connected with the body. The sensors sense emotion, heart beat and temperature continuously. Accordingly the sensors send signal to the microcontroller through ADC.

The microcontroller analyses the signal and accordingly it sends signal to the LCD display through LCD driver

Projects list

Project 21: Ultrasonic Parking Guidance System

Parking the vehicle's on the road is a major problem now-a-days. In a crowded place, it is difficult for us to park the vehicle easily. In order to overcome this problem, we designed and developed a system so called as ultrasonic based parking guidance system.

This system is used to park the vehicles easily on the road. The system employs no one's help to park the vehicle on the road. The ultrasonic based parking guidance system is placed in front and back side of the vehicle. This system helps the vehicle to be parked without any damage.

The ultrasonic based parking guidance system consists of ultrasonic transmitter, ultrasonic receiver, oscillator, frequency generator, amplifier, driver circuit, alarm, microcontroller, display.

The system identifies any obstacle which is 1 feet before the vehicle or after the vehicle .The frequency generator generates a frequency which in turn makes the oscillator circuit to get enabled.

Projects list

Project 21: Ultrasonic Parking Guidance System

The oscillator frequency is then given to ultrasonic transmitter for transmission of the signals. It transmits the signal of particular frequency and the signal gets received by ultrasonic receiver. The received signal is amplified and given to microcontroller for display.

If there is any obstacle before the vehicle, the ultrasonic transmitter transmits the signal to ultrasonic receiver side. The transmitted signal is then given to an amplifier circuit for amplification.

The amplified signal is given to microcontroller unit. The microcontroller sends the corresponding signals to alarm driver circuit which in turn enables the alarm. The alarm sound will indicate that, there is an obstacle in front of the vehicle or in the back side of the vehicle.

ADVANTAGES:

1. The vehicle can be parked without anyone's help.
2. Avoids damage to the vehicle.
3. The system is reliable.
4. Help's to identify the obstacle easily.

Projects list

Project 22: Green House Monitoring

Appropriate environmental conditions are necessary for optimum plant growth, improved crop yields, and efficient use of water and other resources. Automating the data acquisition process of the soil conditions and various climatic parameters that govern plant growth allows information to be collected at high frequency with less labor requirements.

The existing systems employ PC or SMS-based systems for keeping the user continuously informed of the conditions inside the greenhouse; but are unaffordable, bulky, difficult to maintain and less accepted by the technologically unskilled workers.

The objective of this project is to design a simple, easy to install, microcontroller-based circuit to monitor and record the values of temperature, humidity, soil moisture and sunlight of the natural environment that are continuously modified and controlled in order optimize them to achieve maximum plant growth and yield.

Projects list

Project 23: Line Sensing Robotic Car

Our innovative project aim to drive a car without any human interference. In our project we make the use of IR rays for controlling and providing a path for car movement. Here IR emitter (transmitter) and IR detector (receiver) are used for providing control actions.

We know that IR emitter emits the IR rays and it is detected (received) by an IR detector. In our project both IR detector and an IR emitter is placed on the car. As we know that black colour absorbs all rays and does not reflect any colour. Our project works in this principle.

Here the IR emitter emits light on the white mark of the road it gets reflected back which was sensed through the IR detector and if it falls on the black surface then the detector cannot get the reflected signal.

Also IR detector always detects the IR rays, which comes from a source of IR emitter. If suppose IR emitter emits the rays in some degree deviations from past, the car (detector) gets alerted and it will turn and focused to the emitter's direction. So we can move a car by means of positioning the IR emitter without manual driving.

Projects list

- **Project 24: Obstacle Avoiding Robot using Arduino and Ultrasonic Sensor**

Projects list

- **Project 25: Stepper Motor Control using MATLAB and Arduino**

Projects list

- **Project 26: Voice Controlled LEDs using Arduino and Bluetooth**