

Best Five Projects 2013-14 (Shift-I)

1. Project Title: Alphabet ASL Recognition using Principal Component Analysis

Abstract: In this thesis, a static gesture recognition system is presented which requires no special hardware other than a Webcam. The system is based on a Principal Component Analysis(PCA).Firstly we convolve all members of the training data with mathematical background of PCA which differences between images and reduces their separation in feature space .This reduces the number of eigenvectors needed to describe data .A Principal component analysis is computed from the convolved data.

We divide the data in this space in to several clusters using the PCA algorithm .Then the level of blurring is reduced and PCA is applied to each of the clusters separately. A new Principal component space is formed from each cluster .Each of these spaces is then divided in to clusters and the process is separated .We thus produce a tree of principal component spaces where each level of the tree represents a different degree of blurring .The search time is then proportional to the depth of tree, which makes it possible to search hundreds of gestures with very little computational cost. The output of the decision tree is then input into the PCA recognizer to recognize temporal information.

Domain/Area of the project: Image Processing

2. Project Title: Solar Powered Automatic Wheelchair

Abstract: The main components are: the wheelchair structure, the solar panels, the DC motors, the controlling circuits, microcontroller and joystick. The proposed model is very useful for the physically challenged people of the rural areas. The wheelchair is cost effective and user friendly. The proposed model is self-driven and independent. For the proposed model the Life Cycle Cost analysis is done and compared with the power wheelchair that takes the grid power for charging and the proposed model is proven to be lower in the cost. The solar powered wheelchair will help the physically challenged people a great deal in their day to day movements. The proposed model will be very effective in the rural areas as well as in the urban areas.

Domain/Area of the Project: Energy Harvesting

Sponsored By: Universal Electronics, Solapur

3. **Project Title:** Automatic Control of Advertising Balloon

Abstract: The project deals with advertising in a gimmicking way which is imperative now-a-days in the field of marketing. It is distinct from other types of advertising in the way that it can be circulated under roof in marketing area to make it noticeable to the spectator. The system consists of a gas balloon with an automatic control system at its base. The control system uses GSM technology for controlling the direction of the balloon. Here the GSM module is used for receiving the signals sent by cell phone for deciding the circulating track. The balloon consists of two fans at the base aligned in a straight line with an automatic control system which is used for controlling the direction of it according to the signals sent by the controller based on signals received by the GSM module. All this encapsulates into a small tangible system without any complexity in operating and a new tactic of enterprising by engrossing the attention of the spectators.

Domain/Area of the Project: Control System

Sponsored By: Chaitanya Aditya Solar Shoppee, Solapur.

4. **Project Title:** Real Time Fuel Monitoring cum Accident Indicator

Abstract: The owner of a vehicle must know the amount of fuel in the vehicle whenever he/she wishes. So, the technology project is designed which will give the fuel report along with some additional information. To continuously monitor the fuel level, a floating potentiometer fuel sensor is used and for all the other controlling purposes the high performance ATmega 328P which belongs to the Arduino family is used. The path travelled by the vehicle will be traced and the vehicle will be tracked using the GPS technology and the fuel data will be sent to the owner through the use of a GSM module.

Domain/Area of the Project: Embedded Systems

Sponsored By: Society of Automobile Engineering (SAE India) Club, WIT Collegiate Club, Solapur

5. **Project Title:** Monitoring and Controlling using ZigBee Protocol

Abstract: ZigBee enables broad based deployment of wireless networks with low cost, low power solutions. It provides the ability to run for years on inexpensive batteries for a host of monitoring and control applications. Smart energy/smart grid., AMR(Automatic Meter Reading), lighting controls, building automation systems, tank monitoring, HVAC control, medical devices and fleet applications are just some of the many spaces where ZigBee technology is making significant advancements. ZigBee is used to monitor and control the devices connected at receiver sides. Zigbee is wireless protocol. In large industries, we can use this technology to control the actuators.

Domain/ Area of the project: Communication, Embedded System

Sponsored By: Rotex, Manufacturer and Engineering Pvt. Ltd., Dombivali, Maharashtra.

Best Five Projects 2013-14 (Shift-II)

1. Project Title: Pipe Climbing Robot

Abstract: Nowadays the PNG (Piped Natural Gas) network is increasing day by day in the metropolitan cities like Mumbai, Surat etc. So the PNG service providers are definitely going to require some method for inspection of the pipelines. Hence the robot explained here gives the solution for both the industrial and social problems in the sense by avoiding the disturbance that building residents go through at the time of maintenance. The robot is mainly designed to provide smooth continuous movements for moving up and down a straight line path along the pipe. The basic working principle of this robot is similar to the movement of a roller coaster. The rollers are used that get attached to the pipe and make the robot climb along the pipe. The robot can also be used in industrial applications, especially for gas pipe inspection. The pipe climbing robot presented in this project report is basically a service robot.

Domain / Area of the Project: Robotics

Sponsored By: Swati Enterprises, Pune

2. Project Title: Personalized Q/A based security system

Abstract: The theme of this project is to maximize security in our day today life. This project delivers a flexible solution to maximize the security of home, lockers, bank lockers or the systems which requires maximize security. This project is an attempt to make use of smart phone and question answer based interactive user response system. Along with that GSM and Bluetooth technology provides multilevel security to our bank lockers. The project is built around AT89C51 microcontroller. An LCD display is interfaced with the microcontroller to know the present status of Q/A session and further authentication process.

Domain/ Area of the Project: Embedded System

Sponsored By: Axis Technologies, Pune

3. Project Title: ATM Security System Using GSM and MEMS Module

Abstract: The overview of this project is to design MEMS and GSM based ATM SECURITY system using PIC16F8777. The aim of this project is to enhance the security system of present existing ATM machine. The project basically consists of a MEMS sensor which identifies the tilt by the machine and activates the microcontroller to start the following sequence in which shutting the door using stepper motor and sending SMS to vigilance system using GSM is involved. It detects any mischief to ATM machine by using tilt sensor (Accelerometer). Turn down the shutter of ATM center automatically. Take the images of all ATM users using Webcam. Detecting Fire sensor and send SMS to fire brigade. Turn OFF shutter facility from remote location using SMS in any riots like conditions.

Domain/ Area of the Project: Telecommunication

Sponsored By: Smart Shield Tech LLP, Navi Mumbai

4. Project Title: ASL To Voice Conversion

Abstract: The dumb people, most probably the mute people, generally undergo problems in order to communicate with the normal people. And the normal people too have same problem on the other side in order to understand their language. Mute people generally perform gestures in order to convey their messages. But these are not understood by normal people. For this the project is designed which would slightly reduce their communication barrier, and just make their lives much easier. This project converts the gestures into an audio output through speakers and visual output through the LCD.

Domain/ Area of the Project: Image Processing

Sponsored By: NXG Embedded, Pune

5. Project Title: Electric Device Control Using GSM

Abstract: The objective of this project is to develop a device that allows for a user to remotely control and monitor multiple home/office appliances using a cellular phone. This system will be a powerful and flexible tool that will offer this service at any time, and from anywhere with the constraints of the technologies being applied. Possible target appliances include (but are not limited to) climate control system, security systems, lighting control system with an electrical interface. The system is implemented using microcontroller-based control module that receives its instructions and command from a cellular phone over the GSM network. The microcontroller then will carry out the issued commands and then communicate the status of a given appliance or device back to the cellular phone

Domain/ Area of the project: Embedded System

Sponsored By: SNR Electronics, Sangli