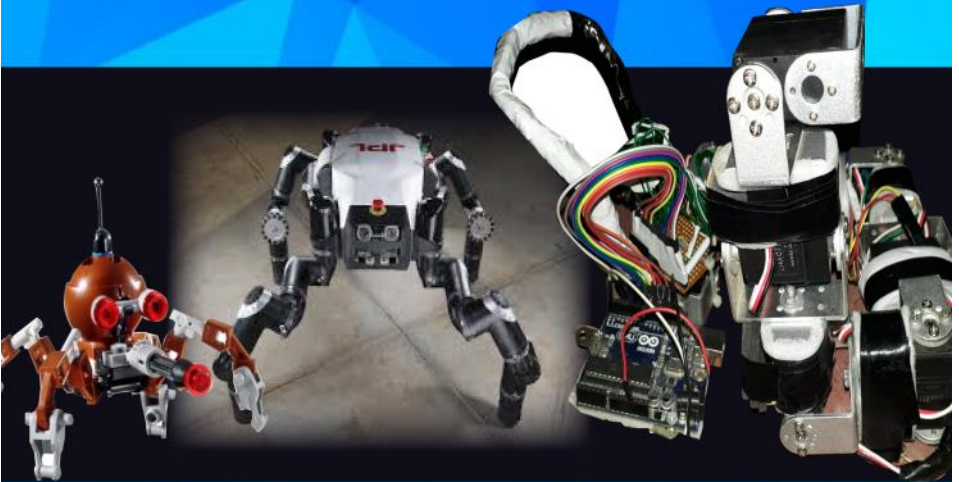# FINAL YEAR PROJECTS

Editors:
- Prof. Dr. Bhawani Shankar Chowdhry
- Prof. Dr. Wajiha Shah

Compiled By:
- Engr. Mansoor Ali Teevno

Department of Electronic Engineering
Mehran University of Engineering & Technology, Jamshoro, Pakistan

These past years have seen an interesting development in institution building in the country and amongst all institutions, the bedrock has been the education institutions that impart practical, technical and research based knowledge. Electronics in particular and ICT (Information and Communication Technologies) in general have a direct and great impact on our life. Electronic Engineering artifacts have played and continue to play a major role in the evolution of mankind and culture. It is an increasingly important engineering discipline that significantly affects the other disciplines of Engineering.

I am delighted to learn that Department of Electronic Engineering, as an innovative and forward looking department, achieved laurels for imparting quality education with practical skills that has been at the forefront in the country and its graduates have risen to positions of great eminence. The success of the department owes much to collaborative efforts involving faculty, administration, students, students' alumni and the community as a whole.

It is a matter of immense pleasure and happiness to see that students have made such remarkable projects such as *Vision assisting device for blinds with Raspberry Pi*, *Smart energy efficient building with cloud control, Prototype development of reptile robot, An indoor comfort based home energy management system* And also projects such as optimal tactile display won the student start-up business competition and grabbed space in the campus incubation center.

On this occasion, I would like to felicitate and express utmost appreciation to the Chairperson of the Electronics department, all faculty members and students for having kept up the standard of the department. The exhibition is indeed a matter of celebration for the university as well as for the country. The crux of the matter is that I am proud of department of Electronics Engineering and its performance.

<div align="center">Long live Mehran ! Pakistan Paindabad!</div>

<div align="right">**Prof. Dr Bhawani Shankar Chowdhry**</div>

Message from Chairperson

In today's era of technological advancement, technical education plays a pivotal role in the development of a country. The field of electronic Engineering has witnessed overwhelming importance in almost every sphere of our lives and infact it is the driving force behind the development of world's information technology. It has made revolutionary changes the way people interact with the outside world.

It has deeply penetrated in every field of our existence. Being one of the most dynamic and active departments in terms of arranging numerous curricular, extracurricular, and technical workshops related events, our department's envisages to be nationally recognized for high quality academic programs and research through focused activities and excellence of its faculty, staff, graduates and facilities.

We will achieve this vision through fostering the education of stellar students and contributing towards Electronic Engineering Research.

This department aspires that its graduates be able to face the challenges that many societies face today in such a diverse areas ranging from information Technology to healthcare.

Feeling an urge to develop and encourage a competitive environment, Electronics department, since few years have been organizing *Project Exhibition*, a platform to showcase Final year students' projects that not only polishes the technical skills of those who participate but always becomes an inspiration for students not only from this department but others also.

This time around, final year students of (14ES) of Electronic Engineering Department has put in their invaluable efforts and technical expertise in designing real life application-oriented projects like *Vision assisting device for blinds with Raspberry Pi*, *Smart energy efficient building with cloud control, Prototype development of reptile robot, An indoor comfort based home energy management system,* to name a few. To sum it up, they have done a commendable job.

Indeed, the provision of sound technical environment to the students bore fruits when some of the groups of students grabbed funding in Student start-up business competition 2017 and some were in the runner up.

I would like to express my gratitude to all faculty members who aptly played their part in mentoring and guiding students at every level.

Prof. Dr. Wajiha Shah

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Projects in national Competitions

It is a matter of great pleasure and pride for the department and University that students not only work and design projects on campus level but also are ambitious to participate in national level competitions and start-ups that thrive in the country nowadays.

- Among those students, a project titled "*Optimal tactile display*" won the Student start-up business competition SSBC 2017-2018 under HEC and PEP (Promotion of Education in Pakistan) . The above mentioned project won a cash prize of 200,000 PKR and incubation space in IEC MUET. Such a kind of achievement at undergraduate level is indeed remarkable. The efforts put up by students along with their supervisors is highly commendable.

- Another project titled "*Raspberry Pi ismart home door security system*" was also in the qualifying list by university management to be presented in SSBC 2K'17.
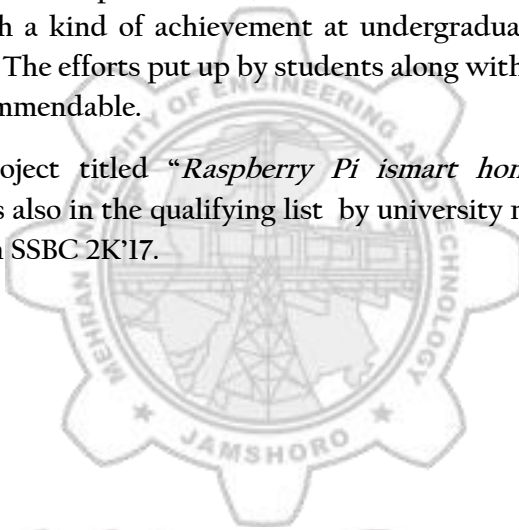
Smart energy efficient building with cloud control

Abstract:

In recent years, the energy crisis has become one of the major problem. Most of the times in our homes, offices, schools, universities and hospitals, the lighting devices remain powered even when not needed which contributes to global energy wastage.

This project "Smart - Energy Efficient Building" has been designed with the aim of energy conservation in mind. As part of market analysis, smart lighting technologies currently available in market were reviewed and their features and limitations were studied.

A building's lighting system can said to be efficient if it makes lighting available when required while minimizing the wastage by turning OFF when it is not needed.

The scope of this project is to make a building's lighting system efficient. It identifies the need of lighting by utilizing the motions sensor to identify the presence of any moving object and thereby powering ON lighting devices. When no motion is detected for some (configurable) amount of time, the lighting are no more needed and are powered OFF.

System also provides a controlling feature for lighting devices. For any reason what so ever, if it is required to not use the energy efficient feature, the system allows an additional option to make lighting devices ON or OFF, disconnecting it from motion detection mechanism. The system provides a web interface through which this controlling can be done.

System is also equipped with a logging feature. It periodically stores the state (ON or OFF) of lighting devices connected to the system with a time stamp in cloud. The system website displays this information in a presentable format. This information can be used in performing usage pattern analysis. The logged information can also be used to figure out how much efficient system was in saving power, by identifying the time durations when lighting was OFF (sensor turning it OFF when no motion is detected) which otherwise would have been ON.

This project will initially be implemented in "IT BUILDING" to make it smarter and energy efficient.

Designed By:

- Nimra Khan   14ES27

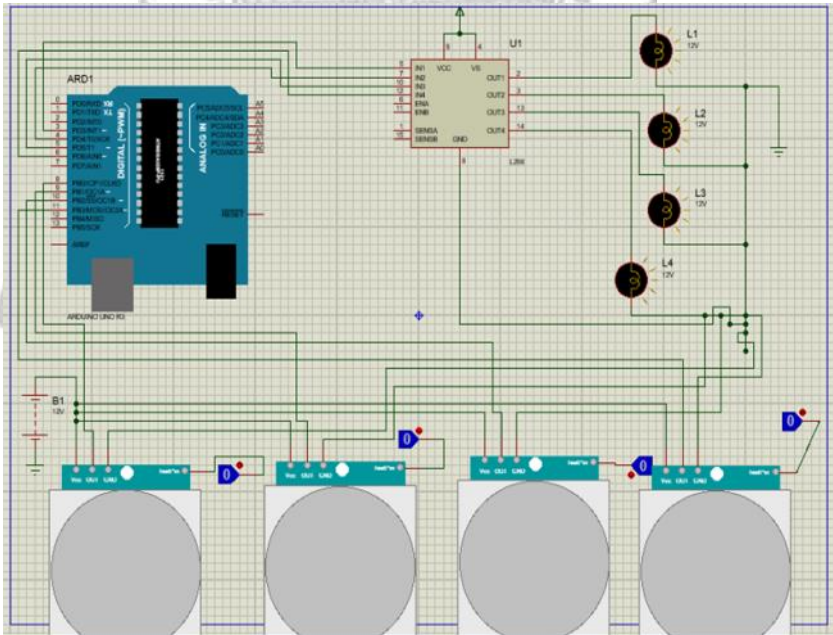- Fareeha Siddiqui   14ES13

- Noor-ul-Ain Suhail   14ES07

- Nimratulain   14ES71

- Aizaz Memon   14ES61

- Ali Raza Shaikh   14ES109

Supervisor: Prof. Dr. Bhawani Shankar Chowdhry

Co-supervisor: Engr. Azam Rafique Memon

Interactive mirror

Abstract:

Our life style has progressed for optimizing time and everyone likes to have quick access to information. This is due to the fact that effective time management is an essential factor in increasing production of day-to-day life. The key to effective time management involving technology is multitasking. This project was formulated through inspiration seen through movies such as Iron Man and technology demos, such as Samsung's transparent LCD Smart Window, seen at the International Consumer Electronics Show in 2012. This extends as well to the continuing trend of integrating touch screens and internet-connectivity into everyday appliances such as ovens and refrigerators. The idea of a smart home is the direction lots of companies are heading. Besides the kitchen, the dressing and bath room is one of the busiest rooms in the home, so it is an excellent place to expand the smart home next. The interactive mirror is the result of our team brainstorming on how to solve all these issues and develop something that is functional as well can serve as a showpiece. Some common questions always arise when something new is innovated, which are, what was the need? Why anyone would want this new technology? Because it helps to keep track of time and stay on schedule. It has a uniqueness factor in itself along with its gesture controlling and presence detection features. It has reduced complexity of user handling to some extent. It is convenient we have used raspberry pi which provides portability. Interfacing of Raspberry PI is done with LCD which is pasted behind an acrylic see through mirror to provide better quality mirror reflection with information on its surface.

The fetching of information by the user is done through Gesture Control Mechanism using picamera. We have used computer vision to analyse different sets of gestures using human fingers and interpret them in order to control the system.

The major contribution of our project is to make full utilization of time spent in front of mirror and make it functional like any ordinary mirror as well as having extraordinary, convenient and interesting features. It is offering better starting for each day with high efficiency living experience. Our project is the cost effective enhancement when compared to the touch based apple smart mirror present in the market at around three times the price of our mirror. Moreover, we provide a way of interacting and accessing to information using gesture control mechanism.

Designed By:

- Syed Mudassir Kazmi   14ES09

- Aqsa Ali   14ES37

- Masood Nazir   14ES93

- Hina Ghous   14ES43

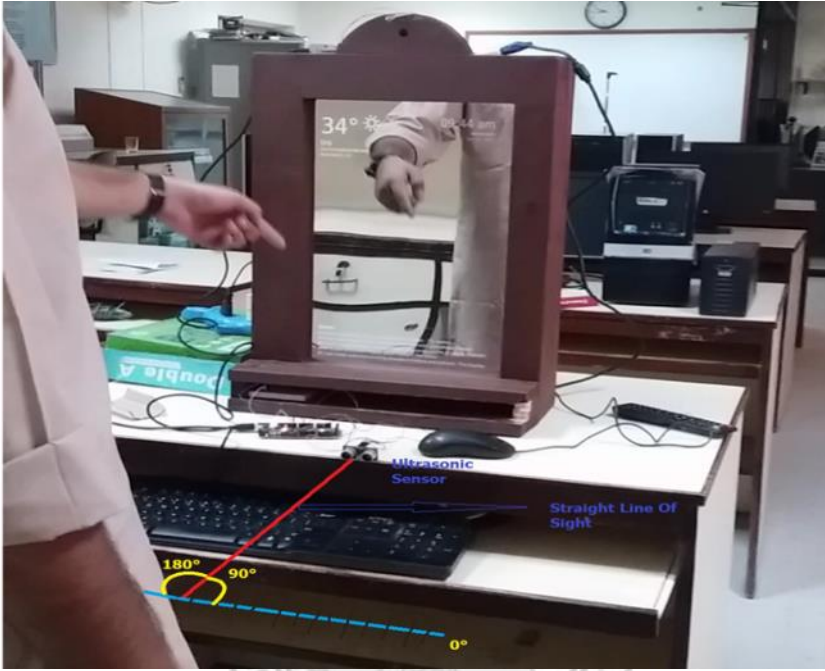- Hafeez-ur-Rehman   14ES33

- Dilbar Ali   14ES15

Supervisor: Dr. Attiya Baqai

Co-supervisor: Dr. Fahim Aziz Umrani

Optimal Tactile Display

Abstract:

Graphical user interface is a visual way of interacting with computer. In past we have experienced 2D graphics that is to visualize digital data on screen and then technology evolved; we have switched to 3D graphics like augmented reality and virtual reality but the fact is these animations are based on ghostly pixels and can't be touched at meat space. Owing to fact many researchers were working on the concept of tangible user interface modifying the research framework and other related products; we have formulated a prototype by virtue of which user can interact digital information in tangible way.

Optimal tactile Display is a dynamic display by virtue of which you can render the physical content of digital data. In this project we focus on use of tactile display to design 3D shape that can be visualized by naked eye and touched physically. However, this tactile display can be used by the designers around the globe to optimally visualize their 3D models. It can help students by providing a tactile Braille to blind and help other students to better understand volumetric data and mathematical equations. Furthermore, it can bring a revolution to the real-estate market by providing urban planner architects, builders and developers to physically model their construction designs.

Our device is based on an array of controlled pins which is extended by an abs casing to acquire 3D shapes. Moreover to detect objects and gesture to render physical shape and to provide graphics we have mounted overhead MS Kinect and projector. In spite of the fact that the application of the project is restricted by resolution, hardware design and cost, we believe that plenty of the methods we offer can be utilized to a range of special-purpose applications that have different sensing and actuation.

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Designed By:

- Abdullah Memon   14ES65
- Tahira Aslam Bachani   14ES79
- Faiza Sami Khanzada   14ES77
- Muhammad Owais   14ES73
- Marvi Jamali   14ES41

Supervisor: Dr. Attiya Baqai
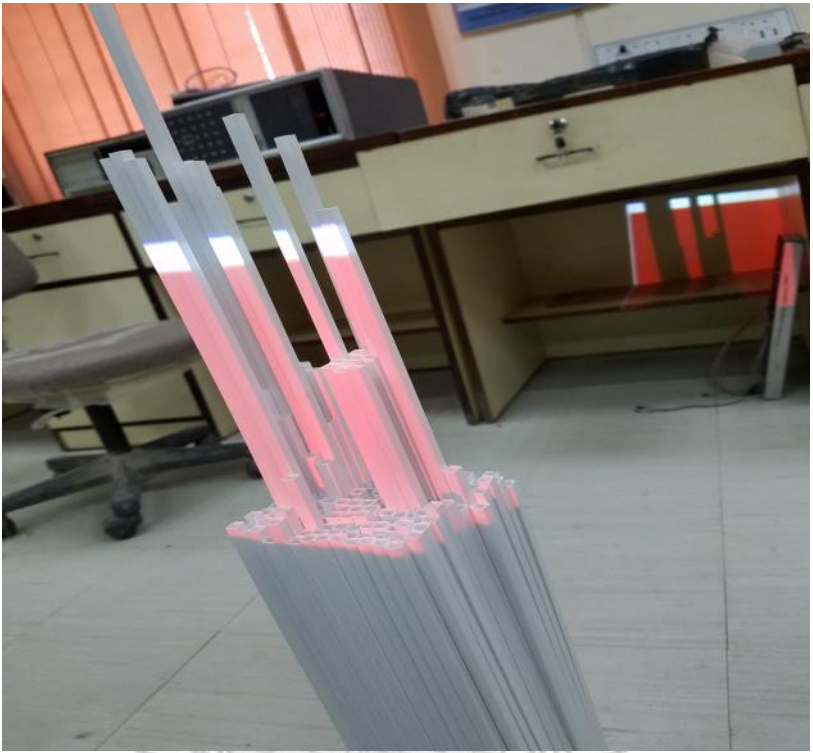
Vision assisting device for blinds with Raspberry pi

Abstract:

The main aim of this paper is to implement a system that will help a blind person. This system is based on a RASPBERRY PI and does the recognition of the faces and facial expressions, it also incorporates additional components to provide more pure expressions or emotions information. The input process is to capture the face, and it is then converted into output processing in voice command which is adopted in Bluetooth headset or direct audio jack which is used by blind people using RASPBERRY PI component. Blind people do not experience the world as we do. They face many difficulties in everyday life. They cannot see any obstacle in their way, or they cannot come to know who is in front of them and what are their facial expressions or emotions. For object identification, there are assisting devices like a blind stick, which detects the object in the way. There are some other devices too for different purposes. We are making a vision assisting device by which a blind people may come to know the facial expressions and emotions of the person in front of them. Blind people find themselves unable to recognize that how the person standing in front of them or talking to them is feeling or reacting, is he/she smiling or sad or angry or something else. Our device tells the blind person that how the person feels or behaves at the moment by using facial expressions of the person in front of them. We have developed an algorithm using facial landmarks and facial features. A camera captures an image of the person in front of the blind person; then landmarks are placed on the face of the individual in the picture. Then expressions are extracted from the distance proportions of the landmarks. Some geometrical methods have been used to do so. Raspberry Pi does not process another frame unless the person changes facial expressions or another person comes in the vision of the camera. When any of the expressions is detected, the blind person comes to know the facial expression through voice in the headset. When the person smiles, SMILE or HAPPY is heard, when the person makes an angry face, ANGRY is heard and so on. As we continued to work on this project, we came to learn the methods of computer vision and we learnt how to develop algorithm in the field of computer vision. This device would help blind people to some extent, to know the emotions or reaction of the person whom they are talking to.

Designed By:

♦ Memoona Shah	14ES74
♦ Muhammad Awais Soomro	14ES94
♦ Hania Rahim Qureshi	14ES64
♦ Shaista Naz	14ES118
♦ Affan Adnan Qureshi	14ES70
♦ Anas Shahid Shaikh	14ES04

Supervisor: Engr. Aamir Ali Patoli

Co-supervisor: Engr. Zaigham Abbas Shah

Prototype development of Reptile Robot

Abstract:

The project developed the department of electronics engineering Mehran University of engineering and technology, Jamshoro during the spring of 2017. The aim of this project is to explore and mimic the movement of the snake in order to gain its advantages. The purpose of this project is to investigate how the motion of snakes can be used for the robotic movement.

The wheel is an amazing invention but it does not roll everywhere. Wheeled mechanisms constitute the backbone of ground based means of transp ortation. On relatively smooth surfaces such mechanism can achieve high speeds and have good steering ability. Unfortunately, rougher terrain makes it harder, If not impossible, for wheeled mechanism to move. In nature the snake is one of creatures that exhibit excellent mobility in various terrains. It is able to move through narrow spaces and climb on rough ground. This mobility property is attempted to be recreated in robots that look and move like snake inspired robots. These robots most often have a high number of degrees of freedom (DOF) and they are able to move without using active wheels or legs. Snake robots have the potential of contributing vastly in areas such as rescue mission, fire-fighting and maintenance where it may either be too narrow or too dangerous for personnel to operate. This project reports novel results within design and motion control of snake-inspired robots as step toward developing snake robots capable of such operations.

The strong motivation for this project work is:

   Such environments where traditional machines are precluded due to size or shape and,
   Where wheels are legs cause entrapment or failure.

Example environments include tight spaces, long narrow interior traverses, and movement over loose materials and terrains. Several applications, including industrial inspection and explorations of hazardous environments required serpentine robots.

In the first part, we provide tools for supportive autonomy in snake-inspired robot. To provide intuitive high level autonomous behaviors, we extend our labs existing giant based control framework to develop gait based compliant control. To reliably and accurately sense the robot's pose and shapes, a new technique is present for robust state estimation that leverage the redundancy in the distributed sensing capabilities of our snake-inspired robot.

To demonstrate these contributions in a practical application, we use them to enable a snake inspired robot to navigate a real-world underground pipe network.

Designed By:

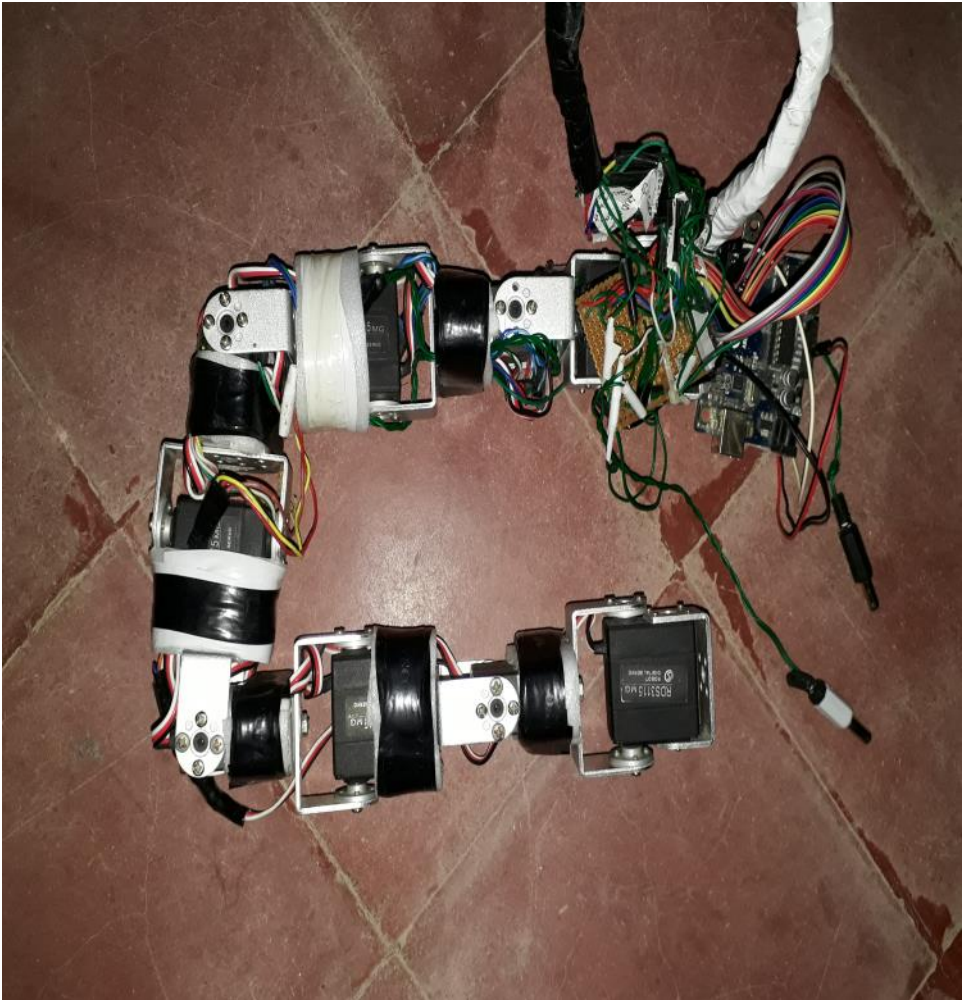♦ Agha Shahzeb Khan   14ES36

♦ Dushyant Kumar   14ES24

♦ Imtiaz Ahmed   14ES32

♦ Muhammad Danish   14ES46

♦ Shah Rukh Khan   14ES50

♦ Muhammad Yousuf Shaikh   14ES84

Supervisor: Dr. Arbab Nighat

Co-supervisor: Engr. Zaigham Abbas Shah

Raspberry Pi ismart home door security system

Abstract:

The sole purpose of advancement in science and technology is to make this world a better, safer and peaceful place. In present days, as the technology is raising a considerable measure where everyone seems to automate most of the possible things to take advantage in providing ease in life, secure and saving time and effort.

Nowadays, security and safety are paramount for everyone and in high demand due to its several advantages, and along with new advancements happening, the security of one's home must also be taken in consideration. In order to prevent our homes from theft and other unusual acts we have proposed a home door security system which will effectively manage this issue keeping user away from fear about home security in all cases. Whenever the user is away from his home for some reason, it happens sometimes that he is left unconnected with people who visit his place. These visitors may be known or unknown to user. The user will have the access of each and every visitor via a notification that appears on user's smart phone application and the door will automatically lock/unlock according to user's wish. This prototype also overcomes the need for the accessibility of monitoring controlling user's home from distant location with ease.

Development of this system consists of a central device (Raspberry Pi), a server and a smart phone application. As Pakistan is progressing day by day and more and more people are getting access to the wonderful benefits internet has to offer. Statistics along with the methodologies adopted in the design of this prototype opens up an opportunity for Pakistan to adopt this scheme not only for homes but on dedicated sites like hospitals, colonies, hotels etc. Working of the prototype itself, vouches for the credibility of the technique adopted.

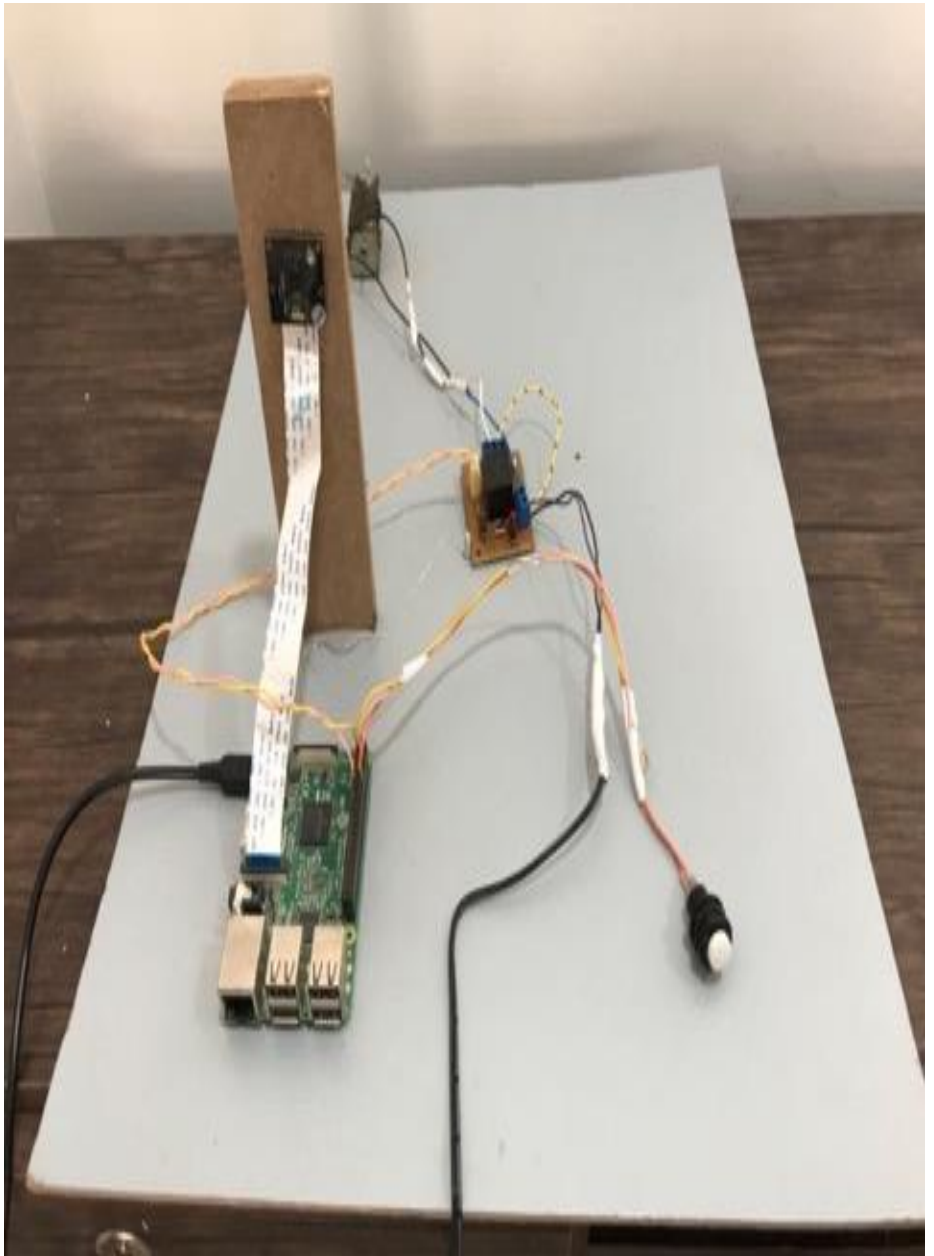**Supervisor:**   Prof. Dr. Bhawani Shankar Chowdhry

Co-supervisor: Dr. Imtiaz Hussain Kalwar

Designed By:

- Fozia   14ES05

- Sharfa Qureshi   14ES29

- Saghir Ali   14ES45

Vision based Intelligent Vehicle

Abstract:

The number of automobiles has been increased on the road in the past few years. Due to high density of human errors, the potential threats and road accidents are increasing. The aim of this project is to eliminate crashes all together and make the travelling safer than it was ever before. We have taken the advantage of technology for vehicles that can think themselves. Our intelligent vehicle uses PI-camera, raspberry pi, ultrasonic sensor, main processor (laptop) and Arduino to perform the tasks of traffic light and stop sign recognition and detection, obstacle detection and self-steering based on decision taken by neural network algorithm.

PI-camera attached with Raspberry PI takes real-time video frames. These video frames are sent to main processor (laptop) that uses the neural network algorithms, which are responsible for taking decisions. The main processor has Arduino attached with it via a serial interface. The laptop gives commands to Arduino given by neural network algorithms. A remote controller is further interfaced with the Arduino, which drives the vehicle according to the commands given by Arduino.

In this project we have used Neural network to control the steering direction of vehicle. Neural network is trained to differentiate between actual path and side planners. Training is done on OpenCV using back propagation algorithm. Once training is done, weights are saved to generate predictions.

Designed By:

- Noor-ul-Ain Ibrahim   14ES02

- Bilal Ahmed   14ES48

- Misbah Khan   14ES10

- Nimra   14ES08

- Sweety Luhana   14ES34

- Faiza Kouser   14ES30

Supervisor: Prof. Dr. Bhawani Shankar Chowdhry

Co-supervisor: Engr. Zaigham Abbas Shah
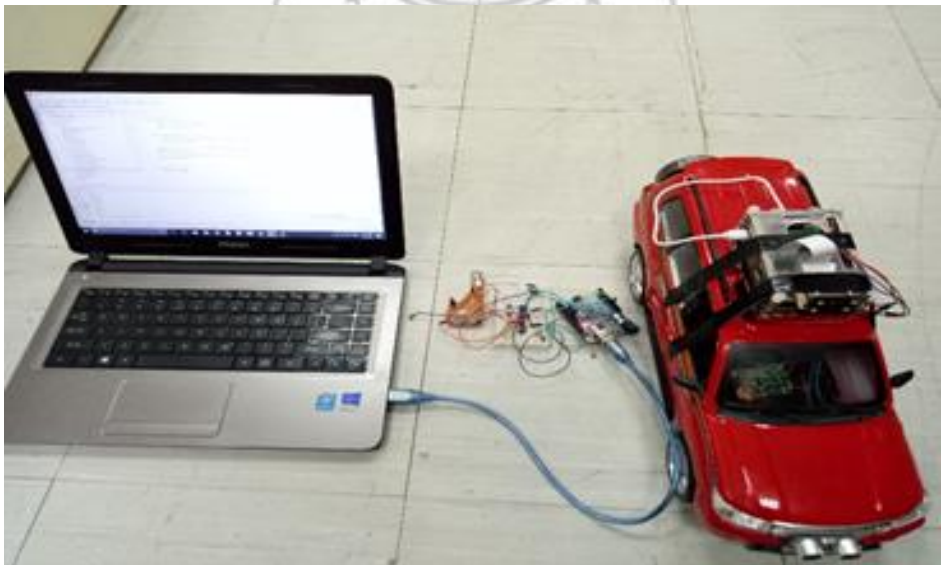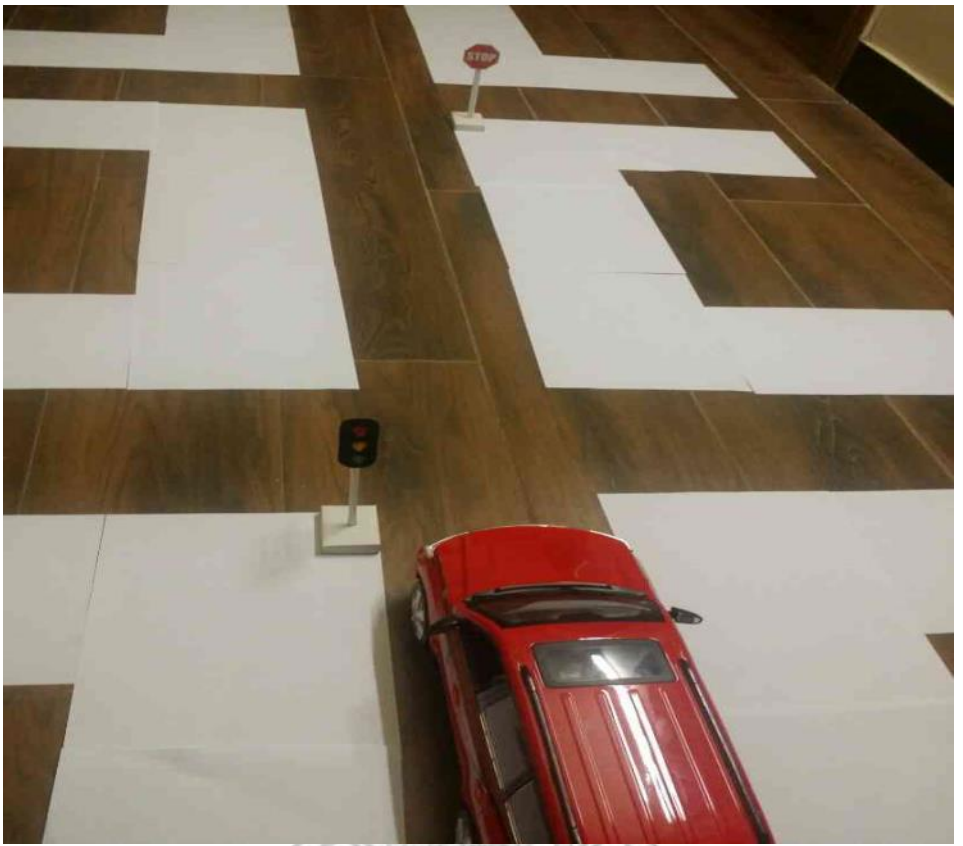
An indoor comfort based home energy management system

Abstract:

Today's era has replaced the manual labor with automation. Automation has given the world endless benefits that humans is enjoying. Our project accompanies context aware home automation to achieve multiple benefits especially the energy-savings. It primarily focuses upon the household conservation of energy. Putting things into perspective, the design establishes a context aware comfort index that assess an environment in terms of luminosity, temperature, humidity and air quality to minimize the total energy consumption in a human living environment.

. In this project, we have designed a model of a comfort aware home that incorporates various functions to analyze the comfort parameters in the residential areas and process its output according to the analyzed input. One sensing unit and one processor unit (decision maker) is utilized. The sensing unit contains an Arduino which is interfaced with the respective sensors (Light Sensor, Carbon di Oxide Sensor, Temperature Sensor, Humidity Sensor) with the support of some physical wiring and libraries installed. The comfort values are read by the sensors, which are transmitted after every instant to the Arduino. Those readings are then transmitted to the processing unit via Bluetooth. The processing unit also contains an Arduino, which acts as master unit and performs estimations based on fuzzy logic on those received measurements, check their thresholds, and regulate the devices (appliances) that are interfaced. The devices include exhaust fan to maintain Air quality, Heater and Cooler to maintain Temperature and LED strips to maintain the luminous intensity of light.

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Supervisor: Engr. Zaigham Abbas Shah

Co-supervisor: Engr. Aamir Ali Patoli

Designed By:

- Zarmeena   14ES68
- Anum Shaikh   14ES12
- Khadija Butt   14ES102
- Asif Khooharo   14ES06
- Shamasudin Bhutto   14ES54
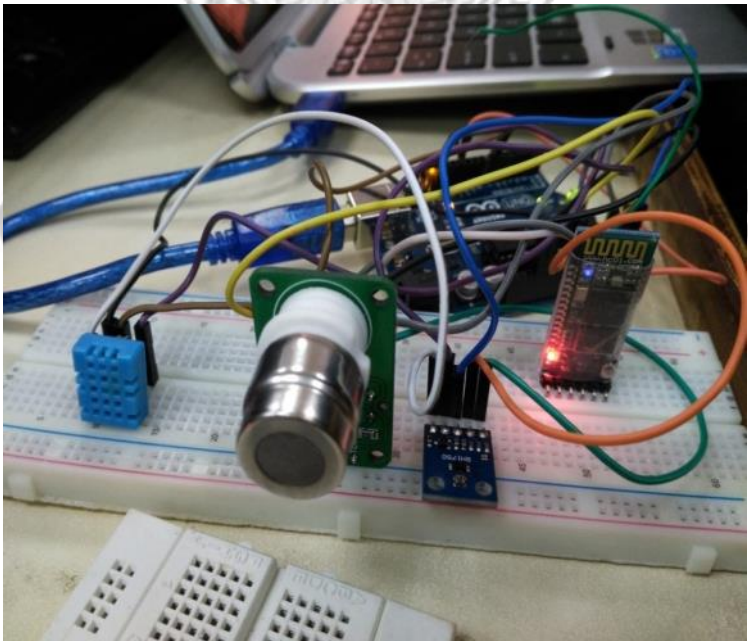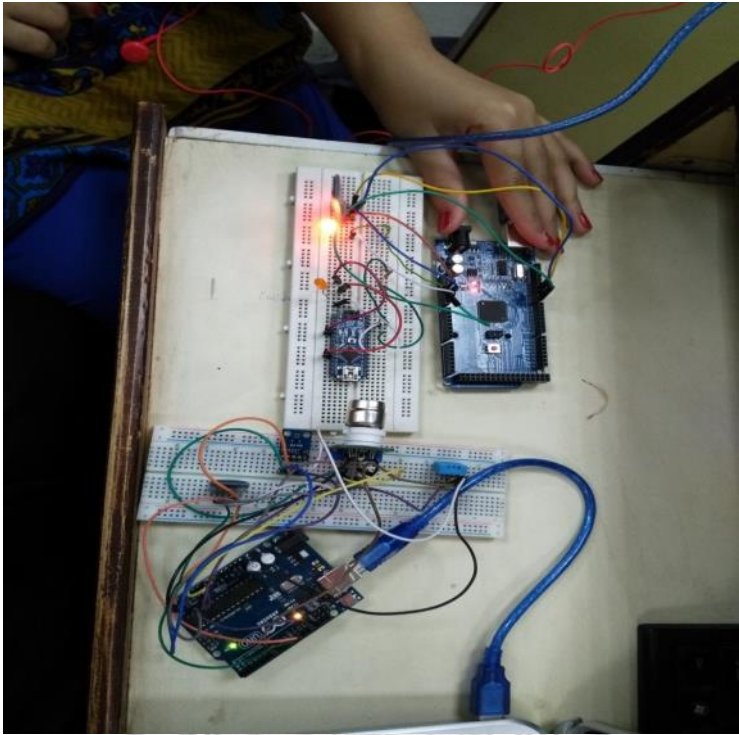
Design of consumer driven multi-agent smart home energy monitoring & management system

Abstract:

Considering the energy scarcity, the active participation of residential consumers is vital for a successful implementation of the smart grid vision. At the application level, Smart Energy Homes are considered as Sub-Smart Grid equipped with smart sensing nodes and intelligent appliances for monitoring and control of residential appliances load consumption to open the doors of consumer driven energy management and control.

In this research work, we have design and simulate a consumer driven multi-agent based home energy monitoring and management system using co-simulation platform of GridMat and GridLab-D. The JADE (Java Agent DEvelopment Framework) is used for the multi-agent design and communication which integrates the smart metering technology, DSM technology i.e., consumers active participation by adopting dynamic Time of Use price signals and load scheduling for smart home energy management and optimization. Simulation results confirm that by adopting proposed optimization algorithm a significant amount of energy not only can be saved also easing system network load stress but consumers can be significantly save their electric bills without much of sacrificing their comfort level.

Designed By:

♦ **Sania Khaskheli**   **14ES01**

♦ **Ayesha Khalid**   **14ES87**

Supervisor: Dr. Irfan Ahmed Halepoto

Design of Consumer Driven Multi-agent Smart Home Energy Monitoring and Management System

Study

- Home Appliances Load Monitoring Techniques
- Home Appliances Load Data Extraction
- Home Appliances Load Consumption Profile

Design

- Smart Energy Home Appliances Operational Model
- Multi-agent Smart Energy Home Model
- Smart Energy Home Control
- Consumer driven Multi-agent Smart Home Energy Management Model

Development

- MATLAB
- JADE Framework
- JaCoMO Framework
- GridMat tool

Co-simulation

Demand2consume protocol

Validation
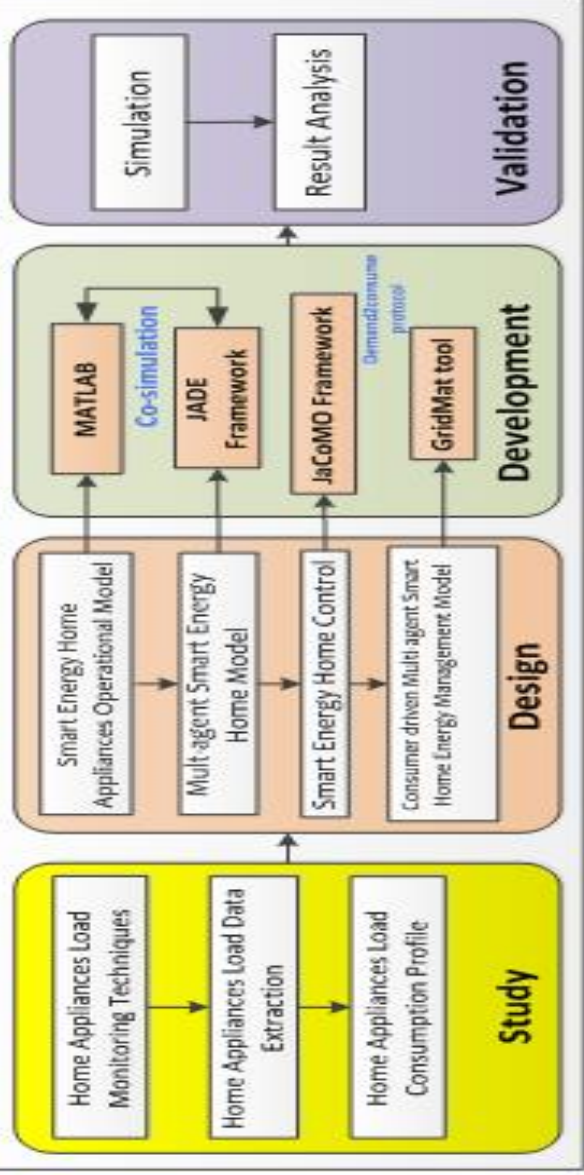
- Simulation
- Result Analysis

Fire Fighting robot using microcontroller technology

Abstract:

Aim of this thesis/project is to design and manufacture a fire detection robot that especially operates in industrial areas and other buildings for fire inspection and early detection. Robot is designed and implemented to track prescribed paths with obstacle avoidance function through obstacle avoidance and motion planning units and to scan the environment in order to detect fire source using fire detection unit. Robot is able to detect the fire 360 degrees in its surrounding.

The Implementation and Design processes of the robot are as follow; the design and the development of mechanical, electronic systems and software. The design and the development of mechanical system; for the sketch drawings, dimensioning and solid state modeling of the robot were used. The carrier board of the robot is produced using wooden material and rigid plastic foam which are cheap, strong enough and easy to manufacture. Differential steering method is selected for robot driving system and it is powered by two brushed DC (direct current) motors. The design and the development of electronic system; electronic circuits were designed and produced, instead of buying a commercial card. These circuits are used to control the motion of the motors and the other peripheral sensing components. Software development; intelligent algorithms for obstacle avoidance and path tracking have been developed. A sensor data fusion algorithm for the sensors was also developed to get more reliable fire detection information.
In conclusion; a fire inspection and detection robot with various functions to especially can be used in industrial areas was designed and manufactured. The functions of the robot were tested. It can be concluded that system is able to detect the fire source maximum 10000 cm distance away while robot is moving with 0.6 m/s forward speed.

Designed By:

- Awais Memon   14ES52

- Aliya Aijaz Memon   14ES40

- Sagar Qazi   14ES90

- Irfanullah   14ES110

- Zeeshan Hussain   14ES80

Supervisor: Dr. Farzana Rauf Abro

Co-supervisor: Dr. Tayab-Din Memon

Phase locked loop control of inverter in microgrid

Abstract:

This project deals with the design, analysis and implementation of a three -phase grid-connected DC/AC inverter, where the input is a typical renewable energy source such as a photovoltaic array. The main contributions in this work are the developments of harmonic filtering analysis plus the design and control of the inverter with grid synchronization techniques.

Initially the principles of three-phase grid connected inverter are presented in order to understand the basis for this work. A broad literature review is presented in order to cover system configurations, voltage and current controls and grid synchronization methods. At the end of this chapter, the motivation and novel contributions derived in this work are presented, supporting the goals and procedures taken in this research.

Designed By:

- Sidra Baloch   14ES99
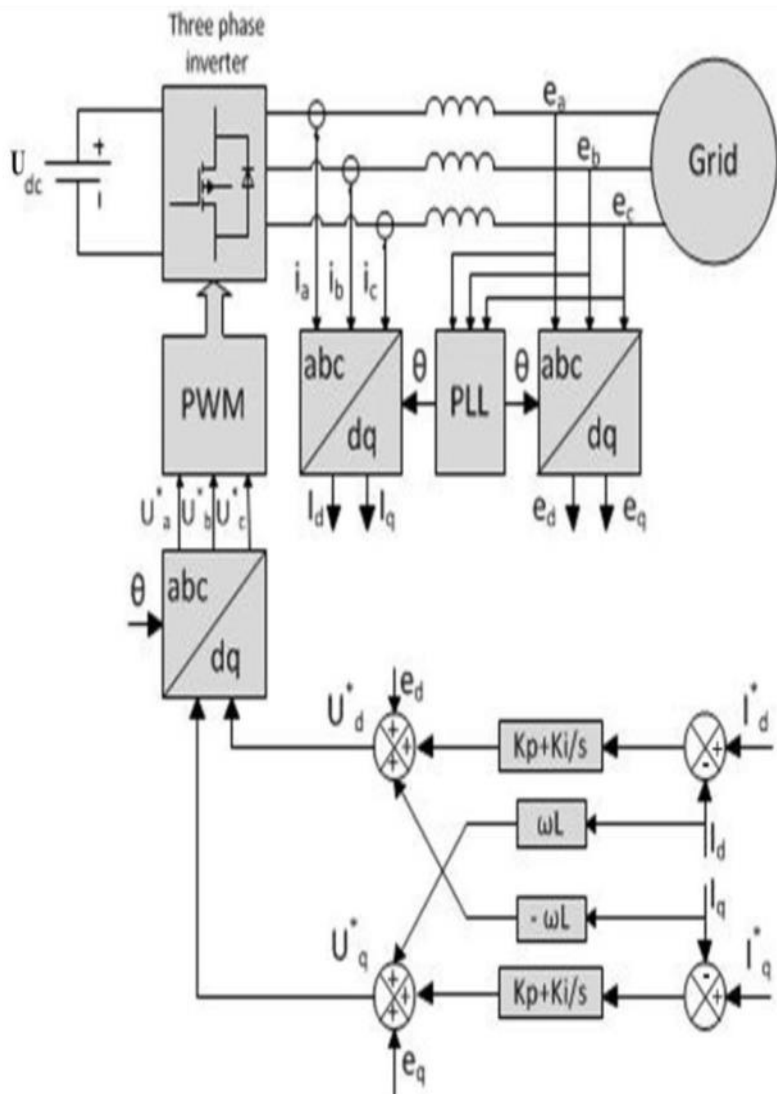- Sundus Memon   14ES101
- Maira Bano   14ERS47
- Takhleeq Qureshi   14-13ES89

Supervisor: Dr. Imtiaz Hussain Kalwar

Co-supervisor: Engr. Aamir Ali Patoli

Programmable Power Supply

Abstract:

The number of power supplies have increased in the past few years since every device is in need of different power ratings so different power supplies gives different power ratings, As the number of power supplies increases it is difficult to handle and maintain it.

Before this there are many manual power supplies were made where amplitude of voltage is varied with a potentiometer where errors may occur. Aim of Programmable Power Supply is to provide an interface where user has to give input and automatically power supply is set their output on user requirements.

We worked on to merge all those power supplies into a single power supply that provides different power ratings. By the use of technology, we have taken the advantage of merging all of these power supplies into a single power supply to help in the reduction of burning devices and can be helpful for user to have required output through an interface.

Our power supply uses four converters 1. Inverter, 2. Rectifier, 3. AC-AC converters (cycloconverter), 4. DC-DC converter (Buck converter, Boost converter, Buck boost converter) in hardware and these are interfaced using a micro controller, but we have worked on developing a GUI (graphical user interface) using MATLAB, GUI provides us a user friendly control to set the ratings of voltages according to user requirements.

Designed By:

- Prem Pertika   14ES22
- Ali Memon   14ES96
- Arsalan Choudhary   14ES100
- Zorwar Kaim Khani   14-13ES114
- Naveen Qureshi   14ES78
- Hibba Zahid   14ES16

Supervisor: Engr. Aamir Ali Patoli

Co-supervisor: Dr. Imtiaz Hussain Kalwar

Figure — Final_GUI: PROGRAMMABLE POWER SUPPLY (AC Frequency Change set to 12.5 Hz)

DC Voltages
Input 7 V
DC Output

AC Frequency Change
Frequency 12.5 Hz
Set Frequency

Output — Time Series Plot:

Figure — Final_GUI: PROGRAMMABLE POWER SUPPLY (DC Output, Input 7 V)

DC Voltages
Input 7 V
DC Output

AC Frequency Change
Frequency Hz
Set Frequency

Output — Time Series Plot:
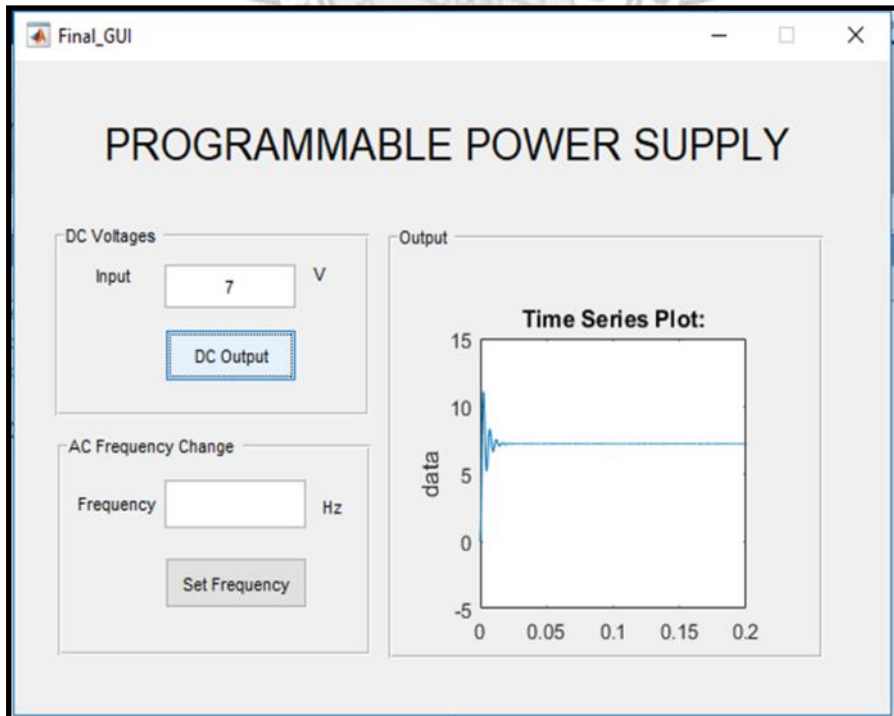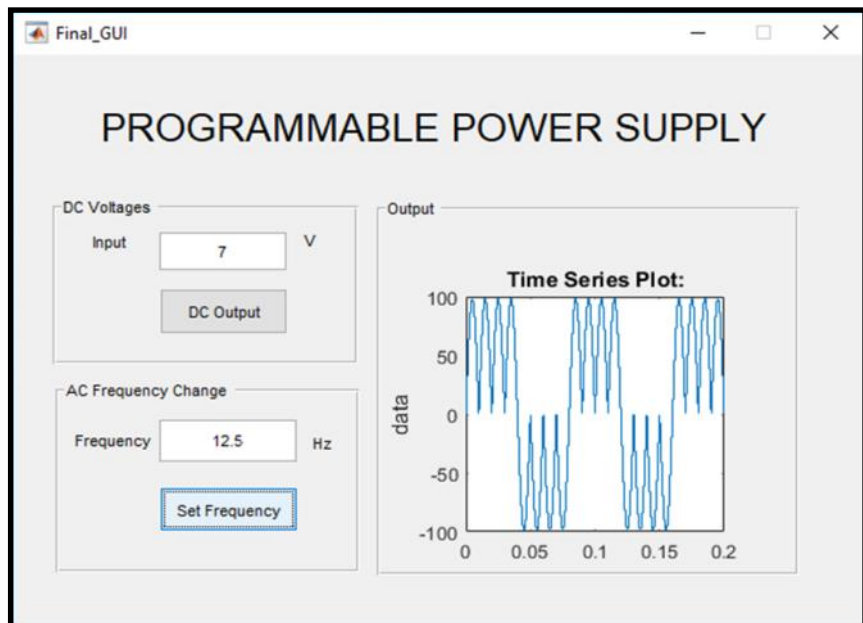
FPGA based secured home automation system using RF module

Abstract:

Smart wireless home automation system is an emanating technology for smart building control. Rf module is a low cost, low power, less complex wireless technology that utilizes a multi hop communication for transference of data. This technique gives an extremely great range of communication which makes it more preferred over other wireless technologies. The radio frequency communication system is operated using ASK technique with transmitter and receiver operating at frequency of 433 MHz, because of wide range of frequency, data can be transmitted and received at sufficient distance without loss of data.

FPGAs are the most compatible and specialized devices for the emerging technologies due to their security, configurability and reprogrammmability. The project comprises communication of data to be secured and protected from unauthorized access. This security can be achieved by using Encryption and decryption techniques on data to be communicated. If one of the stations is stationary, then this can be used as an application of automation.

Eventually, the aim of this project is to wirelessly transmit and receive data with high security and control output from any remote place. By using a radio frequency transmitter and receiver modules operating at a range of 433 MHz.

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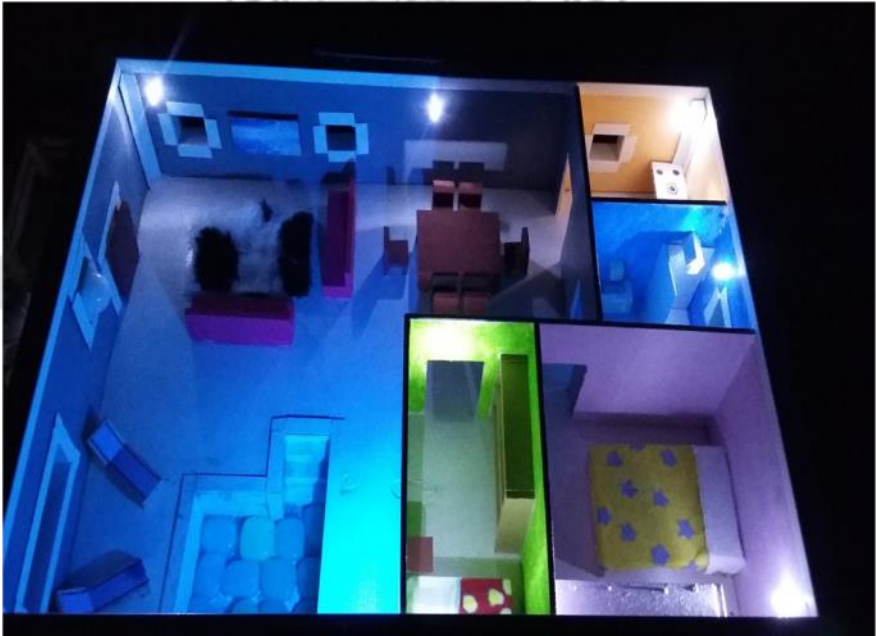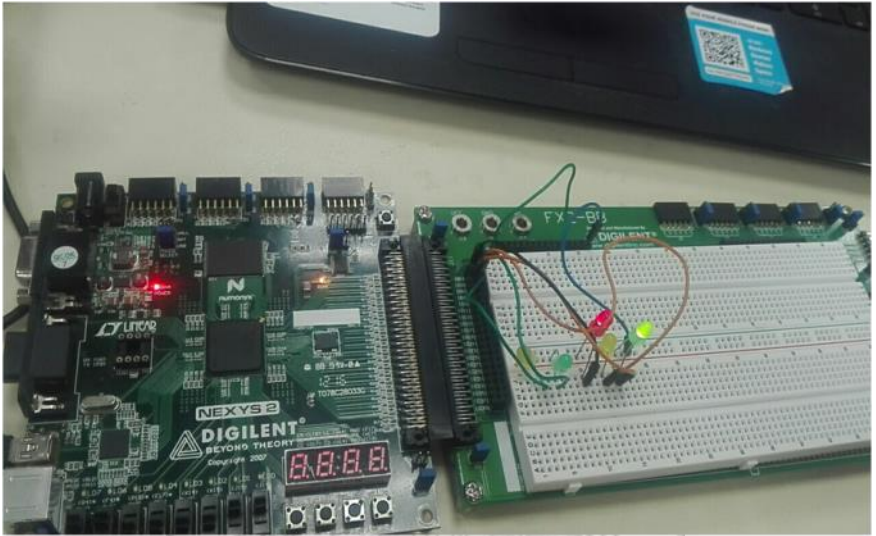
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Arduino based spy and security car

Abstract:

Now a days research and development has been increased in the field of surveillance and security because of human life risks have been increased due to terror attacks and suicide bombing, for that purpose science have been working on several projects to reduce the risks of human lives, and we also have worked on a project named arduino based spy and security car using night vision camera

Aim of this project is a robot car vehicle that can be controlled through any android application connected wirelessly through a Bluetooth module.This robot consist of the arduino UNO that provides signals to the motor driver, motor driver controls the motion of vehicles and on the other hand the night vision camera can be used to monitor and grab different information when it is on surveillance and shows it up on any LCD or computer.

The robot car can be controlled through an android application, its function is to control the movement such as; going up, going down, going right, and going left this all can be done through the android application.
We have used the Bluetooth module that is HC 05 for the serial communication. Bluetooth module that sends the data serially to the microcontroller for the movement of car.

The main objective behind the project is for the security purpose.
The process involved in building the robot includes the assembling of a chassis used for the robot motion of car through motor driver and programming the arduino as well as the interface for the android device.
The outcome of the project is a combination of embedded computing and programming.

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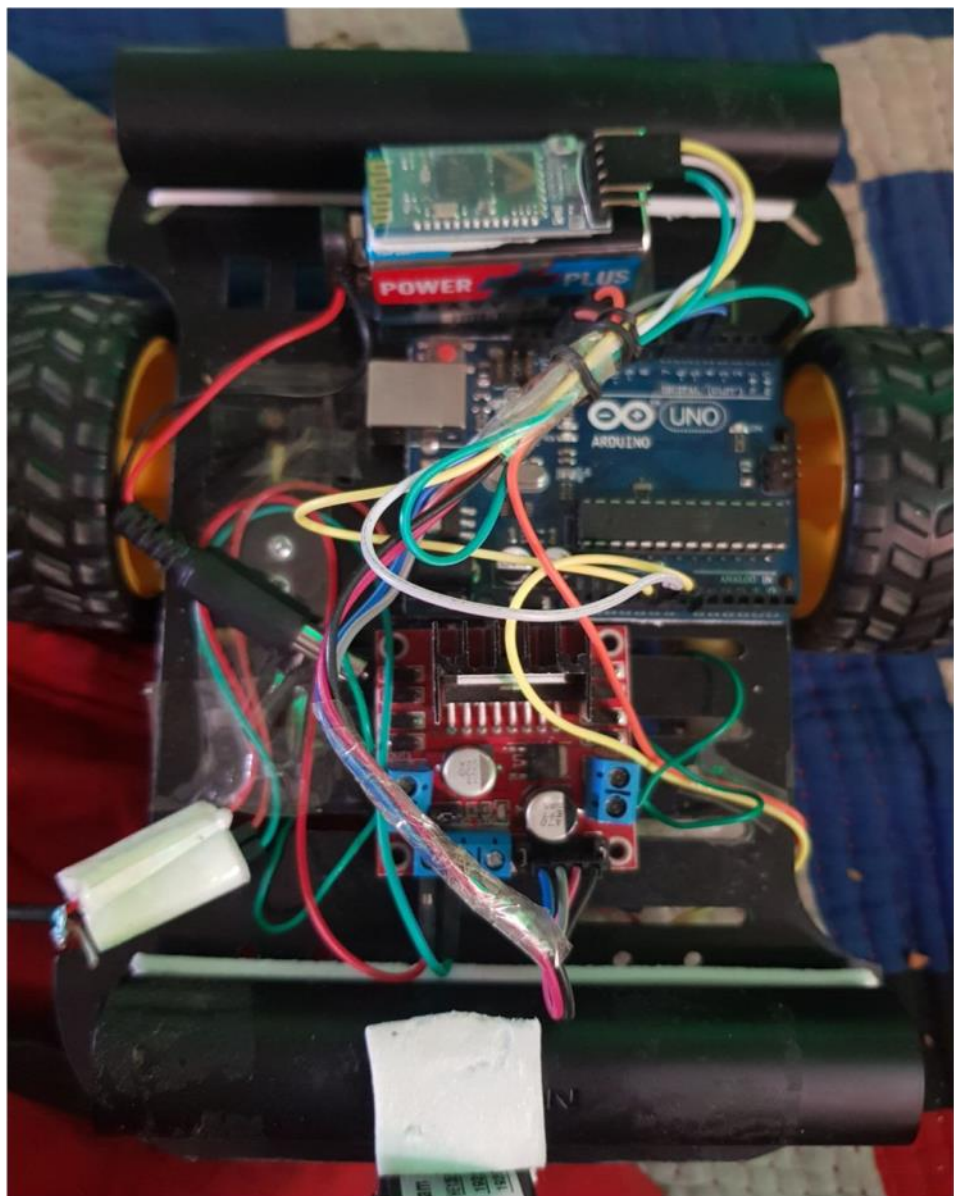
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Supervisor: Dr. Farzana Rauf Abro

Co-supervisor: Engr. Tufail Ahmed Waseer

Interfacing keyboard & VGA monitor to Xilinx ISE

Abstract:

This Project describes about the design of VGA (Video Graphic Array) Controller and PS-2 keyboard controller using combination of three bit input data to control eight different colours to display data at monitor by using keyboard. Three colour signal referred to collectively as R (red), G (green) and B (blue) signal. The VGA monitor using resolution of 640 by 480 by mode to display colours.
The project constructed by using Xilinx ISE 14.2 software and Xilinx Spartan-3E board to develop the project into a complete module.
The design will be written using VHDL (VHSIC Hardware Description Language) coding style based VGA controller and PS-2 controller work properly.
The behavioral simulation was done by using Xilinx ISE Tool software to verify the functionality of the design.
The Spartan 3E starter Kit board was chosen to implement the design.

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Smart Vehicle Parking System

Abstract:

This project is based on smart parking system. In today parking lots, there are no standard system to check for parking spaces. The system heavily relies on human interaction with the physical space and entity. This leads to wastage of human manpower and also parking spaces at times. These parking lots are dependent on Human-to Human Interaction (HHI) which is not efficient.

Most of the time when users go to malls and commercial complex, they experience that there is a limited space for parking spots reserved for particular members whose data base is already saved. Hence, there is a desperate need of a robust parking system that assigns an optimal parking space while also ensuring that the overall parking capacity is efficiently utilized. Our approach solves a Mixed Integer Linear Program (MILP) problem at each decision point in a time-driven sequence.

Where we build a smart system so we can easily get access to it and make it more suitable and efficient as possible. To solve, innovating security and revolutionize smart parking system with finger print access, enhancing the security using finger print access and image processing in raspberry pi, simplifying parking system without any congestion, position platform with catering convenience, to provide an efficient plat form where the parking slot will move to the customer rather than the customer go to the parking system.

This project is based on circular platform that will automatically rotate and will provide particular ID corresponding to the slot being located in which division of slots is based on partition of 360 degree according to the size of garage, finger print access to provide security, where the person sees the slot vacancy by the LED once the person confirm the vacancy, he will go to the scanning process and capturing the picture can also be done by raspberry pi. In order to park the car, pi and scanner will save the picture and fingerprint and the door will open and the slot which has vacancy in circular motion will come to the person. In order to retrieve the car, scanner will detect and door will open and the slot which was allotted in circular motion will come to the person so that he can retrieve the car.

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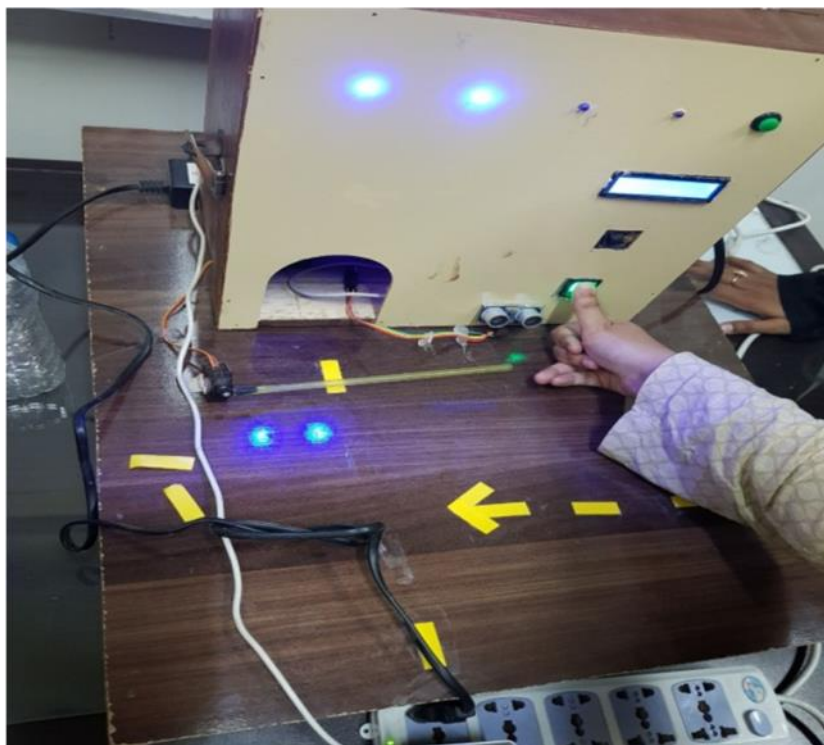- Pirh Khan   14ES38
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Electromagnetic Anti-lock braking ABS System

Abstract:

Electromagnetic Anti-lock Braking System is a fusion of two well-known and well tested technologies used for braking now a days i.e. Electromagnetic braking and Anti-lock braking system.

Electromagnetic anti-lock braking system slows down a car by producing eddy current through electromagnetic induction while maintaining the slip ratio of 0.2%.

Our system keeps an eye on brake pedal, longitudinal speed of vehicle and rotational speed of tire. If the tire gets locked and the inertia of vehicle is about to break the friction of tire with the road, the system cuts off the current easing the brakes and letting the tires to rotate again and catch up the speed and applies the brake again if the car is still in motion and the user is applying brake, the system will keep on iterating this procedure until either the vehicle comes to a stop or the user stops applying the brake.

Our aim with this project is to check the uniqueness of this idea and its practicality in real life. Our idea is still limited to longitudinal braking on asphalt only and is not considered for any angular motion or on any other surface. To obtain the above-mentioned aim we applied our Electromagnetic Anti-lock braking system to a commonly found 70-CC motorcycle's front wheel and compared it with conventional braking system of bikes normally available.

The scope of this system is huge, it can be applied to any vehicle as a replacement to conventional braking or to heavy vehicle as a secondary braking system

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Position control of motor using PID in LabVIEW

Abstract:

DC motor varies proportional to the input voltage. With a fixed supply voltage the speed of the motor can be changed by switching the supply on and off so frequently that the motor notices only the average voltage effect and not the switching operation. This thesis focuses on controlling the speed of a DC motor using PWM technique (varying duty cycle of a square wave) and Data Acquisition Systems. In this circuit, the DC motor is operated by the MOSFET circuit or mega Arduino. In this mode, the circuit can be used as a pulse width modulator with a few small adjustments to the circuit.

One of the best things about this circuit is that we can make it works as an a stable multivibrator with little hardware and buy little cost which can save both the cost involved in making it as well as the space on the printed circuit board is saved.

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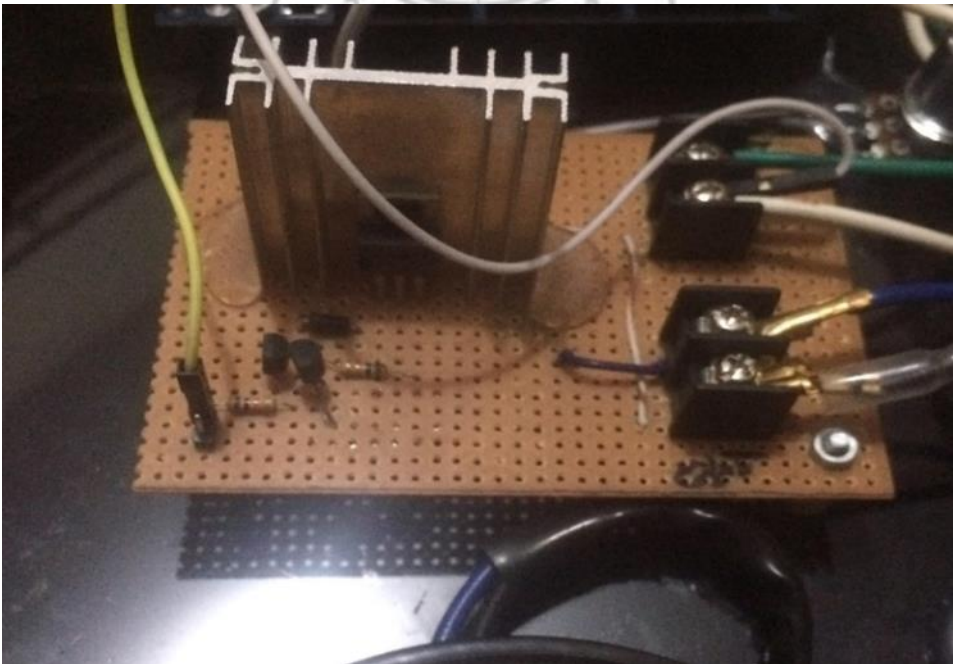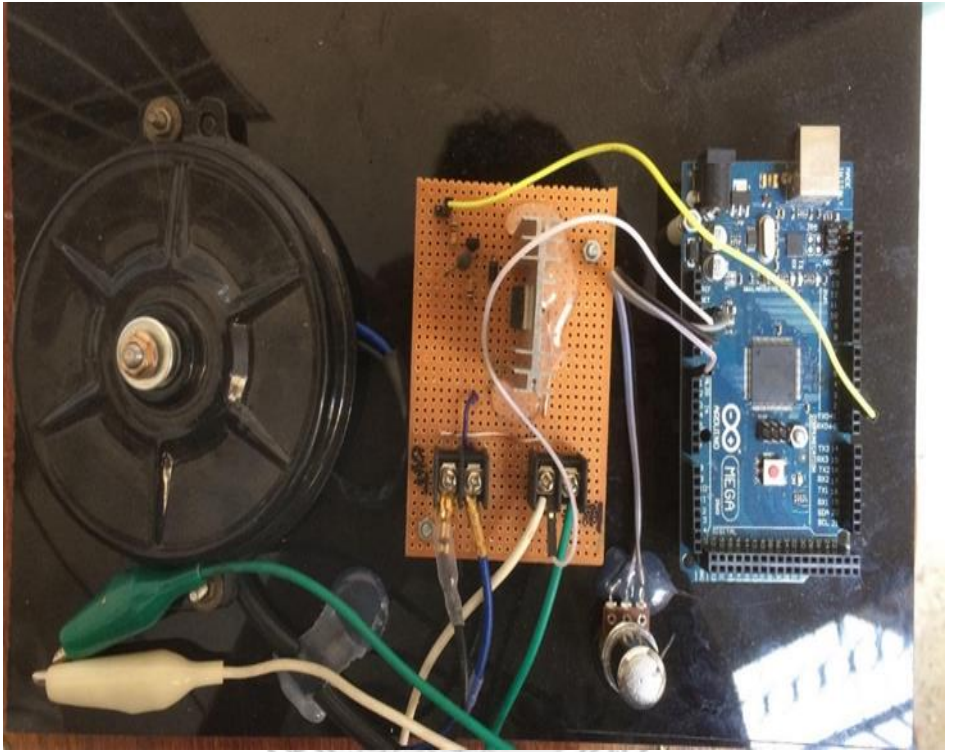**Supervisor:**   Dr. Farzana Rauf Abro

Co-supervisor: Dr. Imtiaz Hussain Kalwar

Automatic controlling of gas water

Abstract:

Pakistan is facing a crippling energy crisis today. The onset of winter would mean more hours of gas outage as the demand for gas heaters increases due to the cold winter months. Wise usage of energy is important part of gas conservation. In this regard, there have been several attempts to develop systems with the intention to allow automation of home appliances. If you live in a home with a gas water heater and notice cold water coming from your hot water faucet, there's a good chance your pilot light has gone out. Relighting it again would require manual work and much more time. And to get the water hot, it requires additional amount of time. In Pakistan, the gas pressure is not well maintained which results in automatic turn off of water heater system. A control/safety apparatus and method for an automatic controller for gas water heater includes temperature sensor strategically located on the water heater vessel at a level at or above a critical water level. The time rate of temperature change is calculated from the sensed temperature. An abnormal value of temperature change rate corresponding to an insufficient water level deactivates the heater to prevent damage to the heater. Water level, projected heating times, heater malfunctions and other operating parameters may be calculated or detected based on the time rate of change in sensed temperature.

Our proposed system is technically designed to overcome the manual work of lighting the pilot. It does all the tasks of the pilot automatically without any manual work. Its solenoid valve turns on the flow of gas to the burner then the Electric Arc ignitor will automatically starts sparking then the system will start functioning. Our well placed sensor senses the temperature automatically and accurately. It shows the output on the LCD where the temperature can be monitored easily. It ask the user to give a maximum temperature input then compares the output and user's input to control water's hotness.

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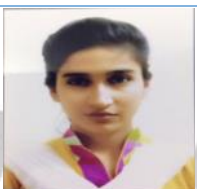
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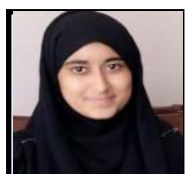
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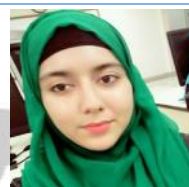|	
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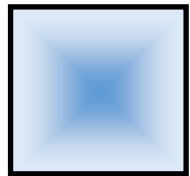|	
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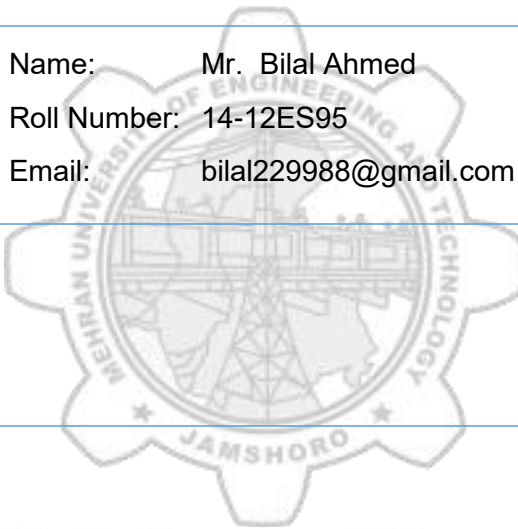
Final Year Projects
14ES

Department of Electronic Engineering

Electronic Engineering is an increasingly important engineering discipline that significantly affects the other disciplines of engineering. It is in great demand in both developed and developing nations. Continual advances in electronic engineering in the areas of materials, processes, devices, and circuits have been leading to rapid advances, in the existing applications of engineering as well as in the emergence of new applications. To harness the full potential of electronic engineering developments and further advance the state of electronic technology, it is important to have strong programs to educate and train individuals in this key discipline of engineering.

Electronic Engineering artifacts play major role in the evolution of mankind and culture. Today, the Electronic Engineering profession and the education of engineers are challenged by the rapidly changing nature of those engineering systems which determine what is meant by 'modern technology'. The advent of Microprocessor Technology has probably made Electronic Engineering the exemplary technology of this century, along with emergence of new species, with higher levels of integration. The existing and potential uses and applications of Electronics are multitudinous. Indeed it is difficult to point to any industrial or commercial area which may not eventually be affected by this technology.

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