Final Year Projects

of

13ES
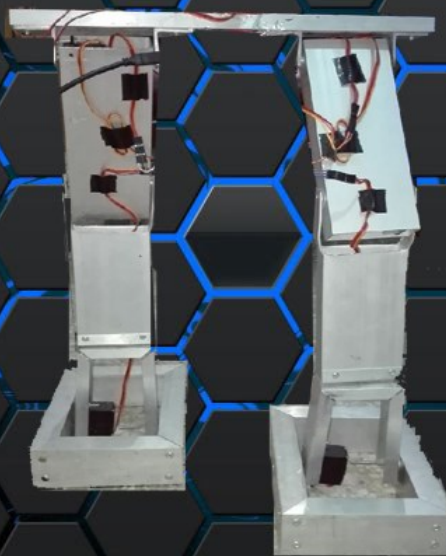
Editors:
Prof. Dr. B.S.Chowdhry
Prof. Dr. Wajiha Shah

Compiled By:
Engr. Azam Rafique Memon

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 Stair Climbing Robot, Advanced Human Gesture Controlled Applications with Microsoft Kinect, Artificial Environment Based Agriculture Growth Chamber, and The Piezo Smart Road which have been funded by various external organizations and bodies. And also projects such as Power Transmission Protection & Monitoring System and Smart Street Lighting which address real problems faced by the country. A significant achievement is that a four projects are funded by National ICT R&D fund.

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.

Long live Mehran ! Pakistan Paindabad!

Prof. Dr Bhawani Shankar Chowdhry

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 (13ES) of Electronic Engineering Department has put in their invaluable efforts and technical expertise in designing real life application-oriented projects like *Advanced Human gestures Controlled Applications with Microsoft Kinect, Smart Street Lighting, and Artificial Environment based Agriculture Growth Chamber*, 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 various groups of students got their projects (due to their strong relevance with current industrial and societal requirement) funded by National grassroots ICT Research initiative.

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

Table of Contents

Funded Projects

Funded Projects of 13ES:

Total Funding Amount: PKR 264,500

National ICT R&D Funded Projects:

1. Advanced Human Gesture Controlled Application Using Microsoft Kinect

Funded by National ICT R&D (Funding Amount: PKR 75,000)

2. Stair Climbing Robot

Funded by National ICT R&D (Funding Amount: PKR 48,000)

3. Piezo Smart Road and Intelligent Transportation

Funded by National ICT R&D (Funding Amount: PKR 70,000)

4. Artificial Environment Based Agricultural Growth Chamber

Funded by National ICT R&D (Funding Amount: PKR 71,500)

Smart Street Lighting

Abstract:

Smart street lighting system is another approach to reduce power consumption. The street lights are turned after sunset till sunrise regardless if any vehicle or human passes from a road, which results in the most of the power to be wasted in a world where power saving is very important.

In past some measures have been taken to reduce the power consumption by introducing new systems/projects. Some of the systems automatically turn the lights on during night time only. While others not only turn on the lights during night time abut also when vehicle/human pass on the road.

An efficient and cost effective system would be one which not only turns on and off the light but it should be turned on and off In a way that can save more power than before. This work is a sole dedication to reduce the power consumption and making a cost effective system as well. Smart street lighting system turns on the light when it's dark but it does not illuminate with 100% power. Instead the illumination of the light is controlled in a manner that it is different for various cases/scenarios.

When the light is turned with a specified amount of power and not 100%, a lot of power is saved and can be used at some other place for the same or different purposes. As the project is cost effective thus it also saves money and time as well. The project was developed to meet the goal and was tested several times while developing the project itself.

Designed By:

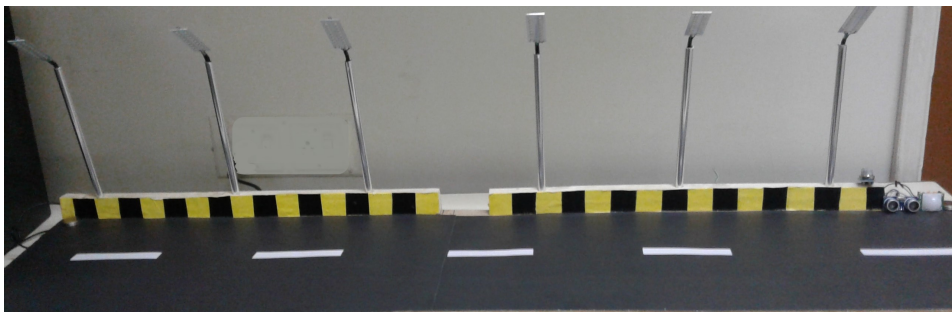|	
• Sahrish Maqbool	13ES23
• Murk Junejo	13ES53
• Waseem Salam	13ES39
• Syed Aizaz Badar	13ES133
• Abdul Hafeez	13ES37
• Hasaan Ahmed	13ES123

Supervisor: Dr. Winod Kumar

Co-supervisor: Engr. Zaigham Abbas Shah

Advance Human Gesture Controlled Applications Using Microsoft Kinect

Abstract:

We have introduced a real-time Virtual Dressing Room which is one of the applications of the Microsoft Kinect. It allows the user to try-on virtual clothes by using the concept of Augmented Reality. The user's skeleton joints are tracked using the depth camera provided by the Kinect sensor. Through the depth image, the segmentation data of the user body structure is obtained. In this manner, the virtual clothes are aligned on the user's body, once his/her pose and position is tracked by the sensor. The Kinect sensor is interfaced with MATLAB in order to provide this functionality.

The main focus of this project is to bring enhancement in the shopping world. In present days, majority of the people prefer online shopping but they cannot try-on the clothes while doing so. At many shops, there are long queues of people outside the try-on rooms. For such reasons, we have designed a virtual try-on room, which allows the user to try on clothing virtually on a screen using hand gestures with the help of a Kinect sensor during runtime. It saves time, and a user can try on multiple numbers of clothing by the swipe of hand gestures.

Many of the current existing Virtual Dressing Rooms are based on a diverse approaches, whereas the additional features provided in our project which let the user to experience more versatile environment. This include features such as Skin color based suggestions, Size suggestions for different user's body sizes and Voice controlled application. This project adds a lot of value in the interacting features of a real-time Virtual Dressing Room application.

Designed By:

- W. Kushan Anuruddha Fernando   13ES132
- Ahsen Noor   13ES49
- Muhammad Wasay Memon   13ES116
- Sara Zahoor   13ES52
- Kiran Fatima   13ES54

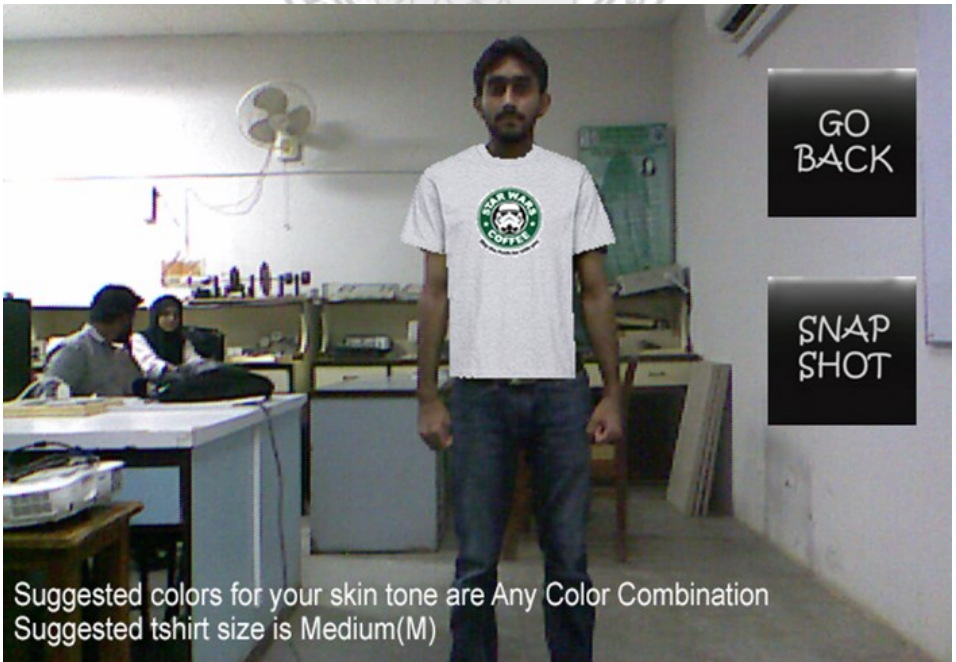- Aqsa Shaikh   13ES70

Supervisor: Engr. Khuhed Memon

Co-supervisor: Engr. Azam Rafique Memon

Suggested colors for your skin tone are Any Color Combination
Suggested tshirt size is Medium(M)

Stair Climbing Robot

Abstract:

The main objective of this project is the development of human-like robotic legs with the capabilities of self-balancing, stair climbing and avoiding obstacles. We are proposing a robot that looks like a human leg and can adjust itself according to the height of the step. Each leg of the robot has four servo motors which are operated by Arduino Mega 2560. The Final biped is a two legged Arduino controlled actuated robot with 8 Degrees of Freedom (DOF).

First step involves the designing of the basic structure and self-balancing. This is achieved by the use of accelerometers. Accelerometers will detect the acceleration when the legs are moved and set the angle for the servo motors through Arduino. Secondly these legs are used for the purpose of stair climbing. This is achieved by the use of ultrasonic sensors and accelerometers that detect the step size of the stairs and send the signals to Arduino which drives the servo motors accordingly. A Bluetooth Module is used to connect the Arduino to the computer.

The Aim of Biped robot is to serve as companions and assistants for humans in daily life and as ultimate helpers in man-made and natural disasters. It is designed to overcome the drawbacks of vehicular robots.

Designed By:

•	Syed Asim Ali Shah	13ES57
•	Rabia Naeem	13ES35
•	Ujala Jawaid	13ES55
•	Sunny Babu	13ES27
•	Ahsan Kori	13ES31
•	Ahmed Saleem Memon	13ES19

Supervisor: Prof. Dr. Bhawani Shankar Chowdhry

Co-supervisor: Engr. Azam Rafique Memon
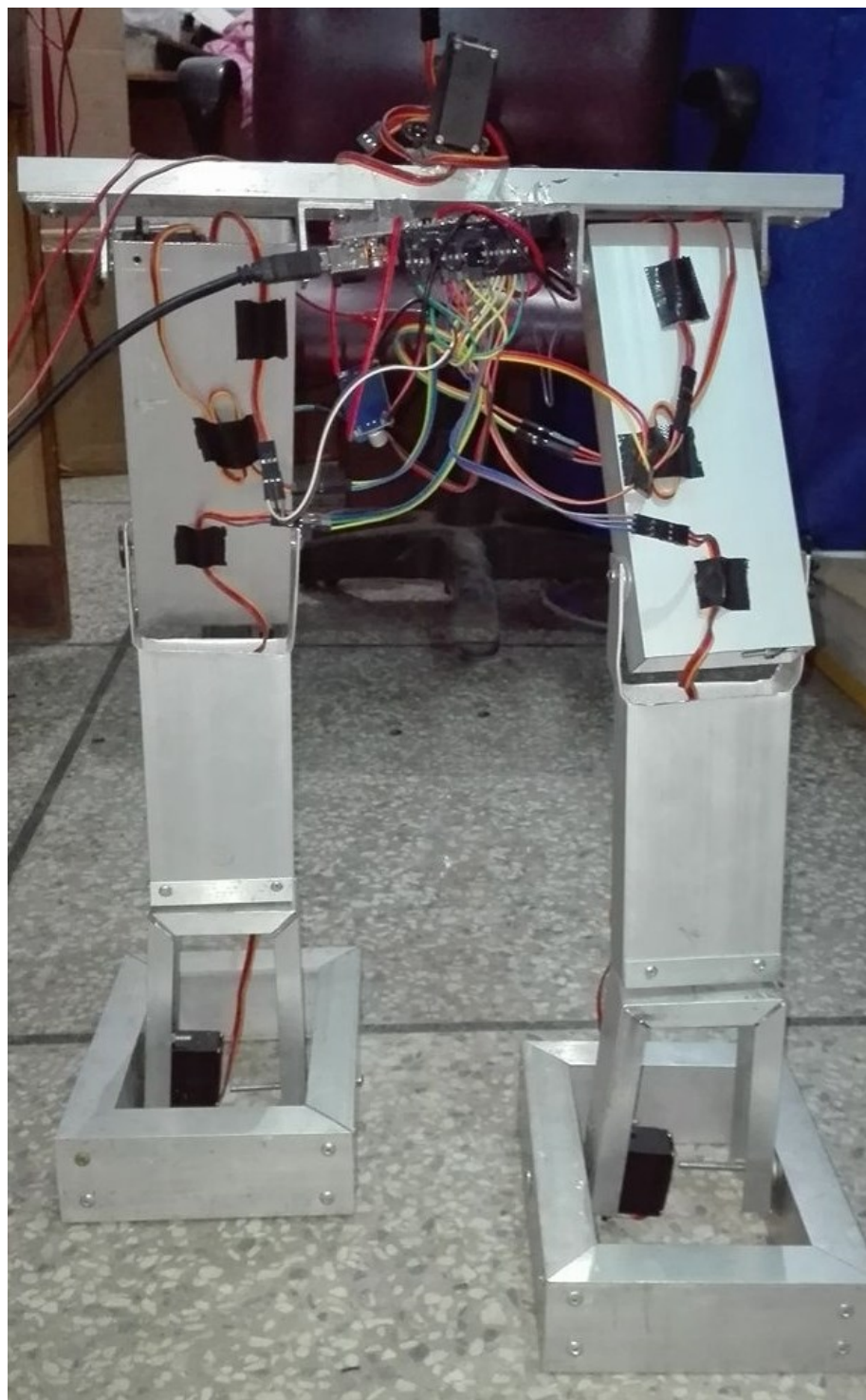
# Power Transmission Protection And Monitoring System

Abstract:

Growth in request of electricity aimed at many applications in somewhat country, want to produce dependably with advance protection system. Several special protections systems are obtainable based on volume of power distributed and often the load changes without prediction required an advance & special communication based systems to regulator electrical parameters generation. Although most of the systems are reliable on several applications but then not perfect for the electrical applications. Electrical atmosphere will have the lots of disturbances in nature, due toward natural tragedy similar storms, typhoons & heavy rainfall transmission lines may lead toward damage. Electrical wires may cut & fall on ground because of these natural disasters, this leads toward very harmful not only human being but each and every living thing it may take the life of innocent people.so, the rigid, dependable and robust communication like GSM technology is used this enhances the speed of communication without distance in dependency. This technology saves the human life after this electrical hazard by providing fault finding & automatically stops electricity from the damaged line and transports the message to electrical company to clear fault. The embedded built hardware system is designed and necessity acquire data from electrical detecting system. Some supremacy GSM networkers are designed to send the data from one network to another, a protection system is designed to immediately stops the electricity in case of any electrical fault.

Designed By:

- **Arslan Saeed Shaikh (G.L)**   **13ES131**
- **Haseeb Naeem**   **13ES17**
- **Muhammad Anas**   **13ES125**
- **Syed Zain-ul-Abdeen**   **13ES83**
- **Tayyab Nisar**   **13ES95**
- **Vishal Lohana**   **13ES107**

Supervisor: Engr. Kamran Kazi

Co-supervisor: Engr. Aamir Ali Patoli
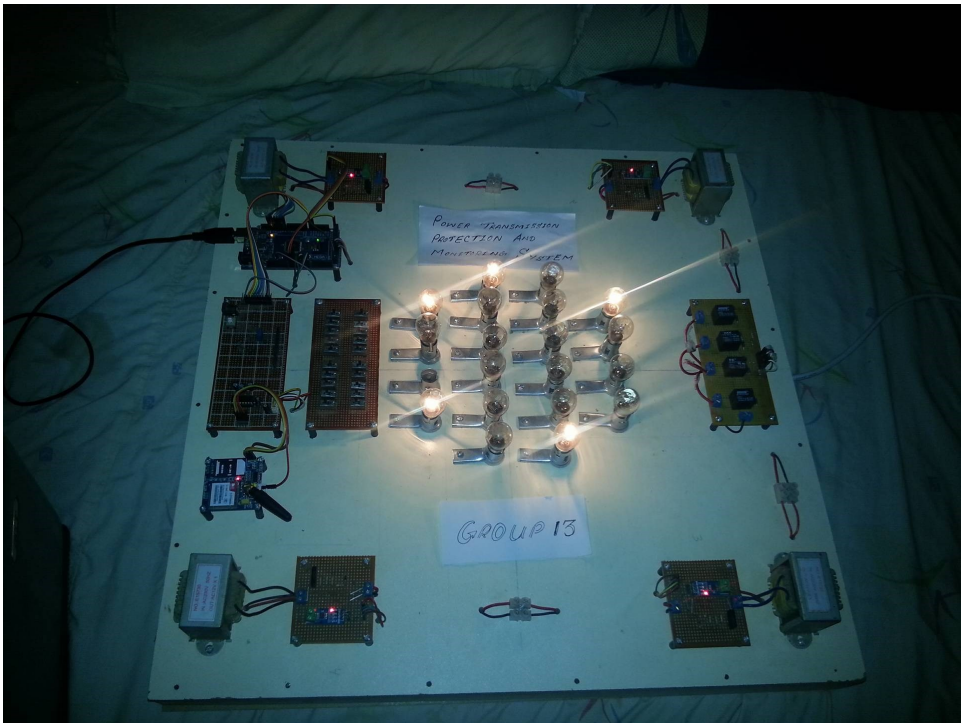
Autonomous Stabilizing Platform

Abstract:

This thesis demonstrates the procedure of designing and building an autonomous stabilizing platform using inexpensive tools (total design under 8 thousands Rupees or 75 US Dollars). The platform is designed using inexpensive materials, plastic sheets for surface and is controlled by an open source microcontroller (Arduino board), an accelerometer, and two servos. An Arduino microcontroller, hobby grade servos, and a two-degree of freedom (axis) accelerometer is used to create the stabilized platform. The intent of the platform design is to maintain the platform at an initially selected position while the support structure orientation changes. The software is written with logic to convert the digital data from the accelerometer to an acceleration magnitude vector. The magnitude is then compared to a predetermined mathematical function to infer the angle of tilt of the platform. The angle of tilt is then converted to angle of rotation for the servos to act on. Overall the platform design is validated based on the positional accuracy of the platform given the low quality components used to create it. In other words, the platform performed greater than the sum of its components.

Designed By:

- Muhammad Arif Soomro (GL)   13ES20
- Agha Inamullah Pathan   13ES108
- Sajjad Ahmed Channa   13ES98
- Noman Abro   13ES106
- Noorullah Chawro   13ES50
- Illyas khoso   13ES90

Supervisor: Dr. Imtiaz Hussain Kalwar

Co-supervisor: Engr. Haider-e-Karar Noonari
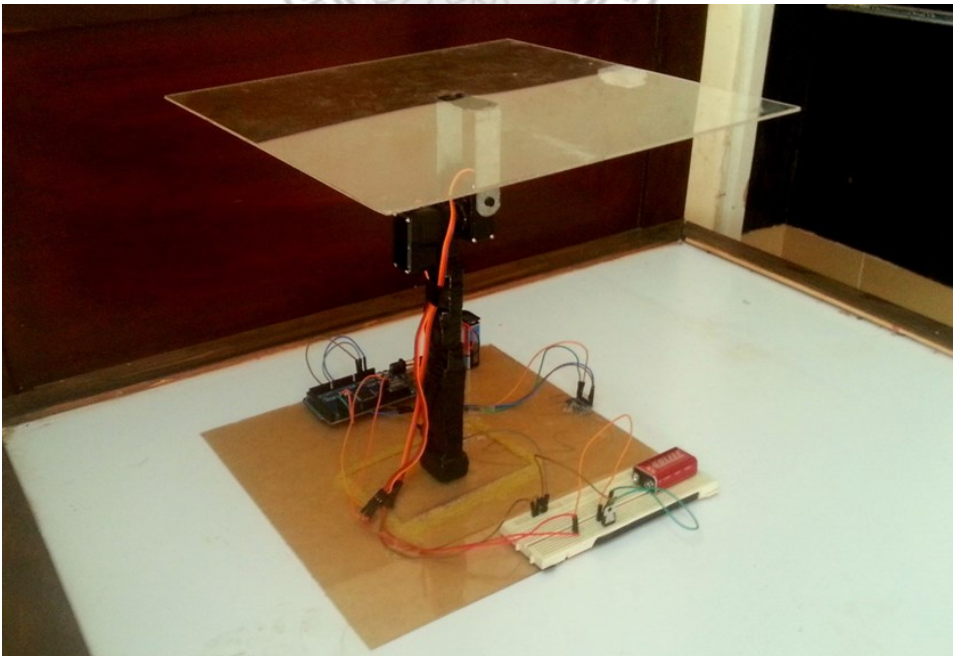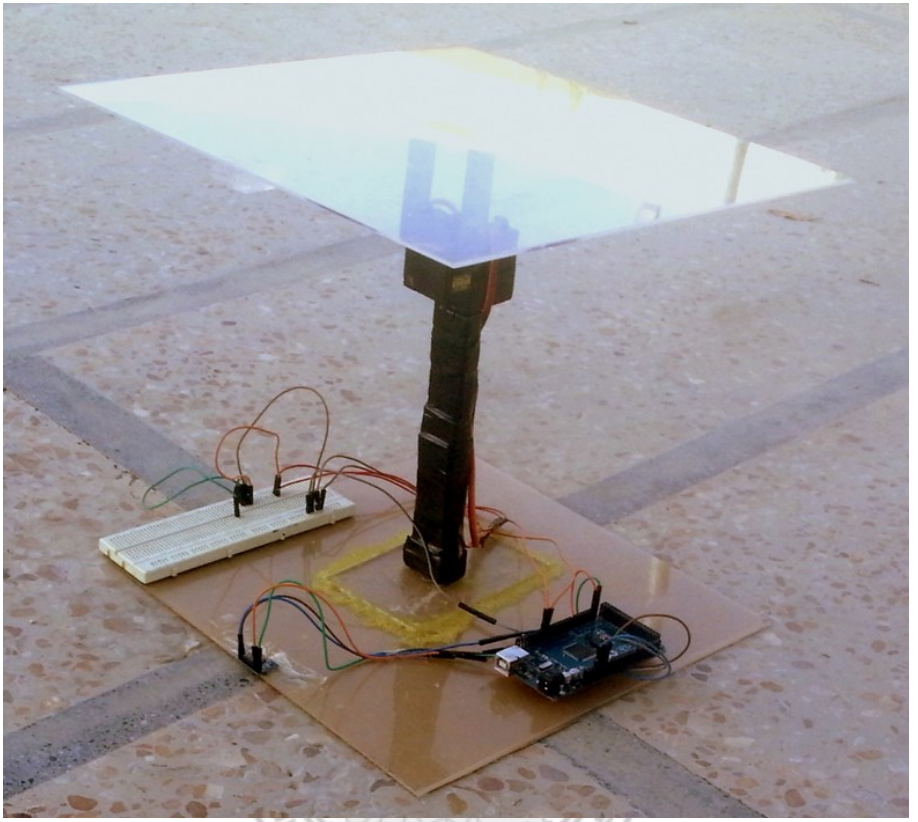
# Perceiving Digital Information In Real World

Abstract:

This project is based on the "Augmented Reality (AR)". Augmented Reality is a live direct or indirect view of a physical real-world environment, whose elements are augmented or supplemented by a computer-generated sensory input such as sound, video, graphics or GPS data. As a result, the technology functions by enhancing one's current view of perception of reality. This project percepts physical view through the mobile phone and shows the result of the processing again on the mobile phone screen, while processing is done via MATLAB running on any computer (PC). The aim of this project is to provide an easiness, convenience and security objective, regarding interacting physical world to quickly achieve information associated with it. This project actually provides easiness in the acquisition of such data which we encounter in our physical world but at once are not able to get detailed information about that. Our project is one of the ways to accomplish such requirement. This project is mainly covering three applications, face detection, object detection & recognition, and finally text recognition. This project perceives its physical information through the camera of the mobile phone by sending it to the laptop at the same time, where Matlab processes its physical data and then can display the results to the mobile phone screen too. Face detection involves detecting the faces that come across the mobile screen then through the database, this project validates faces showing the result again on mobile screen by returning the corresponding information about the face entry that at which time this face came in front of the camera. Object detection is performed by detecting any closed surface object through its geometry specification along with giving the information associated with it. Then finally Text recognition is done for any text, to accomplish the task of data acquisition about that text and its related information.

Supervisor: Prof. Dr. Wajiha Shah

Co-supervisor: Engr. Azam Rafique Memon

Designed By:

- Asfar Arain(G.L)   13-12ES92
- Araib Ahmed   13ES94
- Erum khokhar   13ES30
- Arsha kumari   13ES56
- Munizza Abid   13ES78
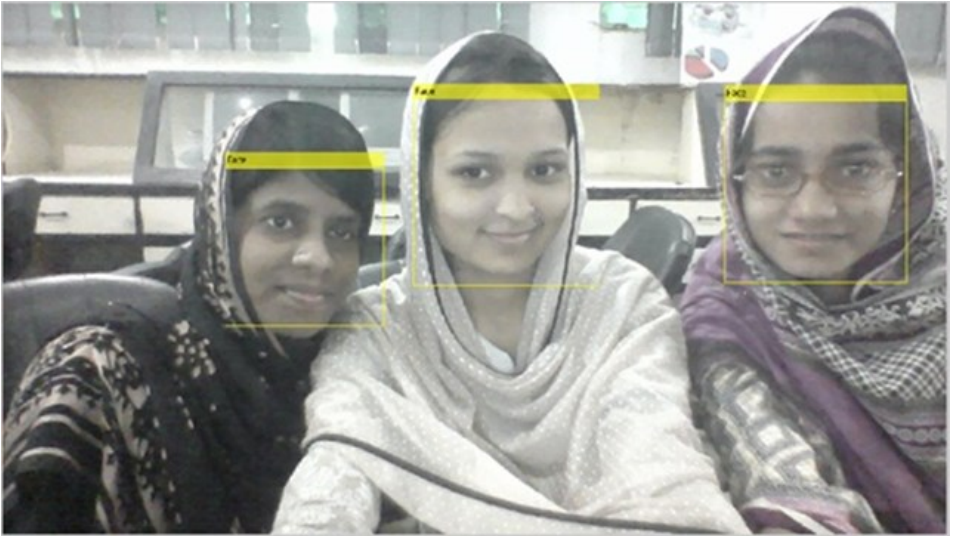
The Piezo Smart Road

Abstract:

Power generation still remains an alarming issue in Pakistan in this modern era. Now-a-days, In spite of the presence of a huge number of non-renewable and renewable power sources, we could not satiate our power requirements. The nation is prone to check the daily load shedding schedule like a daily weather report. The extinction of the natural resources for electricity generation and the increasing human population are the major causes of energy crisis. So we thought to design a system that can be benefitted by an increasing human population.

This mechanism can be installed on crowded roads where the vehicles move around the clock. It is especially recommended for highways where heavy vehicles normally flow. When vehicles move on several small piezo platforms, power is generated as a consequence of applied pressure. The control mechanism carry piezoelectric sensors. This mechanical energy applied on the sensors get transformed into electrical energy. The generated power will be stored in a rechargeable battery and then we can use it for domestic purpose.

Any sort of vibrations, stress or strain caused by the tires on the platform can be used for charging devices like android phones after supplying the generated electrical energy to the street charging stations. It can also be used to lit up the street lights or supplying power to nearby houses.

The generated power is first applied to the harvesting circuit where the output from piezoelectric sensors is amplified and stored in the battery after passing through the stages of unidirectional current controller and ac ripple neutralizer.

A mechanism capable of generating 50V has been formed. Analyzing various piezo electric material shows that PZT is the best among them. Also, during the procedure, we found that series- parallel combination connection is more suitable. The weight applied on the platform and corresponding voltage generated are found to have linear relation. It works best for an implementation in crowded areas.

Designed By:

- Ramsha Rizwan   13ES02
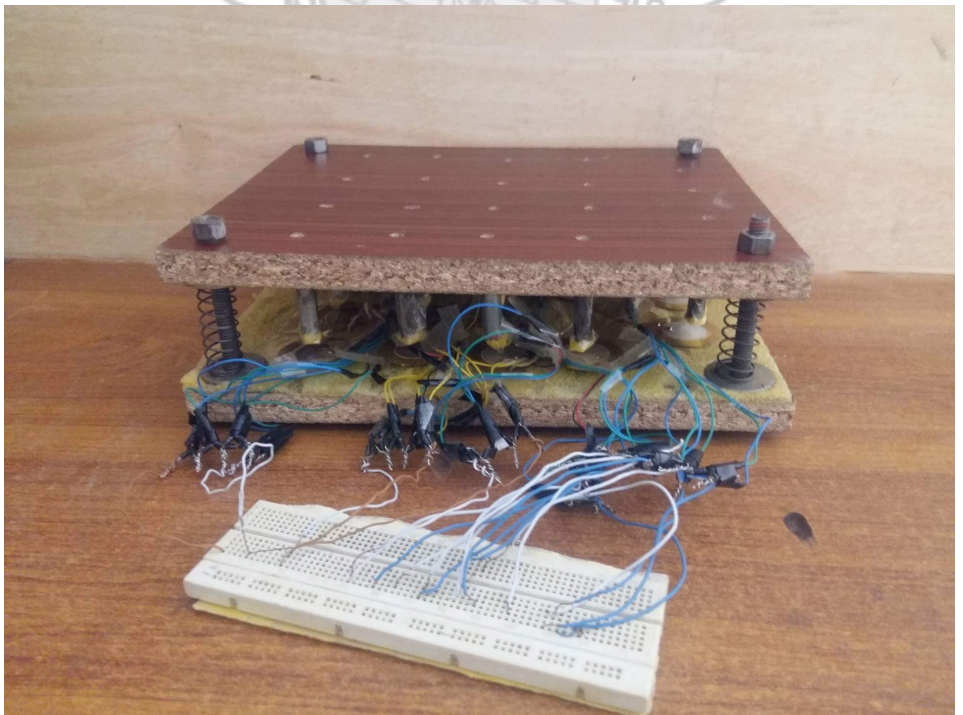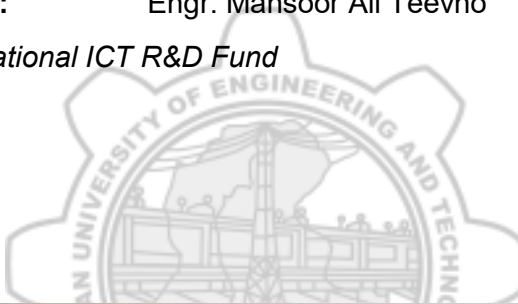- Sania Aslam   13ES12
- Iram Javed   13ES46
- Abdul Fatah Jamro   13ES62
- Jehangir Khan Malik   13ES102

Supervisor: Dr. Imtiaz Hussain Kalwar

Co-supervisor: Engr. Mansoor Ali Teevno

Artificial Environment Based Agricultural Growth Chamber

Abstract:

In this project, remote monitoring and controlling system for an agricultural growth chamber is implemented using 3G.Sensors embedded with the Arduino are used to monitor agricultural chamber continuously and data is being sent to remote site using 3G, after processing data at remote location the control signal is sent back to the chamber in order to turn on/off required actuator for maintaining the defined environmental conditions.

The aim of this project is to develop a prototype for maintaining the environmental conditions of agricultural growth chamber, so that different non seasonal crops can be cultivated using tunnel based agricultural system or system can be used to improve crop production.

System can be deployed at multiple agricultural growth chambers and can be monitored and controlled at single remote location using 3G.

The major goal behind development of this system is to improve the crop production as food requirement is increasing with the increase in population. And variance environmental conditions can effect crop production about 30%. So this system can come over the effect of environmental conditions and enhance the production.

Some vegetables and fruits are needed throughout the year but we cannot grow because of different environmental conditions, but using this system after maintaining environmental conditions like temperature, pressure, humidity etc. we can grow non seasonal crops throughout the year.

Proposed system has got facility of remote monitoring and controlling using 3G and LabVIEW. We can define the desired environmental conditions at remote site hence environment of the chamber is being controlled in accordance with the defined parameters at remote location.

Supervisor: Dr. Wanod Kumar

Co-supervisor: Dr. Wajiha Shah

Designed By:

- Ved Viyas (GL)   13ES43
- Dileep Kumar   13ES99
- Younus   13ES111
- Janib Ali   13ES97
- Ali Raza   13ES103
- Muzafar Ali   13ES21

Real-Time Web Based Monitoring and Control of Renewable Energy Source

Abstract:

Energy crisis is the most important issue in today's world especially in Pakistan. Conventional energy resources are depleting as well as the prime factor for environmental hazards. Renewable energy resources are getting priorities in the whole world to reduce the dependency on conventional resources. Solar energy is attaining the focus as an important means of expanding renewable energy uses. Solar cells that convert sun's energy in to electrical energy are costly and inefficient. Different methods are applied to increase the efficiency of the solar cell to reduce the cost. The proposed project presents the design and implement real-time web based monitoring and to control the solar energy through LabVIEW and Arduino platform in a highly secure environment. Its development is divided in to two stages, which are hardware and software development. Hardware development consists of solar panel, Arduino board, current and voltage sensors and relays. Second phase is software development is based on National Instrument Laboratory Virtual Instrument Engineering Workbench (NI LabVIEW) and it's interfacing with Arduino board. In which GUI interface for users is provided. The proposed system not only extracting maximum energy from solar panels but also providing an effective and efficient method to real time control and monitor the progress of power generation and consumption within the system embedded in a highly secure environment. Although the monitoring interface uses real time measurement results to prepare the current and voltage graphs, it is also possible to record and reach database file to analyze history of renewable energy source (RES) system. This will also help to increase performance of the existing solar system also other alternative resources of energy such as wind energy and tidal energy. In this project monitoring feature includes power production, power consumption, power generation and power management with the help of graphs and meters on GUI interface. Controlling feature includes turn on/shutdown of solar system, increase or decrease energy consumption, generation and switching to other includes available system such as wind energy system etc. (in case failure of solar system).
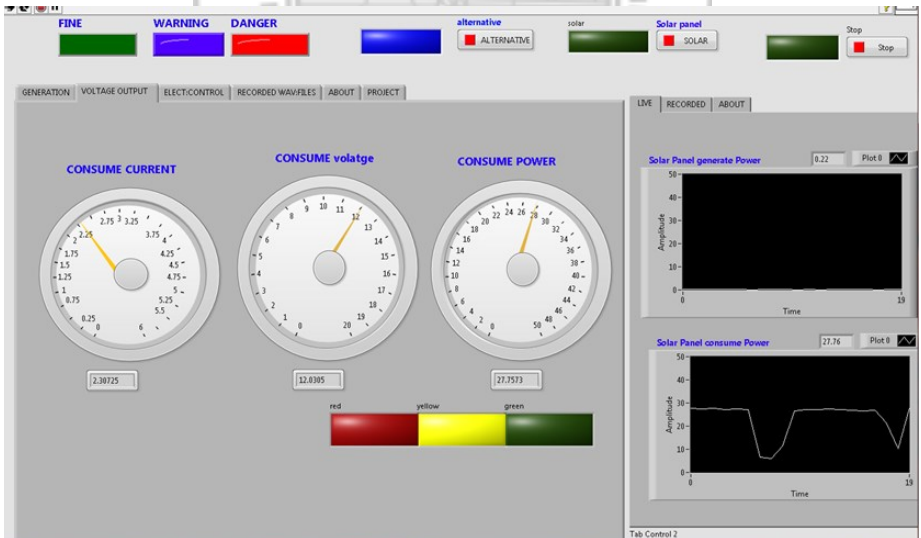
Designed By:

- **Masood Ali (G.L)**   **13ES28**
- **Rafia**   **13ES09**
- **Kanwal Waseer**   **13ES01**
- **Bilal Qureshi**   **13ES36**
- **Salman Ahmed Khoso**   **13ES 126**
- **Aqib Shah**   **13ES 60**

Supervisor: Dr. Farzana Rauf Abro

Co-supervisor: Engr. Haider-e-Karar Noonari

Locomotion of Miniature Hexapod Using Muscle Wire Actuator

Abstract:

Six legged robots are the first choice of all the Robotics Specialist to carry on the research and Experiments. Multiple studies have been carried out in different research laboratories and educational institutes. This project involves the construction and locomotion of small sized Hexapod robot. This Hexapod is a little, cheap, having six legs that will provide backup big and high weight robotic systems and automatic industries with and without servomotors. The very first step of the project includes designing and architecture of the hexapod. Ceramic Glass was used for the construction of body and Flexinol wire was used to drive the Hexapod's legs. Flexinol wire acts as a potency (muscle) for each of the legs, providing locomotion for the robot. With its exclusive ability to contract on demand, Nitinol wire introducing many possibilities in the field robotics.

The final phase involves the Hexapod interfacing with Frequency generation circuit which can generate frequency upto 50 Khz, to achieve the proper locomotion of the Hexapod. This advanced design can be used in many applications which involves the physical structure and legged robots, actuating and driving systems, the systems which involves motion and walking. It was found that compact, and lightweight Hexapod robot shows promise for use in space, defense, military, heavy weight lifting and other robotics applications.

Designed By:

- Faizan Jaliawala (Group Leader)   13ES76
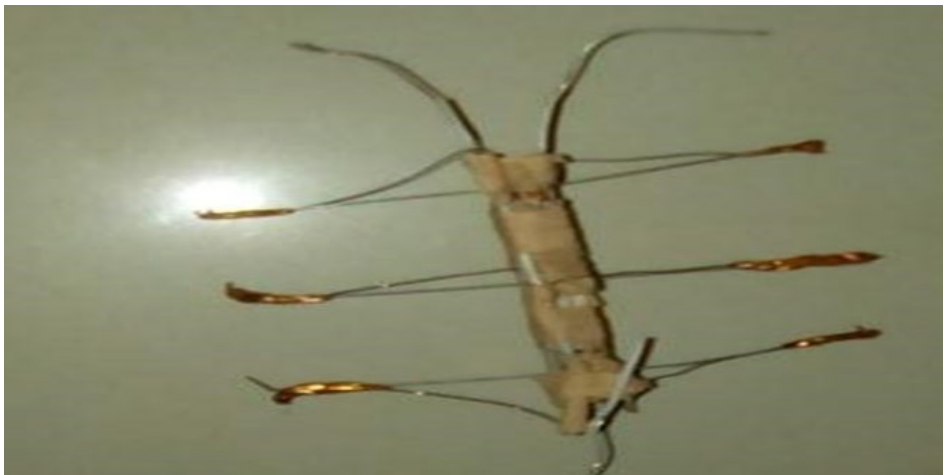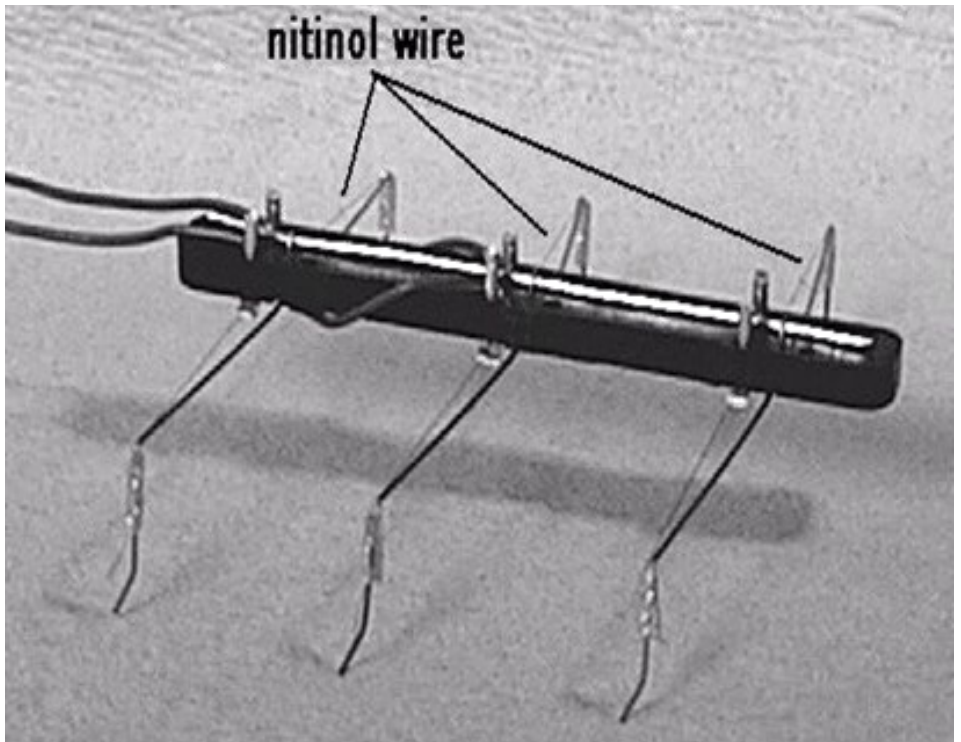- Mahender Dev   13ES34
- Sajjad Memon   13ES96
- Basharat Ali   13ES68
- Sajjad Ali   13ES14
- Chaggan Kumar   13ES84

Supervisor: Dr. Imtiaz Hussain Kalwar

Co-supervisor: Dr. Tayab-Din Memon

Advanced Human Gestures Controlled Real Time Boxing Game Simulation

Abstract:

These days, research and development has increased in the field of gaming industry. Games are being developed at a tremendous rate. However, the interaction of the game with the gamer is still limited even it is played though the remote controller or the game having the advanced features like gesture recognition or a VR sensor build in it. The gamer is still unable to feel the reality of the game's environment. In order to bring the feel to the gamer, it is important to create such a device which would react according to the moves placed in the game and those reactions will be felt by the gamer.

This project is based upon the use of Microsoft Kinect as an input gesture device which will mark the skeleton of the user, hence recording its movements in a game developed in Unity 3D. As the game detects an action performed on the character, a reaction will be experienced by the player through a vest equipped with vibration motors. The vest will receive the signals from an Arduino which is the controller used as an interface between the game and the vest. In other words, when two players will box, they will feel the punch laid on them rather than just view their character get a beating.

The game has been tested on a personal computer and a laptop to know that the characters move according to the movements of the players and the players receive the proper hits when their character is punched in the game. Several collision points have been set up just to enhance and nearly depict the boxing environment.
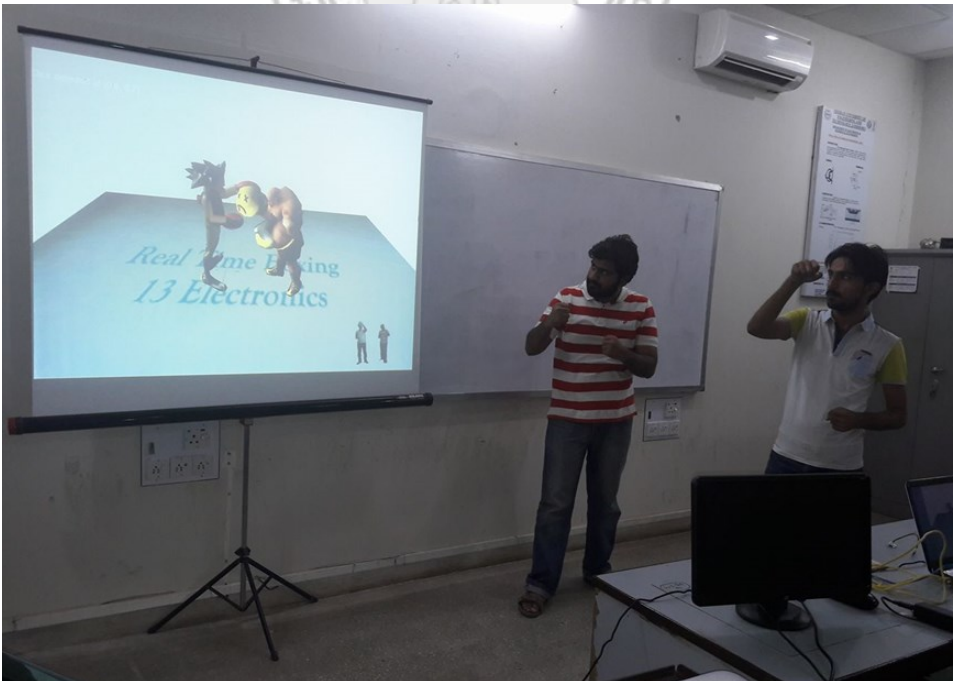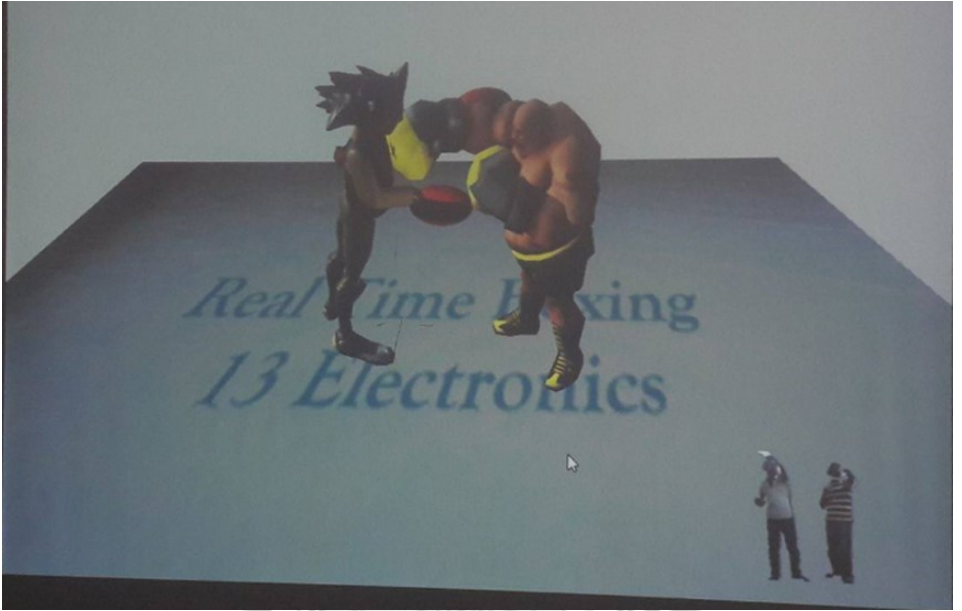
Designed By:

♦ Rizwan Qadir Memon (G.L)   13ES41

♦ Muhammad Arsalan Jalees Abro   13ES29

♦ Ms. Muqadas Sikandar   13ES67

♦ Ms. Showana Shaikh   13ES113

♦ Mr. Darya Khan Chandio   13ES91

♦ Mr. Tahir Hussain Khoso   13ES71

Supervisor: Prof. Dr. B.S.Chowdhry

Co-supervisor: Engr. Khuhed Memon

Grid Based Localization of Robot

Abstract:

During the last 45 years, the Robotics has been aimed at finding solutions to the technical complexities of Applied Robotics. The evolution of application in the fields has influenced research topics in the community of robotics.

In the early 1960s, the industrial revolution put industrial robots in the factories for preventing the human operators from harmful tasks. Later, the new requirements were added in the industrial robots that called for more flexibility and intelligence in the robots and now were applicable into other types of production processes.

The Aim of the research on Localization was to describe the essential method for solving the localization problems and summarize key implementations and demonstrations of the method. While, there are still many practical issues to overcome, especially in more complex outdoor environments.Currently, the traditional manufacturing robotic market (i.e., cleaning, construction, shipbuilding, agriculture) is demanding the creation of new needs and markets outside the service robots to attend to the new market of industrial development.

Our mission was to develop the physical model of the robot that can localize itself on the arena. In which our focus was on the object detection in the range of the arena so that the robot stays in the boundaries. Along with its physical model and Localization, we have to analyze it by doing many experiments.
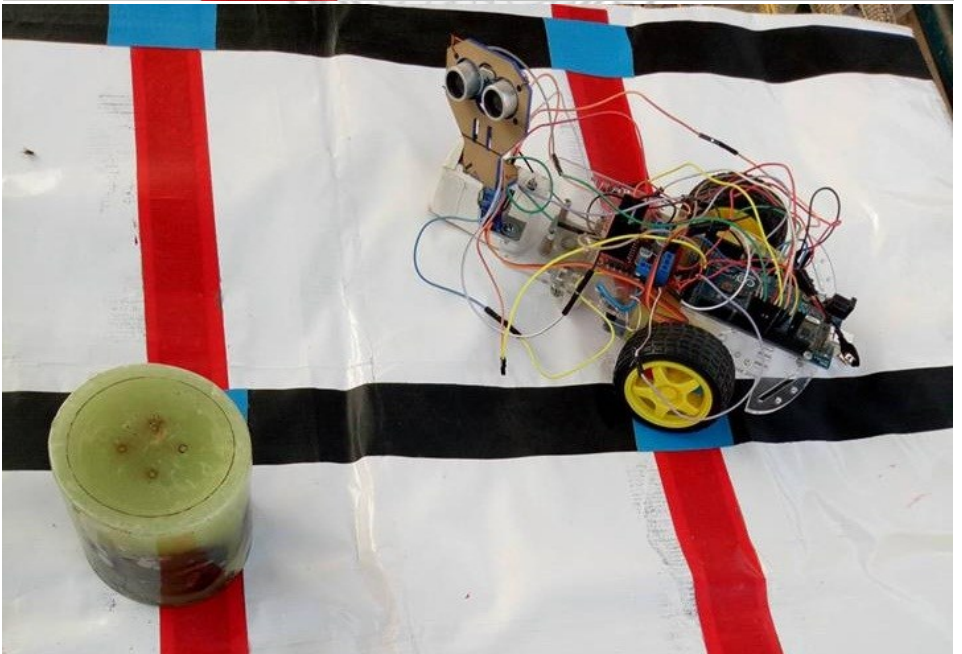
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• M. Sajid Khan (G.L)	13ES15
• Usman Ghani	13ES11
• Laraib Ali Khan	13ES81
• Talha Abid	13ES101
• Waqar Ahmed	13ES117
• Abdul Azif Anjum	13ES121

Supervisor: Dr. Imtiaz Hussain Kalwar

Co-supervisor: Engr. Azam Rafique Memon
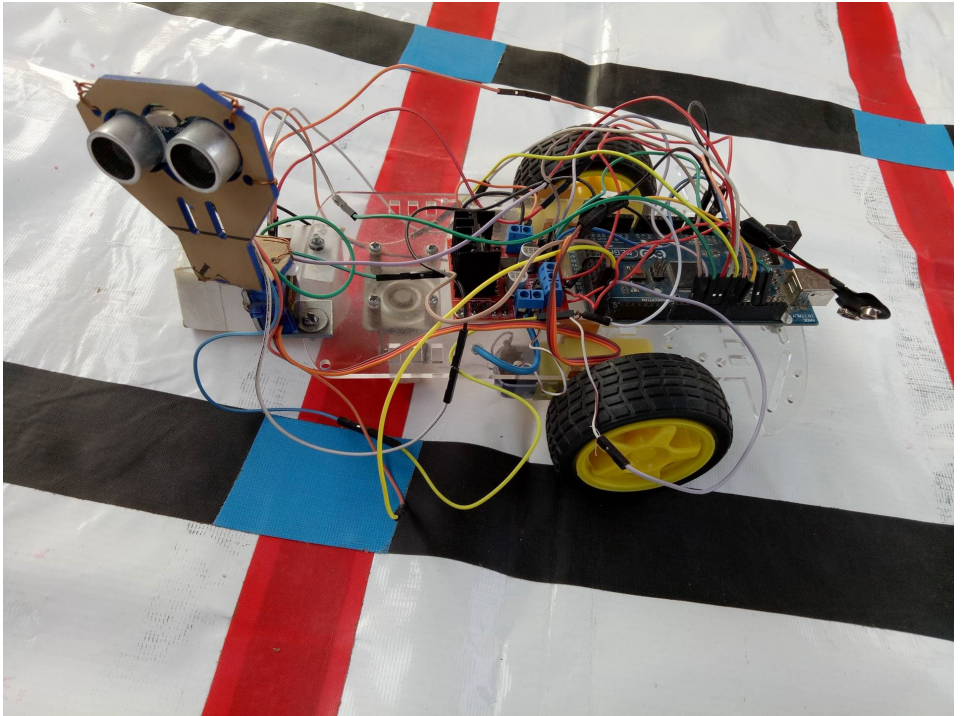
Bluetooth Control Hexapod Structured Based Robot

Abstract:

The work done here is to express and contribute to the better understanding and make application of Hexapod Robot with stability in both theoretically and also practical manners. In this document, analysis and selection of design on the basis of walking with stability in theoretical and practical level, adaptation on walking in four or five legs in case of any deficiency in the legs appear, detecting of obstacle from a suitable range, detecting of motion of heat emitting bodies, measuring of temperature in the surrounding, is carried out and justified using the Hexapod Robot.

Designed By:

- Faisal Akhter kk (G.L)   13ES112
- Awais Rajar   13ES128
- Hasham Khan   13-12ES98
- Zaraque Memon   13ES86
- Ayaz Mari   13-11ES97
- Abid Bughio   13ES124

Supervisor: Dr. Farzana Rauf Abro
Co-supervisor: Engr. Shoaib Hassan Khaskheli

DUALCOPTER

Abstract:

Dual-Copter is an aerial vehicle operated to fly independently and is one of the representations of a UAV (unmanned aerial vehicles). They are controlled by pilots on ground or autonomously via a pre-programmed flight path. UAVs are already being used by the military for recognizance and search and rescue operations. Our project is to design and build a Dual-rotor UAV. Our proposed design is a lightweight, nimble craft that can be operated both indoors and out. The project poses particular challenges in terms of weight reduction and controllability.

Bi-copters are significantly more difficult to nail down that quads. They're quite finicky even when built properly, it takes a long time and a lot of testing to tune them to fly well.

Today the UAV's play an important role in terms of surveillance, military services, farming, advertisements and data acquisition purposes. Our goal is to build a bi-copter with excellent stability and performance to be used in several applications

Designed By:

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- Rahim Memon   13ES42
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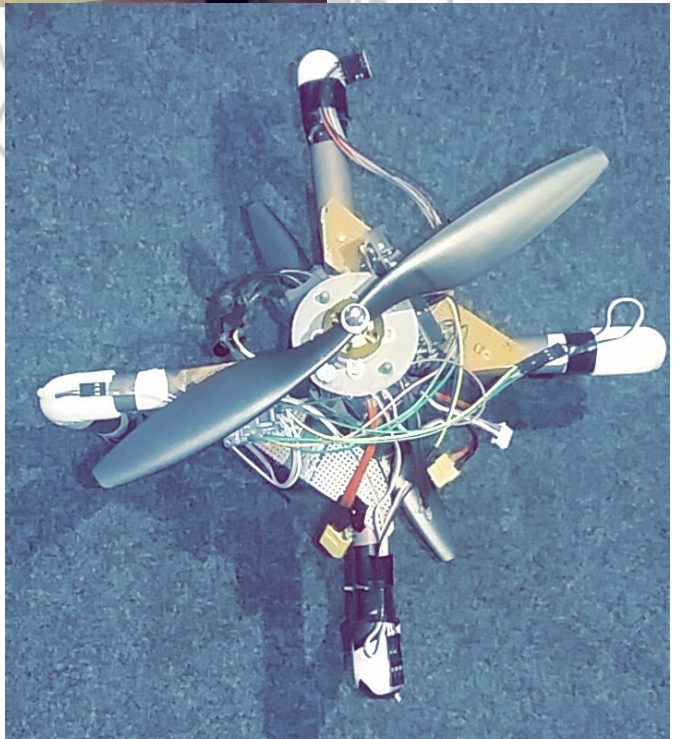- Bhartee Khatri   13ES32
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Co-supervisor: Engr. Zaigham Abbas Shah

Development of Comfort Aware Energy Management System

Abstract:

Working ahead of the HOME AUTOMATION concept was important so as to integrate automation (elimination of user's input) with energy optimization (so as to reduce unnecessary power consumption) with the use of artificially intelligent system accompanied with some easy to use, cheap microcontroller.

Attaining a desired temperature coverage and air quality makes the energy consumption all in vain i.e increased to the maximum level. We tend to see how the development of intelligent control systems has improved the efficiency of control systems for the management of indoor environment including user preferences . This advanced control system is simulated using SIMULINK/MATLAB. The simulation results show that the project successfully manage the user's preferences for thermal and indoor air quality and energy conservation.

A growing number of research projects are concerned with applying intelligent agents to intelligent inhabited environments and intelligent buildings. We wish to perform the same thing with less of the resources and easy to manufacture technique. This intelligent system recognizes the people that live in it and programs itself to meet their needs by learning from their behavior.

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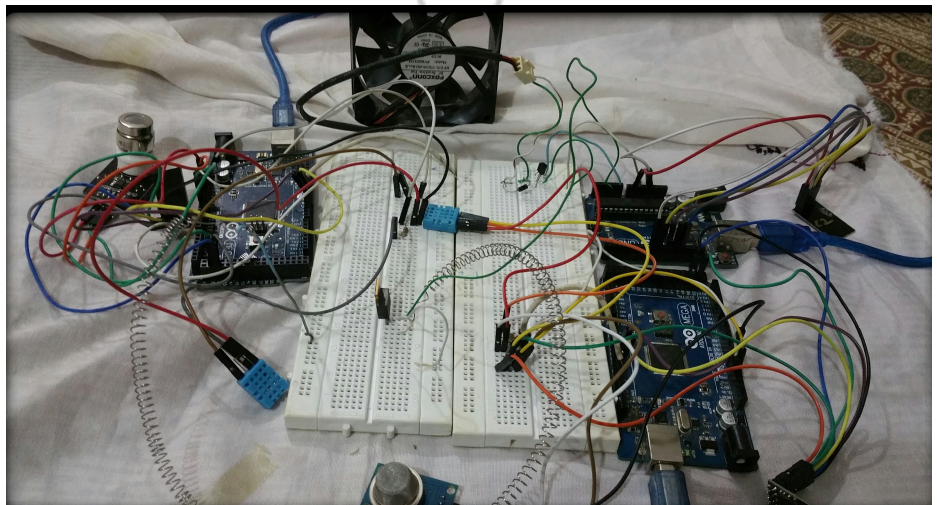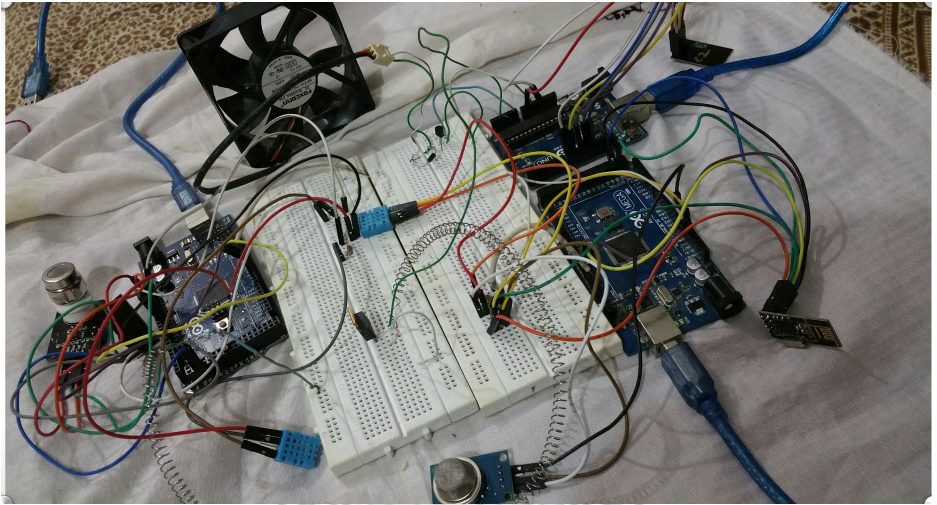- Bakhtawar Kerio   13ES88
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Narrating Assistant For Paralyzed Patients

Abstract:

Our motive for this project was to develop an Eye gaze detection method which can detect different eye ball movements which later on can provide a way to create a HCI (Human computer interface) by using eyes as a mean of input to machines.

We are using MATLAB image processing and computer vision with minimum and most commonly available resources such as a simple webcam which is built in any consumer products like laptop, smart phone, tablets etc.

To show a simple application of this interface using eyes as a mean of input for the machines we have built a narrating assistant for paralyzed patients which can help people with disabilities to communicate with the people around them, we have tried to show what simple movements of eyes can do, and provide a simple mean of communication for them who have difficulty in communicating (speaking) as a result of aphasia, Down syndrome, paralysis and Motor Neuron Disease or any other condition. This can better serve then devices using finger taping as this may not be possible for some users who are in complete locked-in state due to serious spinal injuries also MND is an degenerative disease and patients tends to lost its control over his muscles as time passes, as eyes are the most last longing muscles in this case a device based on using eyes can serve the all patients including on the last stage.

Working on both simultaneously we have tried to achieve maximum efficiency   (more degrees of freedom) in our fundamental eye gazing method as efficiency of a Narrating assistant relies on it.

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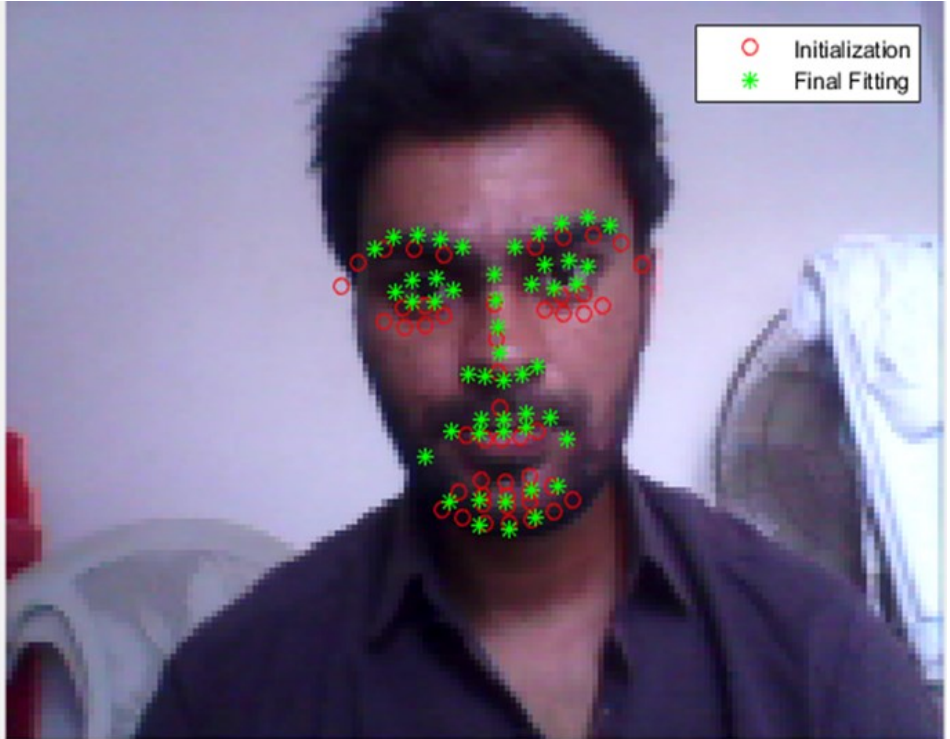

Supervisor: Engr. Khuhed Memon

Co-supervisor: Engr. Haider-e-Karar Noonari

Advanced Robotic Vision

Abstract:

The project describes an advanced vision method in an indoor environment for an autonomous mobile robot which can detect obstacles shape size and distance. It first involve digital image processing and geometric logic for recognition of two dimensional shapes of objects such as squares, circles, rectangles and triangles as well as the color of the object. This approach can be extended to applications like robotic vision and computer intelligence. The methods involved are three dimensional RGB image to two dimensional black and white image conversion, color pixel classification for object-background separation, area based filtering and use of bounding box and its properties for calculating object metrics. Size detection is done with the help of image resolution and distance is measured by calculating the focal length. Vision and obstacles are detected by using webcam which has high resolution . All algorithms are developed and simulated using MATLAB.

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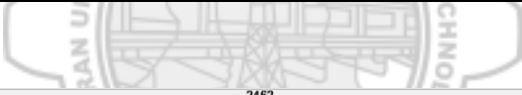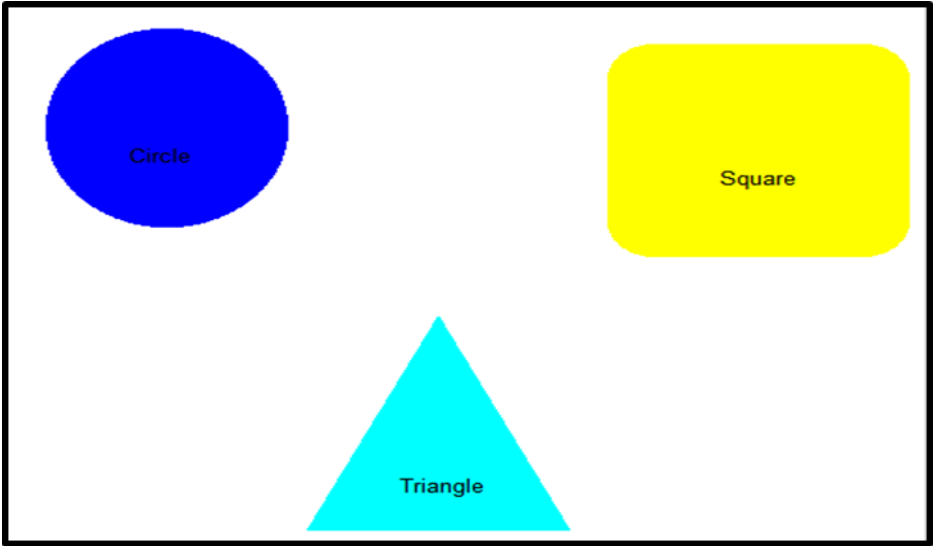
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Buck-Boost Converter Using Fuzzy Logic Controller

Abstract:

A fuzzy controller of DC-DC buck boost converter is designed as presented in this venture. Keeping in mind the end goal to control the yield voltage of the buck and boost converter, the controller is intended to change the duty cycle of the converter. The scientific model of buck and boost converter and fuzzy logic controller are inferred to plan to simulation display. The simulation is created on MATLAB/Simulink program. To verify the effectiveness of the simulation displayan experimental setup is produced. The buck and boost circuit with MOSFET as a switching component is created. The Fuzzy logic controller is designed to create duty cycle of PWM signal. The simulation and experimental results demonstrate that output voltage of the buck and boost converter can be controlled by value of duty cycle.
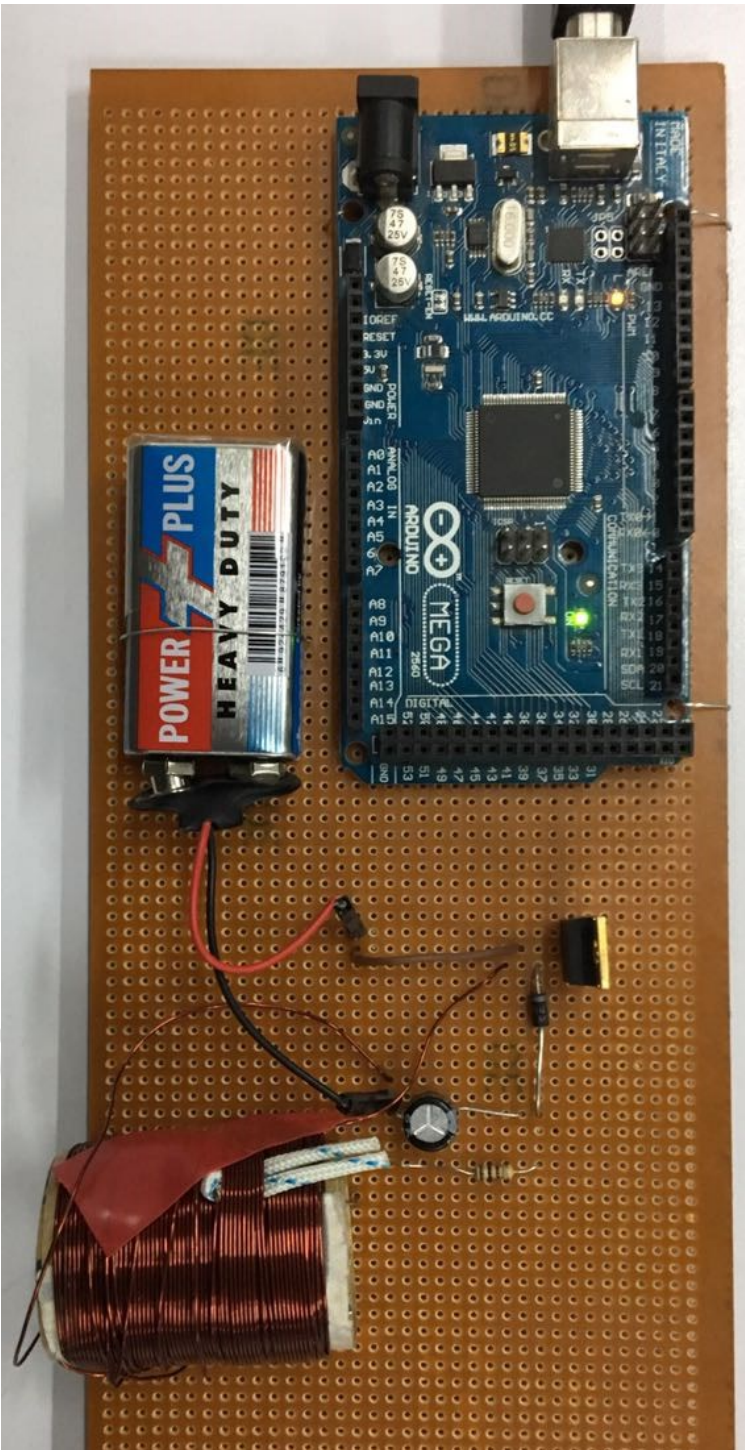
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Design and Development of Trainer Kit for Control Analysis

Abstract:

Control system engineering focuses on analysis and design of systems to improve the speed of response, accuracy and stability of system. In order to improve these parameters, there are different controllers, most common controller is PID.

This project comprises of two portions in a single kit.

a) The Ball on the beam: The ball on the beam is one of the most convenient and popular laboratory model for learning control System Engineering. It is widely used because it is very easy to understand as a system and control techniques can be studied in order to model control design. It is open loop unstable. A ball rolling on the top of the plastic beam. The beam is mounted on the output shaft of an electric motor and the beam can be tilted about its center axis by applying as electric control signal to the motor. The position of the ball on the beam can be measured using Ultra-sonic sensor.

b) Motor Position Control: This refers to the creation, maintenance and monitoring of positions of motor. In this portion, we will develop the design of position control system which enables us to manage the position using dc motor. The potentiometer, attached to the dc motor, interfaced with Arduino, rotates according to the user defined programming. Alternatively, potentiometer can be rotated manually to get output on the software.

The aim of this project is to merge these two portions on a single kit. This whole kit would help us to eliminate the complexity of individual portions. In this way, the students face least difficulties while performing the labs on a single kit as it will also provide the optimum results which can be saved for later operation.
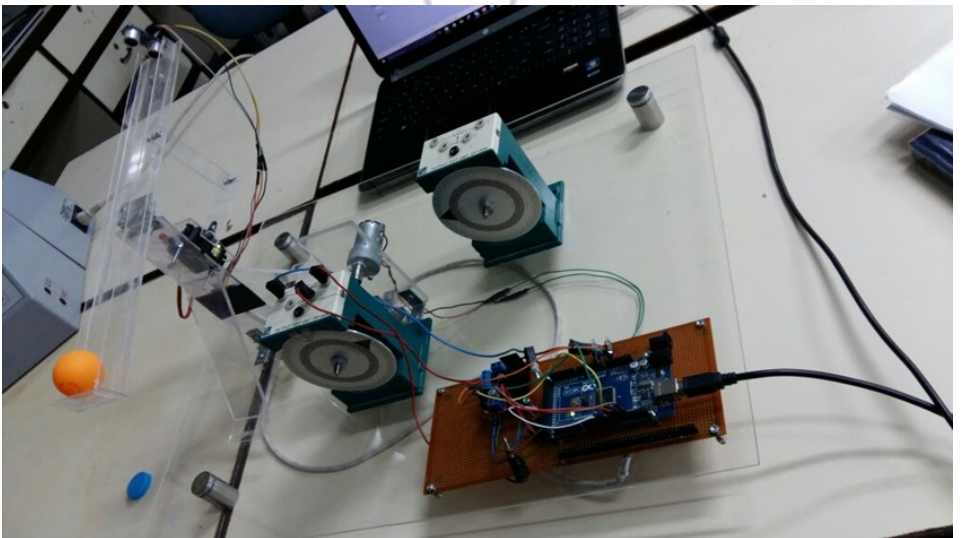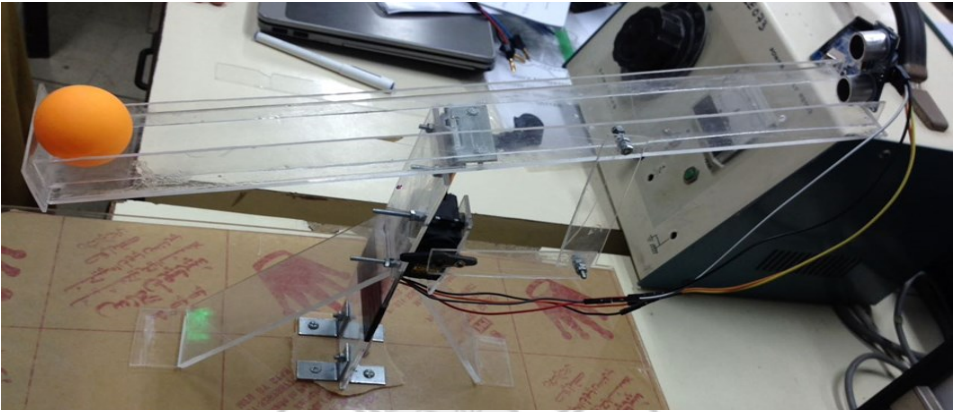
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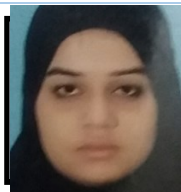
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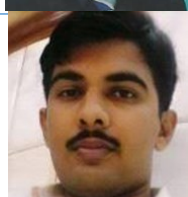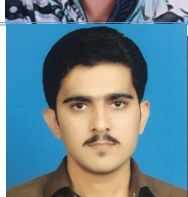
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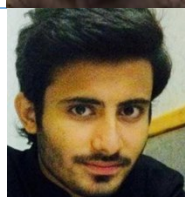|	
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Department of Electronic Engineering

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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