MEHRAN UNIVERSITY

15ES
Final Year Projects
2018

Editors:
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Compiler
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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 *Automatic Circuit Simulations using Image Processing and Augmented Reality, Blood Sample Analysis Using Image Processing.* 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.

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 (15ES) of Electronic Engineering Department has put in their invaluable efforts and technical expertise in designing real life application-oriented projects like *Automatic Circuit Simulations using Image Processing and Augmented Reality, Blood Sample Analysis Using Image Processing* 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 2018 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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ACHIEVEMENTS BY STUDENTS

It is a matter of great pleasure and pride for the department and the University that students, through their diligence and hard work applied for research funding of their projects and remained successful. Successfully winning a research grant authenticates, in itself, the vitality and importance off their research work. Following are some of the highlights.

- Among those students, a project titled "*Blood Sample Analysis using Image Processing*", and "Assessment Tool Development for Visually Impaired" participated and won research funding through "Research Incubation in Public Sector Universities", a collaboration of Sindh Government and IEC-MUET. The students of Assessment tool development project thus completed a goal from vision 2025 .

- Apart from that, following four Final Year Project (FYP) groups secured a research grant through National Grassroots ICT Research Initiative (IGNITE)

    1. Green Crop Monitoring by Unmanned Aerial Vehicle (UAV)

    2. Power Charging Vehicles at your Door step via single click of Phone

    3. Implementation of Hand gesture Recognition System in FPGAs.

    4. Snake Robot

AUTOMATIC CIRCUIT SIMULATIONS USING IMAGE PROCESSING AND AUGMENTED REALITY
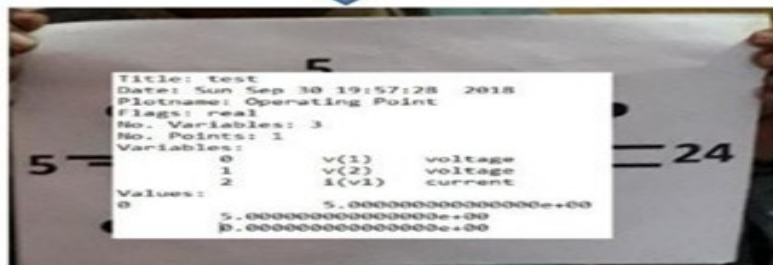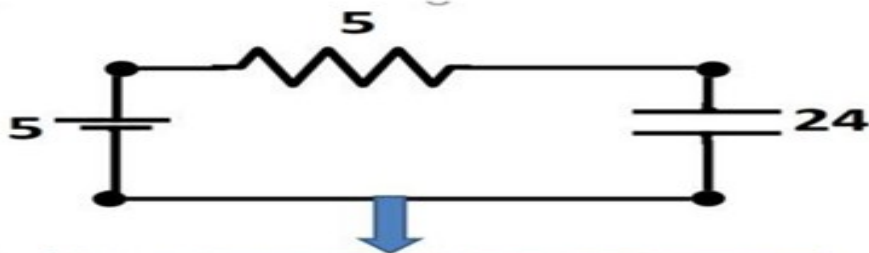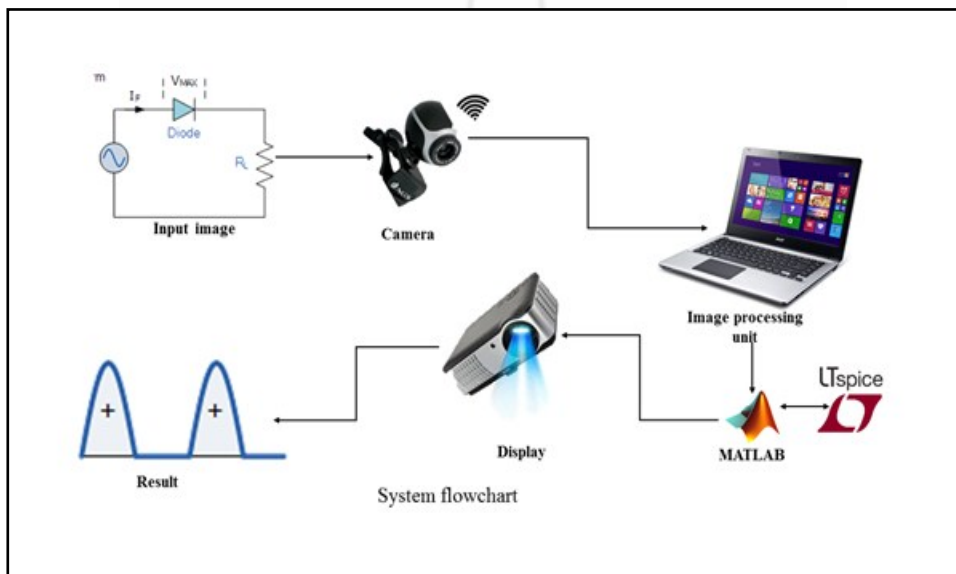
Abstract:

MATLAB (matrix laboratory) is user-friendly software provides an interactive environment for iterative exploration design and problem-solving. It provides several built-in mathematical functions which help to solve mathematical calculations such as algebraic equations, non-linear functions, 2-D and 3-D plotting and graphics, numerical calculations, and various other special functions. In past we have utilized different simulation software techniques for 2-D simulation of circuits; we have switched to automatic 3-D simulation like augmented reality or virtual reality. Owning to the fact many researchers were working for recognition and segmentation or simulation of fundamental electrical circuits using different techniques such as the neural network (NN), but we have formulated a MATLAB prototype by virtue a user can interact with the segmentation, recognition, and in the end with simulation. In this project, we primarily focused on making automatic netlist of fundamental electrical circuits for automatic simulation, in which user can get the automatic simulation of drawn fundamental electrical circuit. However, recognition and segmentation of components are to be done through image processing and Optical Character Recognition (OCR) techniques using MATLAB. Since MATLAB is globally available, the student can simulate their circuit easily at home. It is totally software based so that it couldn't be expensive if you have MATLAB software. In fact, most of the simulation software, a user manually draws the circuit and then gets the result that becomes complex and time-consuming. To save the time, we presented this project in which user has to only input the hand-drawn or printed image, then after pre-processing steps, it will result in the simulation of that circuit with parameters such as current, voltage, etc. Despite the fact application of project is limited to hand-drawn, resolution of inputted images, number of components, but we believe that over plenty of simulation method, we offer a method to utilize the different fundamental circuit for simulation

Designed By:

♦ Versha Kumari	15ES44
♦ Karishma Kumari	15ES20
♦ Jatendhar Dharani	15ES70
♦ Teerath Das	15ES36
♦ Kainat Abro	15ES30
♦ Sidra Shahi	15ES105

Supervisor: **Engr. Khuhed Memon**

System flowchart

PROTOTYPE DEVELOPMENT OF REPTILE ROBOT

Abstract:

The project was developed under the department of Electronics engineering, Mehran University of engineering and technology, Jamshoro during the spring of 2018. 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 develop the forward motion of the reptile robot.

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:

- Priyanka Kalani   15ES09
- Sana Faryal   15ES51
- Unsa Bhutto   15ES11
- Sarshar Memon   15ES29
- Ashraf Ali   15ES27
- Asif Ali   15ES65

Supervisor: **Prof. Dr. Bhawani Shankar Chowdhry**
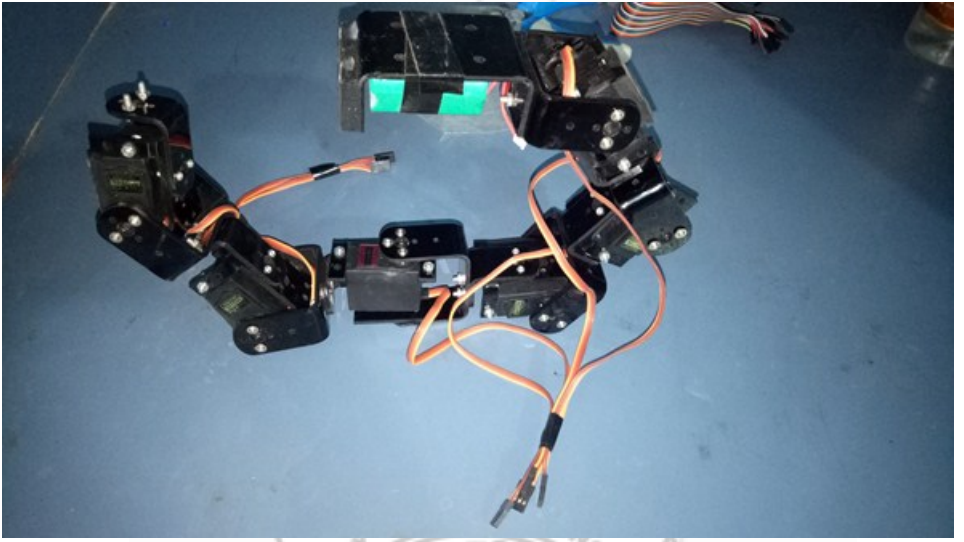
Co-supervisor: **Prof. Dr. Arbab Nighat Kalhoro**

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Assessment Tool Development for Visually Impaired

Abstract:

Approximately one-third of the human brain is devoted to vision. Damage to the head may cause visual problems ranging from profound impairment, to cognitive visual problems only. A person with visual impairments may have intact perception of movement.

Medical assessment tools help identify, define and track the progression of a condition in patients. Assessment tools for the VI, specifically, help these individuals deal with their lives in as much a normal way as possible, while also educating them to see the world in a better way.

The problem is that we have next to non- existent physical or stimulatory aid for the visually impaired. The development of a cost effective assessment tool provides medical staff to access the progress of the patient, successful diagnosis and treatment and the chance of observation and further experimentation.

This research is based to bring such a tool to the field that allows for the rehabilitation and treatment of the visually impaired - especially geared towards the children - and provides a measure of a stable life for the individuals by assessing them for defining characteristics of visual and/or cognitive impairments and scoring them on a VI range chart. The results from this tool are verified by ophthalmologists and neurologists. Now this system can identify the different states of multiple subjects. After this task, the tool was used to assess several patients. This assessment tool is easily available, reliable and very cheap.

Designed By:

- Taha Hussain   15ES34

- Munazza Naeem   15ES08

- Adeel Raja Memon   15ES10

- Azka Rizwan   15ES66

- Hassan Abbas   15ES122

- Daniyal Ahmed   15ES158

Supervisor: **Dr. Attiya Baqai**
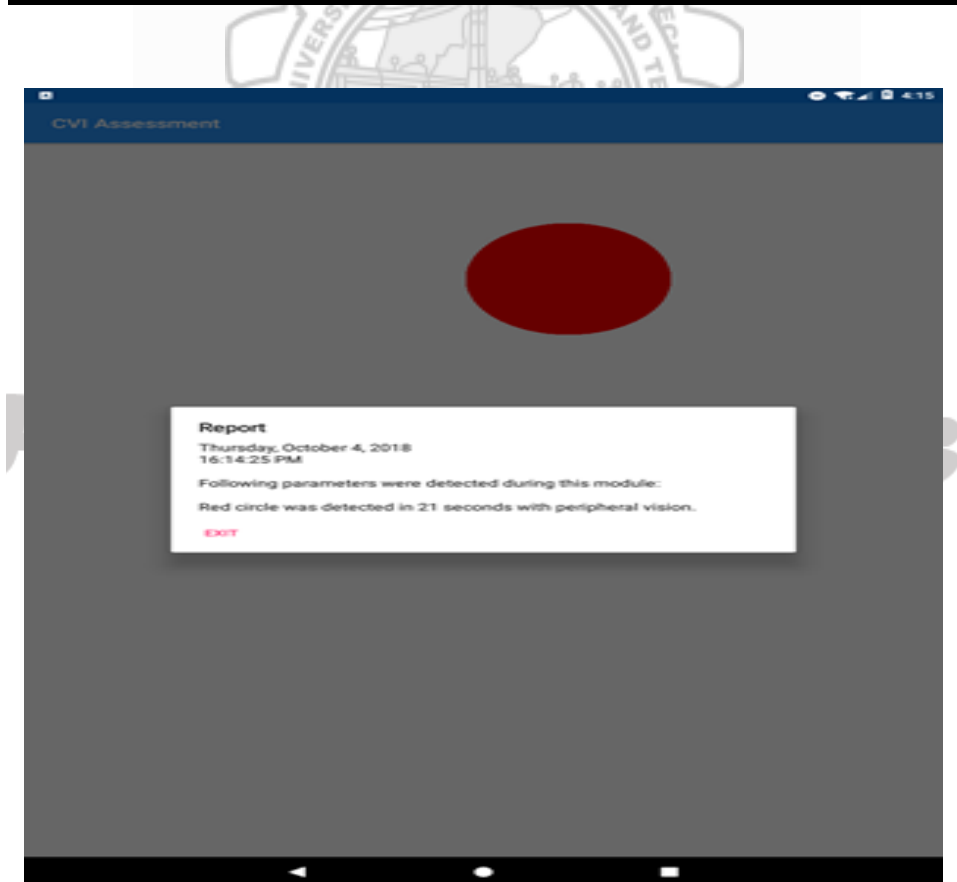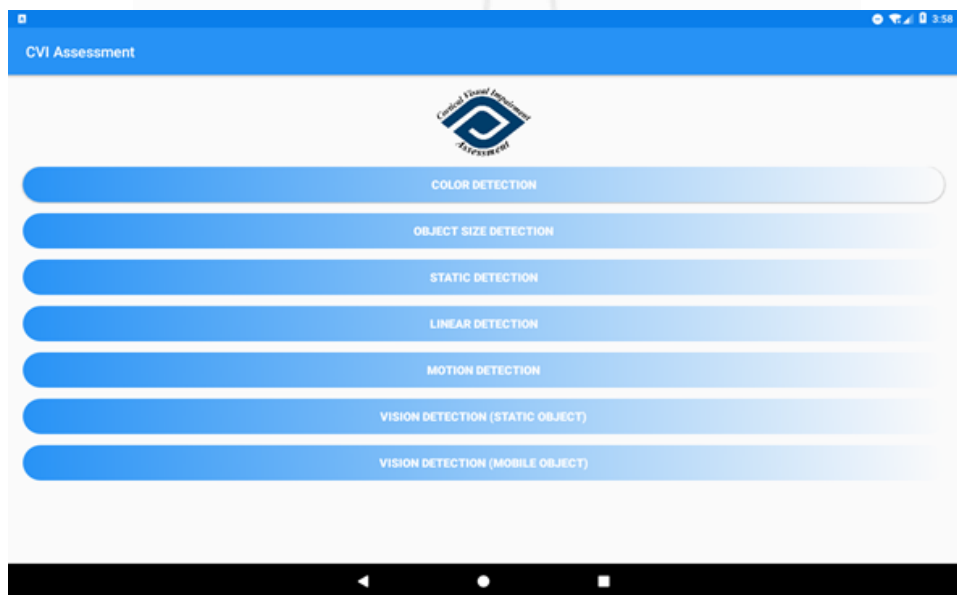
Real Time Industrial Monitoring Using
Internet of Things and Augmented Reality

Abstract:

Industries which are the economical backbone of any country completely relies on human power. Especially in Pakistan, there is no automation and technological revolution in industries or factories. In order to maintain a plant's machine efficiency, skilled workers or machine operators are required to consistently monitor the plant and its parameters by performing manual and repetitive tasks (such as taking readings on multimeters etc.). Hence, we have proposed a system which can automatically gather all the required data from machines and display on an Augmented Reality based user interface.

Now the question arises why AR, why not only IoT? The answer is here: **"By using AR as an interface for the Internet of Things, it can provide a visual medium to display a lot of data clearly and quickly. It will allow us to engage more deeply with what's around us"**. You can get the same data without AR, but combining it with the Internet Of Things (IoT) sensor data and with the ability to overlay and display data directly on top of the product will make the instructions context-sensitive. In the coming time prototypes made with augmented reality technology will enable workers in a factory to be able to procure skills and deliver faster than ever before.

This project is implemented using both hardware and software resources. Our project design process is divided into three (03) phases. The first phase is to design a prototype in order to collect data from the field/plant/object. To do this, sensors are deployed to collect process values like temperature, humidity and ultraviolet. From here the data is putted into the field gateway. The field gateway is responsible for aggregating data from all the different sensor devices and translating that data into a format that IoT platform can understand. The second phase is to stream the collected data to IoT platform which handles data ingestion, storage, analytics and visualizations. Finally the data in IoT platform can be made available to be consumed in a variety of output formats whether web interface, mobile application, automation and integrations or in our case augmented reality.

Designed By:

- Muhammad Moin   15ES50
- Adnan Rasool   15ES56
- Shahriyar Muzamil   15ES68
- Aryan Khan   15ES60
- Syeda Amna   15ES02
- Aisha Haque   15ES102

Supervisor: **Dr. Farzana Rauf Abro**
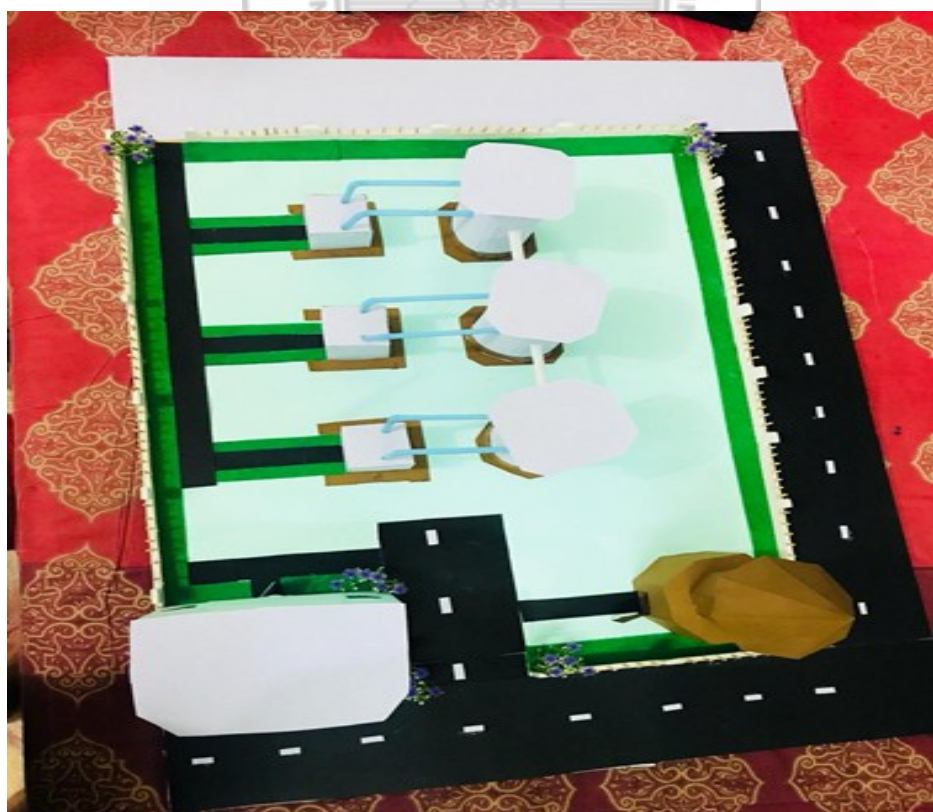
ADVANCE AUTOMATIC TOLL COLLECTION

Abstract:

Nowadays there is a huge rush in the toll plaza in monastic orderliness to salary the toll tax. Therefore in order to reduce the traffic jam and to save time, and also to reduce the money going. We have designed project for the automation in toll tax payment using RFID. It is an innovative technology for expressway network automatic toll collection solution. In this paper, the frame composing and working flow of the system is described and data information is also easily exchanged between the motorists and toll authorities, thereby enabling a more efficient toll collection by reducing traffic and eliminating possible human errors.

The main reason for this traffic at the toll booths is due to the manual working of the toll tax collection at the booths. Each vehicle on an average needs to stop at the tool booth for about a minute for the payment of the toll tax. In order to decrease this traffic, this is project which reduces the manual work and hence increases the vehicle speed passing by the toll booth. Also which allows the vehicles just to pass through the booth without the need to stop. This will increase the speed of the passing by vehicles allowing them to pass through the booth and will also reduce the manual work and as a result reducing the traffic congestion at the toll collecting booths and support in lower fuel consumption. This is very important advantage of this system.

It is one of the easiest methods used to organize the heavy flow of traffic. When the car moves through the toll gate on any road, it is indicated on the RFID reader that it has crossed the clearing. The need for manual toll based systems is completely reduced in this methods and the tolling system works through RFID. The system thus installed is quite expedient reducing the time and cost of travelers since the tag can be deciphered from a distance.

Designed By:

- Zohaib Ahmed   15ES72
- Murk Samoo   15ES06
- Sidra Rafique   15ES40
- Saad Ahsan Khanzada   15ES116
- Mehreen Tahir   15ES04

Supervisor: **Prof. Dr. Wajiha Shah**

Co-supervisor: **Mansoor Ali**

ADMIN PANEL   X

Vehicle Registration

|	
TAG ID:	Tag ID
Type:	Type
Maker	Maker
Year	Year
Engine NO:	Engine NO
Chassis NO:	Chassis No
Registration NO:	Reg NO
Amount	Amount

Toll Tax

Register

DESIGN OF AN AUTONOMOUS OBSTACLE AVOIDANCE OF UAV

Abstract:

The demand for reliable obstacle avoidance capabilities to ensure safe operation of unmanned aircraft platforms in proximity of the terrain has led to the development of a number of obstacle detection and avoidance systems. UAV are cheaper alternative to manned vehicles and ideally suited for dangerous missions that would be inadvisable for human pilot. Compared to manned aircraft, UAV were originated in military applications. Their use is rapidly expanding to commercial, scientific, recreational, agricultural and other applications such as policing, peacekeeping, surveillance, product delivery, aerial photography of agriculture, smuggling and drone racing. The main scope of project is to automatically changing the direction of UAV as required whenever any obstacle comes on its way. Here an ultrasonic sensor is used which detects the presence of any object and sends the signal to flight controller (pixhawk) which changes the direction of UAV. The main objective was to select hardware which includes flight controller pixhawk, all components and ultrasonic sensor. The hardware should provide the integration of additional sensors. As we use the pixhawk flight controller, so for pixhawk there is an open source GUI for programming and configuration of flight controller. After selection of quadcopter, we calibrate all the sensors which are connected externally or built-in in flight controller. The main advantage of GUI is that it provide all the details, you just need to select values according to your requirement. After calibration, we done the remote settings which includes pitch,roll,throttle,yaw,slider and switches. Assembling process was also the main process because all the parts of UAV are not available easily in open market so select only those components which provides compatibility with each other. Then the testing phase was started successfully. The primary reason of testing is to determine whether the theoretical concept of our project is implemented into reality or not. Through this testing one can determine that either the controller is providing smooth flight or not. We have connected one ultrasonic sensor in front so it will avoid obstacle autonomously. Hence we can conclude that UAV's are of great interest for modern era world in which we can utilize it according to the requirement of an application.

Designed By:

♦ Muhammad Osaid   15ES134

♦ Fawad Ahmed   15ES148

♦ Muhammad Saud Alam   15ES142

♦ Usman Ghani   15ES136

♦ Okasha Mansoor   15ES128

♦ Hafiz Hassan Ahmed   15ES160
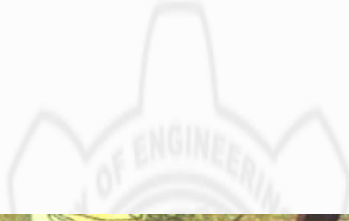
IOT Based Controlling and Monitoring Energy Devices

Abstract:

Internet of things is a growing network of everyday object from industrial machine to consumer home appliances that can share information and complete tasks while you are busy with other activities. The IOT aims to unify everything in our world under a common infrastructure, giving us not only control of things around us, but also keeping us informed of the state of the things. Home automation with the proliferation of IOT is becoming a reality now, and a variety of players like, Apple, Amazon, Google, Samsung, are all converging into this space to provide the platform and solutions for smart homes. In Light of this, this project also aims for monitoring and controlling of electronic devices as well as giving you approximate cost of your usage for the given time (defined by user). Certainly, there are some sensors that should be part of every IOT device intended for remote sensing. It can be established at the IOT product design stage through careful planning, and with the assistance of measurement strategies that can reveal a design's power-consumption characteristics. This requires a set of measurements that accurately characterizes an IOT device's power consumption under its different operating modes, and the type of test equipment that can replicate the IOT device's actual operating conditions at extremely low levels of voltage and current.

Designed By:

- Bhawesh Kumar   15ES07

- Hamza   15ES59

- Saad Soomro   15ES05

- Mir Mohammad Ali   15ES127

- Saddam Hussain   15ES61

Supervisor: **Prof. Dr. Wajiha Shah**

Co-supervisor: **Engr. Shoaib Hassan**

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INTERACTIVE RESTAURANT MENU TABLE USING PROJECTION MAPPING

Abstract:

This project presents an Augmented Reality based solution to the problem of order taken manually by hand in the restaurants. Restaurants have played a great role in our daily gatherings. In restaurants the procedure of taking the order is by hand. If the restaurant is full, it is very time consuming to wait for the waiter. Some restaurants use input devices (tablet, track pad, mouse etc.) to take the order digitally but the devices are prone to damage. In our project, there is no use of tablet, track pad, mouse or any touch screen device, expensive equipment that the customers or waiters have to handle, thereby reducing the probability of physical damage to zero. We will take the order on the surface of the table by the use of Microsoft Xbox 360 Kinect v1 and Portable Beamer GP70 series projector placed above the table. The menu is projected on the table and selection of dining course and order placement is carried out by customers using hand gestures. The hand gestures are based on skin segmentation which is particularly programmed using convex hull and k-means clustering through MATLAB software. The food items, desserts and beverages requested by a table can automatically be transmitted to the kitchen and billing counter over the network. Since the hardware assembly installed over each table is out of access of the people in the restaurant, physical damage rate is nearly zero.

In addition, time delays are drastically reduced as the entire system is online. The projector projects the menu on the dining table (simple table with no gadgetry placed on its surface) and it is the table where the food is served. The customer provides the gesture to turn the projector on and the projector starts to project the menu on the table, the customer selects the cuisine using simple hand gesture (e, g, finger pointing) on the table. The order is sent to the kitchen via the User Datagram Protocol (UDP) application and then the food is served. The total amount of the bill will be shown on the table. Through this project, not only augmented reality will be first time introduced in our country, but it will also give rise to the idea of using modern technology in daily use. It will bring a revolutionary change in this country. It will also expand technical development in our country.

Designed By:

- Subhash Kumar   15ES58
- Tayyaba Abro   15ES26
- Shifa Chang   15ES24
- Kantesh Kumar   15ES52
- Ghayoor nAbbas   15ES150
- Majid Ali   15ES130

Supervisor: **Engr. Khuhed Memon**

Co-supervisor: **Prof. Dr. Wajiha Shah**

SMART FISH AQUARIUM

Abstract:

Keeping pets at home is becoming popular nowadays. And now comes keepings fishes in our homes, offices or any other place of work or residence is becoming a very popular trend. Fish not only entertains us by their colorful presences but also, are very good piece of decoration. But the problem starts here they don't have senses so they can't do anything by their selves and we can't keep the fish at dry places they need a proper way of aquarium.

The motivation to make this project was to help the aquarist in maintaining the aquarium automatically in their busy schedule and to take care the health of the fishes as well. Aquarium needs fresh water, marine and correct amount of brackish in it and feeding the fish on correct timing and their time intervals should be equal to maintain the health of the fishes. It is very important and must thing to do for us to do a proper care of fishes because the fishes are themselves a breath taking thing. So for a proper look after of the fishes we need a automatic (SMART) aquarium so if we are near or far away we can take care of our fish automatically. To maintain the temperature, Brackish, PH of water automatically and yes of course the feeding system is also introduced as automatically in our project.

The objectives of this project are to implement a system, which uses; Global System of Mobile Communication (GSM) modem for the automatically fish aquarium,, then to facilitate an automatic aquarium in the distance using GSM technology and also to learn and study about GSM modem interface with the main controller to produce a machine that automatically work for fishes. The feeder will feed the fishes on equal time of intervals by using simple and cheap methods, we have used here stepper motor instead of PLC programming. The temperature controlling is also a very important issue so the aquarist will control the temperature automatically if the temperature goes high or low then 30degree Celsius the aquarist will get a notification on their cell phones and can set the temperature accordingly by fan and intense lights either than using costly heater and coolers. As well the PH of the aquarium should be from 6.5 to 7.5 if the PH goes up or down the aquarist well get a sudden notice it will be changed automatically accordingly to the aquarist.

The glass of the fish aquarium, whether should be large or small but the material of the glass should not harm the fishes so we have used here the suitable case of glass. Whose dimensions and size are well explained below in the chapters?

We have tried our best to make the SMART FISH AQUARIUM automatically as well as so cheap so that anybody so have interest in keeping the fish as pet can easily buy and maintain the aquarium as well. All the equipments were expensive are altered with the best and cheap. Safety and precautions rules are also well discussed below in the chapters.

Supervisor: Engr. Kamran Kazi

Co-supervisor: Engr. Talha Kaimkhani

Designed By:

- Ajay Kumar   15ES107
- Sumbul Memon   15ES15
- Osama Bin Abid   15ES157
- Aarifa Phul   15ES25
- Muhammad Javeed   15ES119
- Ifrah Fatima   15ES126
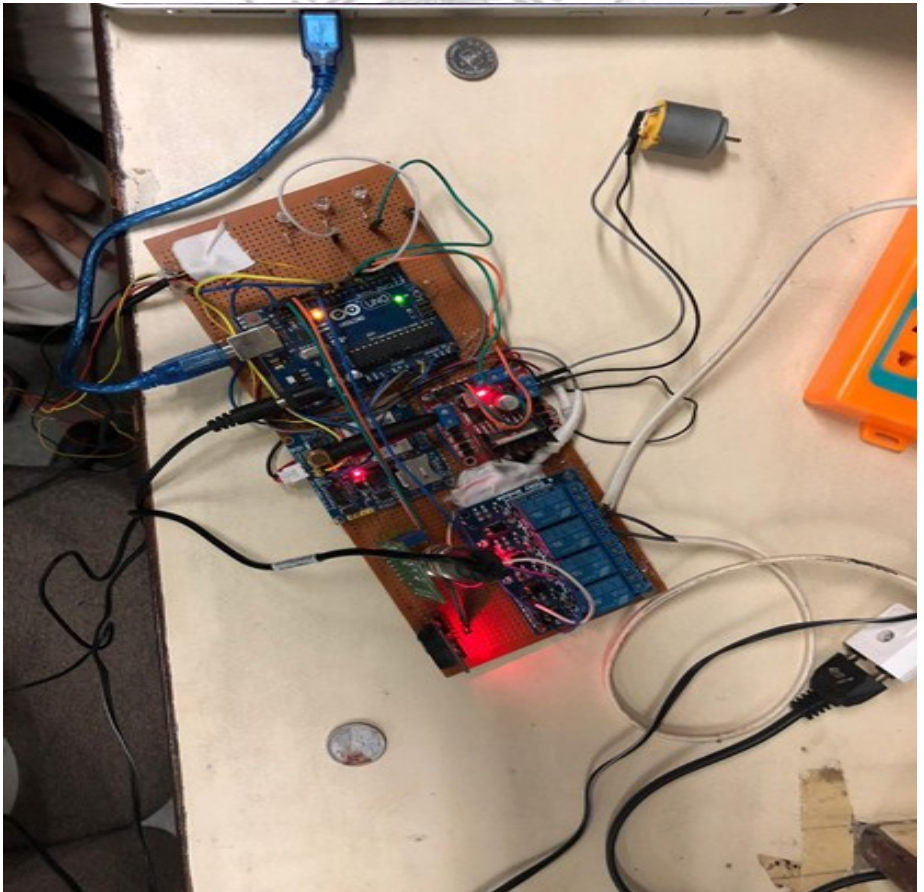
SMART GARBAGE MONITORING SYSTEM (A Real time Implementation in FEECE)

Abstract:

These days, the cleanliness and fuel crisis have become a major problem. The environment is getting dirty due to negative effects of open trash remained unclean. This project "Smart Garbage Monitoring System" has been designed with the aim of fuel consumption. As part of market analysis, smart trash can technologies currently available in market were reviewed and their features and limitations were studied.

A smart garbage system is said to be useful when it consumes less amount of fuel and human load, this is done if only trash cans get emptied when it is needed.

The scope of this project is to make a trash can system efficient. It identifies the need of emptying trash cans by utilizing the ultrasonic sensor to identify the trash level percentage and thereby informing the trash collectors. When the trash level percentage is zero, no trash collector is required to visit the trash can particularly be saving fuel consumption and human load.

System also provides a GSM controlling feature for informing the collector regarding trashcan level. For any reason whatsoever, if it is required for the collector to do emptying process it simply gets information through GSM messaging service.

System is also equipped with a chargeable battery feature. It periodically recharges the battery connected to get the circuit powered. The system receives power on the whole so converter is being used to step down power supply to the required level for different components.

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

Designed By:

♦ Hammad Memon   15ES144

♦ Jaweria Iqbal   15ES62

♦ Khushwant   15ES110

♦ Usama Shaikh   15ES54

♦ Asif Khaskheli   15ES48

♦ Mehjabeen Rind   15ES22

Supervisor: **Dr. Farida Memon**
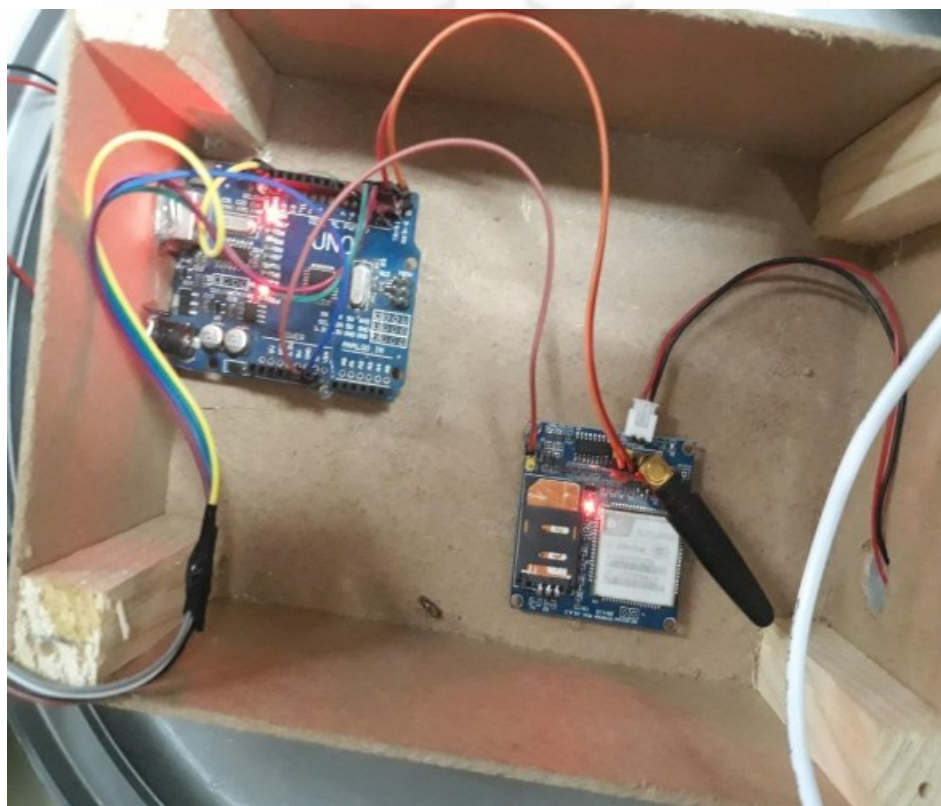
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BLOOD SAMPLE ANALYSIS USING IMAGE PROCESSING

Abstract:

The human blood consists of the red blood cells (RBCs), white blood cells (WBCs), Platelets and Plasma. The complete blood count defines the state of health. Blood is a health indicator therefore segmentation and identification of blood cells is very important. Complete Blood Count (CBC) includes counting of all the cells which determines person's health. The RBC and WBC count is very important to diagnose various diseases such as anemia, leukemia, tissue damage, etc. Old conventional method used in the hospital laboratories involves manual counting of blood cells using device called Hemocytometer and microscope

But this method extremely monotonous, laborious, time consuming, and leads to the inaccurate results due to human errors. Also there are some expensive machines like Analyzer, which are not affordable by every laboratory. The objective of blood sample analyzer is to produce an image processing based system that can automatically detect and count the number of RBCs and WBCs in the blood sample image.

The objective of this research is to study different methodologies of cells counting and come up with the best solution. The blood sample analyzer presents software based solutions for counting the blood cells. Image processing based method of cell counting is fast, cost effective and produces accurate results. MATLAB software is used for the analysis. The accuracy of a system depends upon the quality of input image, Camera used for acquiring an image.

Designed By:

- Arsalan Ali Malik   15ES42

- Hitesh Kumar   15ES123

- Arif Hussain   15ES32

- Maleeha Memon   15ES129

- Abdul Rauf   15ES159

- Wajid Ali   15ES111

Supervisor: **Dr. Attiya Baqai**

Co-supervisor: **Dr. Fahim Aziz Umrani**
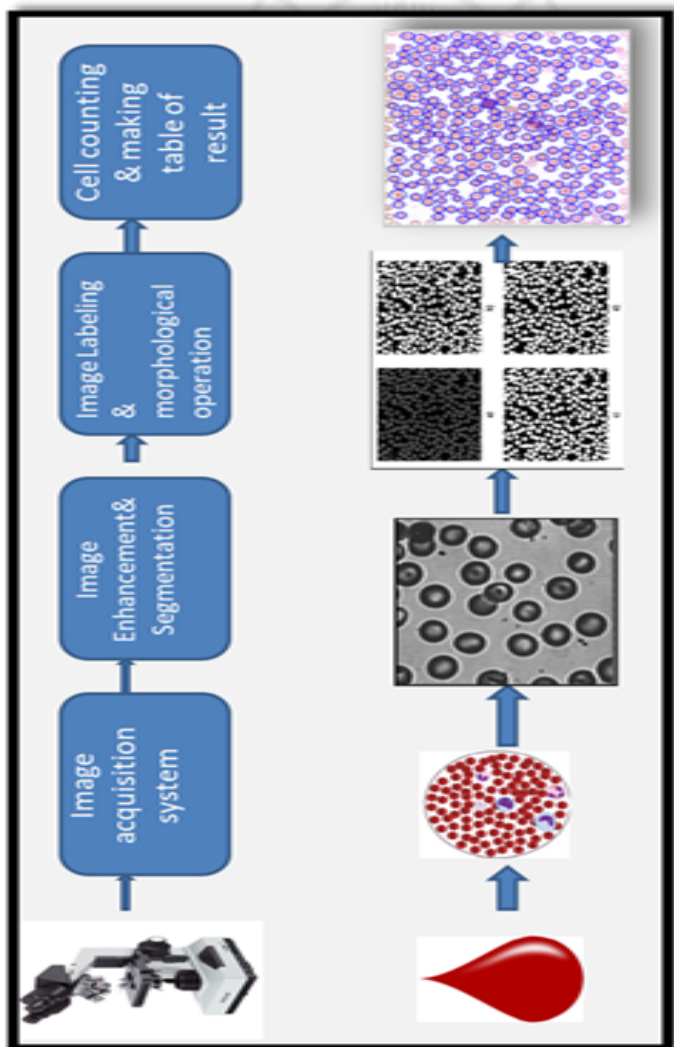
Design and implementation of automated blood bank using embedded system

Abstract:

There are more than 1800 blood banks across the country in public, private, and NGO sectors. Despite such a high number of blood banks, the services are still very fragmented and inefficient. The country annually faces shortage of more than a million blood units to save the lives of thousands of people. In the existing blood bank systems, the blood bank manages the database and it takes much time for the donation of blood to the recipient. There are multiple blood banks/donors around the country; however, none of them offers the capability for a direct contact between the donor and recipient. This is often a serious disadvantage notably in cases when there is an urgent need of blood.

Our project solves these issues by introducing a smart blood bank system in which all the operations are automated, so all the blood related issues are handled efficiently and appropriately. The project aims to beat the communication barrier by providing an immediate link between the donor and recipient. We have proposed a system in which we have enabled the donor and the recipient to communicate via two methods: either through the Android App, or through the Message Alert System. In both of the methods the location of the most eligible donor is obtained. The Android App, with the help of Google Maps, shows the location of the donor. The message-based communication between the donor and the recipient is carried out using the low power, low cost GSMbased mini CPU i.e. ARDUINO.

Designed By:

♦ Noorain Korai   15ES01

♦ Awais Raza   15ES27

♦ Shaheera Abid Qureshi   15E113

♦ Fayyaz Ali   15ES49

♦ Sheeraz Ahmed   15ES43

♦ Waqar Ahmed   15ES55

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

Co-supervisor: **Engr. Shoaib Hassan Khaskheli**
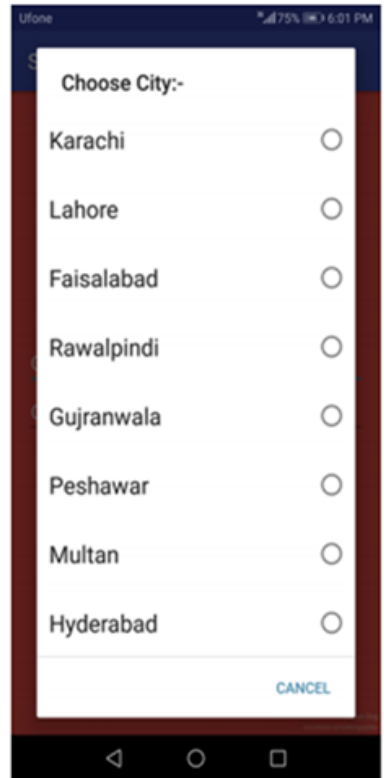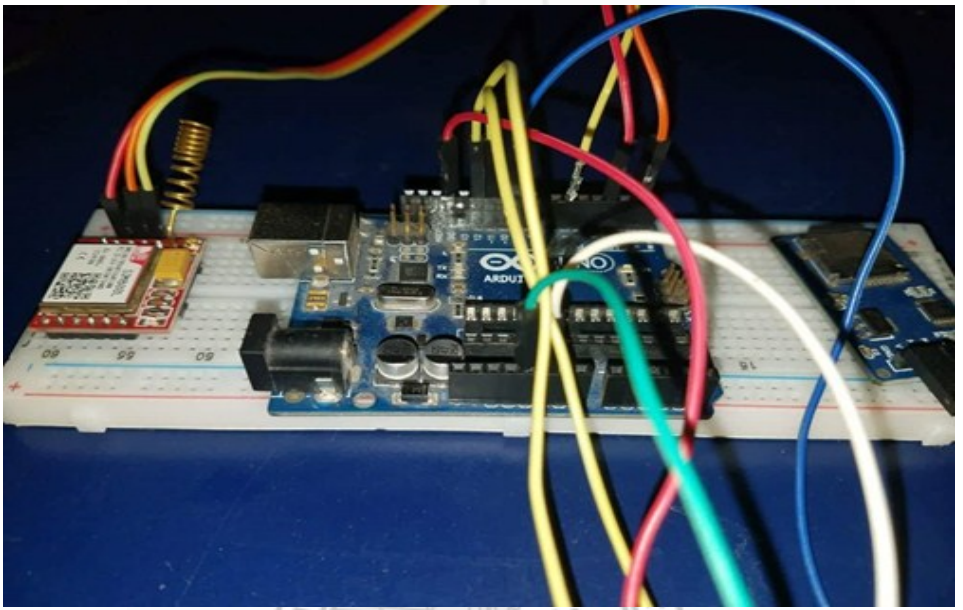
THE SMART TROLLEY

Abstract:

In this project, we've construct a smart trolley model for carrying different objects and grocery items in the shopping environment for the comfort and easiness of the customers. After analyzing the problems that are being faced by the customers while shopping, on the daily basis routine, we came to a conclusion and decided to bring some advancement in the shopping world. So, to get rid of those problems we are introducing a new concept of **"Smart Trolley"**, which consists of an RFID (Radio Frequency Identification) reader. All the items in the supermarket will contain an RFID tag so whenever a customer puts any item in the **"Smart Trolley"**, the code will be identified and the price of those items will be stored in memory. As we insert the items in the trolley, the cost will sums up to the total bill. If the item is taken away from the trolley, its bill will be automatically subtracted from the previous total bill. Thus the item name and its cost will be displayed on LCD, which could be termed as "Smart Billing". The other main objective of this **"Smart Trolley"** is the 'Automatically Following', and for that purpose we are using IR sensor and monster motor shield. So the trolley will be able to follow the specific person via IR beacon.

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Final Year Projects

15ES

ULTRA SONIC BLIND STICK USING ARDUINO

Abstract:

Independence is the building methodology in achieving dreams, goals and objectives in life. Visually impaired persons find themselves challenging to go out independently. There are millions of visually impaired or blind people in this world who are always in need of helping hands. For many years the blind ultra sonic stick became a well-known attribute to blind person's navigation and later efforts have been made to improve the stick by adding sensor. Blind people have big problem when they walk on the street or stairs using stick, but they have sharp haptic sensitivity. The electronic walking stick will help the blind person by providing more convenient means of life. The main aim of this paper is to contribute our knowledge and services to the people of blind and disable society.

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Final Year Projects

15ES

GREEN CROP MONITORING USING UNMANNED AERIAL VEHICLE

Abstract:

The basis of this project was to make agricultural crop monitoring efficient in terms of time and money. The idea was to replace an expensive NDVI camera with a simple RGB camera in a drone which can perform each of the operations like of a NDVI. Our core work was on image processing. By the implementation of K means and Plot land classification with color features and super pixels techniques we accomplished our target. Image processing in our agricultural application did these functions: Detected diseased leaf, stem and fruit. Found shape of defected area by disease. Determined shape of fruits. Determined color of affected area.

Currently the problems from which agriculture sector is going through are: Scarcity in water and electricity actually required for plant growth. Traditional methods of farming which require a lot of men work. Prices are fixed diminishing farmers profit margin. (Production cost= Electricity cost +Pesticides cost+ Transportation cost+ Labor cost+ others. And Profit= Selling price-Production cost)

Our Project addressed all of the above concerns effectively by the implementation of smart farming which uses drone with a built in RGB camera. By adopting this technology we surpassed the old farming trends of farming. It not only saved men work but also hampered farmers to waste water which is a hot issue too. Likewise in particular time and money was saved.

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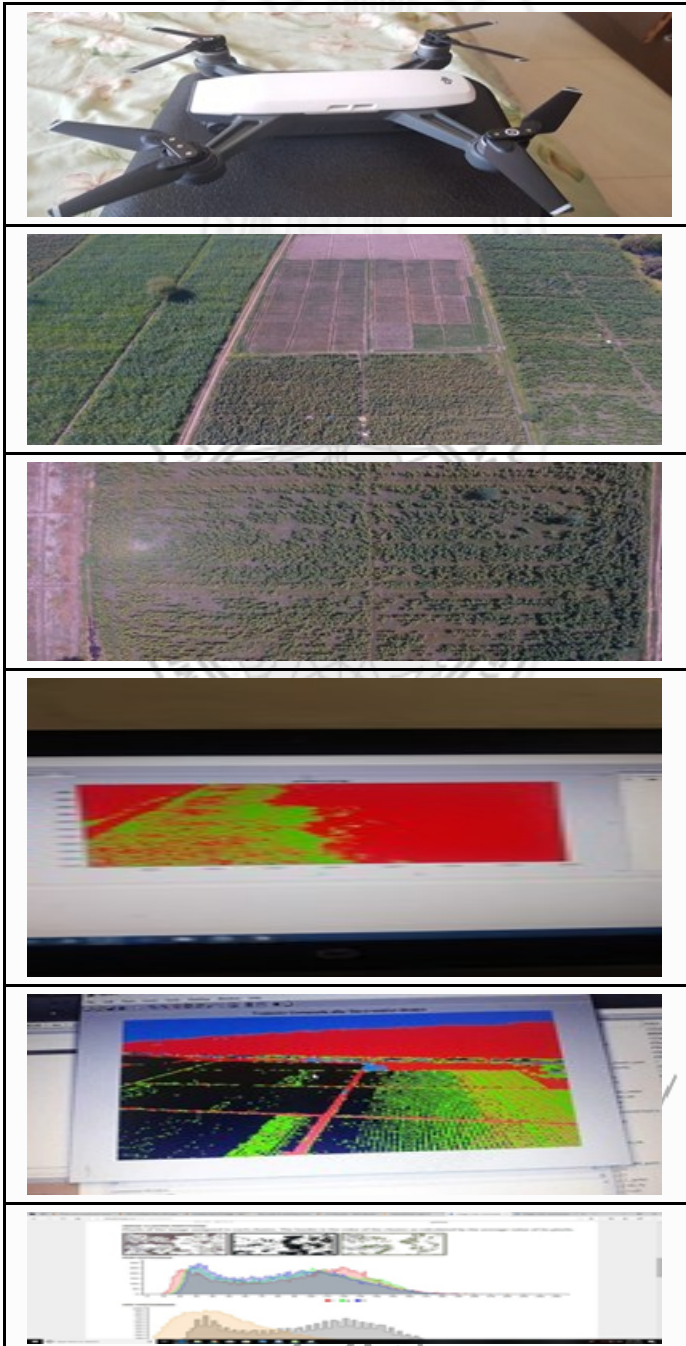- Nawab Mehtab   15ES138

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POWER CHARGING VEHICLES AT YOUR DOOR VIA SINGLE CLICK OF THE PHONE

Abstract:

Smart cities, smart grids, smart homes and smart electric vehicles are the emerging technologies of this era. They lead to secure, user friendly clean and green energy environment. This work leads to the concept of smart cities of 2030 and the current motto of Japan for renewable energy sources. The currently boiling point of energy crisis in our country is the major issue to be taken in account taking that in regard, this work is consisted of four main blocks i.e. solar charging station which can replace the fossil fuel stations and charge the electric vehicles.

The second block is of electric vehicle that charge up the homes on single click of your phones these electric vehicles also contain dynamos in their tyres that convert mechanical energy into electrical energy thus generating power during mobility.

The third block is of smart homes which utilizes the solar power for home utility and in case if weather is not in favour we can call the EV car through an application for power source to that particular home.

The fourth block is application that is quite user-friendly and work efficiently with EV driver and the client running out of power.

Eventually the aim of this project is to have a city with no power grids, no blackout, and no emission of hazardous gases, no need of fossil fuels hence a city with clean and green environment with renewable energy sources.

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Final Year Projects

15ES

FPGA Implementation of the Gaussian Mixture Model Algorithm for Real-time Segmentation of High Definition video

Abstract:

Circuits and systems able to process high quality video in real time are funda-
mental in nowadays imaging systems. The circuit proposed in our presenta-
tion, aimed at the identification of the background in video streams, imple-
ments the improved formation of the Gaussian Mixture Model (GMM) algo-
rithm that is included in the open CV library. An innovative , hardware orient-
ed , formulation of the GMM equations, the use of truncated binary multipli-
ers , and ROM compression techniques allow reduced hardware complexity
and increased processing capability. The proposed circuit has been designed
having commercial FPGA devices as target and provides speed and logic re-
sources occupation that overcomes previously proposed implementations. The
circuit, when implemented on Virtex6 or Stratix1v, processes more than 45
frames per second in 1080p format and uses few percent of FPGA logic re-
source.

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(a)　(b)　(c)

(d)　(e)　(f)

video frame
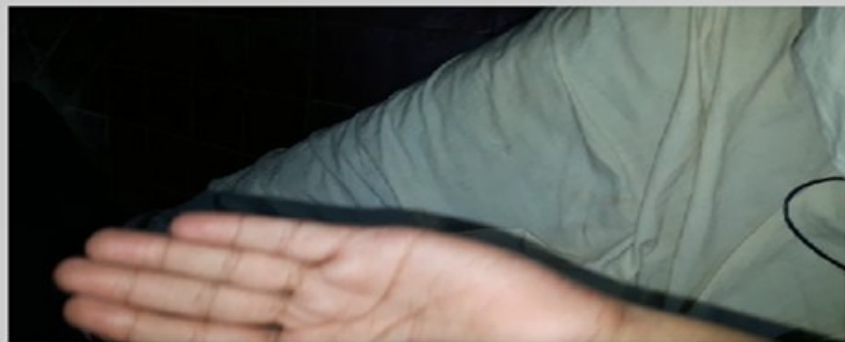
foreground image

DESIGN & IMPLEMENTATION OF HAND GESTURE RECOGNITION SYSTEM ON FPGA

Abstract:

The design and implementation of the hand gesture recognizer system for controlling the hardware appliance in real time. FPGA based implementation proposed for hand tracking system includes the image preprocessing state and feature extraction state that is based on Principal Component Analysis PCA algorithm computation. The main modules in this image processing system employ the developed system exploits the parallelism architecture of the FPGA to achieve real time processing. Essentially, the hand gesture recognizer system design have several essential features: (1) Hand tracking system, (2) Gesture classification and (3) Support real time processing.

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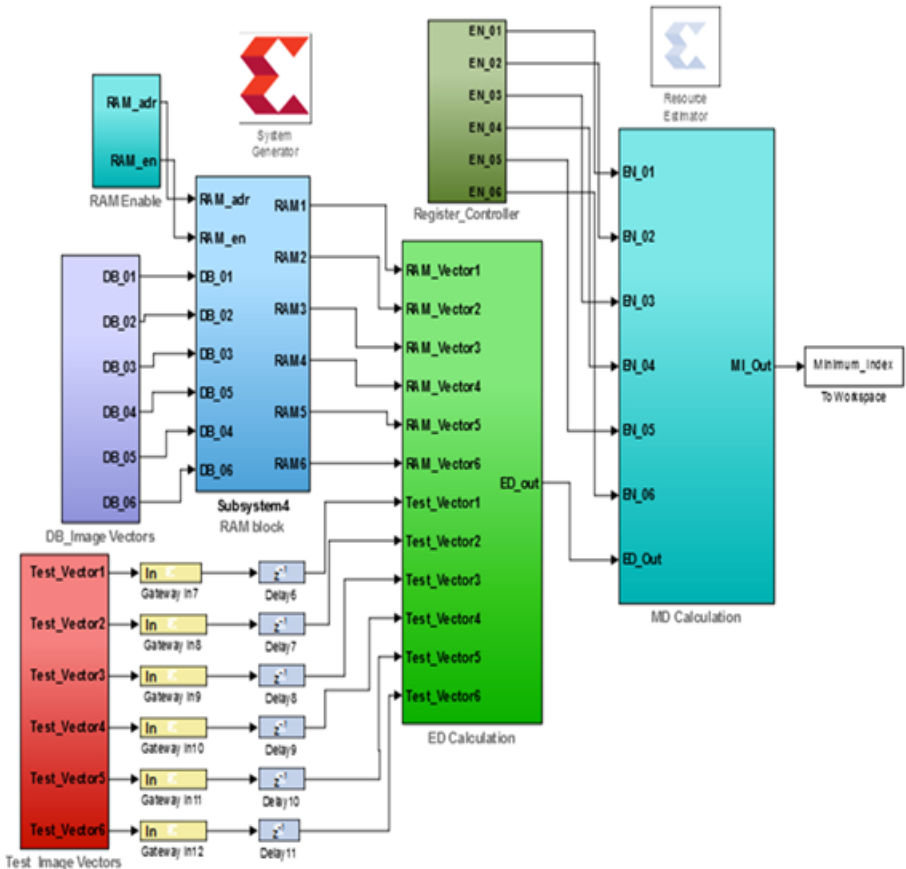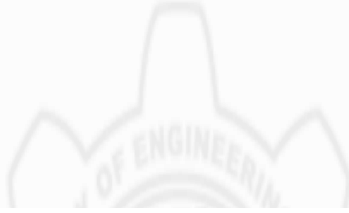
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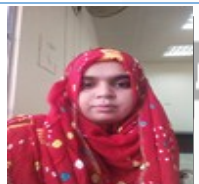
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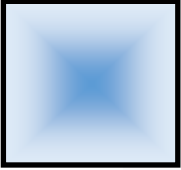
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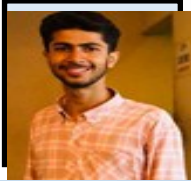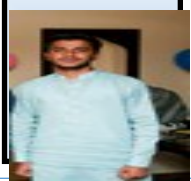
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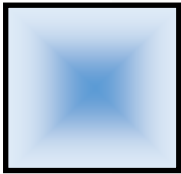
Students' Profiles

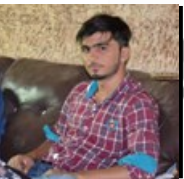|	
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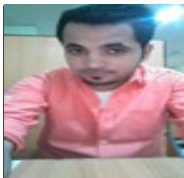
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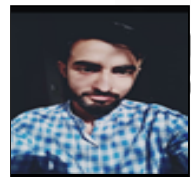
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	Final Year Projects
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Department of Electronic Engineering

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

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