Final Year Projects
16ES

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Mehran University of Engineering & Technology,
Jamshoro

Message from Dean FEECE

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 *Quadcopter based spray drone for agriculture Applications, FPGA Implementation of Intelligent authorization system* and also projects such as *IOT based Agriculture monitoring, controlling and drip irrigation system* secured funding under the RINU project.

On this occasion, I would like to felicitate and express utmost appreciation to the Chairman of the Electronics department, FYP Committee, all the 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 Mukhtiar Ali Unar

Message from Chairman

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 (16ES) of Electronic Engineering Department has put in their invaluable efforts and technical expertise in designing real life application-oriented projects like *Turn any normal screen into touch screen, Design of digital joint ROM Measurement system* to name a few. To sum it up, they have done a commendable job.

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

Dr. Tayab Din Memon

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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.

FYP Funding Secured in IGNITE-NGIRI-2019

S.No	Project Title	Amount (Rs)	Supervisor Co-supervisor
1	Design and Implementation of Multifunction CNC Machine	76,401	Dr. Irfan Halepoto Engr. Burhan Aslam
2	Design of Digital ROM (Range of Motion) Measurement System	70,128	Dr. Attiya Baqai Dr.Sanam Narejo
3	Harnessing Power of Quanta: Analysis, development and implementation of quantum algorithms and devices	80,000	Dr. Attiya Baqai Dr. Bhawani Shankar Chowdhry
4	Design of UAV autonomous charging for surveillance	60,100	Dr. Arbab Nighat Dr. Syed Amjad Shah
5	Quadcoptor based spray drone for agriculture application	57,745	Dr. Arbab Nighat Dr. Bhawani Shankar Chowdhry
6	GPS Controlled Delivery Service by Drone	57,900	Engr Kamran/ Engr Aamir
7	Real time water quality monitoring system	64,200	Dr. Tayyab Din Memon Dr. Khalil-ur-Rehman Dayo / Engr. Burhan Aslam
8	Self-Driving Car using LIDAR sensing & image processing technology	70,000	Dr. Bhawani Shankar Chowdhry Dr.Sanam Narejo

ACHIEVEMENTS BY STUDENTS

Department of Electronic Engineering secured funding in RINU– Cohort-2, 2019, A project in collaboration of Sindh Government & IEC-MUET

It is an honor and moment of pride for the department of Electronics that it has maintained its performance in receiving funding for its FYPs and startups. It gives us immense pleasure to share the details of graduates and award winners from department of Electronics.

S.No	Competition	Category	Amount (Rs)	Title	Supervisor	Team Members
1	RINU	FYP	1 Lac	Smart Automobile	Engr.Khuhed Memon	Ghulam Hyder, Aisha Ahmed, Sadaf, Abu Bakar, Naveed Ali
2	RINU	FYP	1 Lac	Quad copter spray drone for agriculture application	Prof. Dr. Arbab Nighat	Suresh Kumar, Narbat Lal, Gulshan, Kashif Ahmed, Pardeep
3	RINU	FYP	1 Lac	IOT based agriculture monitoring, controlling and drip irrigation system	Dr. Farzana Rauf	Farid Ahmed, Ghulam Hyder, Pervaiz Anwar, Mahalaka Qazi, Raja Abid Hussain

ACHIEVEMENTS BY STUDENTS

Department of Electronic Engineering secured funding in Student Startup Business Competition (SSBC2K19).

In the competition arranged by Mehran University Innovation & Entrepreneurship Center (IEC), forty five (45) ideas were shortlisted out of 90 total submissions in first place. In further scrutiny, 9 ideas were selected for pitch in front of the experts' panel from academia and industry.

One of two ideas that won that went successful was initiated by 16ES batch students. The idea was "Elementary Education for Visually Impaired" securing PKR 200,000 seed money and was supervised by Dr. Attiya Baqai

A cheque distribution ceremony was held at IEC MUET on 1st February 2019. Mr. Tahir Chaudhry, Chief Executive, Falcon Engineering, Founding member and Chair, Industry Academia Linkage at Open Source Foundation of Pakistan .

FEEL VIRTUAL REALITY/THE TOUCH OF VIRTUAL REALITY

Abstract:

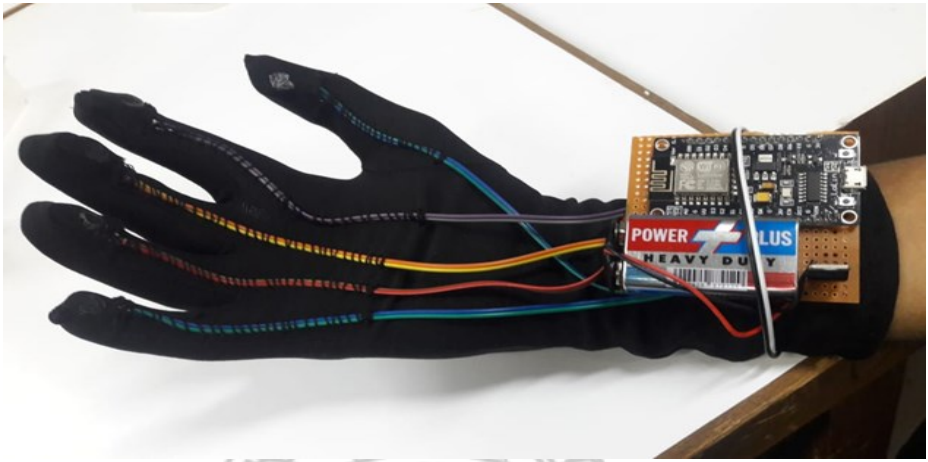
Nowadays virtual reality is a field of interest of every researcher. The degree of immersion and interaction with virtual reality is improving day by day by incorporating human senses in a virtual environment. The presence in a virtual environment along with the sense of touch is presented in this thesis; we propose the Smart glove collaborated with unity 3D environment to provide a sense of touch in the virtual environment. More precisely the Smart glove provides a sense of touch in virtual reality. Our Smart glove will provide force feedback as well as tactile feedback which are essential to acquire a sense of touch. The critical dimensions of the glove were identified and balanced with the optimal layout of the actuators. With a vibrating motor in each finger, the Smart glove can produce vibrations for interactive cues, like textural changes that either a surface is soft/hard or smooth/rough. Also, the TEC1-12715 Thermoelectric Peltier module is used inside the glove to provide the feel of warmness. The interaction between a person and virtual environment is done with the Microsoft Kinect device which tracks the skeletal movements and provides human interaction with a virtual environment. When the hand touches the object in a virtual environment, unity sends the command to NodeMCU V3, as result vibration motors and TEC1-12715 Thermoelectric Peltier module are turned on accordingly thereby producing an immersive VR environment for the user. Overall performance of the Smart glove is tested and evaluated from the feedback of participants involved during testing. Hence the Smart glove proves as an effective interface between the user and the virtual environment.

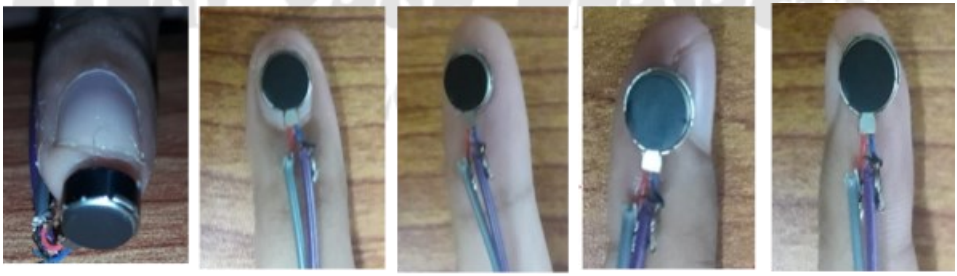
Designed By:

- Sidra 16ES01
- Fabiha Khan 16ES09
- Ehtisham Atta 16ES111
- Basit Ali 16ES121
- Muhammad Aftab Udin 16ES133

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

Co-supervisor: **Engr. Khuhed Memon**





a) b) c) d) e)

UNMANNED AIR VEHICLE CONTROLLED VIA FACIAL & GESTURE RECOGNITION

Abstract:

With the intense development in the technological world things are getting more advanced and reaching at our finger tips. This project aims to design a hand gesture sensor which can provide a control over a UAV using a few hand gestures. Moreover, for the security purpose, an unlocking system with face, commonly known as facial recognition is required to design. The idea is implemented on a quad copter. This bypass the use of conventional transmitters designed to fly the UAVs previously, and just by moving the hand, operator can control the UAV and this controlling is same as of a normal remote-controlled transmitter and the UAV will never be armed or fly, until and unless it will detect the face of one of our members. Once, it detects the face, it sets itself to fly.

Quad copter is the test subject of this project, the quad copter used here is neither of pro level nor of entry level. The gesture module requires different modules, a module with gyroscope and accelerometer, a module for controlling throttle and a module to control all these procedures.

Lift is generated by increasing the throttle with the help of joy stick mounted on a hand glove. Angular movements are sensed by an IMU (MPU-6050). Arduino Nano is used to control all these phenomena. Face unlocking is done by ESP32 cam module.

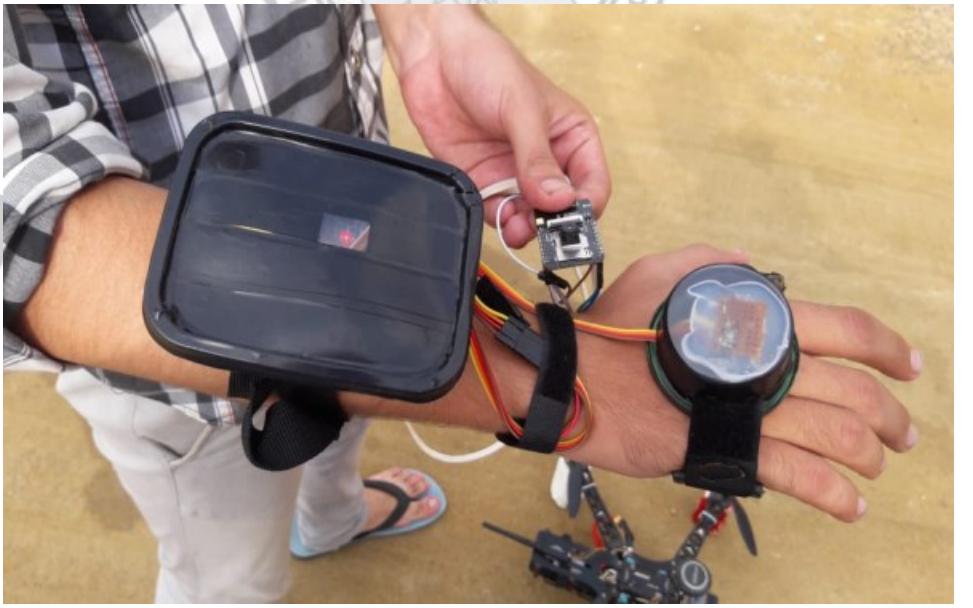
As the normal transmitter is bypassed, a transmission source is needed and for that NRF module is used. As the project is not designed for long distances, the UAV will easily be communicated with the aimed transmitter.

Designed By:

- Muhammad Yousuf 16ES69
- Rafique Ahmed 16ES103
- Wasiq Mazhar 16ES131
- Muhammad Nouman 16ES59
- Saqlain Ali Bashir 16ES107
- Muhammad Hamza Asif 16ES38

Supervisor: **Engr. Tufail Ahmed Waseer**

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



QUADCOPTER BASED SPRAY DRONE FOR AGTICULTURE APPLICATION

Abstract:

Pakistan is an agricultural Based country. Progressive growth of the agricultural field is the need of this country. Lower areas former or agricultural need the protective and very good production to increase the rate of growth. For the crop, to protect them from the insect and to increase their growth, we need pesticides and fertilizers to spray on them. UAVs can be used easily, where the equipment and labor difficulty to operate. Agricultural fertilizer and chemical quickly used to kill insect and growth of crops. According to (WHO) world health organization report 2019, there are more than one million pesticides cases in every year. In that more than hundred thousand deaths in each year. Mostly in developing countries due to the pesticides sprayed by human being. The pesticide affects the nervous system of human and also leads to disorder in body. A remote controlled UAV (unnamed Aerial Vehicle) is used to spray the pesticide as well as fertilizer to avoid the human from pesticide poison. The UAV is operated by manually triggered by RF Controlled Nozzle. A remote control drone or unmanned vehicle will help the people to spray pesticide on crop without handling it. The unmanned Aerial Vehicle (UAV) reduces the direct handling of pesticides by human being and helps to protect them from any diseases will give to them by pesticides these. Diseases came from the pests and insets, which reduces the productivity of the crops. Children may accompany their parents to the fields and helps them with their tasks. Infant who are still being breastfed are often carried by their mothers in the fields. Children may help with agricultural tasks or may be allowed to play around the sprayed field. Multispectral camera is used to capture the remote sensing images which are used to identify the green fields as well as edges of crop area. Total payload liftoff weight of quadcopter is 2 kg.

Designed By:

- Suresh Kumar 16ES13
- Narbat Lal 16ES27
- Gulshan 16ES61
- Kashif Ahmed 16ES51
- Pardeep Kumar 16ES73

Supervisor: **Prof. Dr. Arbab Nighat**

Co-Supervisor **Dr. Bhawani Shankar Chowdhry**

DESIGN OF UAV AUTONOMOUS CHARGING FOR SURVEILLANCE

Abstract:

From some last year's it has been observed keen interest in research work and deployment of involving UAVs. The main reason behind this is their dexterity, briskness, liveliness, potential and propensity to perform too much difficult tasks in comparison with humans in different places and situation, basically they can direct the places and transport where ground robots are unable to reach. Whereas, Rotary Wing Aircraft such as Quadrotors has potential , ability and propensity to operate in cramped spaces .Hover and roost in space at particular point and lands on particular given points and flat surfaces . In this way Quadrotors become very winning and irresistible aerial platform give rise to mass of different set of research circumstances.

Their ability has been restricted due to limited capacity of battery by stiffness on flight time. So, basically by automating the recharging process of battery the autonomous UAVs can get created and re-charged by on-board batteries without intervention of humans and by appoint a team of agent their mission time greatly can be increased.

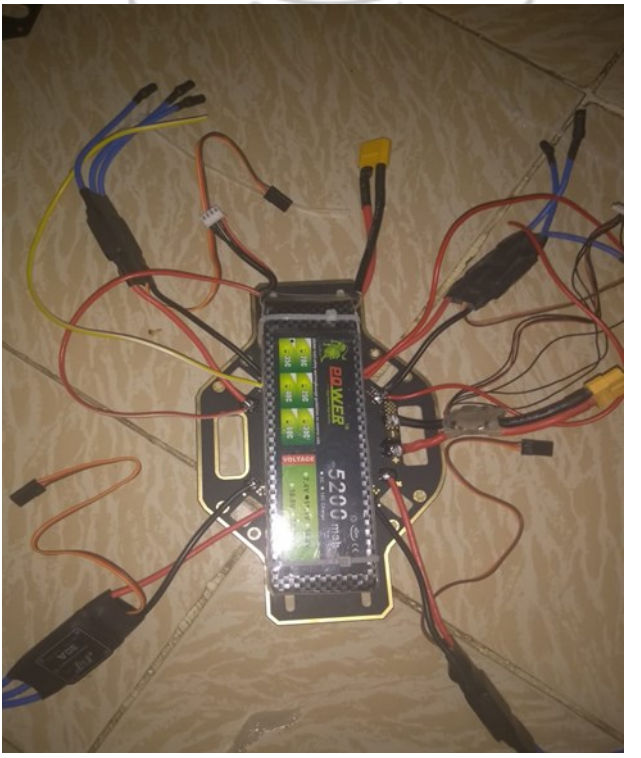
This thesis provide details of development, implementation and testing of UAVs autonomous charging station and can used for autonomous UAVs long-term multi-agent surveillance by keeping persistent station.

Designed By:

- Muhammad Hussain 16ES68
- Rashid Ahmed 16ES18
- Shanza Azhar 16ES46
- Ali Shahzar 16ES10
- Asghar Ali 16ES14
- Aadil Khan 16ES48

Supervisor: **Prof. Dr. Arbab Nighat**

Co-Supervisor **Dr. Syed Amjad Shah**


BOWER
VOLTAGE
5200

FPGA BASED REAL TIME IMPLEMENTATION OF INTELLIGENT AUTHORIZATION SYSTEM BASED ON FACIAL RECOGNITION

Abstract:

The prime aim of this project is to create a standalone authentication application by using face recognition technique. That provided system can eventually recognize and allow the authenticated person(s) within the premises of any in-situation in order to provide a top notch security. The existing systems based on face recognition techniques are unable to get off from the nail of delay factor and have lots of flaws as far as the accuracy, portability, accessibility and storage of database is concerned. The main issue with existing systems is that they are unable to be implemented in real time environment because of amount of delay. Additionally, main motive is to consider the importance of response time that how long that system is going to respond rather than focusing upon the improvement as far as the efficiency of the algorithms is concerned. Thus, in order to cope up with this flaw that exiting systems have, this project will use a combination of hardware and software that will simultaneously indulge the parallel processing techniques and modules such as NI MyRIO FPGA with a sufficient storage while bringing the system into the real time environment so that the security within any institution should be maintained. This upgraded version of face recognition not only reduces the processing delay but also gives a significant amount of convenience as numerous processes are being automated.

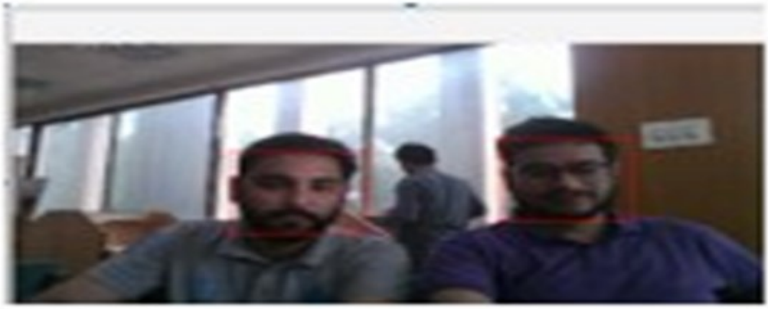
Designed By:

- Mehar Fatima 16ES07
- Zeeshan Ahmed 16ES15
- Danish Ali 16ES67
- Afshan Ahmed 16ES117
- Nimra Tariq 16ES127

Supervisor: **Dr. Tayab Din Memon**

Co-supervisor: **Engr. Mansoor Ali**

Recognition results



IOT BASED WATER QUALITY MONITORING SYSTEM

Abstract:

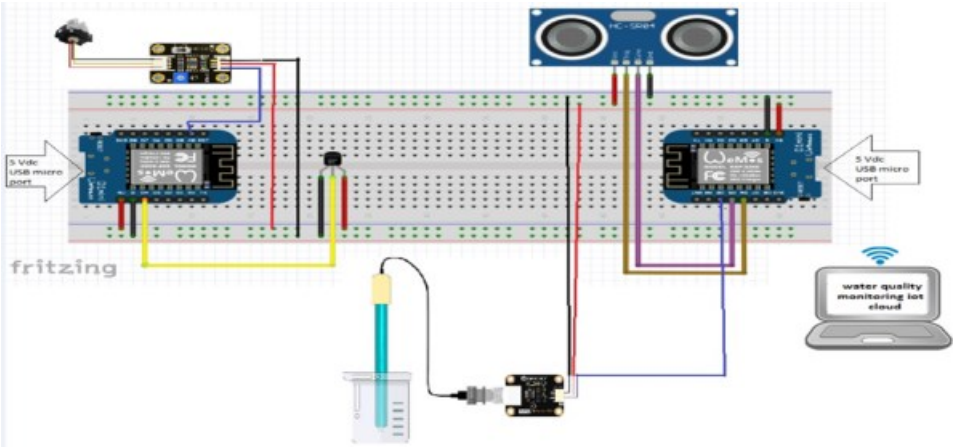
In recent years, the pollution especially water pollution has become one of the major issues that are faced by countries around the world. The increase of amount of factory and vehicle had caused the emission of plague water and chemical to the river, sea and pond. Hence, it is important to monitor the water quality constantly so that immediate action can be taken to counter water pollution. Water quality is described as the general composition of water with reference to its chemical, physical and biological properties. Water is a limited natural resource and it is very essential for human beings. Recent development of internet of things (IoT) in the field of information and technology (IT) makes life easier and more comfortable. In fact, IoT rapidly changes life style. Quality of water is a major issue, so it is necessary to check water quality in real time. The purpose of this research was to make an IoT based cost effective system that can monitor the quality of water in real time. The design and implementation of the system is done by the help of WeMos and sensors (ph, turbidity, temperature, ultrasonic). WeMos is an Arduino board with built in Wi-Fi capabilities to monitor sensed data over the internet. WeMos needs internet connectivity through which it transfers sensors data to thing speak. Thing speak is free IoT platform where data presented graphically. The overall experimental setup was developed and tested for water quality data acquisition, online data transfer, monitoring, recording and analysis. It is experimentally observed that system takes less than one minute to update its data. This cost-effective system is very beneficial for resident as well as for industries to monitor the water quality.

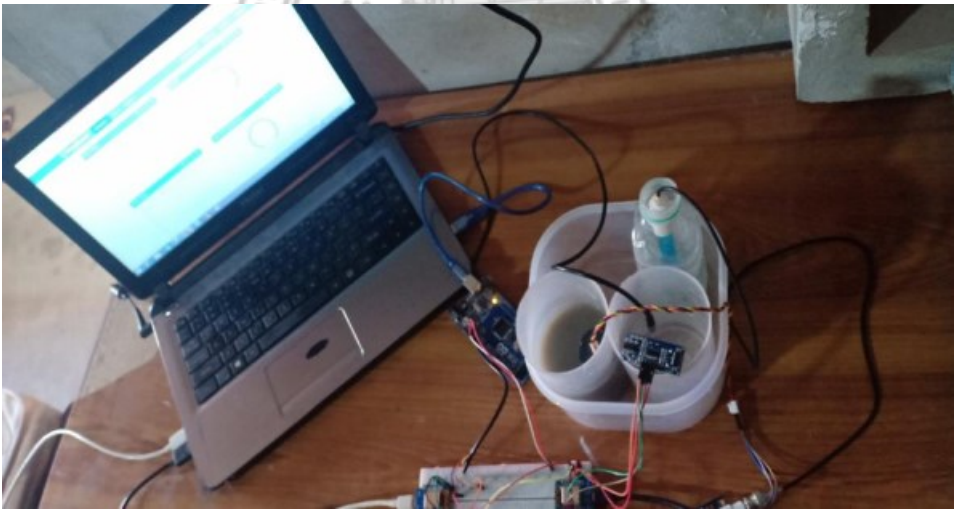
Designed By:

- Abdul Rauf 16ES71
- Raja 16ES16
- Qaiser Qadir 16ES36
- Murtaza Hussain 16ES22
- Shamshad Hussain 16ES116
- Azher Hussain 16ES53

Supervisor: **Dr. Tayab Din Memonm**

Co-supervisor: **Dr. Khalil Rehman Dayo**


5 Vdc
USB micro
port
5 Vdc
USB micro
port
fritzing
water quality
monitoring iot
cloud



CONDITION MONITORING OF INDUCTION MOTOR

Abstract:

The project focuses on the fault detection of an induction motor at an early stage. This effort can be applied in the industries where hundreds of motors are working simultaneously to provide an assembly-line production. The fault detection technique is implemented on System Generator using a single-phase induction motor. System generator provides flexibility to generate the automatic VHDL code and hardware co-simulation. So, a system is introduced for the sake of condition monitoring of induction motor.

The condition monitoring involve perceiving and acquiring the recurring upgrade about the induction motor's condition in running, and taking a careful endeavor to detect the fault when it is at its growing level to circumvent the serious breakdowns and casual damages. Preceding work was only on the bearing faults. This project provides the bearing and rotor bar fault detection at an early stage, occurring in an induction motor.

The Robust and damaging conditions of the motor were analyzed by taking the FFT (Fast Fourier Transform) and STFT (short-time Fourier transform) of motor and comparing the results.

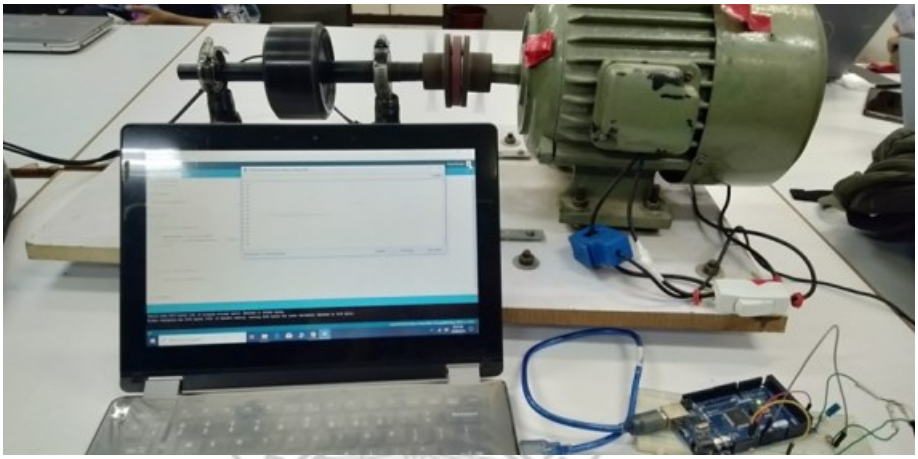
Summing-up, the work will provide better results for the maintenance of the motor at a lower cost.

Designed By:

- Faizan Khan 16ES03
- Zuha Anjum 16ES25
- Komal Talpur 16ES21
- Qazi Muhammad Youshaa 16ES63
- Muhammad Ammar Siqqiqui 16ES123

Supervisor: **Dr. Tayab Din Memomn**

Co-supervisor: **Engr. Burhan Aslam**



DESIGN & IMPLEMENTATION OF MULTI-APPLICATION BASED 3 IN 1 CNC MACHINE

Abstract:

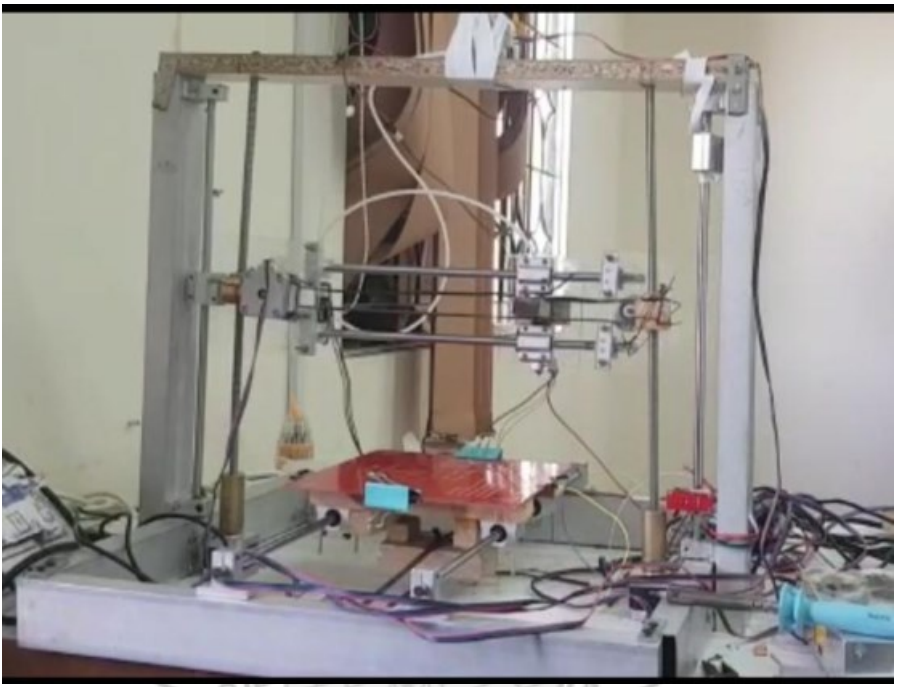
Our project idea is based on a Multifunctional CNC machine, which has ability to perform multiple functions depending on the applications. It is a cost-effective and portable solution, which can be used for domestic as well as for industrial purpose. The invention of portable and smaller sized 3D printer, being one of the major tasks with additional functions relates to the technical field of CNC devices. The machine comprises of three different function performing heads that can be interchanged to perform any of the operations such as 3D printing, laser engraving, and CNC carving. Each of the three configurations offers different advantages depending on the application to be performed. The Multifunctional machine is empowered by an extremely accurate stepper motor, together with high precision linear bearings making every movement more precise. This machine unleashes more choices, possibilities with an affordable price, furthermore the period of production is shorter, and the final product quality is improved.

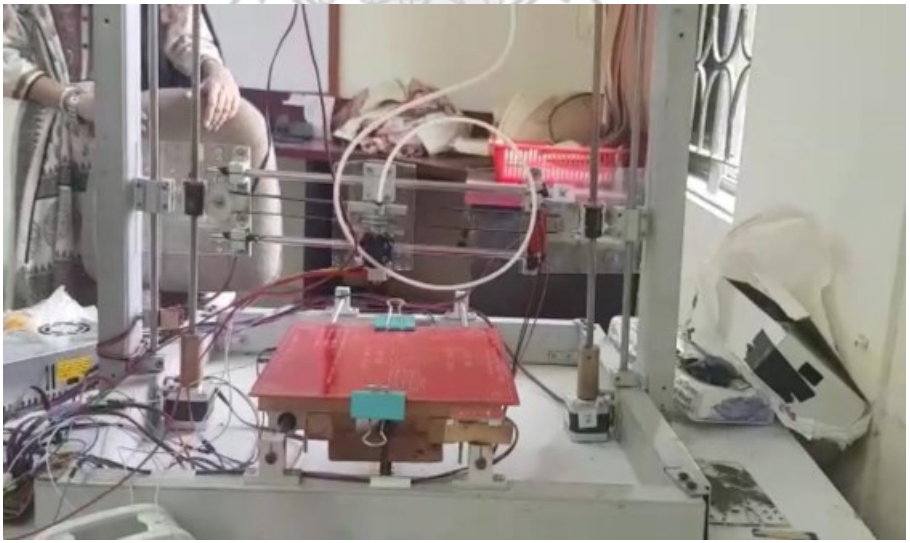
Designed By:

- Sajjad Hussain 16ES58
- Abdul Samad 16ES148
- Aqsa Jawed 16ES44
- Mah Rukh 16ES50
- Muhammad Ayoob 16ES64
- Talha Qaimkhani 16ES104

Supervisor: **Dr. Irfan Ahmed Halepoto**

Co-supervisor: **Engr. Burhan Aslam**





GPS CONTROLLED DELIEVERY SERVICE BY DRONE

Abstract:

With the fast development of technologies, especially in Drone technology, which has many incredible future uses in domestic, medical and commercial applications. The Proposed Project titled as "GPS Controlled Delivery Service by drone" which includes Parcel delivery service based on autonomous UAV (unmanned aerial vehicle) specifically Hexacopter due to its low weight, low cost and less delivery time. customers can order anything (i-e food, medicine, documents etc.) having weight upto 2Kg.

Once the order has been placed by the customer then the operator at GCS (Ground control station) will upload a mission or give waypoints to the Hexacopter in mission-planner software so that it may follow the GPS coordinates of the customer and deliver product to its destination. This Project can be used in many areas, especially in emergency conditions, due to its cost effectiveness and minimum delivery delay. The medicine delivery service is one of the major application where it can be implemented. The purposed project is RPi based autonomous drone. Although it requires continuous connectivity of Internet but it is more secure and more accurate.

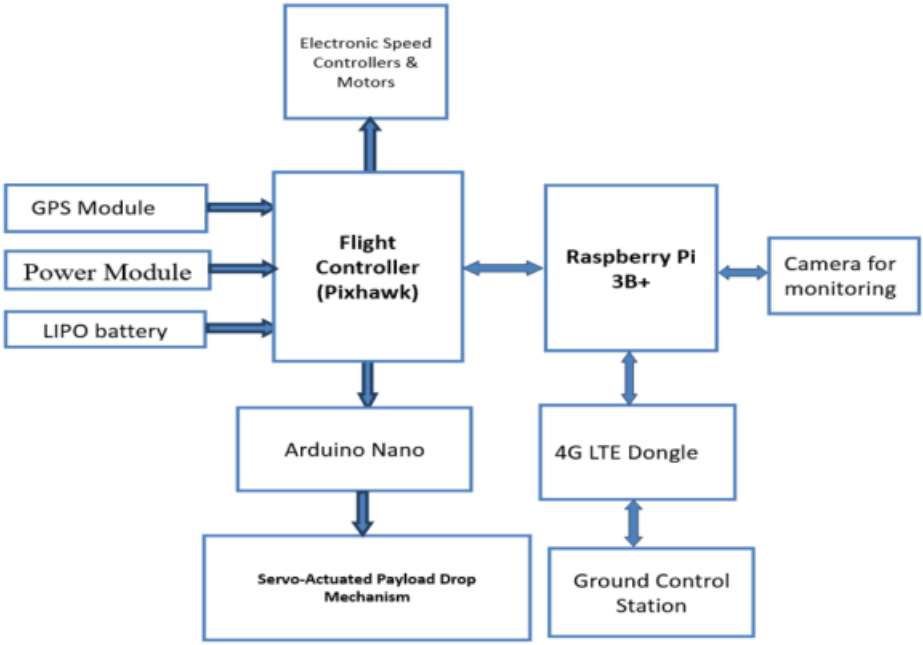
The proposed project featured with Servo-based Payload Dropping Mechanism. Customer can access the drone by turning on Bluetooth and Inserting Password Provided by the GCS. The operator at the ground control station will be continuously monitoring the Hexacopter through the Pi camera installed in the Hexacopter.

Designed By:

- Munir Ahmed 16ES41
- Junaid Khalid 16ES49
- Ali Muhammad 16ES65
- Syed Muneeb Shah 16ES129
- Ghullam Mustafa 16ES135
- Fawad Ali Khan 16ES137

Supervisor: Engr. Kamran Kazi

Co-supervisor: Aamir Ali Patoli


Electronic Speed Controllers & Motors
GPS Module
Power Module
LIPO battery
Flight Controller (Pixhawk)
Raspberry Pi 3B+
Camera for monitoring
Arduino Nano
4G LTE Dongle
Servo-Actuated Payload Drop Mechanism
Ground Control Station

IOT BASED AGRICULTURE MONITORING, CONTROLLING & DRIP IRRIGATION SYSTEM

Abstract:

Now a days IOT based agriculture system has become basic need of country because water resources are limited, scarcity of water is growing day by day and agriculture system is being affected by Climate change, spontaneous rain and abrupt change of parameters; Temperature, Soil moisture and Humidity .In order to solve above problems in agriculture system the system must be IOT based and controlled to yield the maximum production as to meet the needs according to increasing population of the country.

IOT based Agriculture monitoring, controlling and drip irrigation system provides monitoring of parameters ,Irrigation scheduling of different plants and different crop production is planned according to their requirements which is based on the data received from sensors deployed at various places in field. As in drip irrigation system the solenoid valves open according to desired water threshold set by user.

In our project different parameters such as temperature, soil moisture and humidity are being sensed ,monitored and controlled, which can dramatically affect the amount of water and efficient yielding of production.

In addition , we have introduced protecting shelter in order to counter the spontaneous rain which affects field production drastically.

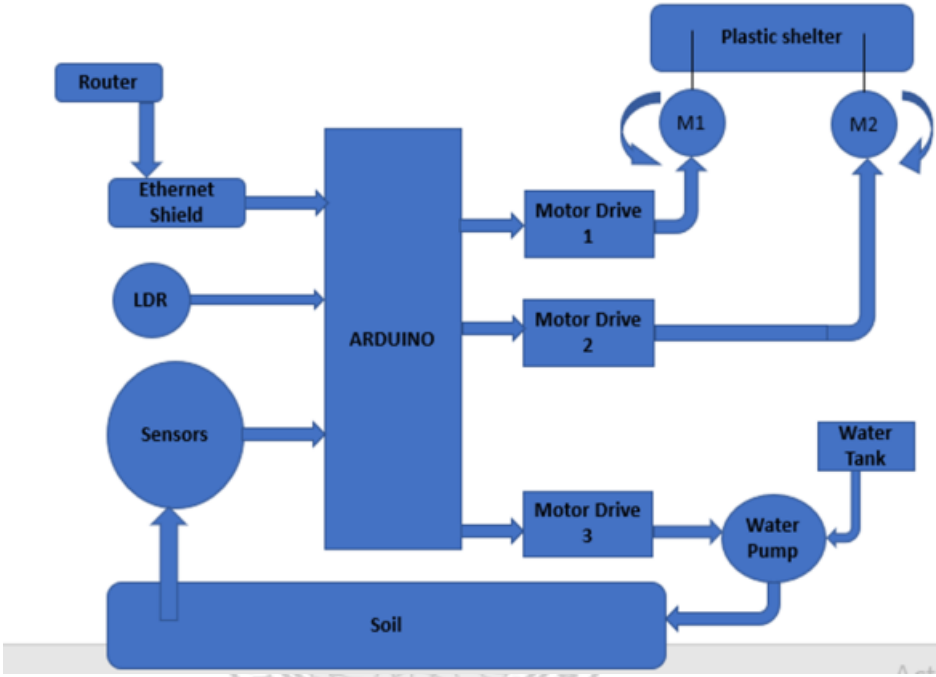
In our project the system monitoring and controlling action performed by field controller and Base station respectively. The field controller controls the sensors operation and flow of water. On the other hand, base station is responsible for informing user/farmer about the readings. Additionally it also acknowledges the forecast alert by the help of IOT.

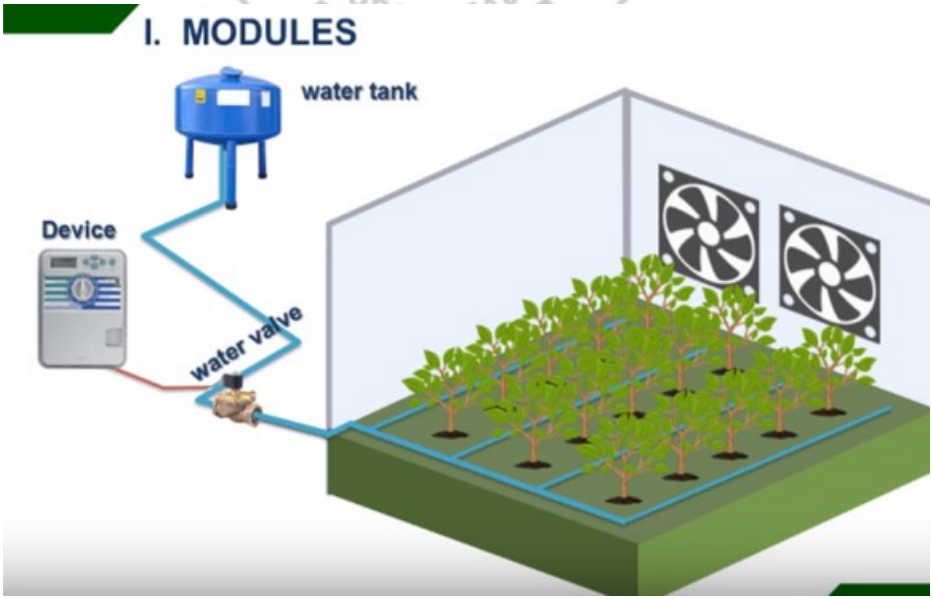
The Agriculture management system usually examines data to trace water lacking location and perform correspondently .In upcoming years the Intelligent agriculture system will be prior need of country to boost their economy and fulfill their needs.

Designed By:

- Farid Ahmed 16ES31
- Ghulam Hyder 16ES39
- Pervaiz Anwer 16ES45
- Mahalaka Qazi 16ES11
- Raja Abid Hussain 16E119

Supervisor: Dr Farzana Rauf Abro


Plastic shelter
Router
M1
M2
Ethernet Shield
Motor Drive 1
LDR
ARDUINO
Motor Drive 2
Sensors
Water Tank
Motor Drive 3
Water Pump
Soil


I. MODULES
water tank
Device
water valve

SMART SENSORS BASED COMMUNICATION ENABLED ELECTRONIC CAR PARKING SYSTEM

Abstract:

As the intensity of vehicles is growing enlarge bit by bit, they need the proper place for parking as well. In city or in big areas parking is a big issue because of this so many problems create for instance traffic issues, accident issue and so on. From keeping safe from these incidents it is needed to apply proper parking system that is Smart Sensor Based Communication Enabled Electronic Car Parking System. This is the up to date mechanism that is applicable to all the areas and it is the more relevant system than the previous ones. For instance in offices, buildings, hospitals and more. This project has designed the mechanism or system in which the user may check the availability of the empty slot, it may be proceed to the procedure of reservation as well by the user in any specific slot if it is empty. But first of all the user has to install the parking app without this app it is not achievable to connect to the parking system. This project will help the system to maintain the parking areas according to the increasing vehicles as they are increasing progressively.

.

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- Zohaib Siddique 16ES114
- Jawairia 16ES30
- Iqra 16ES130

Supervisor: **Dr Farzana Rauf Abro**


BND-941
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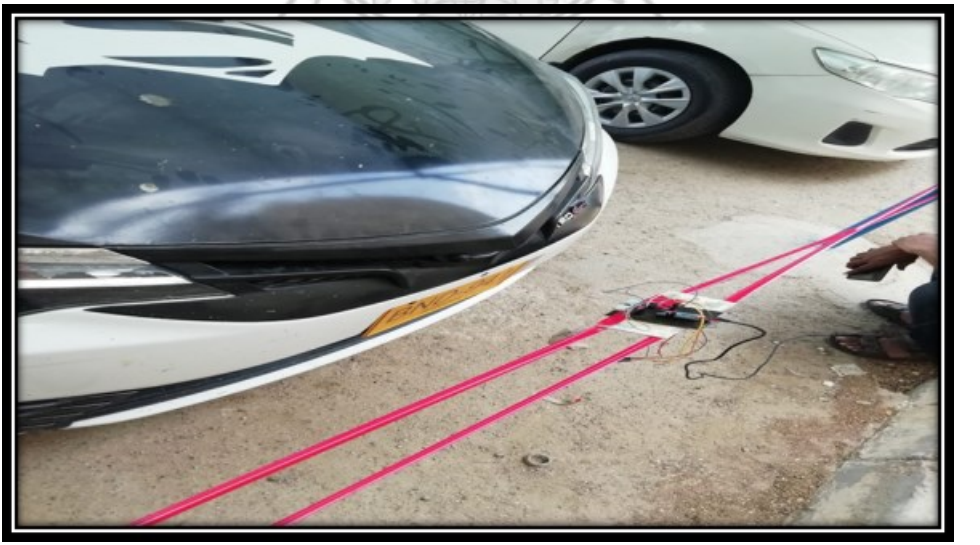

HARNESSING POWER OF QUANTA: ANALYSIS, DEVELOPMENT & IMPLEMENTATION OF QUANTUM ALGORITHMS & DEVICES

Abstract:

Quantum Computation and Quantum Information Processing are two fields which are currently a hot topic for many researchers around the globe. Quantum Information Processing deals with implementation of quantum mechanical concepts to information processing; thereby enabling to work upon a different paradigm and mathematical model of information for different approach to information transmitting information handling and extraction. Whereas Quantum Computation deals with developing alternate model of computation as all our existing computers are using the Turing machine model of computation, the quantum mechanical model of computation has proved to be different and efficient at tasks which are ordinarily not that simple on conventional computers. In this project the aspects of quantum computation and quantum information are used to develop a novel quantum routing algorithm for a quantum network. As a full-scale quantum computer hasn't been yet developed, the algorithm is tested on open source quantum computer hardware service providers which provide an access to real quantum hardware over the cloud for free and tested against pre-existing classical and quantum routing algorithms. The proposed algorithm embed properties like security and better speed at path finding for quantum computers. The study involves building on current classical as well as quantum routing algorithms and developing a better quantum or hybrid algorithm, in addition to that this study also focuses on implementation of the algorithm on real quantum hardware.

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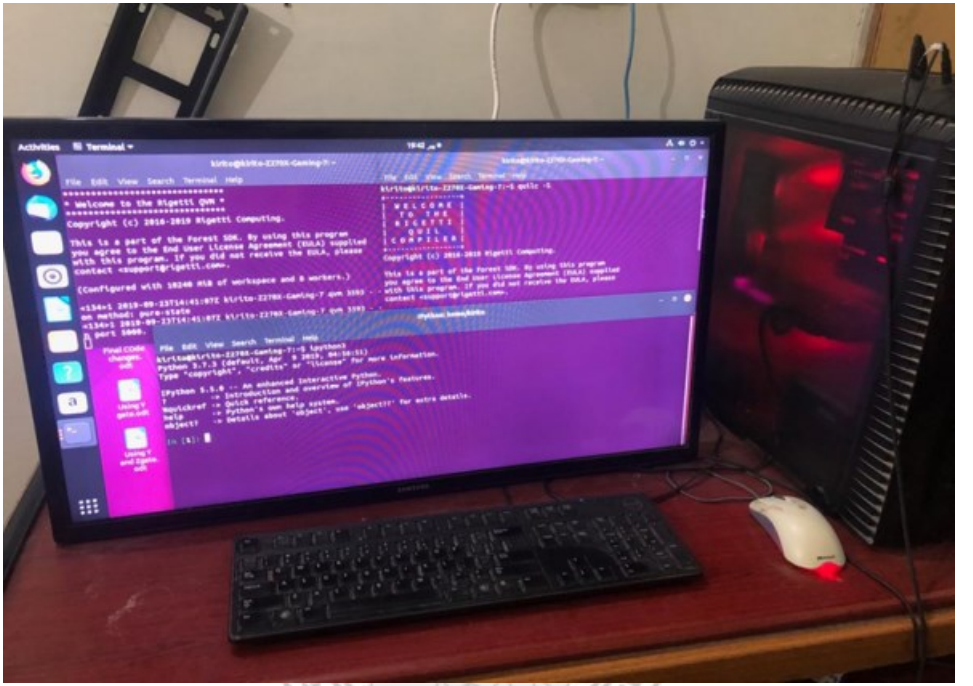
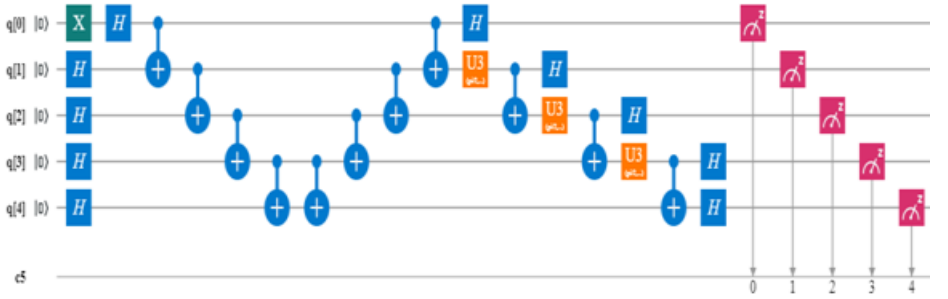

Activities
Terminal
Welcome to the Rigetti qvm
Copyright (c) 2016-2019 Rigetti Computing.
WELCOME TO THE RIGETTI QUIL COMPILER
Copyright (c) 2016-2019 Rigetti Computing.
Python 3.7.3 (default, Apr 9 2019, 04:58:51)
Type "copyright", "credits" or "license" for more information.
IPython 5.5.0 -- An enhanced Interactive Python.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DESIGN OF DIGITAL JOINT ROM (RANGE OF MOTION) MEASUREMENT SYSTEM

Abstract:

In medical terminology Range of Motion (ROM) refers to full movement potential of a joint. In case of numerous diseases and accidents (like paralysis or fractures) it becomes necessary for doctors to measure ROM in order to diagnose the extent of damage caused to a particular joint. Doctors are still relying on manual and inefficient methods like visual estimation and manual goniometer to measure ROM. ROM measurement using manual instrument is a costly and time consuming process. The aim of this project is to design a wearable digital device which measures ROM in a cost effective and time efficient manner and also compares the measured values with standard values and provide results in a user friendly way which can easily be understood by patients. Through multiple user interfaces; a desktop app, an android app and a virtual reality (VR) app, user can visualize the joint movement in 3D environment so that they can easily monitor their progress and conveniently perform different therapeutic exercises in an interactive environment. In addition to that, VR app can give them immersive experience of a game environment, it can help them isolate from their existing environment and make them forget about the pain by diverting their concentration. The game environment (virtual reality) also motivates them to play where the actual purpose is to exercise and score. The final product is a wearable sleeve (incorporating a MPU 6050 motion sensor) that can be worn over a joint, it will measure Range of Motion of that joint and display readings on a small OLED digital display incorporated in sleeve. A Node MCU (ESP8266), incorporated in sleeve, wirelessly transmits data to a desktop, mobile and VR apps. These applications are created using Processing Software.

These applications:

- Display patient arm movement in 3D
- Help the patient exercise by displaying instructional exercises side by side.
- Compare the patient's data with standard values.

Each patient's data is saved as excel file and that data can be exported to doctor/ caregiver when needed.

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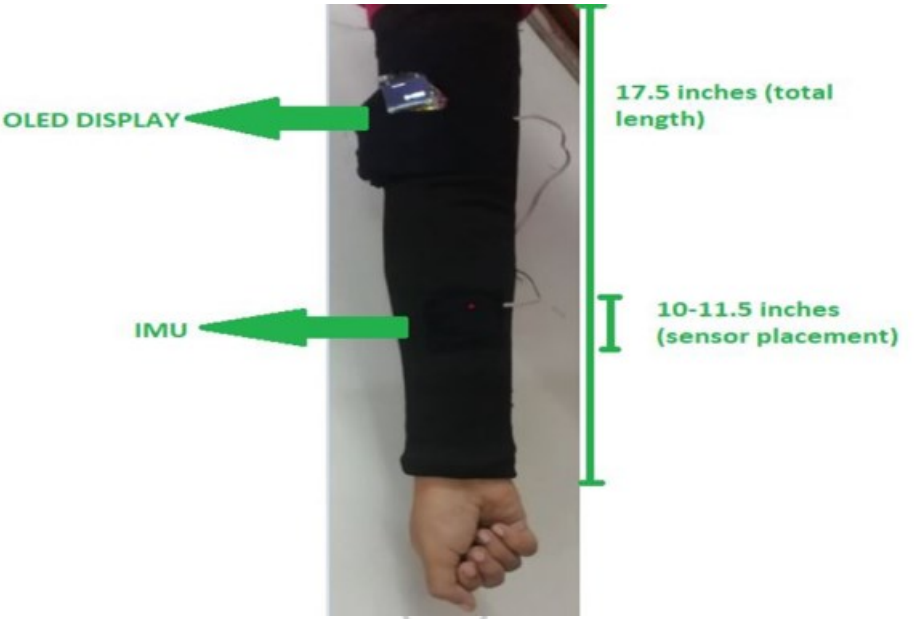
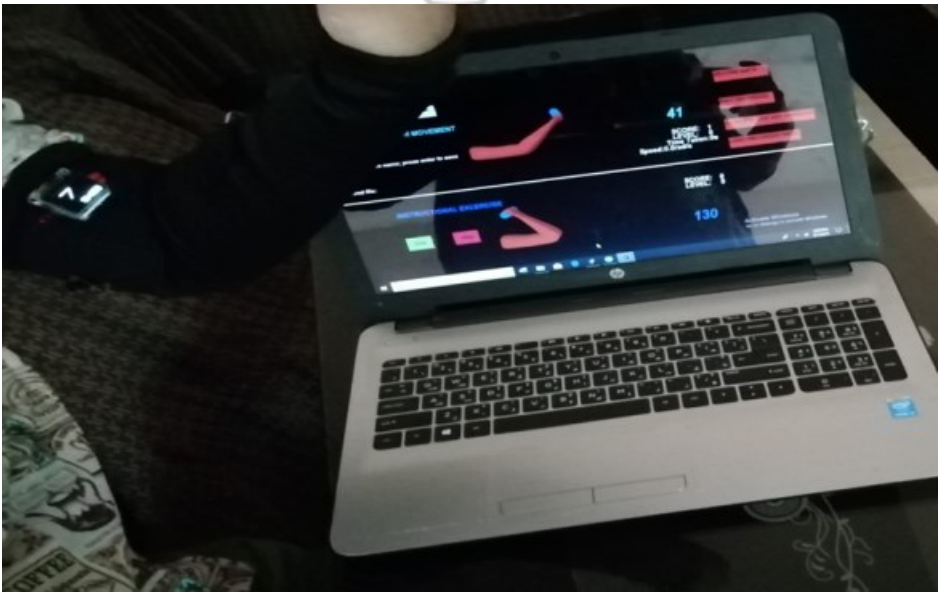

OLED DISPLAY
IMU
17.5 inches (total length)
10-11.5 inches (sensor placement)



SMART AUTOMOBILE (SAM): AN APPLICATION BASED ON DROWSINESS DETECTION, ALCOHOL DETECTION, ANTI-COLLISION & VITAL SIGN MONITORING TO AVOID ACCIDENT

Abstract:

In today's rapidly developing world where every industry's progress is contributing in adding comfort and safety to human life, the automobile industry is focusing on introducing: safe, reliable and autonomous vehicles to save humans from some unbearable losses.

Our project aims to serve the purpose of avoiding road accidents caused due to driver's hypo-vigilance, drunk driving or sudden health issues. Researching on the causes of road accidents, we come to know that a large proportion of road accidents are the results of driver's vigilance. Many researchers have come up with some very interesting and efficient approaches of avoiding accidents caused by human negligence, but the systems proposed earlier were either subjected to cost, adaptability and accuracy issues or those were only monitoring drowsiness, drunk driving or health parameters. Little research is done on developing systems capable of monitoring all the above mentioned states altogether.

The proposed system is an SoC system that can be easily installed in the car, it is able to accurately monitor the driver's state while driving and upon observing him incapable of driving the system switches to auto drive mode followed by a safe parking in the left lane.

To monitor all these states the system is divided into four subsystems namely

- Drowsiness detection subsystem
- Alcohol detection subsystem
- Vital signs monitoring subsystem
- Auto drive subsystem.

The drowsiness detection subsystem monitors the driver's drowsiness by employing the image processing techniques to detect his face and eyes and determine his drowsy state on the basis of EAR. Alcohol is detected by analyzing the BAC levels of driver's continuously vital sign i.e heart rate and electrocardiogram is measured within the car and if it is observed as being abnormal, the information is coordinated with the driver and with the aid of GPRS/GSM module, information is also forwarded to some concerned family member.

Besides taking corrective actions upon monitoring abnormality indicated by the discussed subsystems, the car switches to auto drive mode. This purpose is served by the auto driving subsystem.

Each subsystem developed for the realization of this project is user friendly and easily adaptable within the car. The subsystems are developed keeping cost, size, reliability and real time response constraints in consideration.

Upon testing the system in real world driving scenarios, considerable accuracies are achieved by each subsystem. However, every proposed solution is subjected to some new challenges. The future research may contribute to monitor and avoid more causes of accidents for ensuring human safety and realize system capable of wide range, safe and reliable autonomous driving.

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♦ Sadaf	16ES101
♦ Abu Bakar	16ES113
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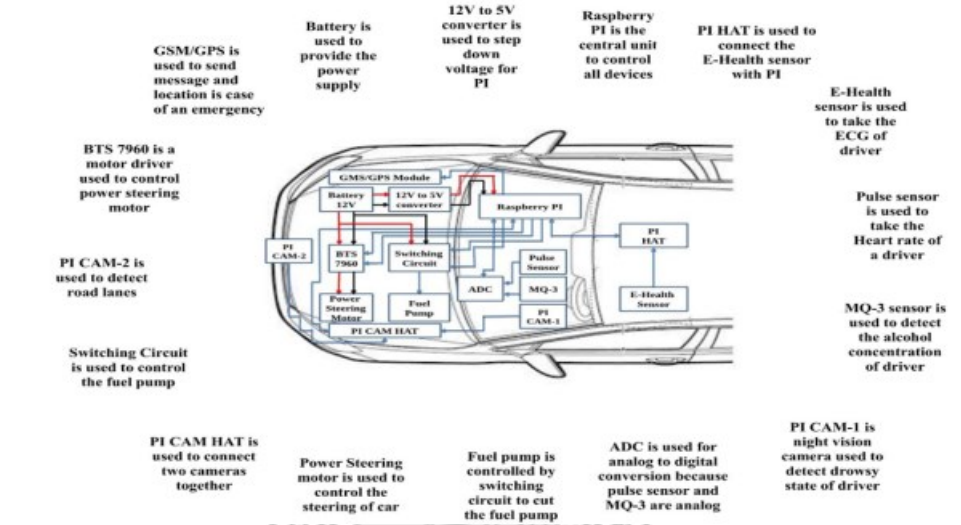

IOT BASED GARBAGE COLLECTOR

Abstract:

In today's modern world increasing population is a major problem. Increasing population causes many other major problems like lack of resources and greater waste and garbage production, garbage management is done through many sources and their are departments in government but increasing garbage and less man power increases the problem. In this project we have tried to present a modern electronic solution to this problem by designing an Internet of things (IOT) based waste collector, the system compromises of two dustbins with connected circuitry and a robot mounted with large bin, whenever the stationary bins signal the main bin that they are filled through WiFi connectivity and main robot tracks those bins through predefined path and goes on and uses 2 degree of freedom robotic arm to empty them into the larger and goes back to the location where it can be emptied by the department when this robot gets full it wont move on signals of other bins.The main function of the prototype of this project is to monitor the garbage in the dustbin. The reading of the dustbin shown on the smartphone by using mobile apps displays the level of the dustbin to notify the smart dustbin when the dustbin is full. l. The main components are the Arduino Uno. This Arduino Uno acts as a head for the ultrasonic sensor, LCD monitor, and the LED. The ultrasonic sensor is made by level for the dustbin, so it will show the level of the dustbin at the mobile apps. l. The hardware required for this project are Arduino Uno, ultrasonic sensor, WiFi module ESP8266, LED, LCD display, resistor and servo motor. The apps used is the Blynk. A prototype is fabricated using readily available components for demonstration purposes. The system is based on Arduino and WiFI module but in future it can be enhanced through addition of microprocessor instead of micro controller and RSSI based tracking the system can be perfected.

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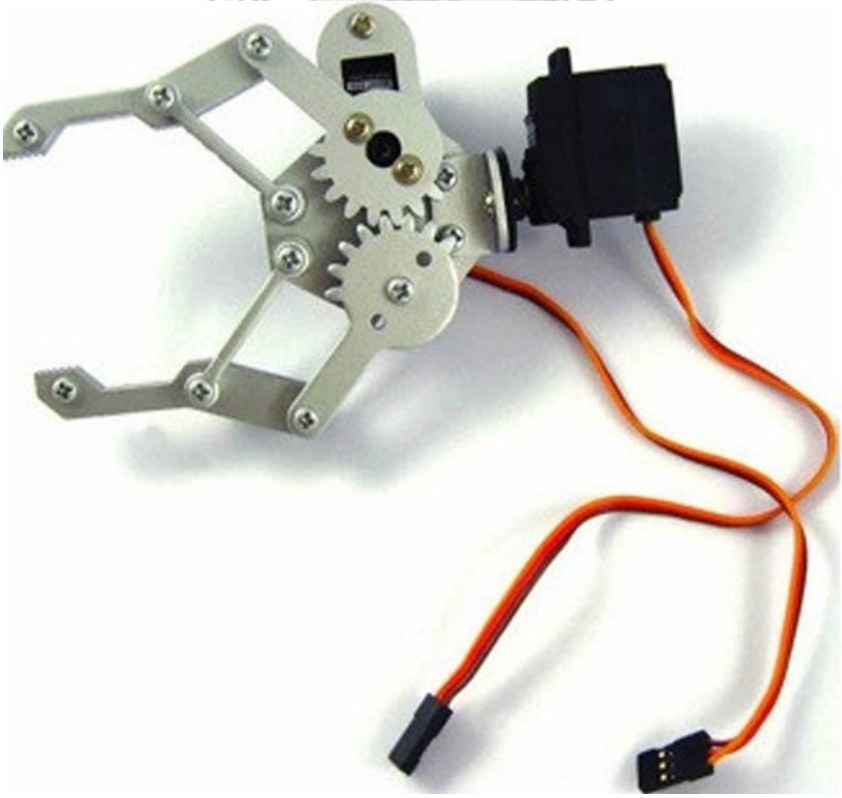

SMART WATER MANAGEMENT SYSTEM

Abstract:

Water is essential for sustenance of life and its preservation is the biggest challenge of these days. It is estimated that by 2025 many countries of South and Central America, Asia and Africa will not have access to water. Water reservoirs are vanishing at an alarming rate. The only way we can preserve water for next generations to come is to use the water in a smart way and overcome issues in Management systems where a big amount of water is being wasted.

The water management system is responsible for water convey from a water treatment plant to the user. We are concern about the loss of water during transit. According to a survey made by IWSA, the major cause of the water loss during water distribution from the water treatment plant to the user is leakage, especially when it comes to the underground pipe distribution system. Many projects are designed for level indication and automatically operate ability even with a smartphone application, which also helps in water loss reduction by indicating water level in water tank before it overflows.

However, the water waste through pipe leakage remained a challenging issue. The designed project effectively reduces the leakage loss effectively making use of electronics and telecommunication. This is the project is capable of converting ordinarily water management system to smart water management system.

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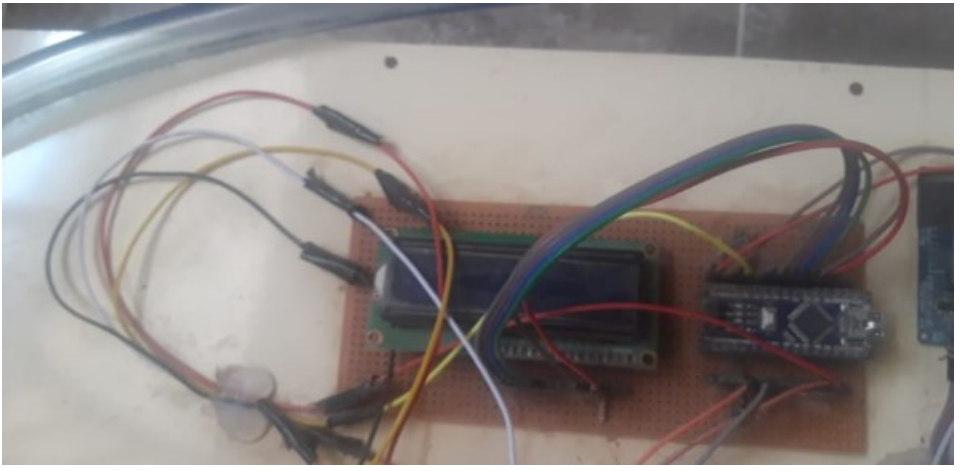
ARDUINO
UNO



EEG BASED EMOTION RECOGNITION

Abstract:

Emotions are sometimes the driving force behind giving positivity or negativity judgment that is concerned with particular work of physiological activity. The EEG expressed as experiment used to calculate the electrical activity of the neuron in the brain. We use EEG sensor(Mindwave Mobile) of Omni electrode placed at FP1.The scalp have distinct portion ,one of the important part to evaluate emotion is Hypothalamus .We extract three emotion from EEG which are Happy ,Sad ,and Anger .Technologies has seen huge difference and fast enhancement .The criteria to be sympathetically aware of the nature of human is still a complex difficult task that of necessity to buildup. For this to make this happen, the emotional state of the objects should be known. Emotions are basically concerned with two widely known dimensions for recognized emotion called as valence, positive valence (which is based on positive values), neutral, negative valence (which is based on negative values) and arousal for the high to low or low to high value of intense level. Here the signal has removed noise and cleaned by Butterworth filter of 4th order. In preprocessing there are three stages: changed signal to desired form, filtering and specific window, the Fast Fourier Transform (FFT) for determining the frequency variables in a time domain signal. which concerns with a sample signal with the sampling frequency of 512 Hz is changed to frequency domain, and spectral analysis, to conform that the EEG signal are presented for extraction of features we have to use extracted features named alpha and beta signal for the EEG wave. To achieve this a band pass filter with the frequency signal of alpha band range 8 to 12Hz and for the beta band is 12 to 38 Hz.

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- Rameez 16ES138
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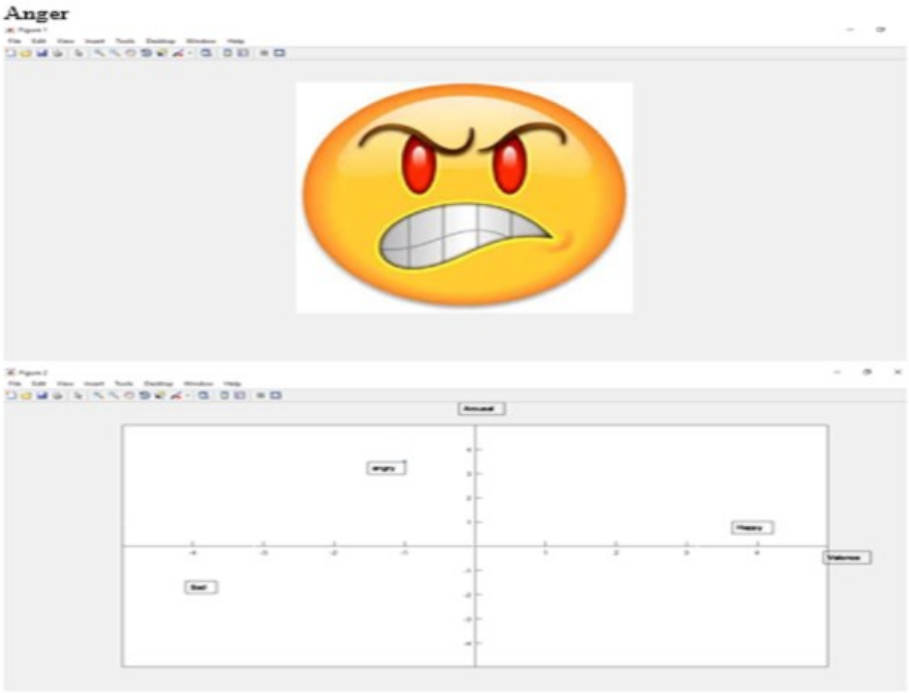
Co-Supervisor: **Dr Tayab Din Memon**


Step 1:
Data
Acquisitio
n
Step2
Preprocess
ed Data
Step 3
:Feature
Extraction
Step 4:
Training
Data
Step
5Selected
Feature
Step
5:Testing
Data
waves
svm
valence
and
arousal


Anger
Arousal
angry
Happy
Valence
Sad

SELF DRIVING CAR USING LIDAR SENSING & IMAGE PROCESSING TECHNOLOGY

Abstract:

According to World Health Organization (WHO)", over 1 million folks lose their lives on the roads as result of automobile accidents, and in one statement by Center for Climate and Energy Solutions (C2ES)" stated that the vehicles consumed more than 50 percent of the total energy in form of transportation. Self-driving car has the capability to save valuable lives and protect the atmosphere from the such emission of greenhouse gases. Self-driving car would decrease the driver's need and is consequently appropriate for individuals, such as older peoples, children or individuals with disabilities, who are unable to drive. The problems and challenges we are facing nowadays are roads accidents and that is the major concern regarding deaths of many folks all around the globe. Most of the times accidents happened due to the mistakes of human. Human does mistakes in different ways by using mobile phones when driving, not following road rules, distracted through bill boards and people also require sleep so they become drowsy sometimes while driving and accident occurs due to these errors. The main goal of this project is to develop a low-cost self-driving system on a remote-control model car that has the capability to resolve these issues by using the machine learning and deep learning approaches such as Convolutional Neural Network (CNN), Mask Regional Convolutional Neural Network (Mask RCNN), Faster RCNN, Single Shot Detector (SSD), OpenCV with Keras and TensorFlow. The over-all project self-driving car using lidar sensing and image processing technology" is based on the Sensors (such as Ultrasonic, LIDAR, GPS module), Controller, Processor, Machine Learning and Deep Learning approaches. We build a self-driving system on prototyped remote-control car and it is capable of driving itself with little human input while moving in particular lane by detecting lane lines and detecting the obstacles in the path of it and recognize different objects and follow the road rules like traffic light and traffic signs is well and driving safely in different environmental conditions by avoiding accidents. This thesis is an attempt to develop a self-driving system with minimal components and equipment such as one smartphone which serves as a camera, GPS and user interface, one Lidar sensor, three ultrasonic sensors and finally a Laptop PC to process and handle all the sensor data. Due to minimum hardware resources this system will only perform selective tasks like lane detection, obstacle avoidance, traffic sign and light detection, object recognition and navigation. In the future, our goal is to implement this system on a real car with larger datasets, more accurate sensors, and powerful processor to handle all the incoming data, and enhance the capabilities of a car by improving algorithms used to increase systems road awareness. Also, the dependency on a single main sensor would be minimized by increasing the number of secondary sensors. Not only this, the system with minimal changes can also be designed for public transport vehicles such as buses and trucks.

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Co-Supervisor: Prof. Dr. Bhawani Shankar Chowdhry

TURN ANY SCREEN INTO TOUCH SCREEN

Abstract:

This thesis focuses on the development of a technology that can be proposed as an alternative to existing touch screens. As we move ahead in time, we see that we are improving a lot in technology and as we talk about technologies, touch screens are a great deal to talk about. Touch screens are increasing rapidly and they are being used in a lot of devices. But what about the devices that are already made but they do not have a touch screen. This project focuses on eradicating this issue.

We aim to develop a set of technologies that by connecting to any laptop or projector screen converts them into an interactive touch screen. This project is designed to overcome many of the limitations of today's touch screens. For example, a normal capacitive touch screen cannot be operated by wearing gloves or with oily hands or when the screen has some dirt on it. The other problems are, traditional touch screens are very expensive and they consume more power. Our project overcomes all of the above-stated problems.

This thesis is based on the comparative study between three touch technologies that were developed during this project and those three technologies are Infrared based touch screens, Laser-based touch screens, and Kinect based touch screens. These technologies are applicable to convert non-touch laptop, monitor and projector screens into interactive touch screens. The ground rule for the working of this project is on the basis of extraction of coordinates of the point of touch and then movement of the mouse to the point of touch and then performing the corresponding operation. We think that this project will be useful in a lot of places especially where there are non-touch monitors, laptops, and projectors that are still being used. Those monitors, laptops, and projectors can be converted into touch screens without being replaced. This project will also be useful where computers are being used in very cold conditions and where gloves need to be worn or some industrial area where the operator has oily or dirty hands. Any computer screen, anywhere, can be turned into a touch screen without actually buying an expensive touch screen. We really hope that it will increase productivity in companies and industries.

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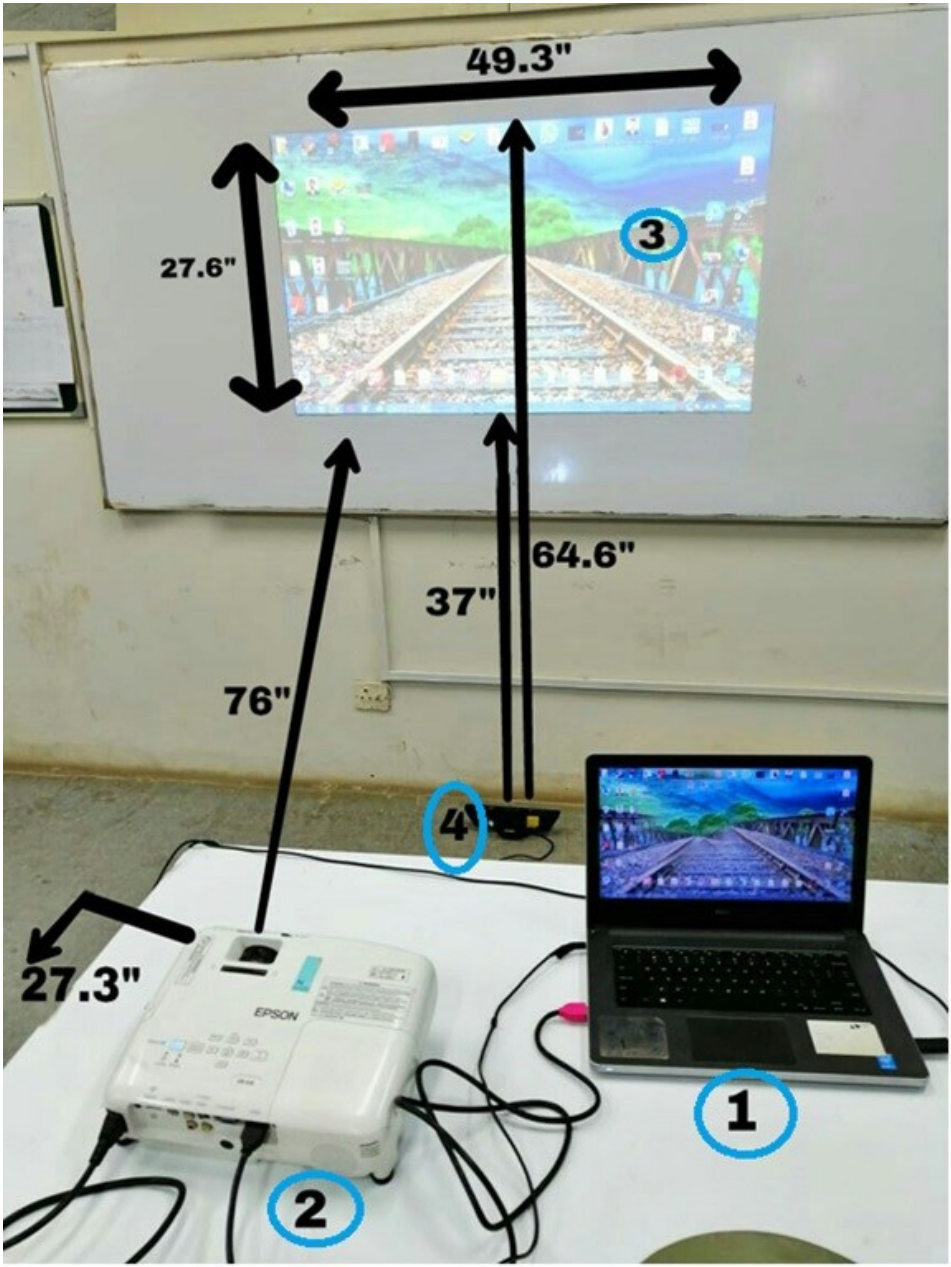
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27.6"
3
64.6"
37"
76"
4
27.3"
EPSON
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2

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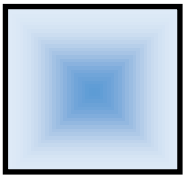

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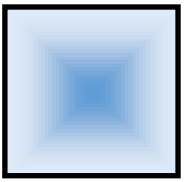

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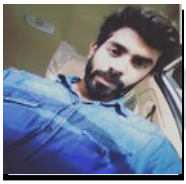

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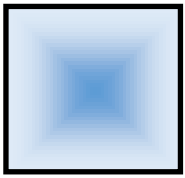

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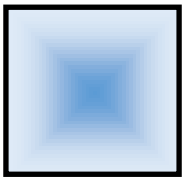

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Department of Electronic Engineering

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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