

17TL FYP/THESIS ABSTRACT BOOK

FYP/THESIS COMMITTEE OF DEPARTMENT OF TELECOMMUNICATION
MEHRAN UNIVERSITY OF ENGINEERING & TECHNOLOGY, JAMSHORO, PAKISTAN 76062

Contents

FOREWORD	3
SOLAR POWERED INDUCTION COOKING STOVE	4
Supervised by: Dr. Fahim Aziz Umrani	4
COMMERCIAL GRADE CYBER LOCK	5
Supervised by: Dr. Fahim Aziz Umrani, Co-Supervisor: Dr. Abi Waqas Memon	5
Asterix/Elastix based Open Source VoIP PBX.....	6
Supervised by: Dr. Fahim Aziz Umrani, Co-Supervisor(s): Engr. Talha Qaimkhani & Engr. Faisal shaikh .	6
Secure Development of Attendance Management System for MUET using ZKTecko Biometric Machines.....	8
Supervised by: Dr. Faheem Yar Khuhawar, Co-Supervisor(s): Engr. Jibran Memon.....	8
Anti-Fraud Solution for Entry Test Candidates.....	10
Supervised by: Dr. Faheem Yar Khuhawar, Co-Supervisor(s): Jibran Memon	10
Software platform for radiation pattern measurement for Anechoic Chamber	12
Supervised by: Dr. Badar Muneer, Co-Supervisor(s):	12
Smart Solar Street Light with Automatic Self Cleaning Arm	13
Supervised by: Dr. Abi Waqas, Co-Supervisor(s): Dr. Fahim Aziz Umrani, Engr. Burhan Arain	13
Photonic sensor for liquid adulteration detection	15
Supervised by: Dr. Abi Waqas, Co-Supervisor(s): Dr. Fahim Aziz Umrani, Engr Talha Kaimkhani	15
REMOTELY CONTROLLED JOYSTICK BASED PRECISION ROBOTIC ARM VEHICLE	16
Supervised by: Dr. Abdul Lateef Memon, Co-Supervisor(s): Dr. Fahim Aziz Umrani.....	16
An Arduino Based Intelligent Shopping System Trolley with Automated Billing.....	17
Supervised by: Dr. Nasrullah Pirzada, Co-Supervisor(s): Dr. Fahim Aziz Umrani.....	17
Speech Analysis for Affect Recognition	19
Supervised by: Dr. Syed Zafi S. Shah, Co-Supervisor(s): Dr. Sajjad Memon.....	19
Towards a Multimodal sensing system for classroom.....	21
Supervised by: Dr. Syed Zafi S. Shah, Co-Supervisor(s): Dr. Abdul Latif Memon.....	21
3 IN ONE: SMART COVID-19 BASIC SOP CHECKING DEVICE	22
Supervised by: Engr. Nafeesa Zaki,	22
Alcohol Detecting and Notification System for Controlling Drunk Driving	23
Supervised by: Dr. Sajjad Ali Memon , Co-Supervisor(s): Dr Zafi Sherhan Shah.....	23
Gain and Bandwidth Enhancement of Compact Patch Antenna for 5G-MM wave Applications.....	24

Supervised by: Dr. Sajjad Ali Memon	24
IoT based Smart parking system	25
Supervised by: Dr. Sajjad A. Memon.....	25
Self-Regulating Home and Fuzzy based Security System	26
Supervised by: Dr. Imran Qureshi Co-Supervisor(s): Dr. Fahim Aziz Umrani.....	26
Application of Optical Sensors to IoT/Biomedical Domain	27
Supervised by: Engr. Hyder Bux Mangrio , Co-Supervisor(s): Dr. Abdul Latif Memon	27
Real time position tracking and Health monitoring of Soldier	29
Supervisor: Dr. Faisal Ahmed Memon	29
Health Monitoring System.....	30
Supervised by: Engr. Shanzah Shaikh Co-Supervisor(s): Dr. Faisal Memon.....	30
IOT BASED FIRE DETECTION AND ALARM SYSTEM	31
Supervised by: Engr. Naeem Aijaz yousfani, Co-Supervisor(s): Engr. Hyder Bux Mangrio	31
Design of Graphene based flexible antenna	32
Supervised by: Dr. Umair Ahmed Korai, Co-Supervisor(s):.....	32
Design of two dimensional Planar Microstrip Phased array antenna.....	33
Supervised by: Dr. Badar Muneer , Co-Supervisor(s): Dr. Umair Ahmed Korai	33
IoT Enabled Smart Railway Crossings	34
Supervised by: Dr. Faisal K. Shaikh, Co-Supervisor(s): Prof. Dr. B. S. Chowdhry	34
Rotating Solar Tracker System for Solar Panel Power Optimization	36
Supervised by: Engr. Nafeesa Zaki , Co-Supervisor(s): Engr. Komal Memon.....	36

FOREWORD

We are pleased to present the Abstract Book of final year projects/theses carried out by 17TL Batch of the Department of Telecommunication Engineering, Mehran UET, Pakistan. This time around we have designed the abstract book in a way that it will also be remembered as a kind of year book with the headshots of almost all the students of 17TL Batch. In total 26 groups were formed in this group out of which 6 groups secured project funding from Ignite Pakistan. The list of those six groups is given below. Due to the unprecedented COVID-19 situation we could not hold the open day for this batch.

FYP Code	Project Title	Supervisor
NGIRI-2021-6557	Department Security System	Dr. Sajjad Ali Memon & Dr. Zafi Shehran Shah
NGIRI-2021-6651	Joystick Controlled Warfield Robotic Arm Vehicle	Dr. Abdul Lateef Memon & Dr. Fahim A. Umrani
NGIRI-2021-7260	Asterix/Elastix based Open Source VoIP PBX.	Dr. Fahim A. Umrani, Engr. Talha & Engr. Faisal Shaikh
NGIRI-2021-7682	Multimodal sensing system for classroom	Dr. Syed Zafi S. Shah & Dr. Abdul Latif Memon
NGIRI-2021-7819	IOT Enabled Smart Railway Crossing	Dr. Faisal K. Shaikh & Dr. B. S. Chowdhry
NGIRI-2021-7992	Photonic sensor for liquid adulteration detection	Dr. Abi Waqas, Dr. Fahim A.Umrani & Engr Talha Kaimkhani

Group # 01

SOLAR POWERED INDUCTION COOKING STOVE



Muhammad Faez Ali (G.L) (17TL16)



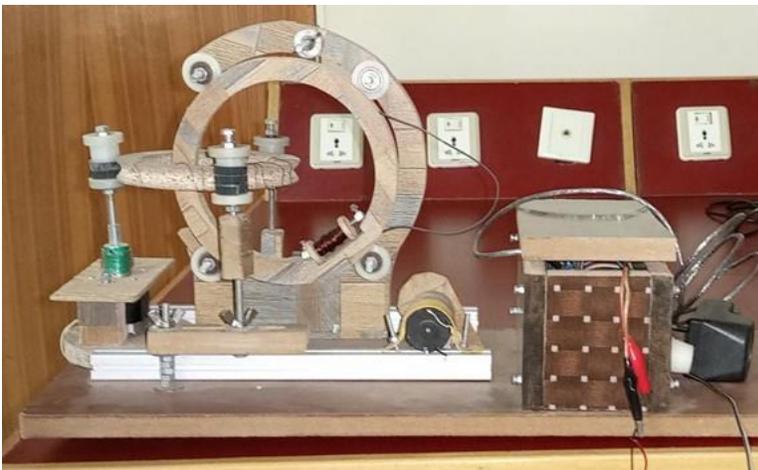
Shehiryar Ali (17TL48)



Urooj Umrani (17-F16TL66)

Supervised by: Dr. Fahim Aziz Umrani

Abstract: Food is a basic need of humans to survive. Usually, food cannot be consumed in its raw form and needs to be cooked, consuming fuel. In this modern world, the non-renewable fuel sources which are conventionally used for cooking are not only fast depleting but are also causing irreversible damage to the environment. Pakistan recently has also started witnessing gas load shedding along with electricity load shedding. This warrants a serious focus. To overcome this crisis, one rewarding yet challenging avenue is to explore the field of renewable energy sources. To keep in mind, the basic life's need a, "Solar-powered induction cooking stove" is designed and presented in this work as an effective alternative to the traditional Gas stoves. The induction stove's operating mechanism is designed in such a way that the heat is produced by the phenomenon known as electromagnetic induction. Changing magnetic fields create eddy current in the coil which can produce heat in the neighboring ferromagnetic material. The coil is powered by solar energy along with battery and as a result, it will be energy and gas independent. The proposed stove can be readily installed at the user premises and does not require the extensive piping network requiring huge infrastructure, planning, maintenance and resources of every kind. The energy produced will be directly transferred to the ferromagnetic pan at a rate of 80 to 90 percent, making it both energy and time efficient. In this work apart from analyzing the induction powered solar stove technically a business case is also presented whereby three different categories of solar stove are designed suitable for lower, middle and upper middle-class families. The stove will require one-time investment and there will be no monthly expenses making the consumer bill free. Moreover, with a slight modification the design can also be made portable.



Toroidal Machine to make windings



Induction cooker hardware

Funding: None



Group # 02

COMMERCIAL GRADE CYBER LOCK



Beenish Talpur (G.L) (17TL82)



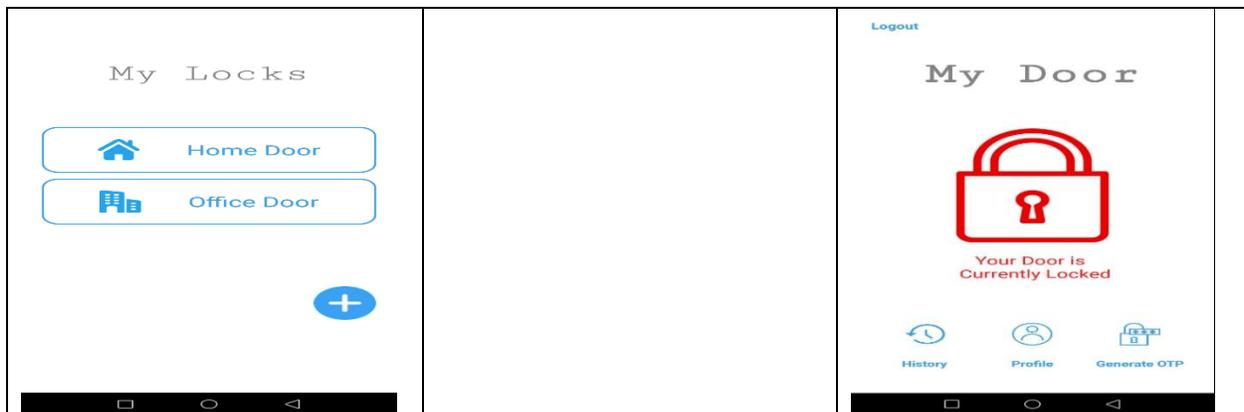
Summaiya Qasim (17TL32)



Dhanesh Kumar (17- F16TL12)

Supervised by: Dr. Fahim Aziz Umrani, Co-Supervisor: Dr. Abi Waqas Memon

Abstract: The interest in smart home system using the internet of things is growing rapidly in this modern era. One of the capabilities of smart home technology is to lock and unlock the doors without relying on conventional keys. Many systems are designed over the years for the automation of homes and offices to give access to authorized users using different identification methods of smart locks. The goal to make these systems is to provide the necessary security to our homes and offices with user friendly mechanism. Hence, the best way to achieve this is to use automated door locks operating wirelessly. In this project we have designed a cyber lock that can be controlled remotely using internet to eliminate the dependency of carrying conventional keys. The PIN code mechanism is widely used in locks for identification; this system is designed to unlock the door lock using a 4-digit PIN code for personal use which works as a primary key for the lock owner. Meanwhile it generates an OTP (One Time Password) for secondary user to get the temporary access to the lock. It can be controlled remotely through the external network such as Internet. The lock is further connected to a database for generating OTP and a mobile app to retrieve the OTP. All the programming is done in microcontroller; the user request for an OTP through the electronic lock, the database will generate a random OTP that can be retrieved by mobile app and further need to send it to the requesting user. Another simplest method for remotely accessing the lock is One Touch Access (OTA) mode in which the lock can be unlocked by just one touch on the app lock icon. It allows users to remotely monitor and control consumer electronics through the external network such as Internet. Home automation is the emerging field that has attracted the attention in both the commercial and research field. Although wired home networks were famous at the early developments of home automation systems, nowadays wireless communication is replacing the wired system which are very messy and difficult to setup.



Application for Cyber Lock

Funding: None



Group # 03

Asterisk/Elastix based Open Source VoIP PBX



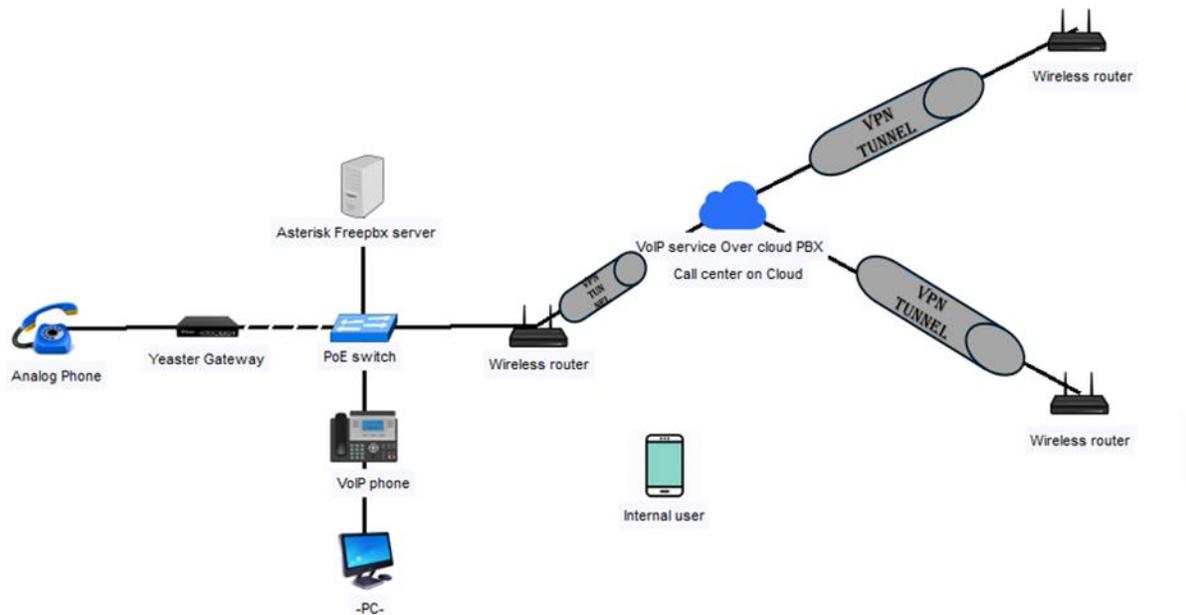
Aisha Malik (G.L.) (17TL10)



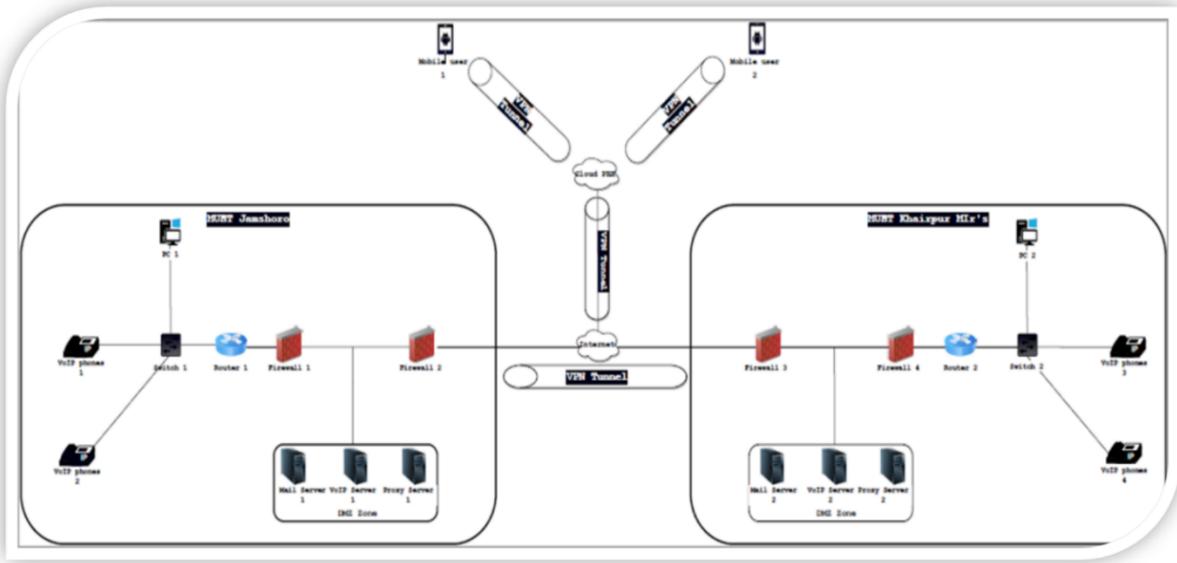
Mukhtar Memon (17-F16TL54)

Supervised by: Dr. Fahim Aziz Umrani, Co-Supervisor(s): Engr. Talha Qaimkhani & Engr. Faisal shaikh

Abstract: In this contemporary day, when the globe is shifting its networks to 5G and even some nations have successfully experimented with 6G, Pakistan continues to rely on old analogue PBX systems in enterprises, which is a more expensive and inefficient means of communication that requires significant maintenance costs. Despite the fact that VoIP is increasing popularity in businesses and organizations, according to our study, firms that use VoIP only provide intranet communication. They acquire SIP lines from PTCL to connect to the outside world via VoIP phones, which is also quite expensive. Our project, “Asterisk/Elastix based open-source VoIP PBX,” creates a prototype for a cloud-based VoIP PBX, as well as a Call Center to handle and manage all calls more cost-effectively and efficiently. The network, which uses VoIP technology, allows for secure communication both inside and outside the corporation, which we were able to do by establishing two VPNs. We used the internet capacity from the cloud for internal communication and the cloud for external communication so that we didn’t have to acquire SIP lines from PTCL, which lowered the cost significantly. Furthermore, QoS analysis has been done to determine the quality of the deployed system the results achieved are shows the efficiency of system with lowest losses. We observed better voice quality as the results are shown in chapter four. We believe our proposed system is significant and can lead to the more development in VoIP in future.



Proposed Cloud PBX Architecture



Funding: Ignite Pakistan NGIRI-2021-7260

Funding: Ignite Pakistan NGIRI-2021-7260



Group # 04

Secure Development of Attendance Management System for MUET using ZKTecko Biometric Machines



Saad Khan (G.L) (17-16TL20)

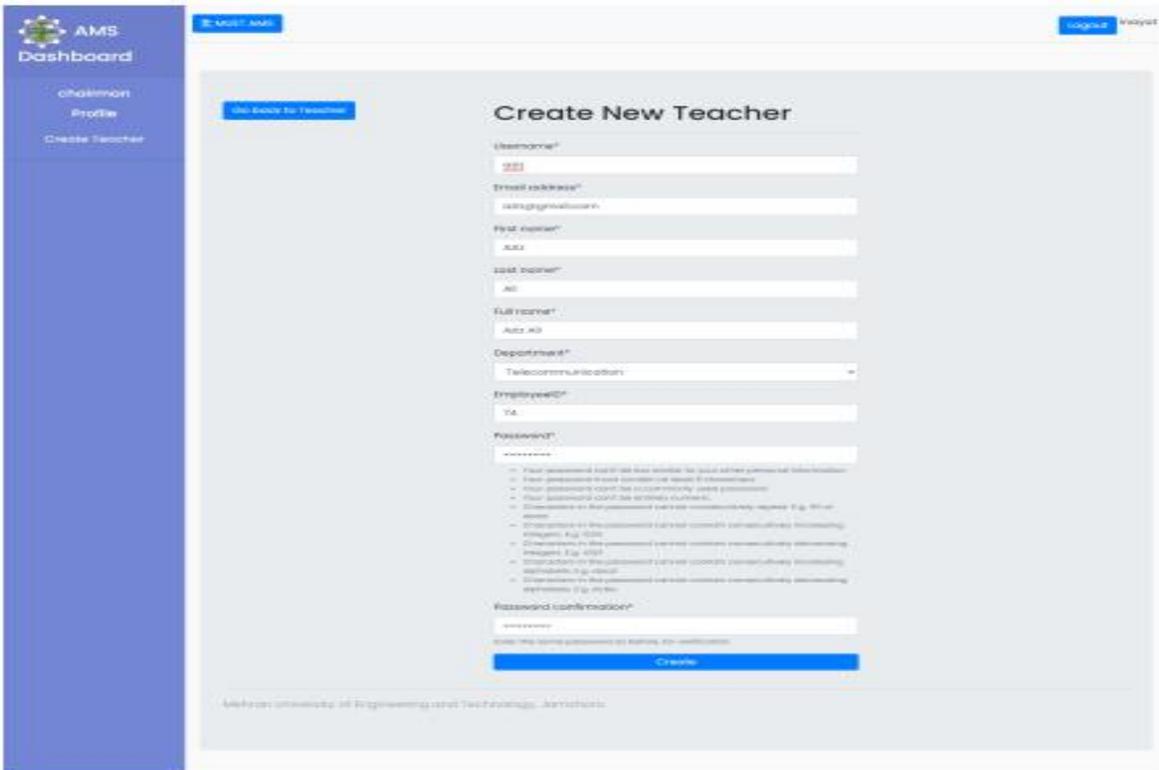
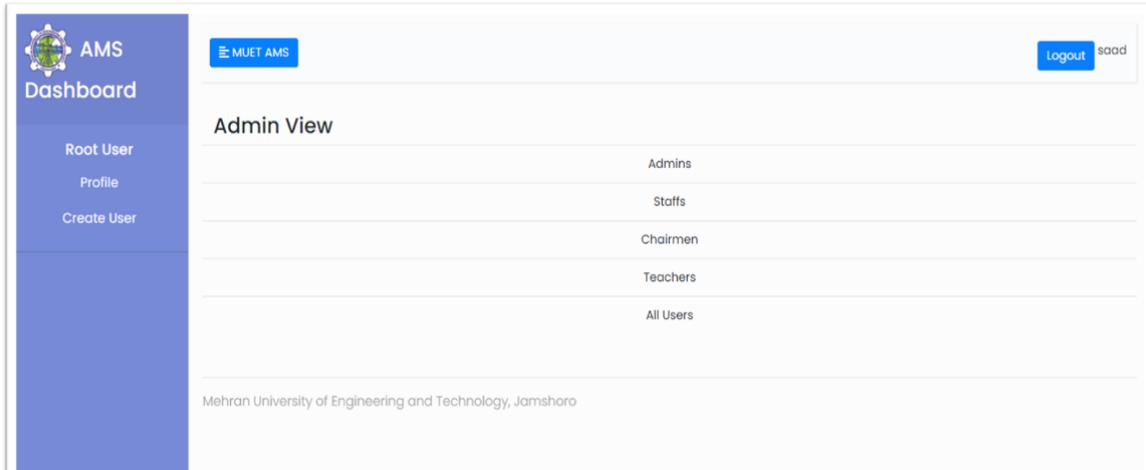


Kamran Khan (17TL72)

Supervised by: Dr. Faheem Yar Khuhawar, Co-Supervisor(s): Engr. Jibran Memon

Abstract: Biometric based attendance management system is essential for recording daily attendance of students and faculty of an institution like Mehran University of Engineering and Technology. MUET already has this system installed in university. MUET has surfeit of ZKTECKO biometric machines to record the attendance of its faculty. However, this system has currently went into a dormant phase because it contains some inherent flaws. The currently installed system is vulnerable from security perspective which endangers the safety of user's information and data. In addition to it, the current system lacks privilege-based access management and any centralized data storing mechanism. Our project aims to remove those limitations by assigning privileges on hierarchical basis , creating centralized mechanism for data storing and retrieving , developing desktop application for controlling data flow and ensuring maximum security for project through performing multiple tests like SQL injection, Password guessing technique and cross site scripting. Our project uses Django framework of python for web development

The screenshot shows the login interface for the MUET Attendance Management System (AMS). At the top left, there is a menu icon and the text 'MUET AMS'. At the top right, there is a 'Login' button. The main content area features the Mehran University of Engineering & Technology logo and name. Below the logo, there is a link 'Don't have an account?'. The login form consists of two input fields: 'Username*' and 'Password*', both with asterisks indicating they are required. Below the password field is a blue 'Login' button. At the bottom of the form, there is a link 'Forgot Password?'.



Funding: None



Group # 05

Anti-Fraud Solution for Entry Test Candidates



Syed Bilal (G.L) (17TL12)



17TL41



Faizan Khan 17TL102

Supervised by: Dr. Faheem Yar Khuhawar, Co-Supervisor(s): Jibran Memon

Abstract: Entry test system is the core activity of any educational institute like in universities and colleges for the selection of candidates. Currently in our university there is traditional way of conducting entry test. A web-based system is employed to collect the student's detail and verify their documents. But there can be a vulnerability of impersonation of candidates that are appearing for the test. So, the best solution to overcome this vulnerability is to verify the candidates by using an authentication method. There are a lot of methods for verification of students including fingerprint, face detection and iris recognition. Our project aims to remove the vulnerabilities of the system by using fingerprint verification of the students. It is a web-based system designed using PHP for the web development. This system ensures the security of the system by using some penetration testing techniques like SQL injection and Brute force technique.

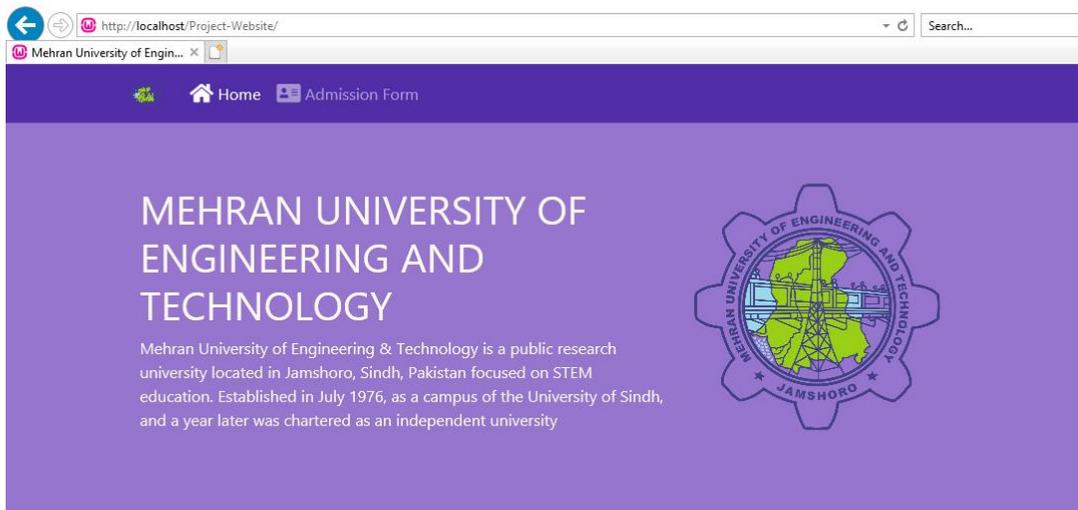


Fig 1: First page of Website

Sign in form

Enter Email

Enter Password

Enter Verification Code

Verification Code

[Create Account or SignUp](#) [Forget Password?](#)

Fig 2: Login page of Portal

SignUp form

First Name

Last Name

Contact Tel.

Email

Password

Fig 3: Sign-up form to create account on portal

	register_id	register_firstName	register_lastName	register_zipcode	register_telphoneNo	register_email	register_password
<input type="checkbox"/> Edit Copy Delete	8	Muhammad Bilal	Ali	92	3110139610	bsyed770@gmail.com	Bilal123?
<input type="checkbox"/> Edit Copy Delete	9	Muhammad	Ali	92	3110139610	bsyed770@gmail.com	Trade123?
<input type="checkbox"/> Edit Copy Delete	10	Muhammad	Ali	92	3110139610	bsyed770@gmail.com	Trade123?
<input type="checkbox"/> Edit Copy Delete	11	Muhammad	Ali	92	3110139610	bsyed770@gmail.com	Trade123?

Fig 4: Form data in store in Database of each candidate

Funding: None



Group # 06

Software platform for radiation pattern measurement for Anechoic Chamber



Rida Fatima(G.L.) (17TL11)



Maheen Shah(17TL109)

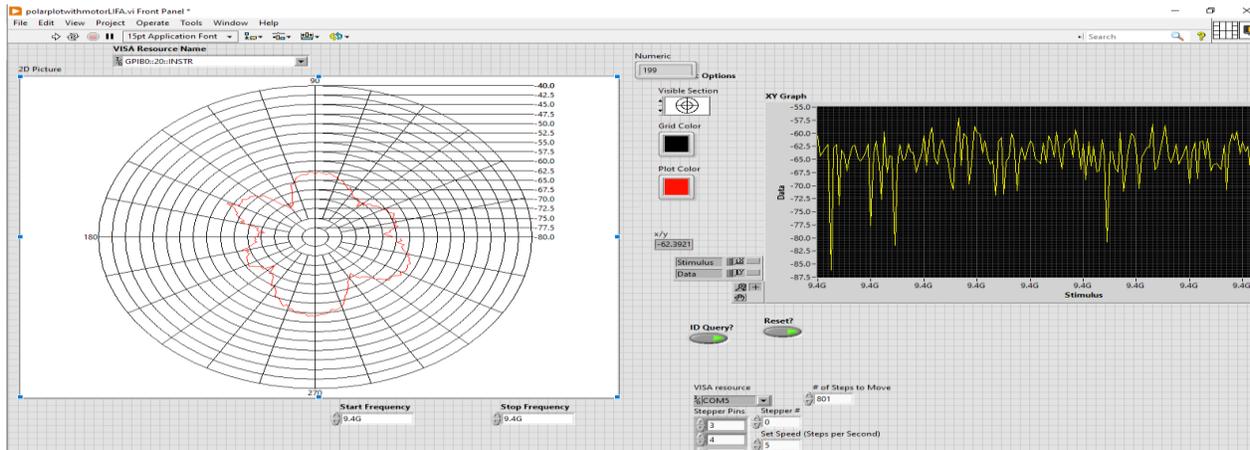


Umer(17TL117)

Supervised by: Dr. Badar Muneer, Co-Supervisor(s):

Abstract: Anechoic chamber is an enclosed chamber used to calculate the radiation pattern of the DUT (Device Under Test) without any external interference and noise. The goal of this project is to layout a device to rotate the antenna platform and additionally able to detect, capturing, logging, and showing measurements inside an Anechoic Chamber. For antenna radiation patterns, a simple, low-cost, small, portable, and automated measuring system is proposed. The antenna platform may move at an angle of 1.8 degrees. The Arduino software is used to control motor rotation from 0 to 360 degrees using LabView, and the transmitted and received power is then correlated with the angle the DUT has turned. The increase of step size of stepper motor is done through LabVIEW that is interfaced with Arduino via LIFA Base. The VNA measures the power received by the receiving antenna after each rotation step, and the after the rotation is completed, graph may be seen on the LabView-based GUI. The LabView-based application will construct a radiation pattern plot once the data has been recorded.

LabVIEW based GUI:



Funding: None



Group # 07

Smart Solar Street Light with Automatic Self Cleaning Arm



M. Aqib Memon (G.L) (17TL110)



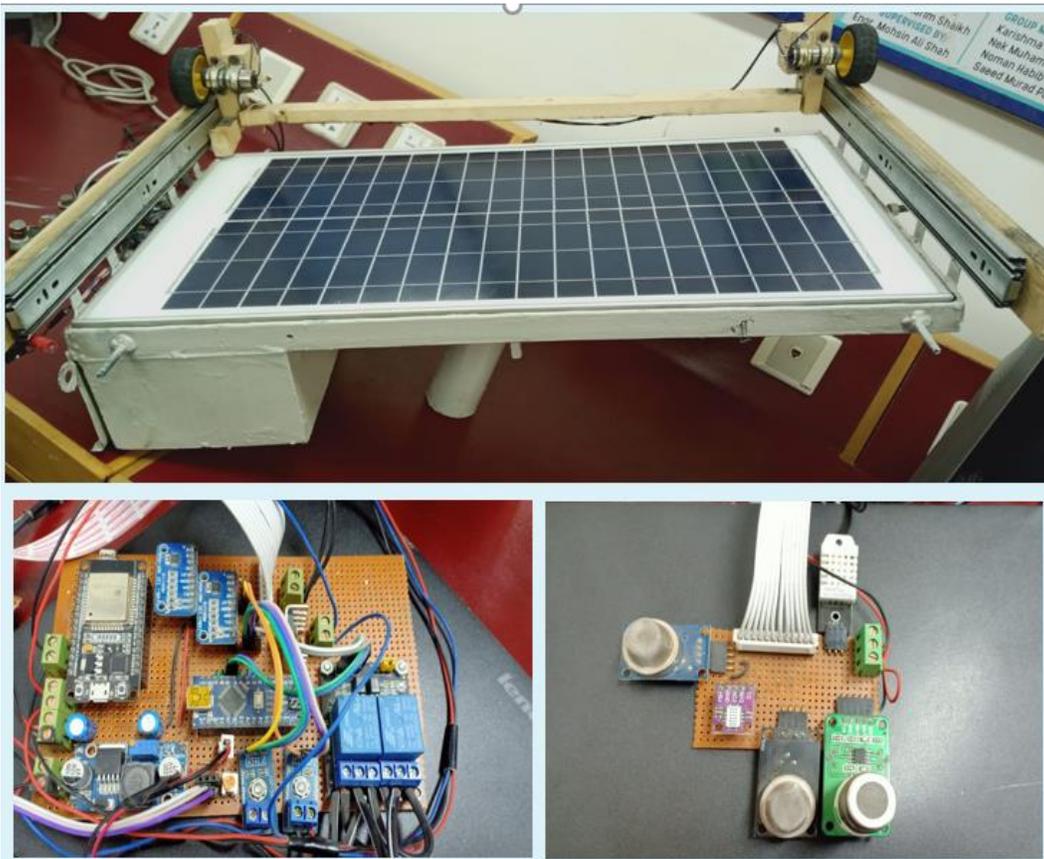
Khushbu Magsi (17TL68)



Nazeer Ahmed (17TL40)

Supervised by: Dr. Abi Waqas, Co-Supervisor(s): Dr. Fahim Aziz Umrani, Engr. Burhan Arain

Abstract: Street Lights are necessary to be installed for many reasons but that's only possible when electricity is available excessively. In Pakistan the government has failed badly to fulfil electricity needs of local consumer and industries as well. The Project SMART SOLAR STREET LIGHT WITH AUTOMATIC CLEANING ARM is created with a goal to create ecofriendly, energy saving, and cost-effective device. The idea was to make and design a streetlight which is operated without taking power from National Grid having self-cleaning robotic arm with air index quality monitoring system controlled through an android mobile application



Smart Street Light 33%

Project by
17 Telecom

Power

Power Saving Mode

Air Quality Index

Clean Panel

Solar Voltages: 0

Brightness

Temperature 28.5 °C	Humidity 43.3 %
CO2 15616 ppm	CO 5 ppm
NH3 3 ppm	NO2 0.08 ppm
Ozone 3344 ppm	Smoke 1728 ppm

Funding: None



Group # 08

Photonic sensor for liquid adulteration detection



Furqan Ali (G.L.) (17TL14)



Zahid Ali 17TL44



Anoosha Khan (17TL104)

Supervised by: Dr. Abi Waqas, Co-Supervisor(s): Dr. Fahim Aziz Umrani, Engr Talha Kaimkhani

Abstract: Adulteration in liquids has become so common these days. We are consuming unhygienic liquids (e.g., milk, water, beverages) without knowing about them specially, children are the frequent consumers. This is the reason that we are surrounded by several diseases like kidney failure, diabetes, blood pressure, heart failure etc. Not only consumables but this fraud is also being done with the non-consumable liquids (e.g., petrol, diesel) which divest us from the fresh environment too. The unfortunate thing is we do not have any cost-effective way for detecting this fraud. Our aim is to make a photonic sensing system that will detect the quality of liquid. We will test several liquid samples and characterize our prototype accordingly. The aim is to make it efficient and inexpensive.



Funding: Ignite Pakistan NGIRI-2021-7992



Group # 09

REMOTELY CONTROLLED JOYSTICK BASED PRECISION ROBOTIC ARM VEHICLE



M. Azeem Talpur (G.L.) (17TL17)



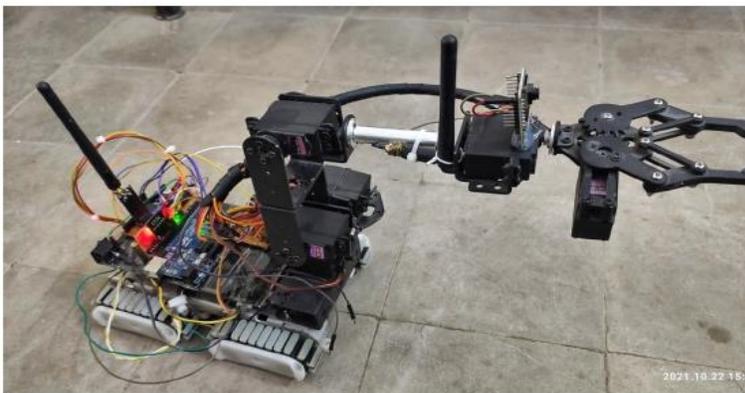
Faraz Rasheed (17TL71)



Azad Ahmed (17TL55)

Supervised by: [Dr. Abdul Lateef Memon](#), Co-Supervisor(s): [Dr. Fahim Aziz Umrani](#)

Abstract: A robotic arm is designed and manufactured in this project. The project involved the understanding of Mechanical system, Electronics, Telecommunication and Computer Programming. The main purpose of this project is to demonstrate the automation technology and how we can achieve a certain mechanical task by combining other technologies. A robotic arm is designed and mounted over 4 motor vehicle driven by a micro controller which is programmed through a computer software. A robotic arm successfully achieved the task of lifting an object from one location to another as per programmed sequence. The project gives the understanding of combined technologies and their importance in the industries. Robots are used everywhere in industries, scientific research in new technologies however the main reason for developing robots is to reduce human efforts and to fulfil basic human needs. This paper is all about the development of "Joystick Controlled Precision based Robotic Arm Vehicle". The project is divided into two parts first one is 4-DOF Robotic Arm and the second one is the Robotic Vehicle to move the robotic arm from one place to another both are controlled by Arduino UNO micro controller which accepts the input commands from the joystick controller controlled by the user. Robotic arm is made of 5 MG966R high torque servos to control the movement of the Robotic Arm combined by rotatory servo metal joints used to hold multiple servos together and by assembling multiple servo joints together produces the final shape of the Robotic Arm. In Robotic Vehicle four 12V High RPM Dc motors are used combined together with the help of metallic vehicle chassis both robotic arm and vehicle are controlled by the single Arduino Uno micro controller. Arduino UNO micro controller has been programmed to receive servo angle values as well as vehicle movement commands from the transmitter with the help of joystick modules.



Robotic Arm & Vehicle (Mobile Unit)



Joystick Controller Module

Funding: Ignite Pakistan NGIRI-2021-6651



FYP/THESES COMMITTEE

16

Group # 10

An Arduino Based Intelligent Shopping System Trolley with Automated Billing



(Hassan Raza)(G.L) (17TL108)



(Atta Muhammad)(17TL38)



(Ayaz Ali)(17TL75)

Supervised by: Dr. Nasrullah Pirzada, Co-Supervisor(s): Dr. Fahim Aziz Umrani

Abstract: Folks around the globe purchase daily need items by spending carefully because of low-budget. Mostly, after the completion of the buying process, they realize that their purchased product's total amount exceeds their expenditure. Subsequently, at that point they waste a lot of time and energy in looking for the items they required and consequently the entire shopping procedure turns out to be tedious and arduous. As a result, customers at the shopping mall become unable to purchase all of their required items, lose-out on a few and also forget to buy some of them. The gravest challenge encounter by the customers occurs after the completion of shopping when they have to wait and stand in prolonged lines at the checkout counter for the payment of the purchased items bill. Because of the absence of the automated billing system at the checkout counter, cashier prepares a bill after the scanning of every single product added to the cart and this makes the billing procedure tedious. However, with this project any individual can come to shopping mall put the items in the trolley, where RFID-Reader mounted on the trolley will scan every item and display the name, cost, quantity of the product on the LCD screen. After the completion of shopping with help of push button the total amount will be sent to the main server at the cashier's end or checkout counter. Micro-controller stores the data, perform calculation and transfer the bill with the help of embedded Wi-Fi-module in the NodeMCU-ESP8266. So, the billing process becomes fully automated and customers just have to move towards the checkout counter and needs to pay the entire bill. Thus, the primary motivation behind this approach is to minimize the time consumed at the billing counters in the form of prolonged lines after the purchasing of products in shopping marts, or other malls with the assistance of the 'Intelligent Shopping System Trolley with Automated Billing'. In future, we are intended to come up with more advance and robust method which would be built by the introduction of Artificial Intelligence (AI). We will endeavor to introduce the Voice features, Self-driving trolley system and Robotic-Arm in this project to make it more competitive.

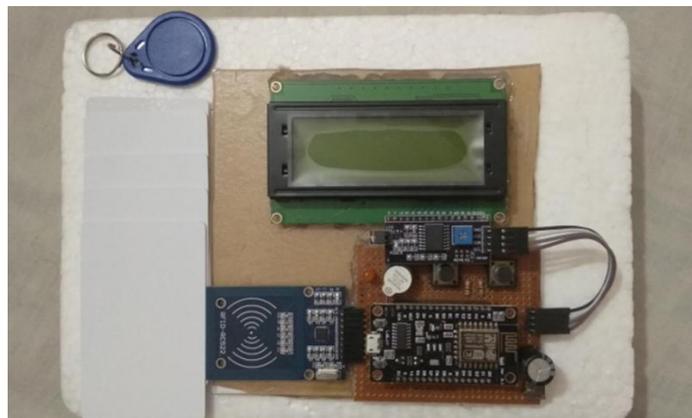


Figure: Intelligent Shopping System Trolley with Automated Billing



Figure: LCD after the commencement of the system.



Figure: After Scanning the Card



Figure: Result shows that the product is added.

Funding: None



Group # 11

Speech Analysis for Affect Recognition



Hasnain Mahboob (G.L.) (17TL22)



Asif Akhtar 17TL80



17TL18

Supervised by: Dr. Syed Zafi S. Shah, Co-Supervisor(s): Dr. Sajjad Memon

Abstract: The reliable design of Speech Analysis for Affect Recognition systems is complex which requires enough amounts of data for data train purpose. However substantial English, German, Urdu and Italian are the only few languages for that currently datasets are present. But these datasets are not publically available due to ethical constraints. These systems have a wide range of applications from human-machine interactions to auto-supervision and control of safety systems.

This research study introduces dataset of *Speech Analysis for Affect Recognition for Sindhi language*. The dataset contains overall 23, 80 examples, from which 437 examples are of happy emotion, 408 examples are of sadness emotion, 310 examples are of fear emotion, 694 examples are of neutral emotion and 531 examples are of anger emotion. The duration of examples is between 1 second to 2 minutes. Dataset is collected from 30 male and 120 female subjects. We have collected data into audio/visual format. Dataset is collected from 300 male and 120 female subjects. To our knowledge, our collected dataset in Sindhi language is world's largest dataset for speech emotion recognition system.

We have collected dataset by three methods. First method is we have collected dataset via YouTube by using different T.V talk shows of different Sindhi news channels mostly included Sindhi news channels are KTN News, Time News (HD), Mehran TV, and Sindh TV and others. Second method is we have collected dataset online by using different online platforms (what's app, Ms. Teams, and Zoom) and third method is we have collected dataset in person (physically) from subjects. For what's app and in person data collection a script of fifty Sindhi-sentences are used. For data annotation *label studio* software is used.

For data classification, MultiLabel, arousal and valence classification is used. We have performed classification (MultiLabel, arousal and valence classifications) by using eGeMAPS, IS10 and ComParE feature sets and linear support vector and Logistic regression classifier. For MultiLabel classification, we have received highest mean of UAR using ComParE feature set that is 51.13 as compared with other feature sets, for arousal classification, we have received highest UAR using ComParE feature set that is 65.84 as compared with other feature sets and for valence classification, we have received highest UAR using eGeMAPS feature set that is 60.03 as compared with other feature sets.

Feature Names (Labs)	Test Accuracy (mean)	Test Accuracy (std)	Test UAR (mean)	Test UAR (std)
ComParE	51.05	3.04	51.13	3.72
IS10	50.51	2.3	50.53	2.95
eGeMAPS	48.71	2.31	49.01	2.44

Table 1.1 summarizes classification results for MultiLabel using ComParE, IS10 and eGeMAPS feature set and logistic regression classifier. Note: chance level UAR is 20 %

Feature Names (Labs)	Test Accuracy (mean)	Test Accuracy (std)	Test UAR (mean)	Test UAR (std)
ComParE	65.28	12.61	65.84	12.27
IS10	61.02	11.42	61.67	11.4
eGeMAPS	57.65	13.01	57.92	11.77

Table 1.2 summarizes classification results for Arousal (binary classification: low arousal and high arousal) using ComParE, IS10 and eGeMAPS feature set and logistic regression classifier. Note: chance level UAR is 50 %

Feature Names (Labs)	Test Accuracy (mean)	Test Accuracy (std)	Test UAR (mean)	Test UAR (std)
ComParE	58.98	6.35	58.34	6.41
IS10 funcs	54.3	4.84	53.91	4.85
eGeMAPS	60.31	7.01	60.03	7.05

Table 1.3 summarizes classification results for Valence (binary classification: positive valence and negative valence) using ComParE, IS10 and eGeMAPS feature set and logistic regression classifier. Note: chance level UAR is 50 %

Funding: Ignite Pakistan NGIRI-2021-7260



Group # 12

Towards a Multimodal sensing system for classroom



Hifsa Khalid (G.L) (17TL04)



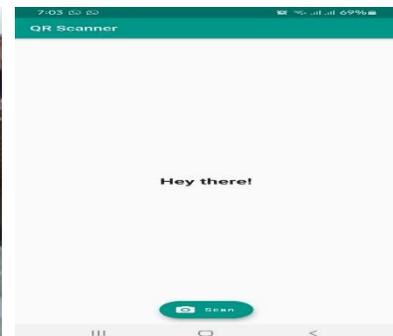
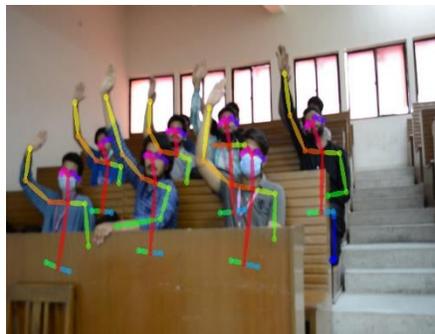
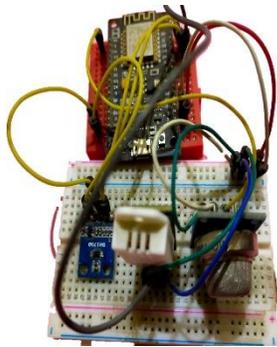
Usama Shaikh 17TL62



Muhammad Ali (17TL84)

Supervised by: Dr. Syed Zafi S. Shah, Co-Supervisor(s): Dr. Abdul Latif Memon

Abstract: As we know that students' progress is necessary for a classroom. The problems faced by students due to learning can be less quality of teaching, light intensity, high temperature, acoustic noise, and less attention of the teacher. These problems affect students' concentration and behavior in a classroom. To solve these problems, we proposed a multimodal sensing system for a classroom to improve the quality of the learning process of students. Our system will do the visual sensing that can be able to monitor students' activity from different views, their body segmentation, speech act between student and teacher, and their head orientation by using open pose tool and img2pose. Additionally, our system will be able to sense different environmental conditions and collect the data through android application to check whether it affects the learning outcomes of students or not. The data will be collected using the prototype, integrated with different sensors, and monitored on the by-link app, then we will export it in a CSV file. This project's aim is to test such a hypothesis through data-driven analysis by taking the Telecommunications department as a case study



Funding: Ignite Pakistan NGIRI-2021-7682



Group # 13

3 IN ONE: SMART COVID-19 BASIC SOP CHECKING DEVICE



Zunair Khan (G.L) (17TL118)



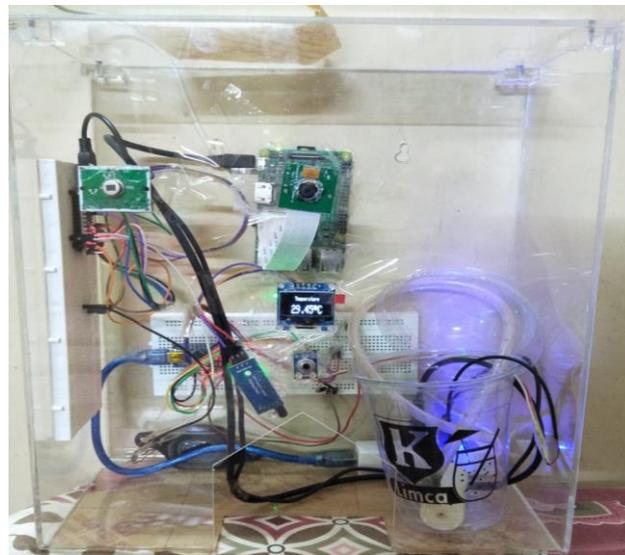
Mahnoor Solangi 17TL116



Wali Raza (17TL52)

Supervised by: Engr. Nafeesa Zaki,

Abstract: Coronavirus has been spread all over the world and it's a deadly virus. It has taken many lives these past 2 years but now its vaccine is invented. There are many types of vaccines according to the health and age of people. The other solution to prevent this virus is to take precautions that are guided by the doctors WHO. For this reason, we thought to design a device that will check the basic SOPs; Temperature checking, Mask detection, and Sanitization by using Arduino and Raspberry Pi.



Funding: None



Group # 14

Alcohol Detecting and Notification System for Controlling Drunk Driving



Dua-e-Fatima (G.L.) (17TL111)



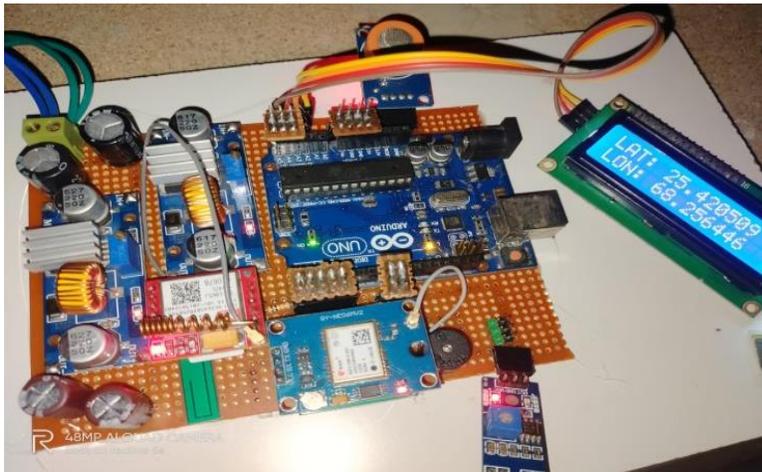
Shahzaib Khuwaja (17TL19)



Syed Ali Raza (17-16TL53)

Supervised by: Dr. Sajjad Ali Memon , Co-Supervisor(s): Dr Zafi Sherhan Shah

Abstract: In today's era, drinking and driving both at the same time are the huge cause of accidents. Although there are many laws to punish such drivers but their implementation does not have a vast scale approach because our cops cannot look out in each car for drunk drivers. Control measures to make sure drivers are not under the influence of alcohol while driving such as Blood Alcohol Level (BAC) check remain undetectable due to the reason of huge manpower, equipment and maintenance cost involved. Therefore, an immediate solution is needed to check drunk drivers and curb such accidents. A less effort consuming idea has been initiated using mq3 gas sensor to detect alcohol level of the body controlling the car. An ATmega 328P Microcontroller processes the alcohol detected from the body and compares it with an already set threshold of 400 ppm. If the threshold surpasses, three modules are activated simultaneously. Car's ignition comes to a halt, LCD activates to alert that alcohol has been detected and the GSM module sends the message to the emergency contact if any accident happens. This system is evolved and evaluated by making its prototype. However, it can be implemented in real life situation if all specifications given our followed.



Accident Happened, I Need Help...,
<http://maps.google.com/maps?q=loc:25.420620,68.256378>

Funding: None



Group # 15

Gain and Bandwidth Enhancement of Compact Patch Antenna for 5G-MM wave Applications



Mehboob Hussain(17TL57)



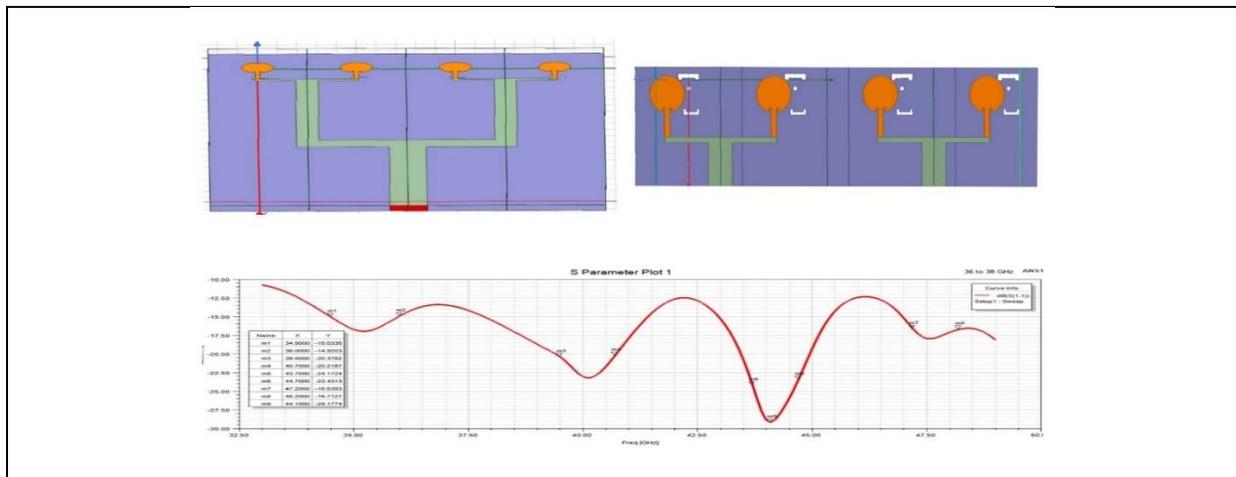
M. Mushaf (G.L) (17TL113)



Nida Zafar (17TL43)

Supervised by: Dr. Sajjad Ali Memon

Abstract: Due to low weight, low cost and low profile, micro strip patch antennas are perfect choice for advanced communication systems. To ensure high data rates, reliable connections and low latency, use of antenna array in system is a best option. In the first part of our thesis, we analyzed different designs of antennas that can be used in fifth generation communication. In second part, we selected microstrip patch antenna and studied its basic properties. In third part we simulate designs on our desired frequencies and applied different techniques that can **improve** the efficiency, gain and return loss parameters of micro strip patch antenna. In fourth part, we design U shape Defected Ground Structure (DGS) based inset-fed micro strip circular patch antenna using separate and single feed and compared the results with previous work.



Proposed Microstrip Circular Patch Antenna

Funding: None



Group # 16

IoT based Smart parking system



Javeria Khan Pathan (G.L) (17TL05)



Syed Fahad Ali Shah (17TL73)

Asfand Ali (17TL25)

Supervised by: Dr. Sajjad A. Memon

Abstract: A rapidly arises of cars in urban areas in which user faces traffic issue. Parking problems in our urban areas is a major issue for citizens. Driver faces many issues while finding the parking slot. It is very difficult for driver to find parking areas while in emergency condition in fact it increases traffic and wastage of fuel and time which is very precious for Driver in emergency condition. If we park our car in random area, we face the security problems. To overcome these problems have bring a new idea "IOT Based Smart Parking System" which helps driver in finding the proposed parking slot via mobile application from everywhere. This Project aims to analyze and detect the vacant and occupied parking slot which is based on mobile application. Our main objective of this project is to detect availability of parking slot using waterproof ultra-sonic sensor to collect data for further processing in Node MCU ESP-8266 and show the result on mobile application. Our project is based on Node MCU ESP-8266 wi-fi module which can drive by a simple AC power supply and connectivity of Internet.



Application for IOT Based Smart Parking System Occupied slot 1



Occupied Parking Slot



Parking Slot Working Status

Funding: None



Group # 17

Self-Regulating Home and Fuzzy based Security System



Bilal Memon (G.L.) (17TL15)



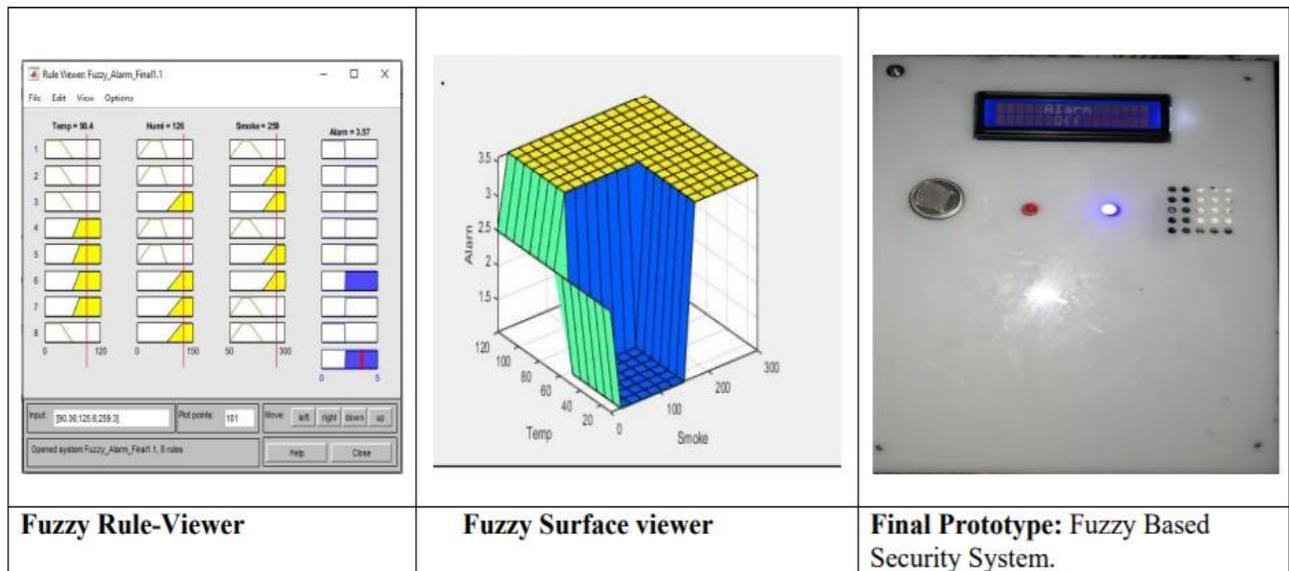
Muskan Aswani [17TL49]



Abdul Subhan Memon (17TL23)

Supervised by: Dr. Imran Qureshi Co-Supervisor(s): Dr. Fahim Aziz Umrani

Abstract: Sensors are widely used in monitoring systems. Wireless Sensor Networks are particularly used for automation and fire detection systems. The primary goals that researchers are attempting to achieve are accuracy for identifying real-time conditions and effectively immunizing against false instances. To accomplish effective measures, our Efficient Home Algorithm employs basic Temperature and Motion sensors to detect human presence and varying temperature. Hence actuating conventional appliances using decision-based automation. Our fire detection algorithms employ temperature, humidity, and smoke sensors to sense fluctuating temperatures conditions, those are compared to defined rules using a Fuzzy Logic System. An efficient fire detecting algorithm is proposed, along with a quick decision-making system. The performance of the fire detection algorithm demonstrates that using simple sensors with the support of fuzzy logic can successfully detect fire. Both fire and hazardous smoke cases are detected and evaluated by the algorithm. Whenever a fire case is detected, the system generates an alarm to indicate a hazardous situation. The results show that the decision-based alarm is near to 100% Efficiency.



Funding: None



Group # 18

Application of Optical Sensors to IoT/Biomedical Domain



Tahseen Fatima 17TL59



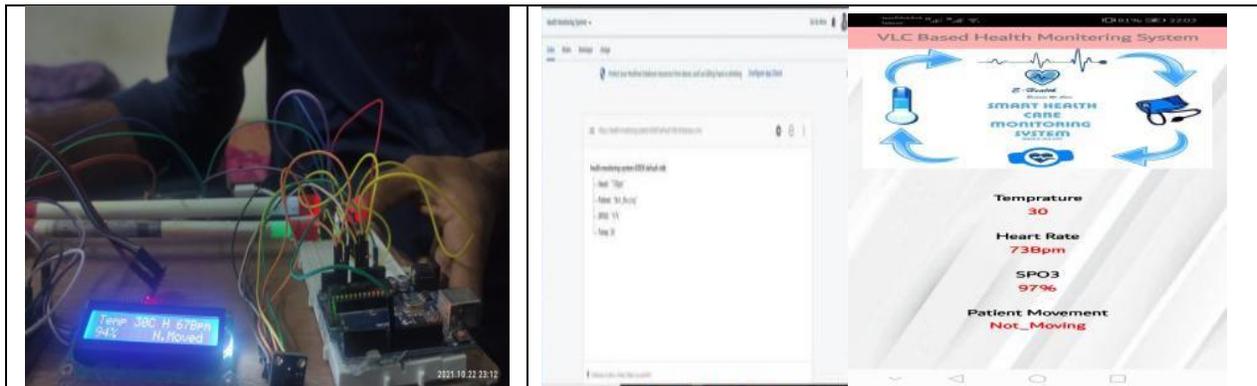
Tarique Alee 17TL31



Asif Ali Shah 17TL35

Supervised by: Engr. Hyder Bux Mangrio , Co-Supervisor(s): Dr. Abdul Latif Memon

Abstract: This thesis work focuses on the VLC and IoT based healthcare system for elderly people. The most existing remote healthcare monitoring systems are wi-fi based technology and it's a popular wireless communication technology, but it is banned in sensitive areas of hospital (e.g. ICU) owing to radio waves interfering with medical equipment and it has negative effects on human body. To overcome these problems, we have used visible light communication (VLC) technology for wirelessly data transmission within the sensitive area (ICU) of hospital or patient's room and at the back end we have used wi-fi module, which will help in data transmitting towards the firebase cloud through which doctor or medical staff can see and monitor the patient's health remotely by using an android based application in smart phone



Funding: None



Group # 19

Face Detection Security System Using AI



BEENISH (G.L.) (17TL85)



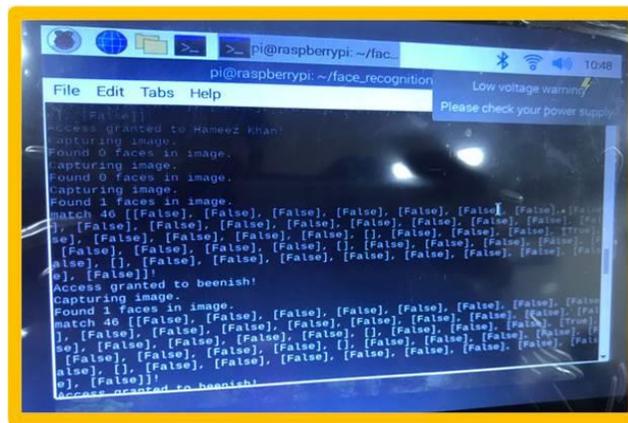
MAHREEN KHUWAJA (17TL51)



HAMEEZ KHAN (17TL103)

Supervised by: Dr. Sajjad Ali Memon, Co-Supervisor: Dr. Zafi Shehran Shah

Abstract: The work done in the bachelor degree thesis has been performed at our department in MUET Jamshoro. In this project we have followed many approaches for the surveillance of department and university. Following the need of security of departments in MUET, we setup a system in which we use Raspberry Pi, Camera and single purpose screen that will detect humans presence in departments. This work is performed by programming the cameras to multiplex their outputs into a screen. The university organization getting more concern to protect their department from not permitted users that is the reason we have planned this project. By implementing this thesis project department will be more secure. The urge of such a system implementation was felt by observing unstable security and threats in university.



Funding: Ignite Pakistan NGIRI-2021-6557



Group # 20

Real time position tracking and Health monitoring of Soldier



Zameer Ali (G.L) (17TL46)



Abdul Aziz 17TL74



Ahmed Ali (17TL106)

Supervisor: Dr. Faisal Ahmed Memon

Abstract: The security of countries has grown in importance as a constraint in the current situation. In times of conflict, strategies play a critical role in the safety of any nation. For the most part, the nation's security is dependent on the military (on land, at sea, and in the air) (air). Army troops play a critical part in this, and their safety is a major issue. As soon as a soldier steps foot on the battlefield, the army base station must immediately know that soldier's position and health condition. In the event that a soldier becomes disoriented on the battlefield, the base station must help him find his way back to his unit. As a result, we're putting into action a strategy to monitor soldiers and report on their health condition so that military leaders may better prepare their wartime tactics. The base station can determine the soldier's location (Latitude and Longitude) and health metrics (such as blood pressure and heart rate) using GPS and biosensors. The system has an additional function that allows soldiers to manually request assistance by pushing the Emergency button. Personal servers are used to accomplish this so that users have full mobility. A wireless connection will be used to link the server at the base station to this personal server. In addition, each soldier is equipped with a GSM (Global system for mobile communication) module, which allows them to contact the base station in the event of an injury. As soon as another soldier crosses into enemy territory, the army base station has no way of knowing where the other troops are located or how healthy they are. We came up with the concept of monitoring soldiers in our initiative and reporting on their status throughout the conflict. The soldier is the critical unit of the nation, and their life is valuable. Lot of soldiers are facing many problems such as communication with the control room and no proper medical help at a proper time which leads to the death of the soldier. We've suggested an alert system to track the soldier's position and health to help reduce these occurrences. To locate the soldier in real time, the suggested system makes use of GPS and a GSM module to send information about his or her health condition to a receiver. The tiny sensors can be fixed to the Soldier body or dress of the soldier to detect body parameter and transmit the information to the control room and other soldier when there is a low body rate or when it falls than the defined threshold value. The soldier can send an alert message to the guardian and control room for the help in the panic situation using emergency switch. The control room/guardian also request the location and Health Status of the soldier by send text message "LOC". In an emergency, the soldier may also seek assistance by pushing the Emergency switch.

Funding: None



Group # 21

Health Monitoring System



Zikra Laghari (G.L) (17TL115)



Rida Fatima (17TL67)



Allah Bachayo (17TL47)

Supervised by: Engr. Shanzah Shaikh Co-Supervisor(s): Dr. Faisal Memon

Abstract: Telecommunications plays an important role in the medical field related to information processing of patients in crisis situations with the revolution of IOT. These technologies can also help in the early treatment of patient and chronic diseases which can be diagnosed in early stage. This system is accountable for accumulating Body temperature, Pulse oximeter sensor (SPO2), ECG and collect the data for every single person and ship the information into IoT Cloud platform (Thingspeak software) with the usage of WIFE-Module, Data of patient saved in the cloud. The doctor or specialist can easily access the system remotely and get the basic information and the current situation of the patient to give the correct treatment. The most appropriate feature taken into consideration of project is to design and build low-cost, low-complexity prototypes that provide high-quality monitoring and security.

Funding: None



Group # 22

IOT BASED FIRE DETECTION AND ALARM SYSTEM



Rimsha Zulfiqar (G.L) (17TL50)



Muhammad Moosa 17TL26



Noman Arain 17TL30

Supervised by: Engr. Naeem Aijaz yousfani, Co-Supervisor(s): Engr. Hyder Bux Mangrio

Abstract: Fire accident in any location causing huge loss of human life and property is considered a serious problem. The fire accident of chemical factory Karachi, Pakistan on 27 August, 2021 took 16 precious lives and the harrowing incident took place in Lahore's main electronics market, Hafeez Center, Pakistan on October 18, 2020 continues to rage despite rescue efforts with millions of rupees' worth of equipment inside. There is no authentic system install in factories and market which minimizes such catastrophes. In order to overcome such catastrophe a reliable system based on Internet of Things (IoT) is proposed to monitor them. In this project, the motive is to propose smart catastrophic monitoring system for any building which monitors catastrophe by disseminating information inside the building and nearby places. The system based on master and slave concept in which three slaves' node and one master node are proposed. The slave nodes with their respective ID tags are located in different areas of buildings and those slave nodes are connected with the central master node to trigger action in case of emergency. The IoT-based fire detection and alarm system is implemented by using a microcontroller (NodeMCU), GSM sim800L module, buzzer, LCD, MQ2 smoke sensor, DHT11 temperature and humidity sensor, flame sensor KY026 to collect the required data. This system not only monitors disasters in the building, but also generates alerts to other connected nodes at the same time. Its sole purpose is to inform people (inside buildings) near places (schools, homes) of the worst situation to save their lives and property. The system first displays the results on LCD and alert through buzzer, and at the same time sends the same information to other connected slaves, and master and then the slave also generates an alert about the location of the disaster. The notification is then finally sent on a smartphone with an Android application for authenticated users, and a short message is sent via the GSM module.



Funding: None



Group # 23

Design of Graphene based flexible antenna



Farman Ali (G.L) (117TL81)



Sai fur Rehman (17TL107)



Hare Singh (17TL33)

Supervised by: Dr. Umair Ahmed Korai, Co-Supervisor(s):

Abstract: The essential theme of today's growing technology is to replace metals with various lighter, cheaper and least energy consuming materials with more and more functionalities. The wireless world demands the more integrated tools for the fulfillment all the requirements of today's wireless globe. We have put forward a robust simulated modeling of graphene based flexible antenna that is a revolutionary concept in wireless communication for efficient performance. We have designed a superlative micro strip patch antenna; particularly it is a loop antenna, that has loops wounded one another. The wavelength of frequency of loop antenna is obtained through simulation measurements in the results section. The achieved wavelength of the antenna will be considered the area of loops; the acquired wavelength is used for developing in a circular shape. The number of loops depends on the stability and gain, the more the loops the more will be the gain. This graphene material is highly recommended for antenna purpose because it has great efficiency of conductivity. It is may be used for dipole or patch antennas or used on near field communication antennas. The selected substrate of the micro strip patch looped antenna is poly ethylene naphthenic (PEN). The substrate pen is in the wearable form, that can be used in a roughly way and it can be paste anywhere and very light weighted glass like slim and flexible. The basic purpose of this graphene based flexible antenna is of RFID functionality, so the selected substrate can be feasible to take the antenna anywhere and can fix it anywhere without any problem. The main objective behind designing this graphene based flexible antenna is to increase the loops to reduce the size of antenna and achieve the maximum gain and stability. Through this way we can run our antenna in a smoother manner. The designed antenna is a cost effective, power efficient, smaller in size and a real time antenna that can be usable in multiple domains of wireless communication.

Funding: None



Group # 24

Design of two dimensional Planar Microstrip Phased array antenna



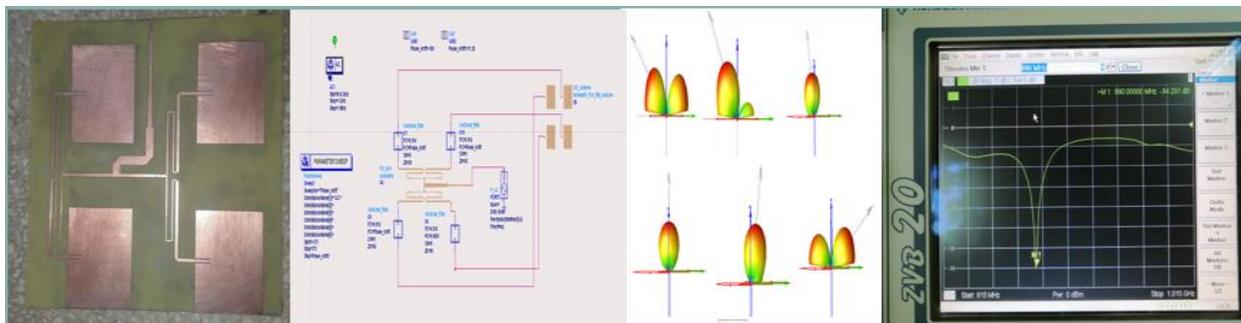
Hafsa Talpur (G.L) (17TL37)



Jai Kumar 17TL29

Supervised by: Dr. Badar Muneer , Co-Supervisor(s): Dr. Umair Ahmed Korai

Abstract: In the realm of wireless communication, the antennas have versatile applications and importance due to their flexibility in implementations and geometrical shapes. Our proposed work focuses on the modeling, simulation of beam steering for 4 elements antenna array having frequency of 916 Mhz. The objective is to design a rectangular patch antenna array combined with digital phase shifter to steer the beam in ± 45 degrees from the original direction. The two-dimensional linear array configuration is used to realize the required radiation properties. The digital phase shifter integrated with the microstrip cooperate-fed array feeder network is designed using Wilkinson's type structure. Tunable phase shifter is design using RLC circuit. The design offers the phase shift from 11 to 90 bits. Four-way Wilkson power divider splits the power in four directions that enhance port impedance matching and isolation. The phased array antenna is designed using calculated parameters and stimulated by professional software Advance Design System (ADS). The ADS provides simplification in designing process as it is easy to use and gives accurate results. The antenna array is fabricated on FR4 copper clad PCB board using chemical method. The measured results are in good agreement with the simulated results for 2x2 array antenna.



Array Antenna Fabrication on FR4

Schematic design of Phase shifter in ADS Software

3D Radiation Pattern of Phase Shifter

Reflection coefficient of 2x2 Array Antenna on VNA

Funding: None



Group # 25

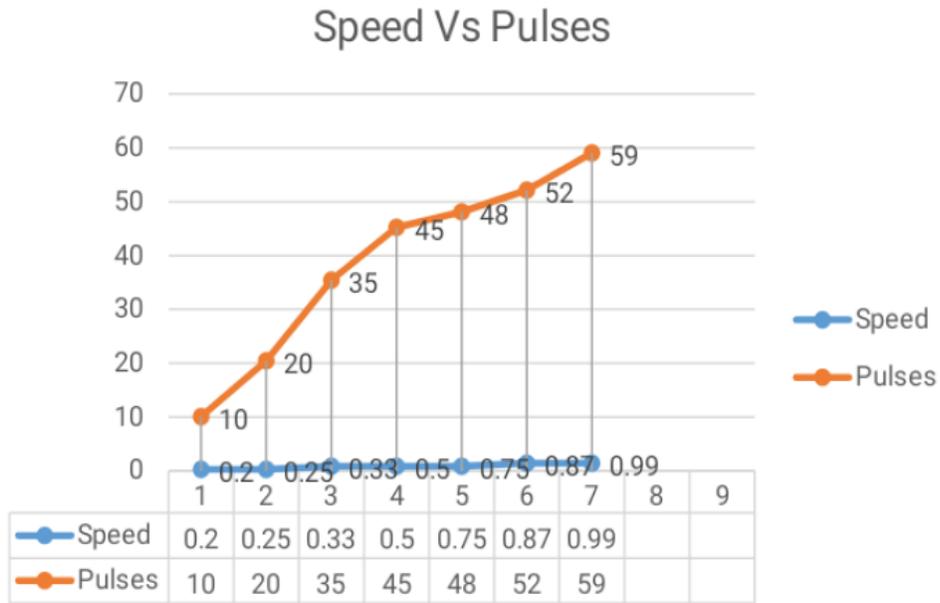
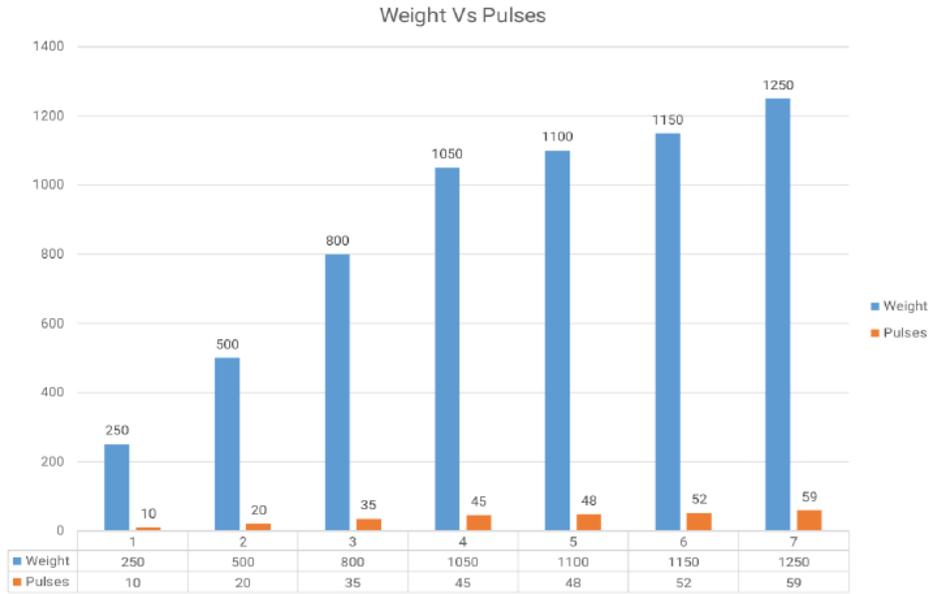
IoT Enabled Smart Railway Crossings

		
Saeeda Chandio (G.L) (17TL39)	UmmeLailaMirjat17TL09	MuhammadUmar17TL65
Supervised by: Dr. Faisal K. Shaikh, Co-Supervisor(s): Prof. Dr. B. S. Chowdhry		

Abstract: Railway transportation is a cost effective mode of transportation that is regarded as a country's lifeline. Train transit differs from car mobility in that trains are guided by tracks. Many studies and implementation projects have been carried out over the world to improve railway transportation. The railway system in Pakistan is yet to be upgraded and brought up to date with modern trends in developed countries. As a result of concerns such as unmanned railway crossings, track health, and a lack of signal between trains in close proximity, various problems develop, leading in the loss of life and property. As a result, the main goal of this project was to create an effective railway system that addressed difficulties such as in correct railway crossings. Working on this project, we used technology that is very cost effective, such as the design of an automated level crossing for high reliability and time reduction without human mistake. This method is significantly more efficient and safe for road users, and it can help to prevent accidents. To implement this method, we are using Node MCU ESP8266, Vibration Sensor, Servo motor(MG996R), Buzzer & LED's. We can sense the vibration pluses of the Train by utilizing a Vibration sensor. When the sensor detects train vibration, the Node MCU ESP8266 Send the signal to Level Crossing node where Servo motor is placed and perform the function of Open/Close the gates.

Keywords: NodeMCU, ESP8266, Vibration Sensor, Servo Motor.





Funding: Ignite Pakistan NGIRI-2021-7260



Group # 26

Rotating Solar Tracker System for Solar Panel Power Optimization



Muniza Memon (G.L.) (17TL58)



Awais Halepoto 17-F16TL72



Salar Mumtaz 17TL66

Supervised by: Engr. Nafeesa Zaki , Co-Supervisor(s): Engr. Komal Memon

Abstract: Energy crisis is most important issue in the world so renewable sources of energy are getting priority in the whole world. Among them, Solar energy is important means of increasing renewable energy for that purpose solar panel directly converts solar radiation into electrical energy. It is costly and inefficient solution that is why to increase the efficiency of solar panel the most appropriate technology is solar tracking system. However solar panel efficiency is the major concern While the sun travels a parabolic path in the day the panel used in our country are attached to a pole or the house's roof and therefore, the efficiency lowers greatly thought the day. That's why Project aims to create rotating solar tracking system which controls the altitude angle as well as azimuth angle to enhance the power efficiency of the panel instead of purchasing additional solar panels, this project is micro controller based. LDR are the sensors for sun detection and for rotating appropriate position servo motors are used.

Funding: None

