

FINAL YEAR PROJECT PROPOSALS OFFERED BY EE FACULTY



**Department of Electrical Engineering
SUKKUR IBA UNIVERSITY**

List of FYP Proposal

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1	Design and fabrication of Electricity generation through trash facility to fulfil the needs of an average family.	Dr. Fareed Hussain Mangi	Engr. Shakil Ahmed Jiskani
2	Design and fabrication of a biogas production facility to fulfil the gas consumption/needs of an average family.		Engr. Shakil Ahmed Jiskani
3	Optimization of Tilt angle for mono and poly crystalline PV modules and their performance analysis at different temperature levels.	Engr. Shoaib Ahmed Shaikh	Engr. Qasir Ali Engr. Muhammad Fawad Ahmed Shaikh
4	Soft robots with self-powered configurational sensing.	Dr. Saeed Ahmed Khan	
5	A Water-Proof Triboelectric–Electromagnetic Hybrid Generator for Energy Harvesting in Harsh Environments.		
6	Soft-contact cylindrical triboelectric-electromagnetic hybrid nanogenerator based on swing structure for ultra-low frequency water wave energy harvesting.		
7	Free electrical energy from movement to power portable electronics of the future.		
8	EEG/ECG signal reconstruction using deep learning models.		
9	Image denoising using DL and ML techniques.		
10	Artificial Intelligence and COVID-19: Deep Learning Approaches for Diagnosis and Treatment.		
11	Edge Intelligence and Internet of Things in Healthcare.		
12	A robust ultra-sensitive optical humidity sensor for environmental monitoring.	Dr. Muhammad Waqas	Dr. Afaque Manzoor Soomro
13	Automated Visual Data based NDT of Surface Defects in rail.	Dr. Junaid Ahmed	
14	Wireless Power Transfer based Non-Destructive Testing.		
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31	Human following E-Puck robot.		Dr. Muhammad Waqas Soomro.

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37	Intelligent crowd management system by counting human faces using Matlab and camera	Dr. Abdul Aziz	
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SUKKUR IBA UNIVERSITY
DEPARTMENT OF ELECTRICAL
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FINAL YEAR PROJECT PROPOSAL

Supervisor	Project Title	Area of Field
Engr. Shoaib Ahmed Shaikh	Optimization of Tilt angle for mono and poly crystalline PV modules and their performance analysis at different temperature levels.	Electrical Engineering (Power)
Co-Supervisor		
Engr. Qasir Ali Memon and Engr. Muhammad Fawad		
Project Synopsis (200 Words Max)		
<p>Renewable sources for power generation are becoming prevalent since it has numerous benefits, such as environment friendly and mitigates the usage of fossil fuels. Solar energy is one of the renewable sources. It is available in huge quantities and can be used to reduce power generation costs. Pakistan has its own significance due to its geographical location; it receives giant solar irradiance throughout the year. Thus, the country has paid much attention to generate electrical power and ease the shortfall of electricity, which is of huge concern in recent times.</p> <p>In this project, a calculation and comparison of irradiance on fixed and variable tilt angle will be done by using MATLAB/Simulink and hardware prototype. The optimal tilt angle of each month will be decided on the maximum value of irradiance taken from calculations at different tilt angles.</p> <p><i>Keywords: PV modules (mono and poly), Irradiance, FF, Efficiency, Frame</i></p>		
Possible Deliverables of the Project		
<p>Prototype can be designed to verify the results at different tile angles to find the optimum tilt angle.</p> <ol style="list-style-type: none"> 1. Calculation and comparison of irradiance at different angles. 2. Design of frame for fixing PV modules at different angles. 		
FYP Committee Comments		

**DEPARTMENT OF ELECTRICAL
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FINAL YEAR PROJECT PROPOSAL

Supervisor	Project Title	Area of Field
Dr. Saeed Ahmed Khan	1. Soft robots with self-powered configurational sensing.	Electrical Engineering
Co-Supervisor	2. A Water-Proof Triboelectric-	(Electronics)
	Electromagnetic Hybrid Generator for Energy Harvesting in Harsh Environments. 3. Soft-contact cylindrical triboelectric-electromagnetic hybrid nanogenerator based on swing structure for ultra-low frequency water wave energy harvesting. 4. Free electrical energy from movement to power portable electronics of the future. 5. EEG/ECG signal reconstruction using deep leaning models. 6. Image denoising using DL and ML techniques. 7. Artificial Intelligence and COVID-19: Deep Learning Approaches for Diagnosis and Treatment. 8. Edge Intelligence and Internet of Things in Healthcare.	
Project Synopsis (200 Words Max)		
Possible Deliverables of the Project		
FYP Committee Comments		

**DEPARTMENT OF ELECTRICAL
ENGINEERING**

FINAL YEAR PROJECT PROPOSAL

Supervisor	Project Title	Area of Field
Dr. Muhammad Waqas	A robust ultra-sensitive optical humidity sensor for environmental monitoring.	Electrical Engineering (Power & Electronics)
Co-Supervisor		
Dr. Afaque Manzoor Soomro		
Project Synopsis (200 Words Max)		
Possible Deliverables of the Project		
FYP Committee Comments		

**DEPARTMENT OF ELECTRICAL ENGINEERING
FINAL YEAR PROJECT PROPOSAL**

Supervisor	Project Title	Area of Field
Dr. Junaid Ahmed	Automated Visual Data based NDT of Surface Defects in rail.	Electrical Engineering (Electronics and Computer Science)
Co-Supervisor		

Project Synopsis (200 Words Max)

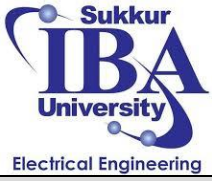
This project proposes to investigate the surface defects present on the rail track there types and severity. Further, visual data set will be created for the different types of defects. Finally, the Machine Learning based algorithms will be used to detect and quantify the defects.

Possible Deliverables of the Project

1. Investigation of surface defects in rails.
2. Creating visual data set for the defects.
3. AI and ML algorithms based solution for visual inspection of defects.

FYP Committee Comments

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DEPARTMENT OF ELECTRICAL ENGINEERING FINAL YEAR PROJECT PROPOSAL

Supervisor	Project Title	Area of Field
Dr. Junaid Ahmed	Wireless Power Transfer based Non-Destructive Testing.	Electrical Engineering (Electronics and Computer Science)
Co-Supervisor		

Project Synopsis (200 Words Max)

This project aims to use simple wireless power transfer (WPT) circuit to detect the surface defects in metal structures. The mutual inductance based RLC circuits will be used to detect and inspect the specimen. Further, testing and evaluation will be done using the Network Analyzer based data collection and analysis.

Possible Deliverables of the Project

1. Design of the WPT circuit.
2. Testing and evaluation using Network Analyzer.
3. Further evaluation using feature selection for the defect analysis and quantification.

FYP Committee Comments

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DEPARTMENT OF ELECTRICAL ENGINEERING FINAL YEAR PROJECT PROPOSAL

Supervisor	Project Title	Area of Field
Dr. Junaid Ahmed	Background/Foreground Modelling using Machine Learning.	Electrical Engineering (Electronics and Computer Science)
Co-Supervisor		

Project Synopsis (200 Words Max)

This project investigates the background modelling algorithms using image processing and machine learning. Data set will be created based on images and videos. Further, image processing and machine learning algorithms will be carried out to separate the important information from the images/videos.

Possible Deliverables of the Project

1. Review of existing approaches
2. Data set creation.
3. Applying the AI and ML algorithms to achieve the desired task.

FYP Committee Comments

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FINAL YEAR PROJECT PROPOSAL

Supervisor	Project Title	Area of Field
Proposed By M. Fayyazuddin	Securable Identity Based Encryption Technique By Generating Key In Wireless Sensor Networks.	Electrical Engineering (Telecomm & Electronics)

Project Synopsis (200 Words Max)

Cryptography contains five elements, plain text, keys, cipher text, encryption algorithm and decryption algorithm. In conventional cryptosystem (symmetric key) the same key for encryption and decryption algorithm is used. Distribution of key is a big problem in symmetric cryptosystems. For Cryptography scheme, where two keys are used for encryption and decryption namely, public key and private key. Public key is shown publicly while private key is for, owner. Sender encrypts the message with the receiver's public key and accessible receiver decrypts the message with his/her private key. The core purpose of identity based encryption was to simplify the certificate management and thus eliminate the need for Certification Authorities (CA). Normally in Public Key Infrastructure (PKI), public key certificate is required to bind the key to its user's identity. However in identity based encryption there is no need of certificates, because each user has his/her own unique identity to which they are strictly bound. Identity based encryption requires a Private Key Generator (PKG) (trusted central authority) for generating and distributing of private keys to its registered users in WSN.

Possible Deliverables of the Project

1. Simulation Results.

FYP Committee Comments

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FINAL YEAR PROJECT PROPOSAL

Supervisor	Project Title	Area of Field
Engr. Zulqarnain	Flat-plate solar collector thermal water purification system for remote communities.	Energy Systems Engineering (Renewable Energy-Mechanical)
Co-Supervisor		
Engr. Qasir Ali		

Project Synopsis (200 Words Max)

This FYP is actually a solar thermal system comprised of a flat-plate solar collector thermally powering the water purification systems. A flat-plate collector will be designed and assembled by the students. Raw water supply and purified water storage system will be connected with a flat-plate solar collector for proper and continuous output. Solar thermal energy will heat-up the evaporation rate exponentially. As a result, the proposed Solar thermal flat-plate collector will produce clean and consumable water and this system can be installed in remote areas where communities lack access to clean power.

Possible Deliverables of the Project

1. Engineering drawings for designing and assembling of the whole system.
2. Practical executions of the laws of thermodynamics and fluid mechanics.
3. Development of mobile self-powered water purification for remote communities.

FYP Committee Comments

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DEPARTMENT OF ELECTRICAL ENGINEERING

FINAL YEAR PROJECT PROPOSAL

Supervisor	Project Title	Area of Field
Dr. Safer Hyder	Air Quality Monitoring and Purification Design – Prototype 2.0.	Energy Systems Engineering (Renewable Energy-Mechanical)
Co-Supervisor		

Project Synopsis (200 Words Max)

The Air pollution is one of the biggest cause diseases and thus indoor air quality monitoring and purification design is essential for sensitive populations such as old, infants and allergic patients. The objective is to remove aerosols, dust particles and viruses from air and provide healthy and fresh air to the indoor residents.

The proposed project aims to collect data through various sensors, process the data using Arduino based controller, then acquired information is transmitted through wireless protocols which forwarded to IoT dashboard and/or mobile app. The system acquires data through dust sensor, gas sensors (MQ-2, 3, 7), and other sensors. The design is specifically useful the indoor air quality monitoring and purification. The air purification requires air filters and fans to be assembled and integrated with the current system into a single compact form factor.

Example product: <https://www.youtube.com/watch?v=Zh5shmRLXt0>

Keywords: Air Quality, IoT, Arduino, Sensors

Possible Deliverables of the Project

Prototype 1.0 has been successfully designed and properly working. Following attributes need to be updated to the current prototype:

1. Adding CO₂ and TVOC (total volatile organic compound) sensors
2. Designing Air Purifier
3. App through monitoring and control
4. Integrating Air Quality Monitor and Air Purifier
5. Sensor calibration

FYP Committee Comments

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FINAL YEAR PROJECT PROPOSAL

Supervisor	Project Title	Area of Field
Dr. Suresh Kumar	Run-time high beam light filtering system for vehicles on two-way roads.	Electrical Engineering (IoT)
Co-Supervisor		
Dr. Muhammad Waqas		

Project Synopsis (200 Words Max)

On two-way roads, high beams of vehicles reduce visibility for the drivers driving in opposite direction. This dangerous situation sometimes causes life threatening accidents. The project is about developing a high beam light filtering system for vehicles that filters out high beam lights coming from opposite direction of the vehicle and stream video with clear visibility onto the mini screen within the vehicle, allowing the driver to see clearly despite of high beam light in opposite direction.

Possible Deliverables of the Project

1. Developing a high beam filter
2. Development of run-time high beam light filtering system

FYP Committee Comments

FINAL YEAR PROJECT PROPOSAL

Supervisor	Project Title	Area of Field
Dr. Suresh Kumar	Indoor mapping using E-Puck2 robot	Electrical Engineering (Electronics)
Co-Supervisor		

Project Synopsis (200 Words Max)

E-Puck 2 are small mobile robots, with many builtin sensors including IR sensors, IMU, RGB camera and an omnivision camera. This FYP is about autonomous map developing of indoor environments using E-Puck 2 robots. A visual map will provide information about the location of the robot and any other (sensed/scanned) object in the indoor environment. The mapping and localisation will help the robot to move around autonomously and follow optimal path in order to reach a target location in the map.

Possible Deliverable of the Project

1. Developing a simultaneous localization and mapping (SLAM) algorithm on E-Puck2 robot
2. Autonomous map development in indoor environments using E-Puck 2 robot

FYP Committee Comments



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FINAL YEAR PROJECT PROPOSAL

Supervisor	Project Title	Area of Field
Dr. Suresh Kumar	Low Cost Mini Weather Station	Electrical Engineering (Electronics)
Co-Supervisor		
Dr. Muhammad Waqas Soomro		

Project Synopsis (200 Words Max)

The weather station consist of indoor and outdoor units. The outdoor unit contains light, temperature and humidity (including but not limited to) that transfers the sensors' data, as a specific rate, towards the indoor unit using a wireless channel. The outdoor unit also contains a battery which is recharged using a solar panel. The indoor unit also consist of same pair of sensors to record indoor data and a LCD/Screen to show the data, including current time of the location. The indoor contains enough memory to record the indoor and outdoor data for several days and show in shape of a graph on the screen when triggered. The station should also be able to upload the data on a server to be able monitor remotely. The indoor unit also shows sunset/sunrise times when triggered and able to control (turn On/Off) outdoor lights accordingly.

Possible Deliverable of the Project

1. Developing outdoor sensors node.
2. Developing indoor unit.
3. Combining the indoor and outdoor units to build a mini weather station.

FYP Committee Comments



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FINAL YEAR PROJECT PROPOSAL

Supervisor	Project Title	Area of Field
Dr. Suresh Kumar	Blood Glucose (BG) level measurement through Images	Electrical Engineering (Electronics)
Co-Supervisor		
Dr. Muhammad Waqas		

Project Synopsis (200 Words Max)

This project is about developing an algorithm for measuring blood glucose levels through images. The images may be taken online or offline for measurement. The idea is to measure the BG level using skin colour in images. The idea has been used to measure the blood pressure through measuring level of red pigmentation in human face. Similarly this can be applied to measure the [BG level](#).

Possible Deliverable of the Project

1. Developing an algorithm to measure BG level in still images
2. Developing an algorithm to measure BG level in images from a live video stream

FYP Committee Comments



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FINAL YEAR PROJECT PROPOSAL

Supervisor	Project Title	Area of Field
Dr. Faheem Akhter	Automatic Chess using mobile app	Electrical Engineering (Power , Electronics & computer systems/computer science)
Co-Supervisor		
Dr. Asim Samejo		

Project Synopsis

This FYP is based on hardware and mobile app. Beauty of this project is that all the all the pieces of chess will move automatically without any visible interaction. It will feel like that pieces are moving by itself. Hardware will be made using gentry structure robot and mobile app will be developed. Mathematical (Kinematics) modeling of gentry' robot will be done. In first phase both player will use mobile app to play the game. Both player make moves in mobile app, in the mean time pieces in real will be moved accordingly without any visible support. In next phase (if time allows) then we will make this game as human vs. computer style. Inspiration taken from commercial product made by "Squareoff" which cost around US \$400 to \$450. We can make its simpler version within US \$200 and introduce in local market.

Possible Deliverables of the Project

1. Gentry structure robot will be made which is going be it's (hidden)base
2. Overall chess board and Pieces will be designed and fabricated
3. Mobile app will be developed.

FYP Committee Comments



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FINAL YEAR PROJECT PROPOSAL

Supervisor	Project Title	Area of Field
Dr. Muhammad Asim	Automatic Cash Receiving Machine based using Computer Vision.	Electrical Engineering (Computer vision, Robotics & Electronics)
Project Synopsis (200 Words Max)		
<p>This FYP is based on application of computer vision, robotics and electronics. This project has potential for great commercialization as it can automate receipt of cash at any point of sale. This product is particularly useful for vending machines installed at public places such as Bus, Train stations, Hospitals, Shopping malls. Using computer vision to detect the security features of modern currency notes can help prevent fraud and create a powerful tool which can help develop a variety of commercial vending activities.</p>		
Possible Deliverables of the Project		
<ol style="list-style-type: none"> 1. Develop computer vision application for currency validation 2. Prepare functional prototype 3. Develop a vending machine employing proposed machine. 		
FYP Committee Comments		

SUKKUR IBA UNIVERSITY
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FINAL YEAR PROJECT PROPOSAL

Supervisor	Project Title	Area of Field
Dr. Muhammad Asim	3 axis CNC machine using BLDC motors.	Electrical Engineering (Electronics)
Project Synopsis (200 Words Max)		
<p>Computer Numerical Control (CNC) machines are very finding application in various applications such as 3D printers, Milling Machines, Laser Cutters and Vinyl Cutters. BLDC motors a preferred choice because of high speed, accuracy of positioning and high torque. Our objective in this project is to design a 3 axis milling machine based on BLDCs. The main challenge is to design electronic driving circuitry to accurately locate the control the position of end-effector. This project can have a variety of applications such as design of laser cutter, milling machine, 3D printer just to name a few.</p>		
Possible Deliverables of the Project		
<ol style="list-style-type: none"> 1. Active BLDC control with feedback loop based on rotary encoder. 2. Design and build physical structure with BLDC drivers with rotary encoder. 3. Develop software framework to drive system based on formatted input. 		
FYP Committee Comments		

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DEPARTMENT OF ELECTRICAL ENGINEERING

FINAL YEAR PROJECT PROPOSAL

Supervisor	Project Title	Area of Field
Dr. Abdul Baseer	Prototype development to interface devices	Electrical Engineering (Electronics/Computer/Control)
Co-Supervisor		
Dr. Suresh Kumar		
Project Synopsis (200 Words Max)		
<p>LabVIEW due to its simplicity and graphical programming has widely been used in academia and research. It, however, generally requires national instrument (NI) proprietary boards like MyRIO to interface with the physical systems like motors, sensors. The purpose of such equipment in academia is generally to demonstrate the effect of feedback or of some parameters (like delay time and damping ratio) on the response of a first or second-order system. The NI and third party (like Quanser) equipment and interfacing boards are expensive ranging from 0.1 – 1.0 million PKR per lab experiment.</p> <p>The proposed project is to design and develop a prototype to interface low-cost and readily available systems and sensors directly with the PC and access them in LabVIEW using the USB port.</p> <p>Please be noted that the project requires a sound knowledge of measurement and instrumentation LabVIEW programming.</p> <p><i>Keywords: LabVIEW, Interfacing, Measurement, and Instrumentation</i></p>		
Possible Deliverables of the Project		
<ol style="list-style-type: none">1. Interface accessible in LabVIEW2. Reading from and writing to a device3. Controlling some quantity in a feedback configuration4. Overall and an extendable control system		

**DEPARTMENT OF ELECTRICAL
ENGINEERING**

FINAL YEAR PROJECT PROPOSAL

Supervisor	Project Title	Area of Field
Dr. Gulsher Ali	Design and manufacture of smart desk using capacitive touch sensors and computer vision	Electrical Engineering (Power & Electronics)
Co-Supervisor		
Engr. Sohail Ahmed Soomro		
Project Synopsis (200 Words Max)		
<p>This project is about designing a smart desk using capacitive touch sensors for smart offices. The objective is to manufacture a prototype table having embedded futuristic technologies in Fab lab established in khairpur.</p> <p>Student will be trained for designing and then manufacturing any design in Fab lab. And then capacitive touch sensors are installed for executing various tasks like controlling LEDs. Raspberry pi is programmed to handle the computer vision features embedded in smart table.</p>		
Possible Deliverables of the Project		
<p>1- Design of smart desk using any suitable software 2- Manufacture the design in Fab lab 3- Install capacitive touch sensors, LEDs on table 4- Install computer vision based tasks using Raspberry pi</p>		
FYP Committee Comments		

**DEPARTMENT OF ELECTRICAL
ENGINEERING**

FINAL YEAR PROJECT PROPOSAL

Supervisor	Project Title	Area of Field
Dr. Gulsher Ali	Hand Gesture Recognition Based Energy Management and Robot Control Using Artificial Intelligence	Electrical Engineering (Power & Electronics)
Co-Supervisor		

Project Synopsis (200 Words Max)

This project is about automating the operation of energy consumption devices and to control the movement of robot using hand gestures. The intensity like speed of fan/robot, brightness of light emitting diode, temperature of air conditioner etc. will also be controlled using hand gestures.

The mentioned objectives can be achieved by training a model using machine learning algorithms. Then trained model is run on Raspberry Pi to do the multiple tasks. The camera is used to capture the hand gesture and then it is processed using trained model to figure out the task

Possible Deliverables of the Project

1. Training a model using machine learning algorithms on hand gesture dataset.
2. Development of the prototype.

FYP Committee Comments

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SUKKUR IBA UNIVERSITY
DEPARTMENT OF ELECTRICAL ENGINEERING
FINAL YEAR PROJECT PROPOSAL

Supervisor	Project Title	Area of Field
Dr. Gulsher Ali	An Artificial Intelligent (AI) based IBA Virtual Assistant- A Chabot that responds to queries in real time using machine learning	Electrical Engineering (Electronics)
Co-Supervisor		
Engr. Aizaz Ahmed Larik		

Project Synopsis (200 Words Max)

This project is about developing a virtual assistant or Chabot for Sukkur IBA University. A virtual assistant is an Artificial Intelligence (AI) software that can simulate a conversation with user in natural language through mobile application, messaging application, websites or through telephone.



The objective of this virtual assistant is to provide the platform that can solve queries of potential students and current students of Sukkur IBA University without human intervention. This shall provide all the information about Sukkur IBA University with ease.

Skills required for the Project

- 1- Students should have sound programming skills
- 2- Students should be interested about learning AI and machine learning
- 3- Students should be interested in app development and have basic knowledge about it

FYP Committee Comments

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Supervisor	Project Title	Area of Field
Dr. Safer Hyder	Park Here: An App for Locating Parking Spaces	Electrical Engineering (Power & Electronics)
Co-Supervisor		
Project Synopsis (200 Words Max)		
<p>Finding a parking space is turning tedious every day, everywhere. This project aims to locate parking spaces within an institute, shopping mall or parking plaza. A network of sensors are to be deployed at parking locations to detect empty spaces and connected through Wi-Fi network. The received data at server from all sensors update the parking map and shared with the users through Android/MacOs application using Smart Phones.</p> <p>The project also aims to design a notice board at parking entry point where security guards can inform the drivers about availability of parking spaces.</p>		
Possible Deliverables of the Project		
<ol style="list-style-type: none"> 1. Data acquisition using single sensor through Wi-Fi for finding empty parking space 2. Developing App: Interface and data visualisation 3. Scale the design up 4. Design notice board 		
FYP Committee Comments		

SUKKUR IBA UNIVERSITY
DEPARTMENT OF ELECTRICAL ENGINEERING
FINAL YEAR PROJECT PROPOSAL

Supervisor	Project Title	Area of Field
Dr. Safer Hyder	Drone and Machine Learning Based Green Space Monitoring	Electrical Engineering (Electronics)
Co-Supervisor		

Project Synopsis (200 Words Max)

Problem statement

Deforestation is a major contributor to the climate change and it's a well-established fact now. Existing forest monitoring setup requires lot of resources, nevertheless results in inefficiency, lack of transparency and lack of accurate forest data generation. To improve forest management, we need solutions exploiting modern technologies such as machine learning and drone imaging. These solutions are badly needed in the countries which are leading list of climate change hit regions and Pakistan is one of these countries.

Methodology

The proposed project aims to collect data through drone "DJI Mavic Mini" Quadcopter with 2.7K Camera 3-axis gimbal with in built-in GPS. Imaging field map can be provided manually or automatic using GPS, then acquired information is transmitted over WIFI or extracted from camera manually through SD Card. Finally, images dataset are analyzed using Machine learning algorithm Keras-Retinanet architecture. The design diagram and components are presented on the second page.

Outcomes

The proposed project aims to achieve following outcomes.

1. Automatic tree counting using aerial imaginary.
2. Measuring green and non-green areas.
3. Growth Monitoring of tress.

Impact

1. Efficient Green space management.
2. Digitized data acquisition and storage of green spaces.
3. Cost effective

Keywords: Tree growth Monitoring, Machine Learning, Drone Imaging

Possible Deliverables of the Project

1. Drone testing and Data acquisition using DJI Mavic Mini
2. Transmitting data to processing station using WIFI
3. Training Algorithm for Tree counting and growth monitoring using MATLAB/Python.
4. Testing Algorithm with different scenarios.

**DEPARTMENT OF ELECTRICAL ENGINEERING
FINAL YEAR PROJECT PROPOSAL**

Supervisor	Project Title	Area of Field
Dr. Junaid Ahmed	Single Image Super-Resolution by Clustering Oriented Multimodal Coupled Sparse Representation and Dictionary Learning	Electrical Engineering (Electronics and Computer Science)
Co-Supervisor		

Project Synopsis (200 Words Max)

This project targets one of the oldest and yet active problem of image processing that is single image super-resolution. The task is to up-scale the given low-resolution (LR) image to high-resolution (HR) image. This approach falls under the supervised learning paradigm of machine learning and artificial intelligence. Where the proposed model will be trained on a predefined set of HR, LR images with same modality and guided HR image with different modality. After that, it will be tested on separate LR images to obtain the HR counterparts. During the training and testing process, instead of using the single dictionary and sparse representation for the whole image. The patch based clustering will be carried out to generate the class dependent dictionary. Further, Multimodal Coupled Dictionary learning will used to train the dictionaries. The proposed model will be evaluated using the conventional quality parameters of peak-signal-to-noise-ratio (PSNR), structural similarity index measure (SSIM), information fidelity criteria (IFC) and computation time.

Possible Deliverables of the Project

4. Simulation and Evaluation of the existing state-of-the-art single image super-resolution algorithms in Matlab.
5. Mathematical Modelling and Simulation of the proposed algorithm using Matlab.
6. Analysis and Evaluation of the proposed model using Matlab.
7. At least one conference or E-SCI paper may be written from the achieved results.

FYP Committee Comments

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DEPARTMENT OF ELECTRICAL ENGINEERING FINAL YEAR PROJECT PROPOSAL

Supervisor	Project Title	Area of Field
Dr. Junaid Ahmed	Residual Up-Sampling Integrated Joint Dictionary Training for Medical Image Super-Resolution	Electrical Engineering (Electronics and Computer Science)
Co-Supervisor		

Project Synopsis (200 Words Max)

This project targets the medical image enhancement problem. The clinical image data of X-Ray or CT-Scans contains useful information for the doctors to evaluate and diagnose the disease of the patient. Thus it becomes critical for that image to have a good resolution. To this end, through this project, the state-of-the-art medical image enhancement algorithms will be first tested and evaluated. Further, a novel algorithm based on residual up-sampling and joint dictionary learning will be proposed. This approach falls under the supervised learning paradigm of machine learning and artificial intelligence. Where the proposed model will be trained on a predefined set of medical images. After that, it will be tested on separate medical X-Ray or CT images. The proposed model will be evaluated using the conventional quality parameters of peak-signal-to-noise-ratio (PSNR), structural similarity index measure (SSIM), information fidelity criteria (IFC), and computation time.

Possible Deliverables of the Project

4. Simulation and Evaluation of the existing state-of-the-art medical image enhancement algorithms in Matlab.
5. Mathematical Modelling and Simulation of the proposed algorithm using Matlab.
6. Analysis and Evaluation of the proposed model using Matlab.
7. At least one conference or E-SCI paper may be written from the achieved results.

FYP Committee Comments

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SUKKUR IBA UNIVERSITY
DEPARTMENT OF ELECTRICAL ENGINEERING
FINAL YEAR PROJECT PROPOSAL

Supervisor	Project Title	Area of Field
Dr. Junaid Ahmed	Improved Robust Tensor Principal Component Analysis for Background Modelling and Denoising	Electrical Engineering (Electronics and Computer Science)
Co-Supervisor		

Project Synopsis (200 Words Max)

This project aims at the modern tensor decomposition based techniques and algorithms for solving the classical inverse problems in the image analysis. The general inverse problems of Background Modelling and Denoising are considered. The tensor decomposition based algorithms will be studied and evaluated for this task first. After that, novel tensor principal component analysis based algorithm will be proposed for this task. This approach falls under the un-supervised learning paradigm of machine learning and artificial intelligence. Where the proposed model will be directly applied on the images with noise or background extraction. The evaluation of the proposed algorithm will be carried out. Further, comparison with recent and state-of-the-art algorithms will also be conducted. The proposed model will be evaluated using the conventional quality parameters of peak-signal-to-noise-ratio (PSNR), structural similarity index measure (SSIM), information fidelity criteria (IFC) and computation time.

Possible Deliverables of the Project

4. Simulation and Evaluation of the existing state-of-the-art algorithms in Matlab.
5. Mathematical Modelling and Simulation of the proposed algorithm using Matlab.
6. Analysis and Evaluation of the proposed model using Matlab.
7. At least one conference or E-SCI paper may be written from the achieved results.

FYP Committee Comments



SUKKUR IBA UNIVERSITY

DEPARTMENT OF ELECTRICAL ENGINEERING FINAL YEAR PROJECT PROPOSAL

Supervisor	Project Title	Area of Field
Dr. Hafiz Mudassir Munir	Hierarchical Power Sharing Control in DC Microgrids	Electrical Engineering (Power & Electronics)
Co-Supervisor		
Dr. Qasim Ali		

Project Synopsis (200 Words Max)

To obtain stable and optimal operation in DC power systems (microgrids), proper load sharing among different energy units and acceptable voltage regulation across the microgrid is required. This can be achieved by use of a hierarchical power management structure. Therefore, this FYP has the goal to model and design of DC microgrid such that the power sharing can be maintained, keeping in view the stability of the microgrid. For the experimental validation, this can be checked in the PHIL lab.

Possible Deliverables of the Project

FYP Committee Comments



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DEPARTMENT OF ELECTRICAL ENGINEERING

FINAL YEAR PROJECT PROPOSAL

Supervisor	Project Title	Area of Field
Engr. Shakil Ahmed Jiskani	Automated Solar Grass Cutter	Electrical Engineering (Power, Electronics, Renewable Energy)
Co-Supervisor		
Engr. Shoaib Ahmed Shaikh		

Project Synopsis (200 Words Max)

Today the most promising source of energy where everyone focusing is the concept of Solar Power and its Utilization. Generally we see people who had gardens use lawn mowers manually to cut the unwanted grass. Those lawn mowers are powered from normal household's power through cables or using petrol/diesel. Using cables creates messing problem and if there is any power cut we can't use that lawn mower. Through this project you are going to build a unique Automatic Solar Grass Cutter (Lawn Mower) which is powered by solar energy and it will overcome all the above-mentioned problems.

Possible Deliverables of the Project

1. Programming logic onto the Arduino Uno board.
2. Interfacing the Cutter, Solar panel and DC Motors with Arduino.

FYP Committee Comments

**SUKKUR IBA UNIVERSITY
DEPARTMENT OF ELECTRICAL ENGINEERING**

FINAL YEAR PROJECT PROPOSAL

Supervisor	Project Title	Area of Field
Dr. Ahmed Ali Shah	Home Automation based on EEG Signals	Electronic Engineering
Co-Supervisor		

Project Synopsis (200 Words Max)

The key objective of this project is to assist physically disabled and paralyzed persons to control the device based on Electroencephalogram (EEG) signals inputs. An electroencephalogram (EEG) signal is a brain signal captured from human scalp by using electrodes. The BCI (Brain-Computer Interface) are systems that can bypass conventional channels of communication to provide direct communication and control between the human brain and physical devices by translating different patterns of brain activity into commands in real time. The EEG signal contains millions of neuron patterns. These patterns interactions produce thought motion which composed of different kinds of EEG waves. EEG sensing headset consists of sensors to detect human attention degree and can quantitatively distinguish concentration and directed mental activities level. EEG signals would be converted into raw data packets and would be transferred to the Level analyzer unit (LAU) wirelessly. The LAU would process the signal and drive the solid-state switch.

Possible Deliverables of the Project

- ✓ The immediate outcome would be full support to paralyzed person or old person to control home appliances based on EEG signal
- ✓ The other possible deliverable would be to prepare library of different sizes of headset by 3D printing. That can be fit to any size of head.

FYP Committee Comments

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SUKKUR IBA UNIVERSITY



DEPARTMENT OF ELECTRICAL ENGINEERING FINAL YEAR PROJECT PROPOSAL

Supervisor	Project Title	Area of Field
Dr. Ahmed Ali Shah	Psychophysiological Tracing of Game Addicts and Non-Addicts by Statistical Modelling with EEG Signals	Electronics, Signal Processing Sensors, Biomedical
Co-Supervisor		
Engr. Ghulam Akbar Dahani		

Project Synopsis (200 Words Max)

Over the past few years, addiction of gaming addiction has obtained growing attention from mental health organization, media, teachers, psychiatrist, psychologist, parents and, to a certain extent, by gamers throughout the world. This study aims to examine the frequency and time domain characteristics of EEG data to determine any difference between non-addicted and addicted games layers and the study would help to distinguish specific frequency and region of scalp between two groups. EEG data would be obtained from commercially available, EEG device. The study can be employed to trace the abnormal gaming activities and can assist in a warning if someone crossing the limits of normal game playing.

Possible Deliverables of the Project

1. Identification of game addicts
2. Conference/Journal publication
3. Expertise development in EEG signal analysis

FYP Committee Comments

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