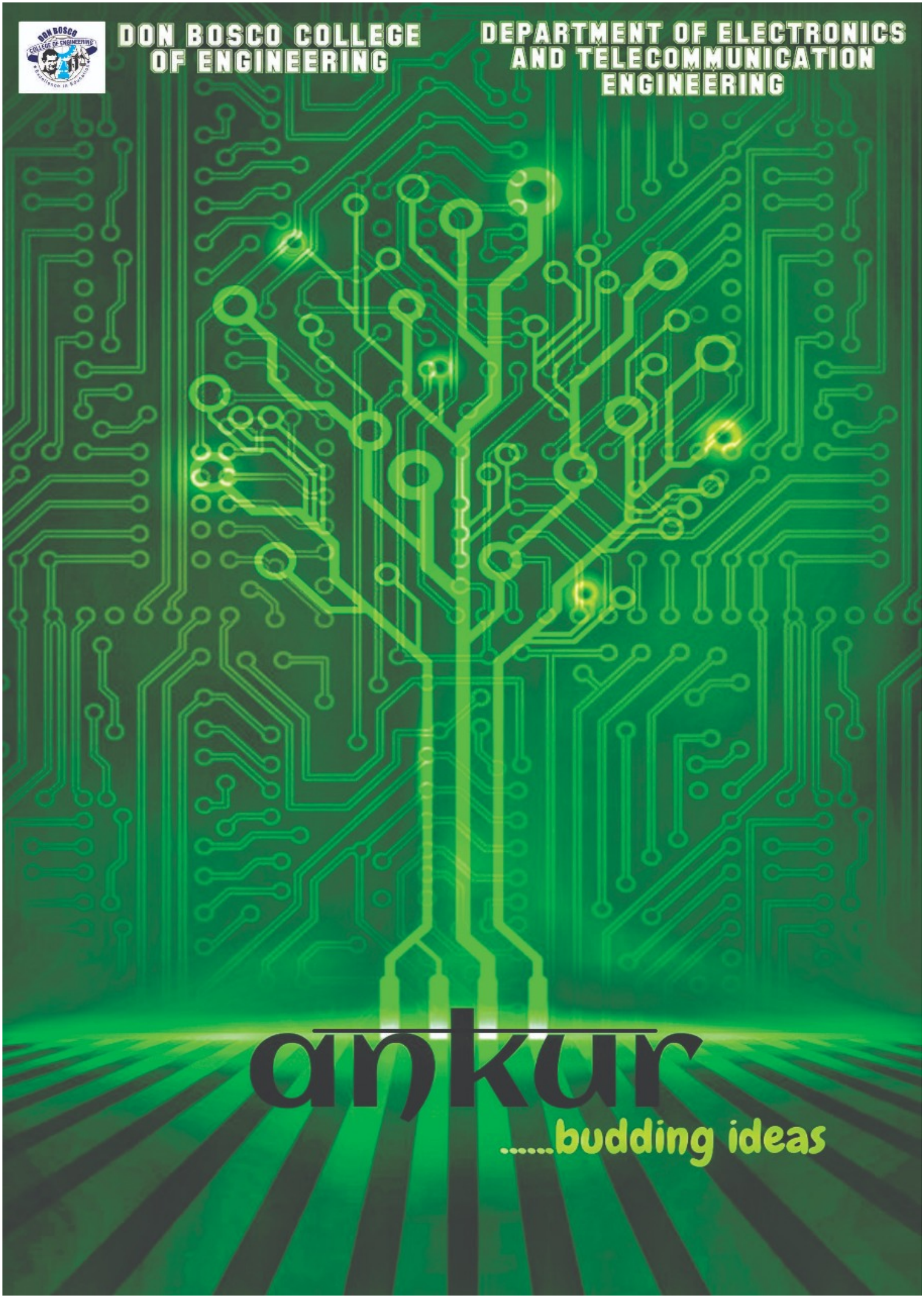

DON BOSCO COLLEGE OF ENGINEERING
DEPARTMENT OF ELECTRONICS AND TELECOMMUNICATION ENGINEERING
ankur
.....budding ideas

From the HOD's Desk:

It gives me immense pleasure to pen a few words as prologue to our department project idea book **"ANKUR 2k21"**, exclusively a collection of the latest project ideas which bears immense potential of shaping into astounding startups in the fields of Biomedical, Robotics, Automation, VLSI, Signal processing, Image processing, Internet of Things, Machine Learning and many more.

The Electronics and Telecommunication Engineering is an erratically changing and ever evolving branch. Innovation, orientation and an ever expanding base serve as a firm foundation for the latest development in the department of Electronics and Telecommunication Engineering.

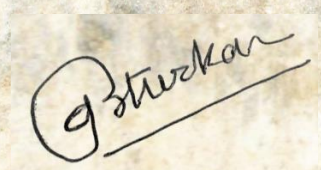
Our department is imparting the required technical and practical knowledge to the students. Electronics and Telecommunication department has always been a source of development may be its social, cultural or technical.

Launching **"ANKUR 2k21"**, a project idea book of Electronics & Telecommunication department is an attempt to be a part of global connection.

"ANKUR 2k21" would provide a platform for aspiring engineering to gain knowledge about the latest projects in the various upcoming domains of Electronics and Telecommunication Engineering.

The book contains project ideas, applications and student achievements in the field of research and publications and many more. We motivate and guide students to present/publish the research paper on successful completion of their projects in the reputed international conferences or journals.

We invite our readers to respond to the **"ANKUR 2k21"** with suggestions, criticisms and scope of improvement so that this book takes a genuine interactive shape.



Dr. Varsha Turkar, PhD (IIT Bombay)
IEEE Senior Member
Professor and Head,
Dept. of Electronics and Telecommunication Engineering
Don Bosco College of Engineering, Fatorda-Goa

DON BOSCO COLLEGE OF ENGINEERING GOA

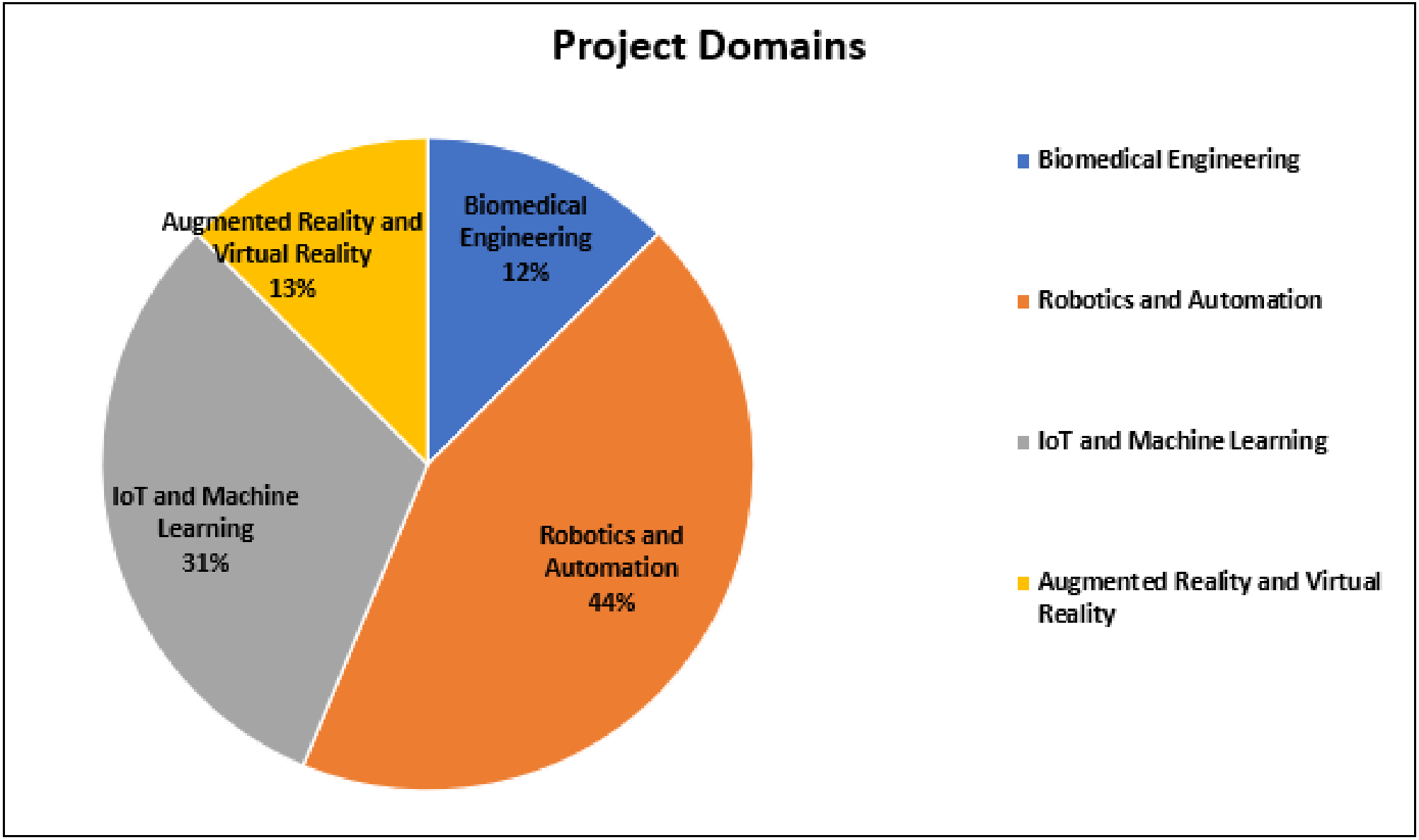
DEPARTMENT OF ELECTRONICS AND TELECOMMUNICATION ENGINEERING

2020 – 2021

"Ankur 2k21"

.....budding ideas

Concept and Guidance by: Dr. Varsha Turkar
Edited and Designed by: Asst. Prof. Priyanka Padiyar


Project Domains
Augmented Reality and Virtual Reality 13%
Biomedical Engineering 12%
IoT and Machine Learning 31%
Robotics and Automation 44%
Biomedical Engineering
Robotics and Automation
IoT and Machine Learning
Augmented Reality and Virtual Reality

CONTENTS

Non-Invasive Body Vitalities

Domain/Area of Interest: **Biomedical Engineering**

Project Members:

Mr. Suyog Borkar

Ms. Miti Gaunekar

Mr. Adarsh Mishra

Project Guides:

Mrs. Mathilda Colaco

Mrs. Anisha Cotta

Brief Idea of project:

People in current times suffer from several long-term health issues, creating a sense of self-consciousness amongst them to get a regular health check-up. Buying a device for each parameter separately is inconvenient and expensive. This demands a home-based health monitoring device that would monitor multiple body parameters at once. The proposed design aims at developing a single non-invasive device to measure different health parameters like blood glucose, blood pressure, and heart rate. The three said parameter kits are first individually constructed and combined into the final kit. Once combined the results are displayed onto an App with a user-friendly interface.

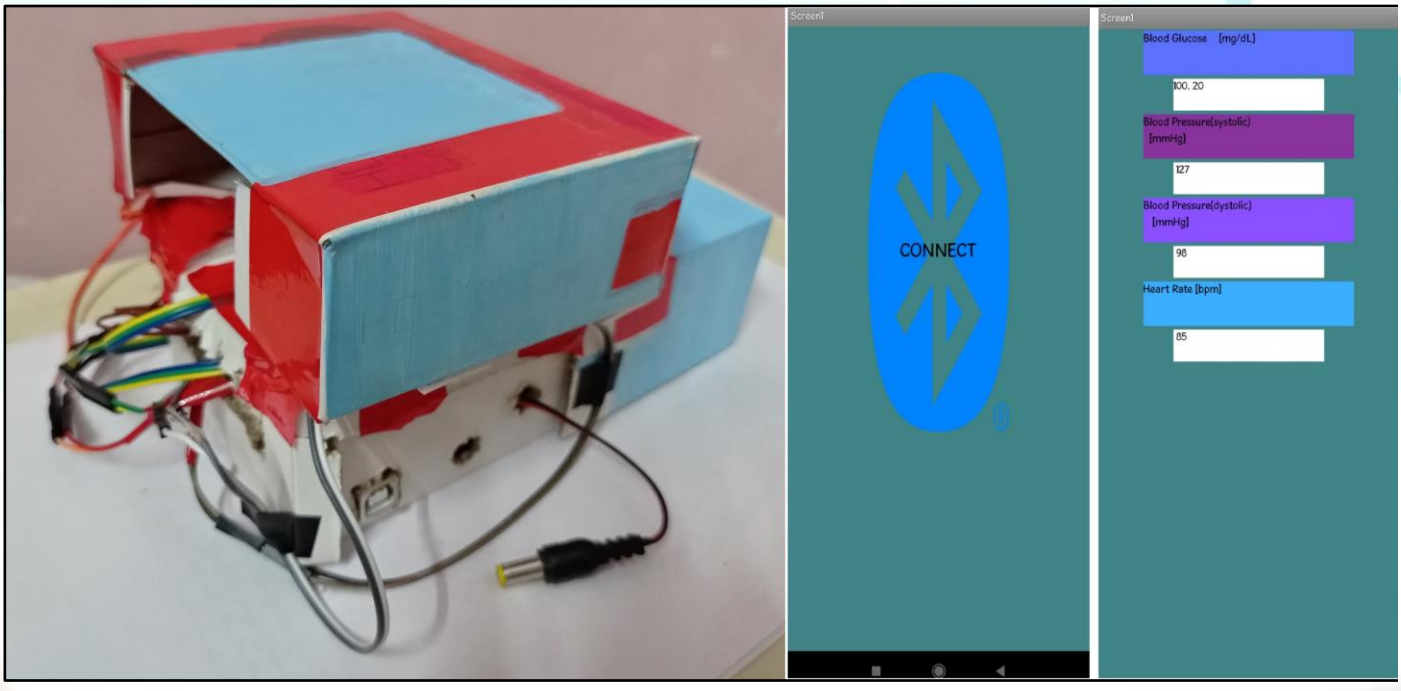
Applications:

1. Quick and precise checking of body parameter
2. Doctors can constantly monitor the patients under medical supervision, and keep themselves updated regarding the patient health.

Awards and Participation:

1. Received grants from GCCI
2. Participated in TECHNIX 2021- National Level Project Competition

Working Model



Ambulatory Blood Pressure Monitoring System

Domain/Area of Interest: **Biomedical Engineering**

Project Members:

Ms. Valini D'Silva

Mr. Gautam Desai

Ms. Krystal Fernandes

Mr. Velton D'Silva

Project Guides:

Mrs. Anisha Cotta

Mrs. Samantha Cardoso

Brief Idea of project:

The majority of India's population suffers from hypertension, cardiovascular diseases, and high blood pressure due to various reasonable changes in lifestyle. The affected mortality rate by the above factors can be decreased using a portable Ambulatory Blood Pressure Monitoring technology (ABPM). In our approach, we control and integrate this blood pressure monitoring system (using a pressure sensor) to an Arduino micro controller with IOT through the GSM module to send an SMS containing the patient's hourly BP reading to the doctor as well as storing it into the Doctor's server. Finally, we implement a machine learning algorithm to roughly if the patient is at the risk of suffering from hypertension and heart disorders in the near future.

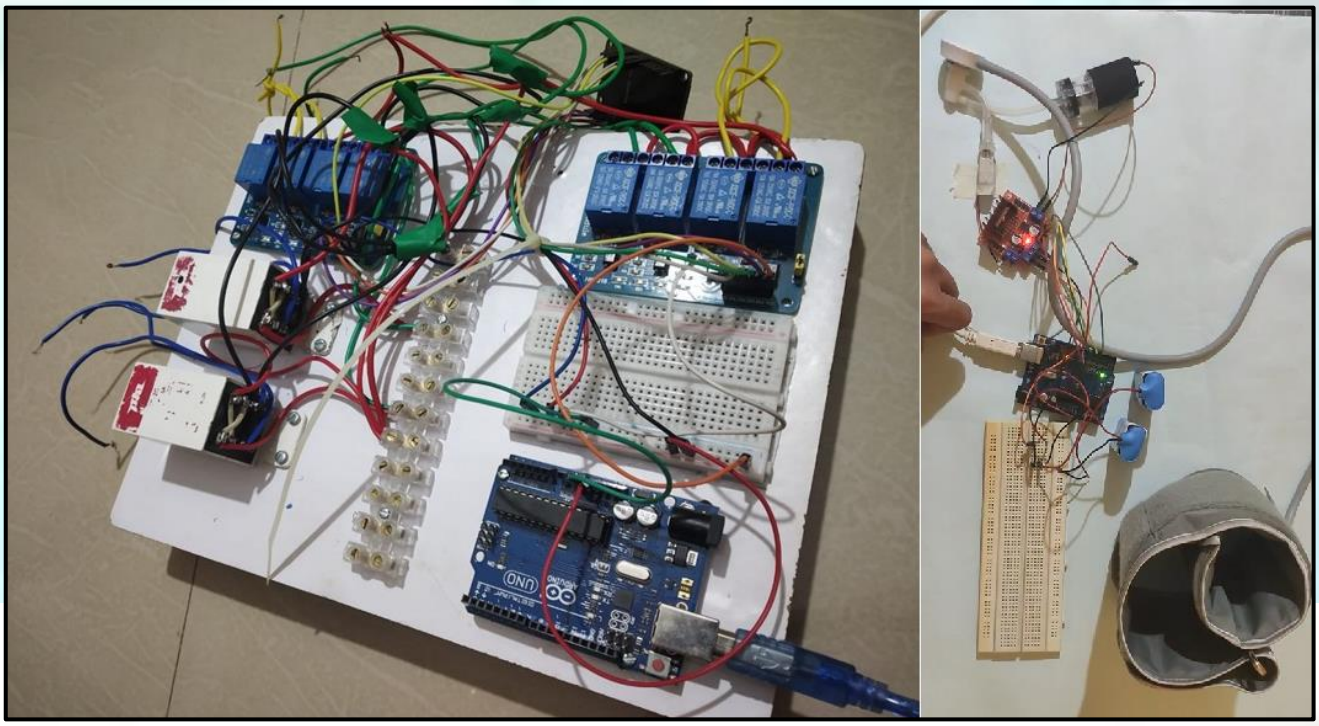
Applications:

1. To check patient is suffering from hypertension
2. In ICU, to constantly monitor BP of patient under care

Awards and Participation:

1. Paper accepted at ICECCME 2021, Mauritius
2. Received Prototyping Grant from Goa State Innovation Council
3. Participated in TECHNIX 2021- National Level Project Competition

Working Model:



Aquatic Multi-Purpose Robot

Domain/Area of Interest: **Robotics and Automation**

Project Members:

Mr. Nihal Sinai Sambhary

Mr. Yash Rege

Mr. Ryan Rodrigues

Project Guides:

Mr. Deron Rodrigues

Mrs. Melba D'Souza

Brief Idea of project:

Disposal of solid waste, non-treated industrial waste in various water bodies, affects water quality, causing water pollution. Cleaning the aquatic waste and continuously monitoring the quality of water efficiently and effectively is a challenging issue, thereby seeking some technological solutions. Multi-purpose aquatic robot is an IoT based system which helps us in collecting all the surface waste and from the water using conveyor belt mechanism. It makes use of wireless communication and various sensors to traverse automatically and collectively performs the cleaning and monitoring operation. The data acquired from the sensors is sent to the cloud. The system also includes a fish feeder and a weed cutting system along with the skimmer belt to take care of the oil spills. The system can collect trash weighing up to 8kg.

Applications:

Collection of solid waste, checking contamination level of water, cutting weeds in the water and Fish feeding

Awards and Participation:

Participated in TECHNIX 2021-National Level Project Competition

Working Model:

Design and Development of Snake Robot for Pipeline Inspection

Domain/Area of Interest: **Robotics and Automation**

Project Members:

Mr. Govindsingh Rathod

Ms. Madhavi Satarkar

Mr. Gajanan Sangodkar

Project Guides:

Mrs. Mohini Naik

Dr. D.S. Vidhya

Brief Idea of project:

Due to the complex inner geometry and hazardous content constraints of pipelines, robots can be used to test the corrosion, cracks and scale formation on inner surface of pipes. Snake robots can easily access wide range of pipelines from that in oil and gas industry to sewer pipes. The project focuses on design, development and working of a pipeline inspection snake robot (Slyder). Slyder consists of compact links (brackets) which allows them to maintain smooth motion inside the pipe. It is designed using servo motors, ESP32 camera, Arduino micro controller remote control, etc. The system also has the ability to record and display the online view on the employees monitor screen for effective observation, detection and quick analysis.

***Applications*:**

1. Due to its flexibility can move inside pipe providing inside scenario
2. Can detect cracks, blockages and corroded areas inside the pipe

Awards and Participation:

1. Participated in TECHNIX 2021- National Level Project Competition

Working Model:

Library Management Robotic System

Domain/Area of Interest: **Robotics and Automation**

Project Members:

Mr. Kinglsey Fernandes

Mr. Renvick Fernandes

Mr. Jhurran Francis

Project Guides:

Mr. Yeshudas Muttu

Mrs. Flavia Leitao

Brief Idea of project:

With ever growing technology and competition, there is a desire for doing work in less time, also considering economy in the equation. A library generally consists of thousands of books and there are two or three employees to arrange them. This project aims at minimizing the efforts required to arrange books in a library. The Library Management Robotic System (LMRS) will mitigate the problems by collecting the books from library counter and aims to automate the tasks involved; thus, making the system smart. This will minimize the time wasted for locating, issuing and returning books that will ensure the maintenance and count of the books. The robot will then locate the book in the library and issue it to the user.

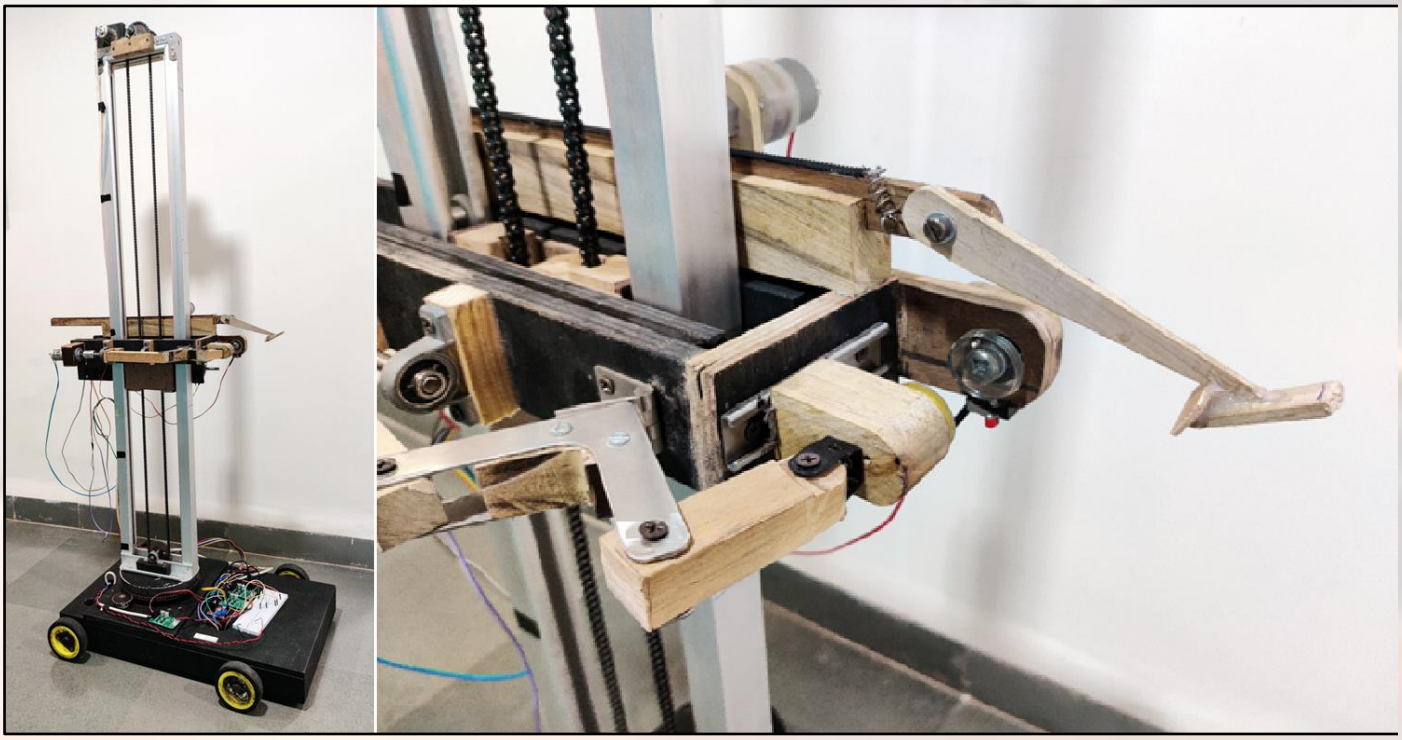
Applications:

1. Shopping Malls
2. Storage Warehouses

Awards and Participation:

1. Awarded Best Project at 5th National Level IEEE Project Competition, organized by GSSS Institute of Engineering and Technology for Women
2. Participated in TECHNIX 2021- National Level Project Competition

Working Model:



Autonomous Solar Tracking and Cleaning Mechanism with MPPT Charge Controller

Domain/Area of Interest: **Robotics and Automation**

Project Members:

Ms. Juella De Oliveira

Ms. Salome D'Costa

Ms. Pooja Phadtare

Project Guides:

Mrs. Melba D'Souza

Mrs. Mathilda Colaco

Brief Idea of project:

The advancement in technology has provided an alternative of fossils such as solar energy. The Solar Panel produces maximum energy when operated at Maximum Power Point (MPP) which varies due to change in environment and has to be tracked continuously using MPPT tracker. Maintenance of the panel is mandatory due to output drop caused by dust, dirt, bird droppings or pollen settled on the panels. In the existing system the panel is cleaned manually and is time consuming and requires a lot of labor. In the proposed system the work is done automatically. This project aims to increase the efficiency of the solar panel to its maximum by taking into consideration various factors and parameters along with the maintenance of the panel.

Applications:

1. Automatic cleaning mechanism proves more beneficial in situations where no man power is available for cleaning especially considering the height at which solar panels are installed
2. In situations of limited space, a small array of PV panels can be used to generate sufficient power

Working Model:

Sanitizing Robot

Domain/Area of Interest: **Robotics and Automation**

Project Members:

Mr. Vivek Khadilkar

Ms. Saeel Kamat

Ms. Drashti Naik

Project Guides:

Mrs. Michelle Araujo e Viegas

Mrs. Mohini Naik

Brief Idea of project:

COVID-19 has changed and impacted lives. Healthcare workers are more vulnerable to the infection being in frequent contact with affected individuals. To lower the burden on healthcare system and save human lives, we propose a project "SANITISING ROBOT". The two main features are UV light sanitization and Disinfectant spraying system which are used for indoor and outdoor sanitization respectively. The user can operate both the systems from 400-meter distance through wireless remote control. A camera on the robot will provide live stream to the user so that the robot can be controlled easily, an electric charger and solar panels are place on the robot to charge the battery.

Applications:

1. Reduces the risk of infection and cost of traditional cleaning methods
2. Sanitizes indoor as well as outdoor efficiently n effectively.

Awards and Participation:

1. Selected in top 24 projects at National Level at IMP 2021, IIT Hyderabad
2. Received grants from GSIC and DSTE, Goa
3. Participated in TECHNIX 2021- National Level Project Competition

Working Model:

Android Controlled Wildlife Observation Robot

Domain/Area of Interest: **Robotics and Automation**

Project Members:

Mr. Rohan Nayak

Mr. Manjunath Lamani

Mr. Klinsmann Costa

Mr. Shubham Gaude

Project Guides:

Ms. Kimberly Morais

Mrs. Trima Fernandes e Fizardo

Brief Idea of project:

The ability to trail wildlife in natural environment while remaining unexposed poses many technological challenges. Observing an animal's behavior in the wild can be daunting task for research purpose. The observer may have to wait for hours, days or months to record any unknown or unusual activity. The main aim of this project is to get a close footage of wild animals without the user having to go into wildlife in order to get a close footage. The ESP32 has an on-board camera. This allows the user to control the robotic vehicle wirelessly and get the desired angle. The video or photos can be captured and it can then be stored on SD card. We can gradually observe the activity that were held in forest lives.

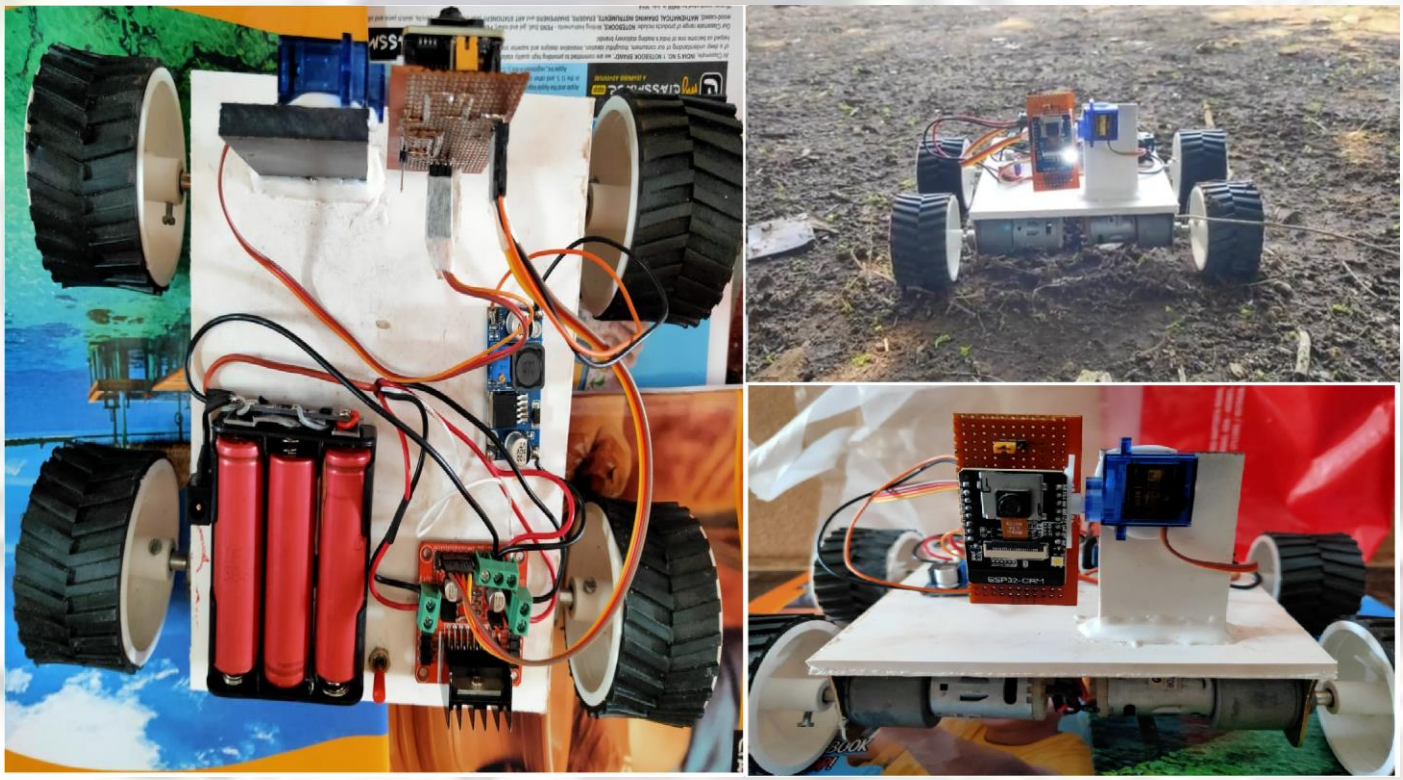
Applications:

Can be used as a wirelessly controlled surveillance system to monitor outdoor events during daytime and nighttime.

Awards and Participation:

Participated in TECHNIX 2021- National Level Project Competition

Working Model:



Automated Sanitary Napkin Dispenser

Domain/Area of Interest: **Robotics and Automation**

Project Members:

Mr. Viresh Rao Valaulikar

Mr. Siddhant Gurav

Mr. Shahil Ibrahim

Mr. Ninad Gaikwad

Project Guides:

Mrs. Trima Fernandes e Fizardo

Ms. Kimberly Morais

Brief Idea of project:

Menstrual hygiene is a subject matter of deep concern in India where women, especially rural areas face challenges in acquiring hygiene absorbents and develop health risks. To overcome this problem, we propose to develop and install an automated sanitary napkin dispenser in public places. In order to avoid hassles associated with cash, the conventional method is replaced by digital payment options. So, to mitigate the demand for both conventional and modern payment modes, we propose to implement a 2-way payment support system that accepts both coins and digital payments via UPI. This helps a lot during the current ongoing pandemic.

Applications:

1. In public places like educational or work institutions for dispensing sanitary pads
2. Ideal way for dispensing medical supplies in hospitals and public places

Awards and Participation:

Participated in TECHNIX 2021- National Level Project Competition

Working Model:

Classification of Land Cover Features for Urban Planning using PolSAR Images

Domain/Area of Interest: **IoT and Machine Learning**

Project Members:

Mr. Rahul Khotru

Mr. Musab Shaikh

Mr. Satyaswarup Banerjee

Project Guides:

Dr. Varsha Turkar

Dr. Shreyas Simu

Brief Idea of project:

Urban land use-land cover classification is one of the core applications in the field of remote sensing. The traditional methods which are used for urban mapping are time consuming. Instead, microwave remote sensing can be used to acquire data. The data can be further be processed to provide information on various classes like unplanned settlements, industrial zones and undeveloped forest area, water bodies and mangrove bio diversity and its complex ecosystem. Data can be acquired from various satellites like UAVSAR, ALOS-PALSAR and Sentinel. This project aims to develop a classifier using deep learning algorithms (semantic segmentation) which can aid city planners in decision making.

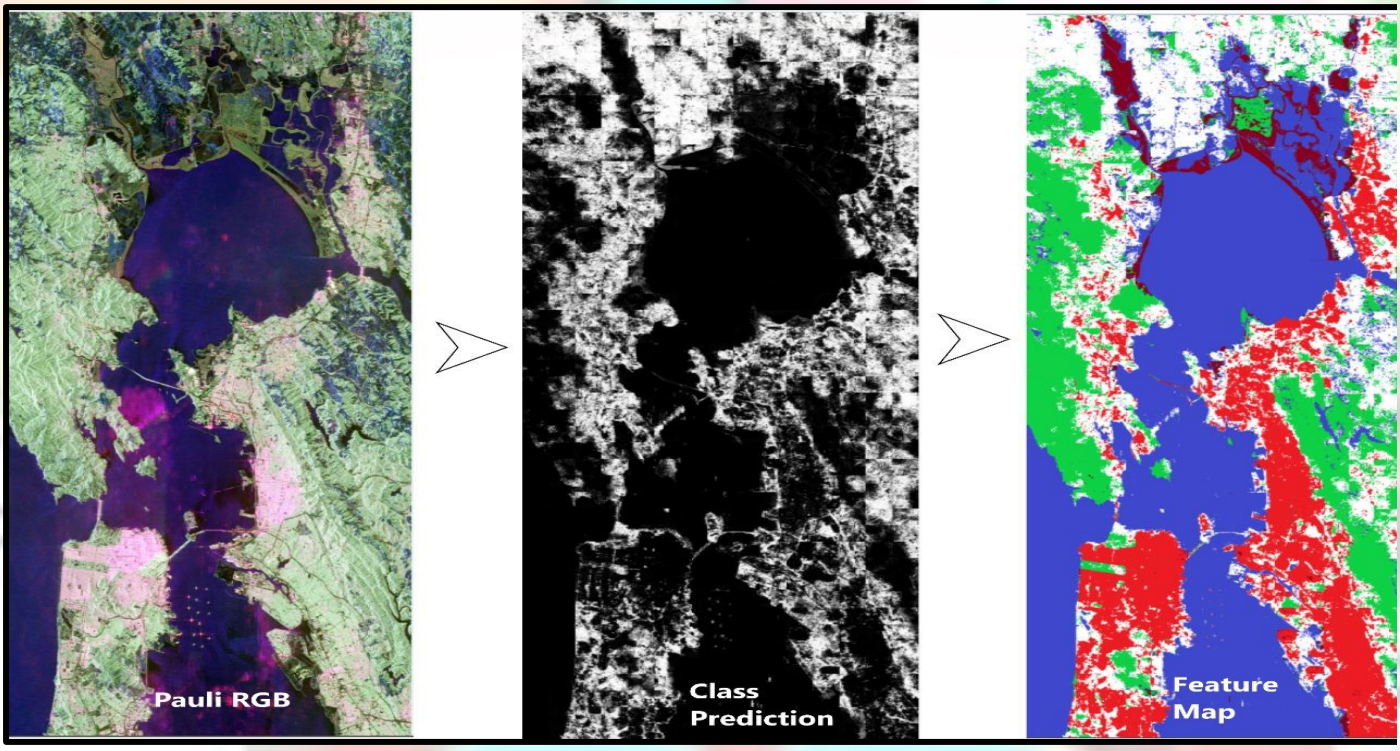
Applications:

Decision support system for City planners and Geo-scientists

Awards and Participation:

1. Paper published in IEEE conference IGARSS 2021
2. Participated in TECHNIX 2021- National Level Project Competition

Working Model:



Fish Quality Assessment System

Domain/Area of Interest: **IoT and Machine Learning**

Project Members:

Mr. Pavan Kalyan

Mr. Siddhant Kunde

Mr. Vaishabh Jalmi

Project Guides:

Dr. Varsha Turkar

Dr. Shreyas Simu

Brief Idea of project:

Fish is most popularly consumed in coastal areas of India. To cater the increasing demand for fish, illegal increase in adulteration of fish using chemicals (formaldehyde) for preservation has been observed. This could lead to several health issues, including cancer. The project presents an approach to analyze the quality of fish using a hardware/software interface. Fish quality analysis system will be able to detect presence of artificial formalin on fish, using HCHO sensor. Also, image processing and machine learning techniques will be used to classify fish into different family types and predict the fish freshness based on number of days after the catch.

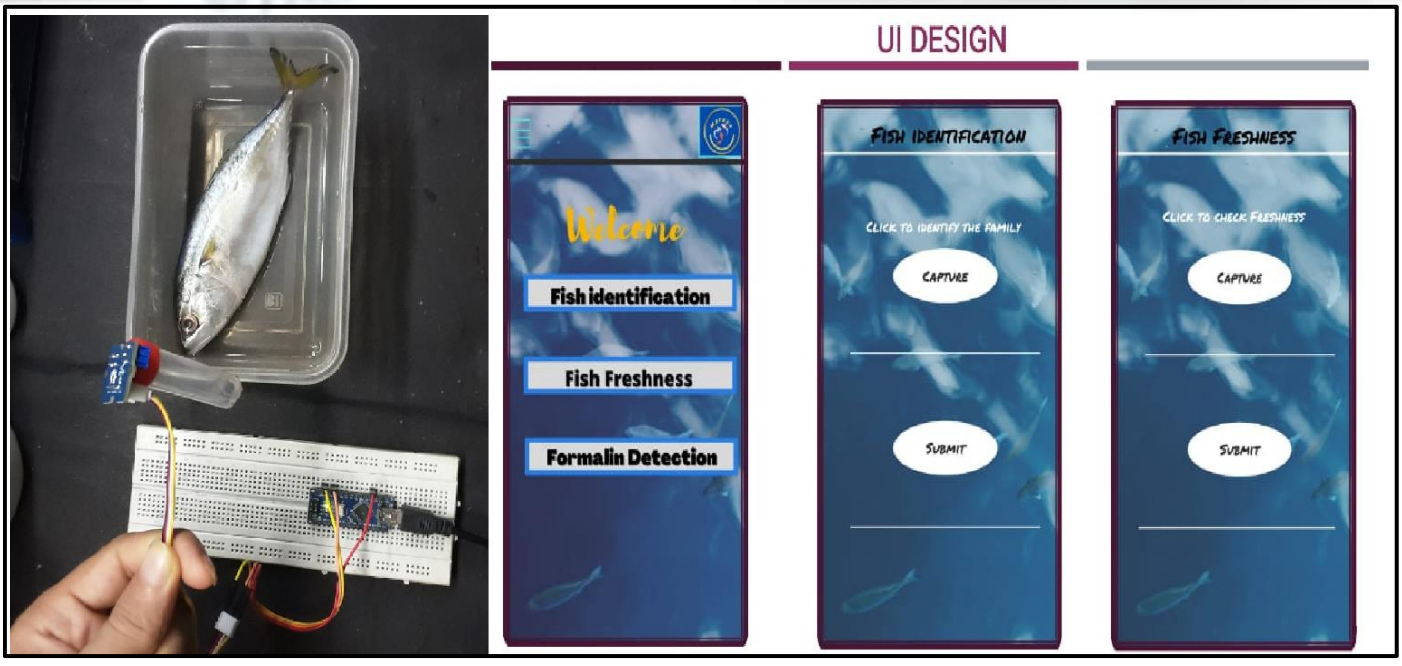
Applications:

1. Can be used by fisheries department for quality assessment of the fish
2. Can be easily used by locals and fish industries

Awards and Participation:

1. Received prototype grant from Goa State Innovation Council
2. Presented the project at Business Plan 2021 under IIC
3. Participated in TECHNIX 2021- National Level Project Competition

Working Model:



Water Pollution Monitoring and Decision Support System

Domain/Area of Interest: **IoT and Machine Learning**

Project Members:

Mr. Abhishek Dhumvad

Mr. Saurabh Prabhu

Mr. Stanford Da'Silva

Project Guides:

Dr. Shreyas Simu

Ms. Priyanka Padiyar

Brief Idea of project:

Fresh water management is one of the most important tasks since many health risks arise from consumption of contaminated water. Water quality is determined by assessing the physical, chemical, and biological parameters. In the proposed idea, these parameters are used to predict the water quality and spread of water pollution in industrial areas. The model consists of technologies such as IOT and Machine learning, along with sensors to measure the pH, turbidity, temperature and dissolved oxygen. The data collected from these sensors is stored in database through cloud platforms. Various Machine Learning algorithms are applied for analysis and prediction of water quality. Further on, water dispersion models are used to predict the dispersion of pollutants in the water body.

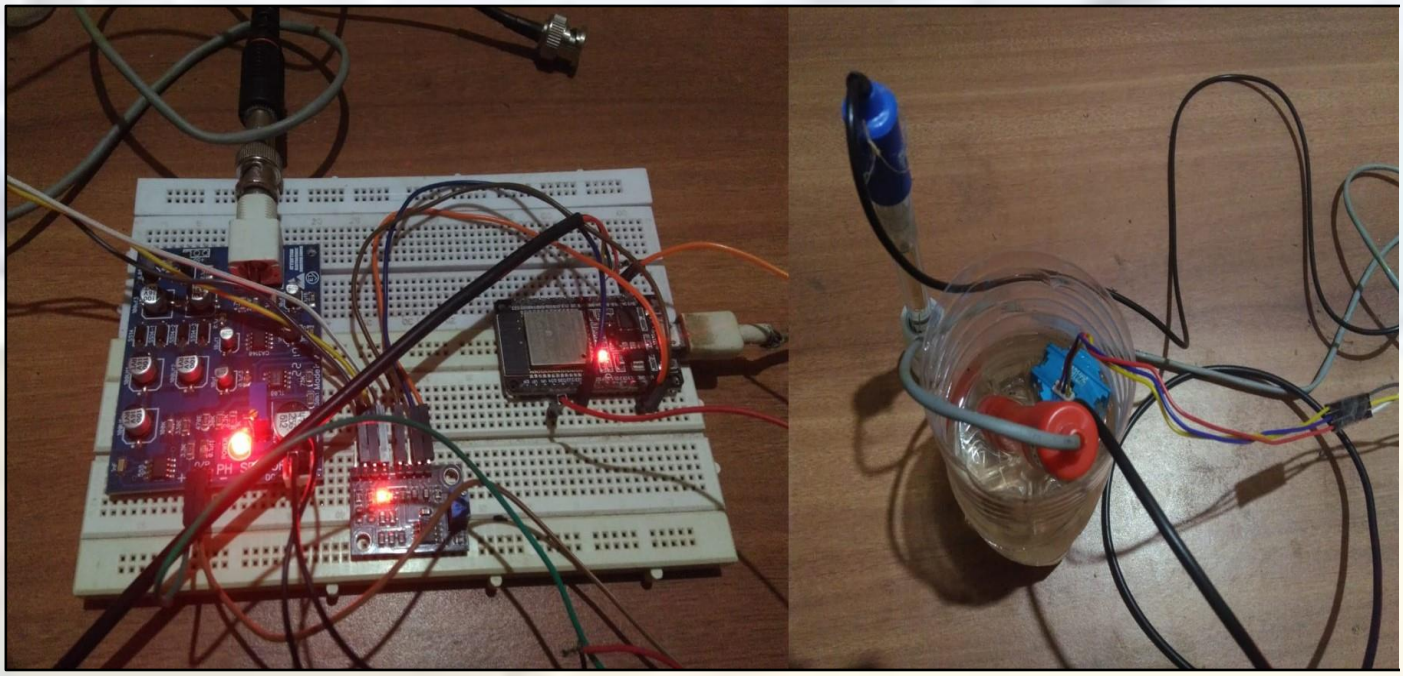
Applications:

1. Check the efficiency of waste water treatment plants, water purifiers, water quality of tanks installed in schools and colleges
2. Can be used in Agriculture and Aquaculture fields.

Awards and Participation:

Participation in TECHNIX 2021- National Level Project Competition

Working Model:



Hybrid Drone for Environmental Monitoring

Domain/Area of Interest: **IoT and Machine Learning**

Project Members:

Mr. Shashidhar S Kolur

Mr. Paresh Redkar

Mr. Vishwajeet Desai

Mr. Wasim Patwekar

Project Guides:

Dr. D.S. Vidhya

Mr. Yeshudas Muttu

Brief Idea of project:

The main aim of this project is to design a hybrid drone that will operate in all three mediums air, water, and land. This can save multiple machine power and make it efficient. UAVS provide information of situations where humans cannot access in situations like emergency, search and rescue operations and so on. The main purpose of the drone is to test soil and air samples for environmental monitoring. Testing includes harmful gas detection in air and measuring soil moisture or water level in it.

Applications:

1. Can test soil and air samples for environmental monitoring
2. Can be used in emergency, search and rescue operations

Awards and Participation:

Participated in TECHNIX 2021- National Level Project Competition

Working Model:

Object Recognition for Blind People using Camera

Domain/Area of Interest: **IoT and Machine Learning**

Project Members:

Mr. Sanket Naik

Mr. Sunil Patil

Mr. Sanmesh Gawade

Project Guides:

Mrs. Samantha Cardoso

Mrs. Michelle Araujo e Viegas

Brief Idea of project:

In today's world it is very essential for visually impaired people to detect and recognize objects which they face in their day-to-day life. There are many problems and hurdles faced by them in society in performing everyday routine works, the barrier of low vision does not let them to become active and efficient part of this society. In our project, we have used deep learning technique to counter this problem. We have used raspberry pi to implement our project. Deep learning which is also a part of machine leaning is used. Object recognition is a computer vision technique. It identifies the object which is seen in images and videos. It is one of the main applications of machine learning and deep learning. This field teaches machines to recognize the content of an image just like humans do.

Applications:

1. Can be used by blind people to identify objects
2. To keep track of objects in public places to avoid stealth

Awards and Participation:

1. Participated in TECHNIX 2021- National Level Project Competition

Working Model:

Augmented Reality based Online Shopping

Domain/Area of Interest: **Augmented Reality and Virtual Reality**

Project Members:

Ms. Simran Vernekar

Mr. Raj Kubal

Ms. Francy Cabral

Project Guides:

Mrs. Flavia Leitao

Mr. Selvyn Fernandes

Ms. Priyanka Padiyar

Brief Idea of project:

Online shopping represents an enormous market, but not reached its full potential. The cause for this is unable to try outfits, and view it in real time. We have proposed to develop an Augmented Reality interface allowing users to experience a visual representation of the product. A unique feature is the trial of clothes on user in all direction like a trial room, customizable dress color and size, 360-degree view of product, realistic feature of cloth in real-time and an interactive gesture control API. All these features are made possible for users with the mere presence of an Android mobile phone with good camera.

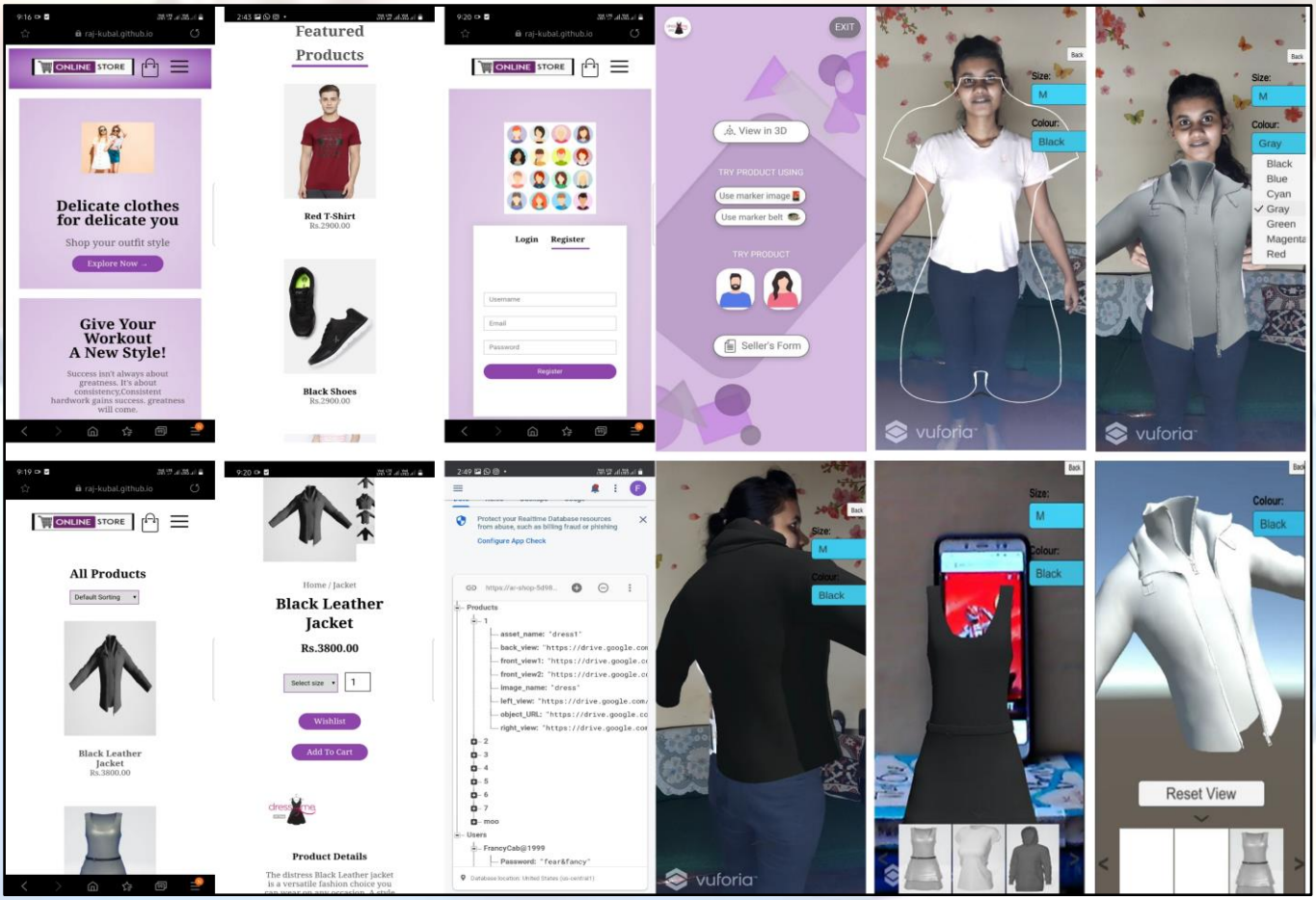
Applications:

1. Clothes can be tried virtually before placing an order
2. User can change the attributes of the clothes like color, size

Awards and Participation:

Participated in TECHNIX 2021- National Level Project Competition

Working Model:



Innovative Medium of Learning Using Augmented Reality

Domain/Area of Interest: **Augmented Reality and Virtual Reality**

Project Members:

Ms. Sapana Kambli

Ms. Lata Pawar

Mr. Joel Fernandes

Project Guides:

Mr. Selvyn Fernandes

Mr. Deron Rodrigues

Brief Idea of project:

Use of AR technology in a classroom can turn an ordinary class into an engaging experience by providing virtual examples to support textbook materials. An innovative medium of learning especially for engineering students, using Augmented Reality is proposed. Animated explanation on working 3D objects such as electronic gadgets, mechanical components and electronic circuits can be devised for this AR application to help students understand better. This AR application uses Android phone to blend digital content into the real world. From the experimental result, it is found that the system could overlay the digital information on the user's surrounding real world appropriately; thus, providing a better learning platform for them.

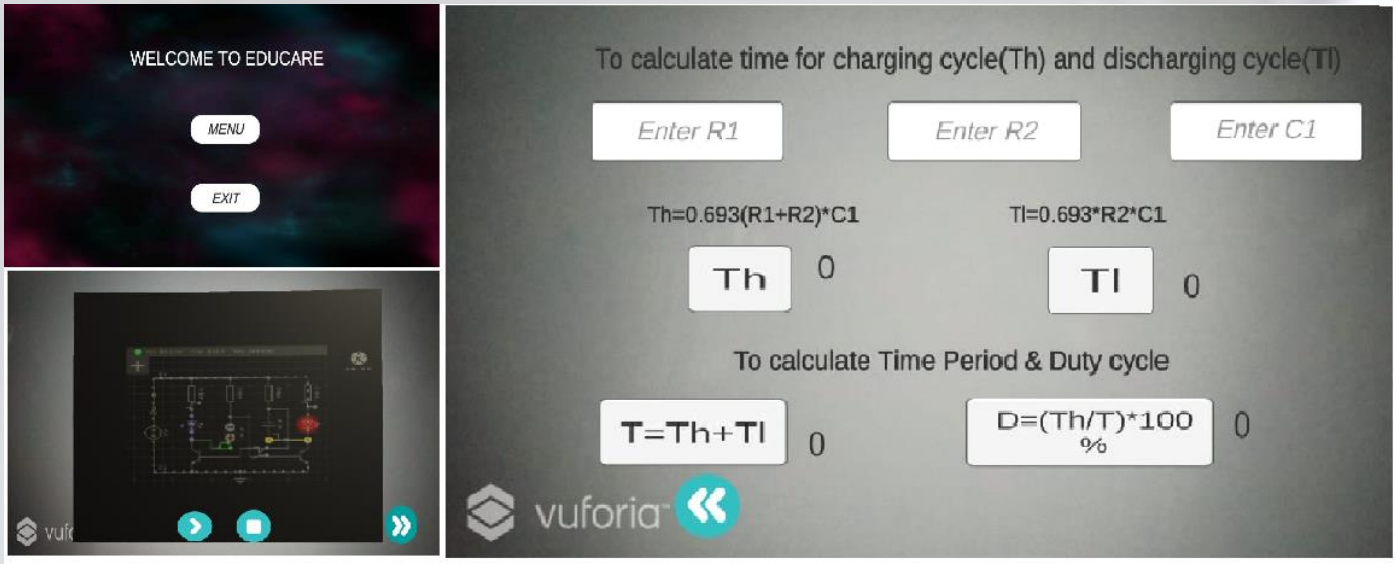
Applications:

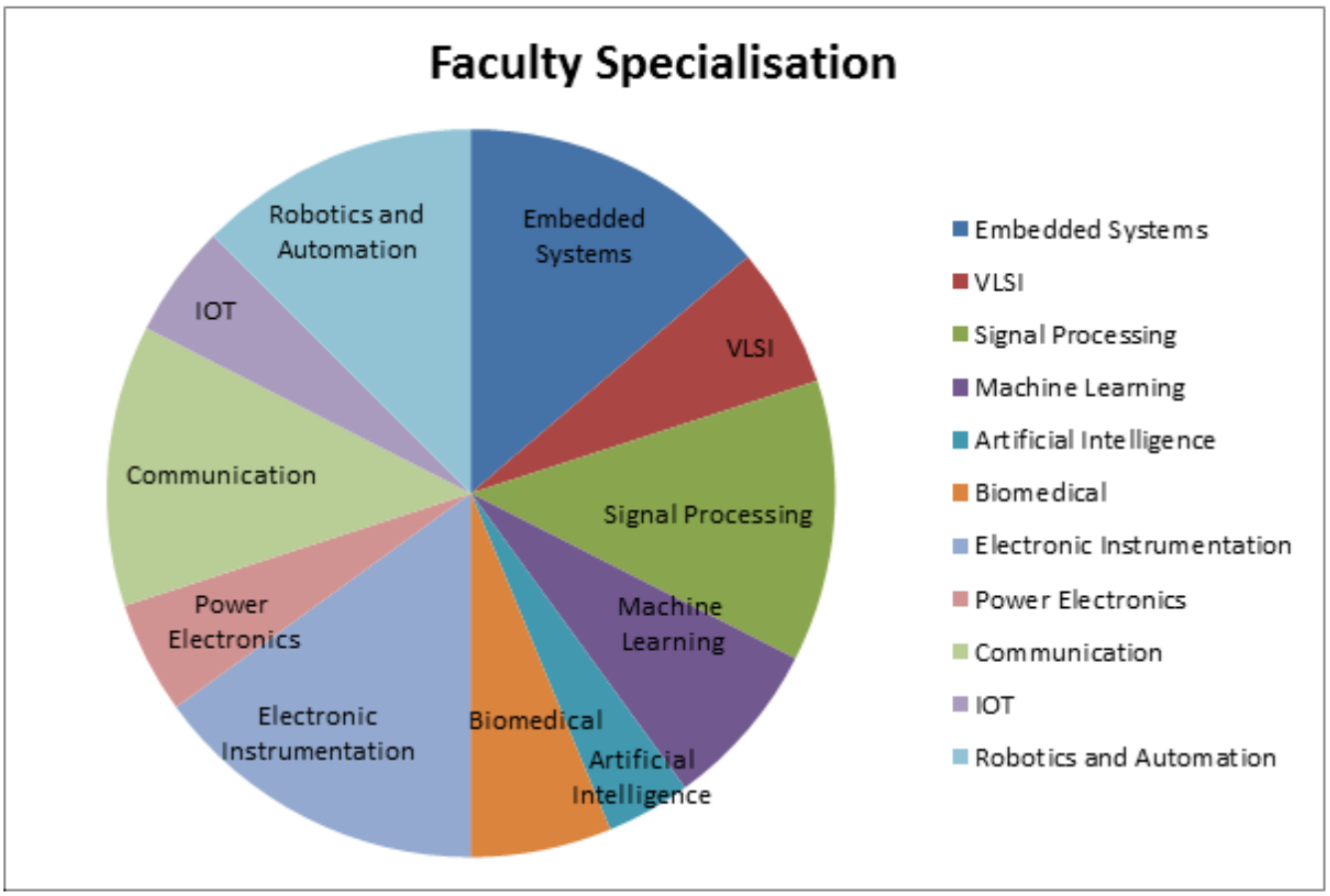
1. Virtual examples to support textbook materials especially for engineering students.
2. Animated explanation of circuits and calculator to calculate equations related to the circuit help students to understand better.

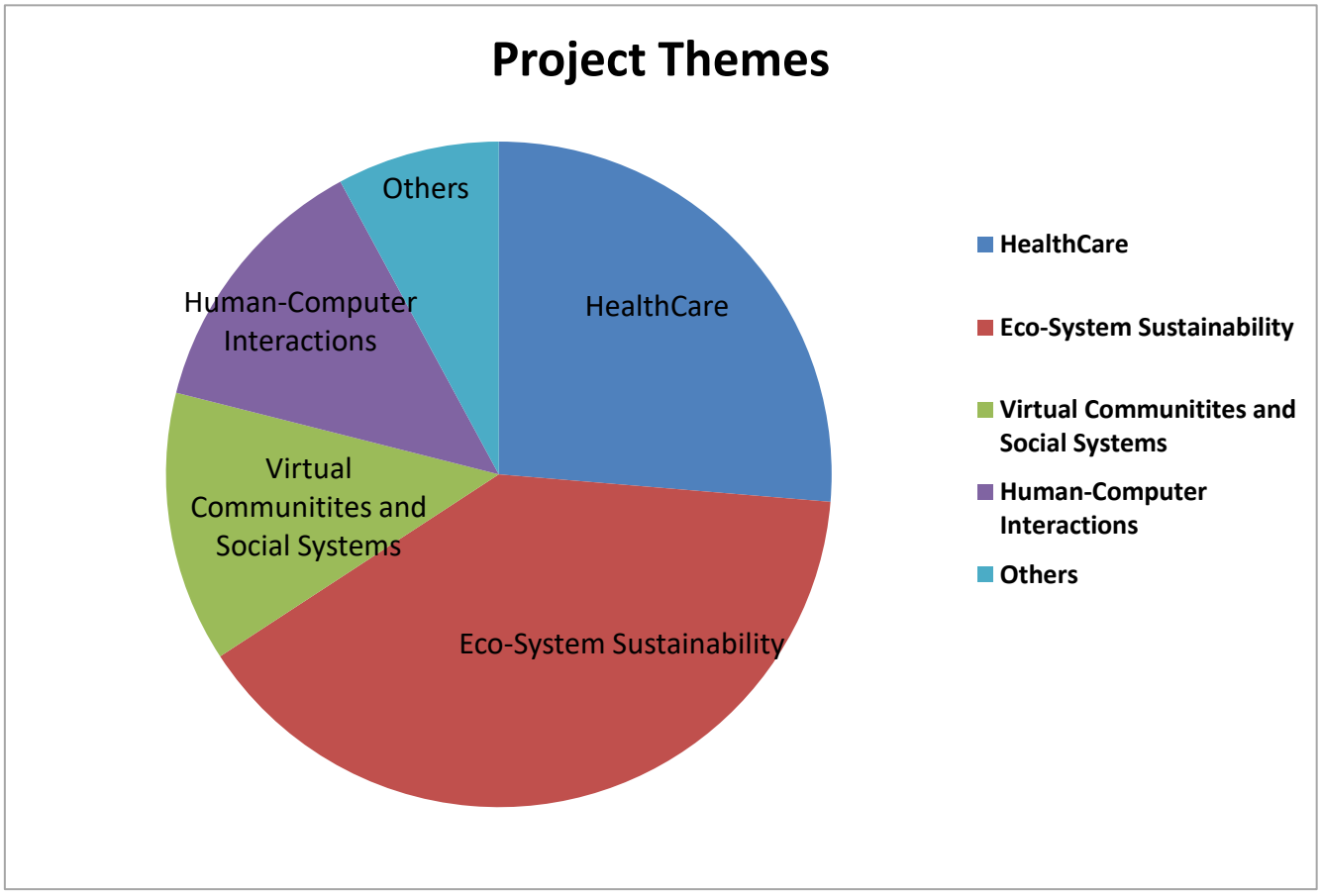
Awards and Participation:

1. First place at Internal Business Plan/Prototype competition 2021, held by IIC, DBCE
2. Participated in TECHNIX 2021-National Level Project Competition

Working Model:




Faculty Specialisation
Embedded Systems
VLSI
Signal Processing
Machine Learning
Artificial Intelligence
Biomedical
Electronic Instrumentation
Power Electronics
Communication
IOT
Robotics and Automation


Project Themes
HealthCare
Eco-System Sustainability
Virtual Communitites and Social Systems
Human-Computer Interactions
Others

BATCH: 2017-2021

DEPARTMENT OF ELECTRONICS AND TELECOMMUNICATION ENGINEERING

At a Glimpse

It gives me immense pleasure to present to you the second edition of “Ankur”-2021. Technology is changing at an unprecedented speed and could create a world we can barely begin to imagine. Ankur 2021 showcases the innovative ideas of our students and brings out the various technical and analytical skills of the budding engineers.

I would like to extend my heartfelt gratitude to our Director, Rev. Fr. Kinley D’Cruz for his unwavering support and motivation in all our endeavours. Special thanks to our Principal, Dr. Neena Panandiker for her continual encouragement. My gratitude goes out to our HOD, Dr. Varsha Turkar and her constant support and guidance. I feel proud to acknowledge the effort of all the faculty members of ETC Department who have painstakingly ensured the unsurpassed quality of every project.

I wish that Ankur 2021 establishes to be a flint to fire the enthusiasm and excite the minds for many innovations and inspire a passion for technology among the readers.

Asst. Prof. Anisha Cotta
Project Coordinator
Dept. of Electronics and Telecommunication Engineering

It is my privilege to have my short note penned down for this issue of our Project Idea Book.

I have been involved with student's project report documentation very closely. Right from providing a semester-long training in a Professional documentation tool: LaTeX, to solving doubts of each project group via Teamviewer, the journey has been a challenging but exciting one! I can proudly say that this time all our project reports are in the same format.

I appreciate all the students for showing a lot of interest in learning and getting trained in LaTeX. They are the ones who have converted my efforts into a perfect professional document.

Asst. Prof. Yeshudas Muttu
Final Year Project Report Incharge
Dept. of Electronics and Telecommunication Engineering

It gives me immense pleasure to introduce the project idea book for the academic year 2020-21 **“Ankur 2k21”,** a collection of innovative and remarkable software and hardware projects implemented by final year ETC students.

“Ankur 2k21” gives an insight into the projects in the latest and upcoming fields such biomedical, robotics, automation, augmented reality and virtual reality to pen down a few. It also highlights their work in research, publications and their participation in conferences and national level competitions.

It was an joyful experience to design this project idea book. I would like to appreciate and congratulate the students and their guides for their tremenduous effort even in these difficult times of the Covid-19 pandemic for successfully carrying out these projects.

I do hope that the next edition of Ankur will also showcase a myriad of such brilliant ideas.

Asst. Prof. Priyanka Padiyar
Project Coordinator
Dept. of Electronics and Telecommunication Engineering

DEPRTMENT OF ELECTRONICS AND TELECOMMUNICATION ENGINEERING
DON BOSCO COLLEGE OF ENGINEERING, FATORDA-GOA

VISION

To evolve into a Holistic Learning Hub, that molds technologically proficient engineers in the field of Electronics and Telecommunication; enhancing the global industry and society with Integrity, Ethics and Professionalism as envisaged by Don Bosco.

MISSION

- To impart education abreast with the advances in technology and transform students into globally accepted professionals.
- To foster networking with all stakeholders for promoting technical innovation, research and entrepreneurship.
- To encourage extra-curricular activities and instill high levels of work ethics and responsibility for a better society.