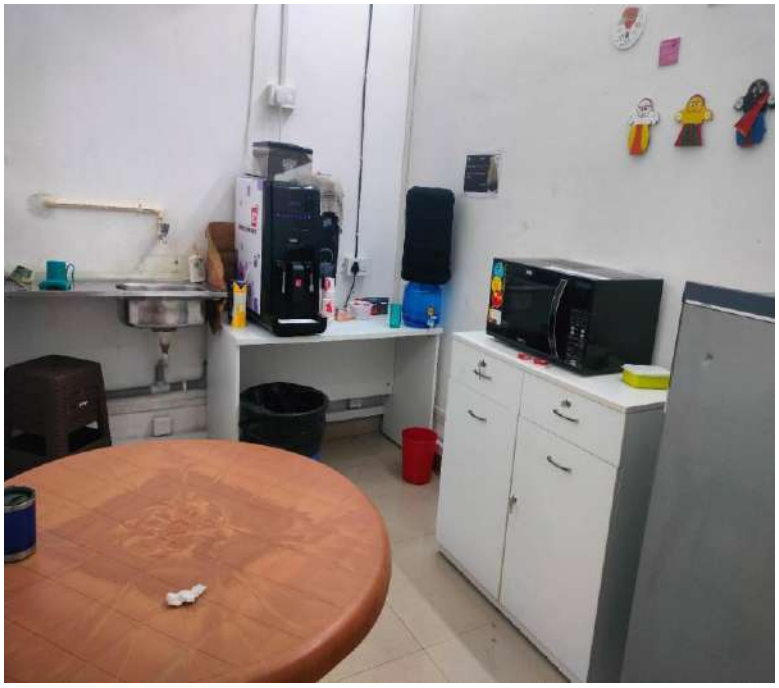
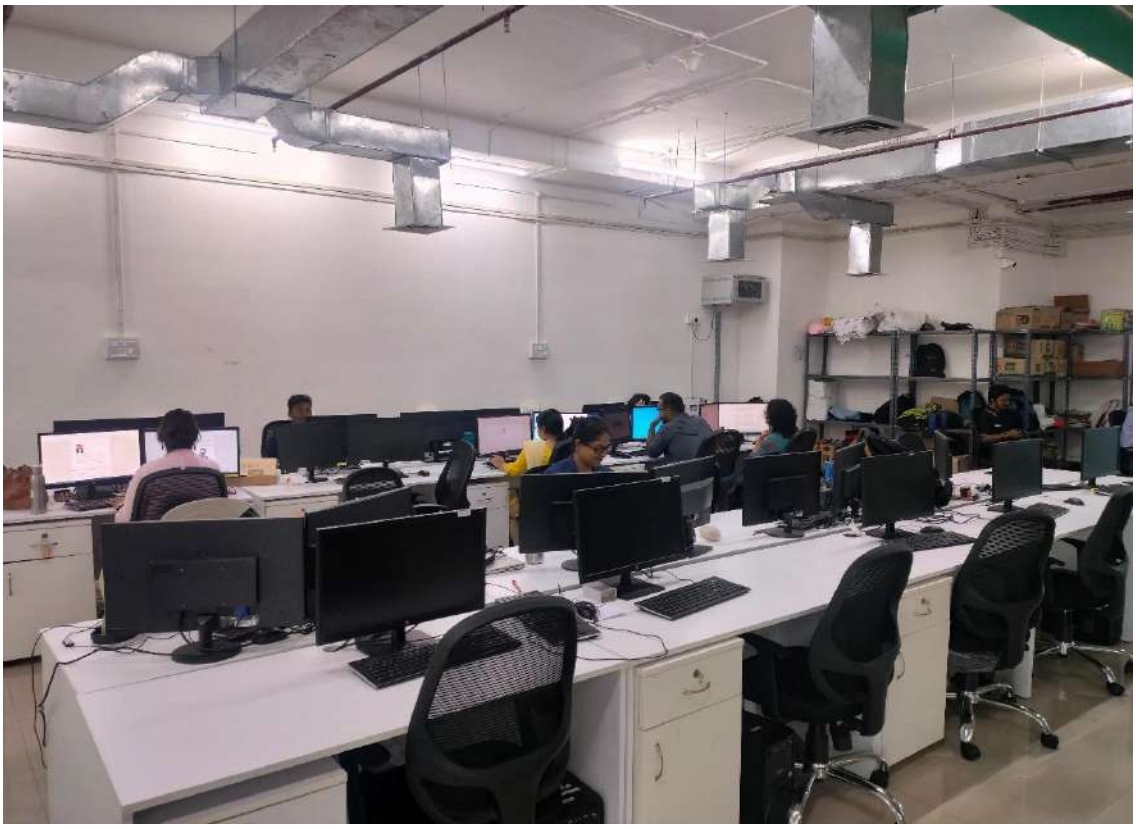
Innovation Ecosystem

INNOVATION & ENTREPRENEURSHIP DEVELOPMENT CENTRE (IEM)

CONFERENCE ROOM

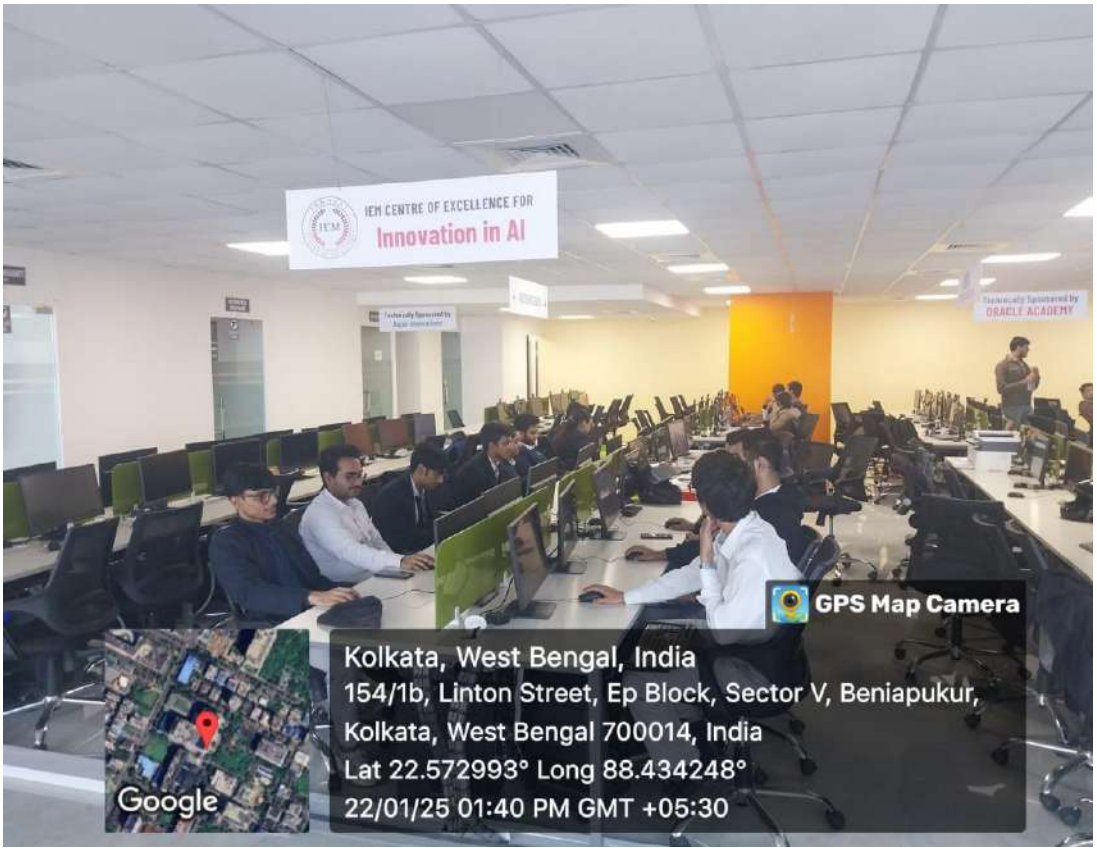
PANTRY





FACULTY & RESEARCHER'S ZONE

STUDENTS' RESEARCH ZONE



InnovAI centre of excellence

IEDC BCA

Centre of Excellence -IIFR

GREEN ZONE

INVENTORY

FIRE EXTINGUISHER

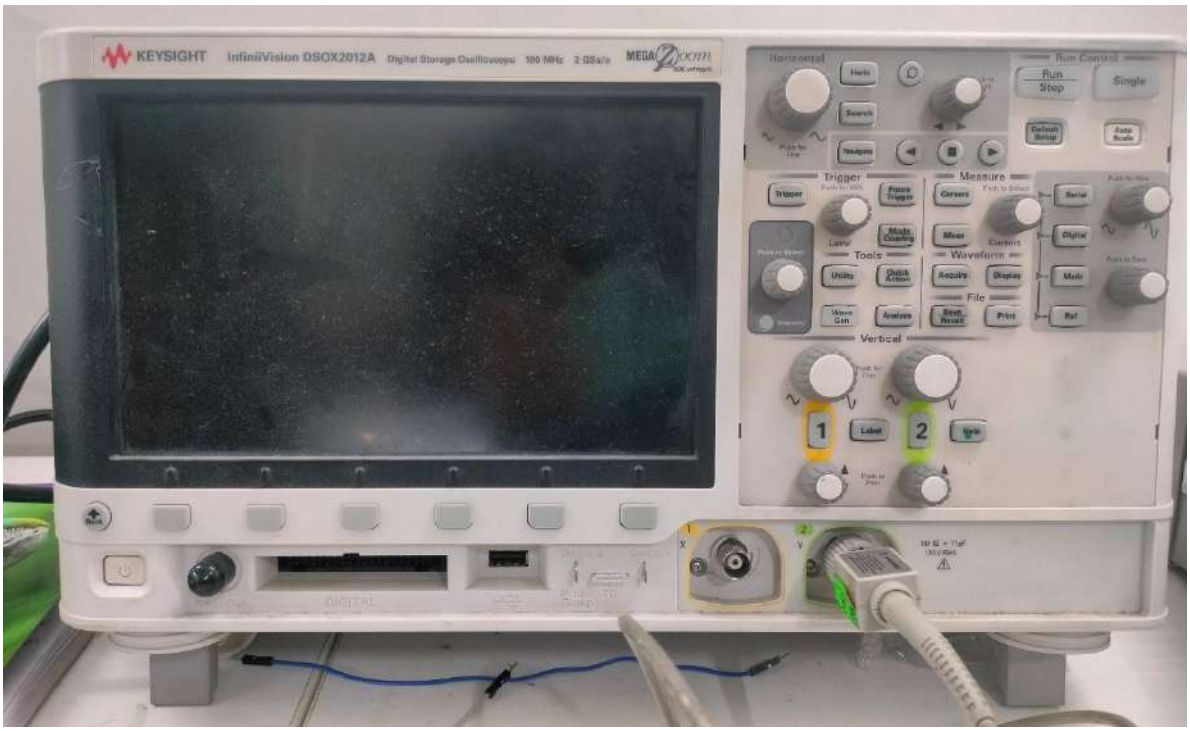
INSTRUMENTS

DC POWER SUPPLY

A DC power supply is a type of power supply that gives direct current (DC) voltage to power a device.

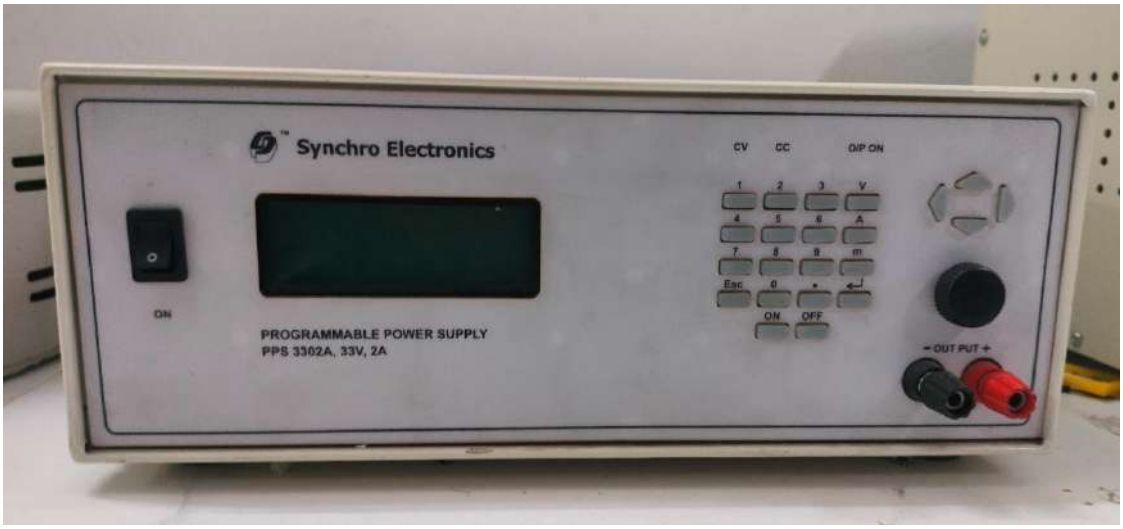
FUNCTION GENERATOR

A function generator is usually a piece of electronic test equipment or software used to generate different types of electrical waveforms over a wide range of frequencies**.**



DIGITAL OSCILLOSCOPE

A digital oscilloscope is an electronic device consisting of numerous software and electronic hardware modules that work together to capture, process, view and store data representing the relevant signals of an operator.



PROGRAMMABLE POWER SUPPLY

A programmable power supply (PPS) is one that allows remote control of its operation through an analog input or digital interface such as RS-232 or GPIB.

SOLDERING STATION (SMD)

A soldering station is a multipurpose power soldering device designed for electronic components soldering.

SOLDER STAND

Soldering iron stands and stand accessories are used to hold a hot iron when not in immediate use.

SOLAR CHARGE CONTROLLER

A solar charge controller or charge regulator is basically a voltage and current regulator to keep batteries from overcharging by using solar energy.

DRILL MACHINE

A Drilling Machine is a type of production machine in which works are to drill the workpiece**.**

SMD HEATING PLATE + BLOWER

A SMD heating plate is a device that is used for soldering SMD components to the PCB by means of heat transfer.

12V 10A POWER SUPPLY

It is a type of power supply which has its output specified as 12V and 10amp.

COPPER WOOL

Copper wool is used as heat conductive packing material, in ventilators, polishing for soft surfaces.

SMD REWORK STATION

SMD rework station is used for soldering and de-soldering of integrated circuit (IC) parts or chips and Ball Grid Array (BGA).

SLIDING POTENTIOMETER

It is potentiometer that is adjusted by sliding the wiper left or right (or up and down, depending on the installation), usually with a finger or thumb.

ELECTRIC SCREW DRIVER

Electric screwdrivers are portable electric devices used for driving (and removing) screws effortlessly.

3D PRINTER

A 3D printer is a type of material design printer that designs and builds 3D models and products of devices and components using an additive manufacturing process.

PROJECTOR

Projector is a device that is used to project rays of light, especially an apparatus with a system of lenses for projecting slides or film on to a screen.

Project Title: IOT BASED FIRE EXTINGUISHER

Description: This is a smart fire extinguisher which can be triggered automatically from any location using the help of internet. Preventing the spread of fire.

Image:

IOT BASED FIRE EXTINGUISHER

Project Cost: 1500/-

Project Duration: Jan 2022- Feb 2022

Faculty Pi: Souhridya Bhattacharjee, Dibakar Roy Choudhury

Project Title: LAKSHMAN REKHA SHEILD

Description: This is made for defence purpose. This sheild is electrically charged giving an output voltage of 2500v. This sheild is designed for controlling huge crowds and riots while keeping police officials safe.

Image:

LAKSHMAN REKHA SHEILD

Project Cost: 1000/-

Project Duration: Sep 2022- Oct 2022

Faculty Pi: Dibakar Roy Choudhury, Souhridya Bhattacharjee

Project Title: ATMOSPHERIC WATER GENERATOR
Description: This is a system which produces water from air using compressor. This system can produce water in remote areas depending upon the humidity and weather condition of the specific area.

Link: https://youtu.be/rxJzqlLHSnc

ATMOSPHERIC WATER GENERATOR

Project Cost: 3000/-

Project Duration: Jul 2022- Oct 2022

Faculty Pi: Souhridya Bhattacharjee, Dibakar Roy Choudhury

Project Title: DEVELOPMENT OF SMART ARDUINO BLIND STICK

Description: It is an Arduino-based stick that uses ultrasonic sensors to warn a blind person of upcoming obstacles; it has GPS and GSM modules incorporated for emergency message calling and a water sensor to detect water. It can enhance the protection and enhance the lives of blind people.

Link: https://youtu.be/JXvOXV-MEts

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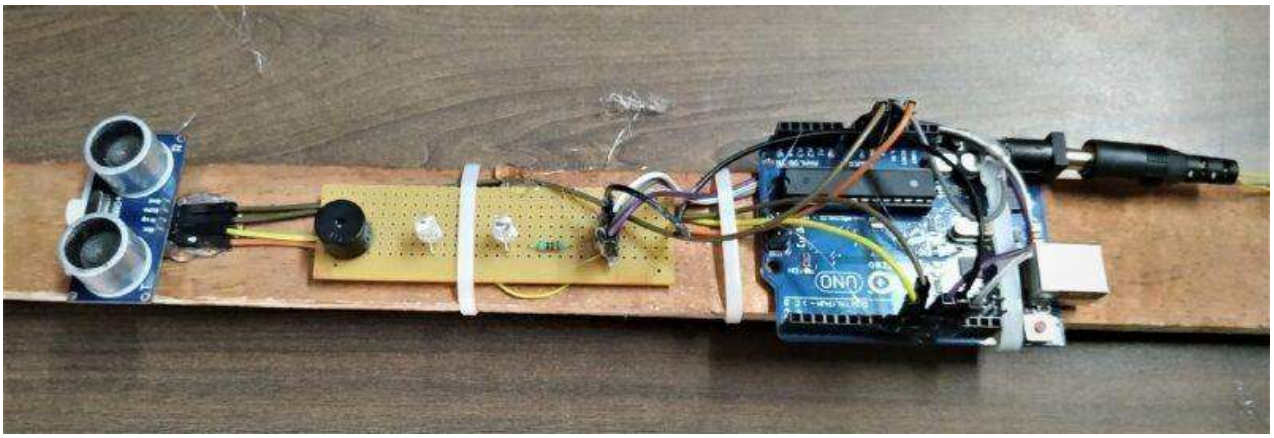


DEVELOPMENT OF SMART ARDUINO BLIND STICK

Project Cost: 1000/-

Project Duration: Jan 2022- Feb 2022

Faculty Pi: Dibakar Roy Choudhury

Student Pi: Sayak Sarkar

Project Title: SMART GARDENING

Description: We can check soil moisture, Temperature and humidity by this device and get all this information in our mobile phone and control the water flow to our plants via our mobile.

Image:

SMART GARDENING

Project Cost: 1500/-

Project Duration: Feb 2022- Mar 2022

Faculty Pi: Dibakar Roy Choudhury

Student Pi: Debanjan Dhara

Project Title: ANTI-TREMOR BAND WITH TREMOR STAGE PREDICTION

Description: This device/model thus created is a significant development over the conventional means of controlling tremors and identifying the stage of the tremor according to the patient's nervous system. The primary purpose of this band is to stabilize the handshaking and detect the stage of the tremor using a machine learning algorithm.

Image:

ANTI-TREMOR BAND WITH TREMOR STAGE PREDICTION

Project Cost: 3000/-

Project Duration: Sep 2022- Nov 2022

Faculty Pi: Asmita Biswas, Souhridya Bhattacharjee, Dibakar Roy Choudhury

Project Title: HUMANOID ROBOT

Description: Our project is in the first Phase of humanoid robot. It is an interactive AI based robot, which has the feature of locomotion and greet people with user detection. Here we have used embedded system and Computer vision with machine learning.

Image:

HUMANOID ROBOT

Project Cost: 50,000/-

Project Duration: Sep 2022- Nov 2022

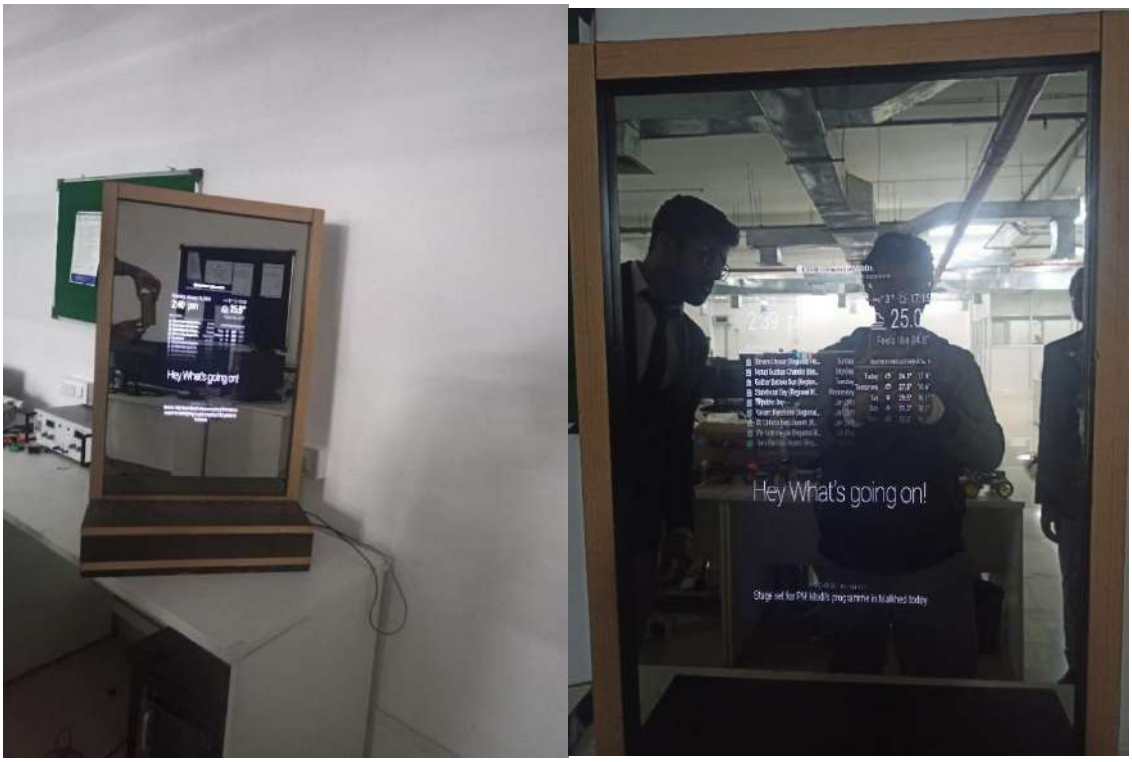
Faculty Pi: Souhridya Bhattacharjee, Dibakar Roy Choudhury

Student Pi: Arpan Goswami, Saptarshi Sen

Project Title: **SMART MIRROR**

Description: A smart mirror is a mirror with integrated technology such as a screen, and internet connectivity. The screen can display a variety of information, such as the time, news, weather, and upcoming holidays. With the ability to connect to the internet, the mirror can also display information from other sources, like social media updates or calendar events. The smart mirror can be used in various settings, such as homes, hotels, and offices, to provide useful and convenient information at a glance.

Image:



SMART MIRROR

Project Cost: 25,000/-

Project Duration: Sep 2022- Nov 2022

Faculty Pi: Sourab Ghosh

Student Pi: **Uday Shankar Mukherjee**

Project Title: ELECTRIC CYCLE

Description: E-bikes are categorized based on the amount of power that its electric motor is capable of producing and the control system, or when and how the motor's power is applied. Rechargeable batteries, electric motors, and some kinds of control are all included in e-bikes. There are several types of battery systems in use, including sealed lead-acid (SLA), nickel-cadmium (NiCd), nickel-metal hydride (NiMH), and lithium-ion polymer batteries (Li-ion).

Image:

ELECTRIC CYCLE

Project Cost: 20,000/-

Project Duration: Sep 2022- Nov 2022

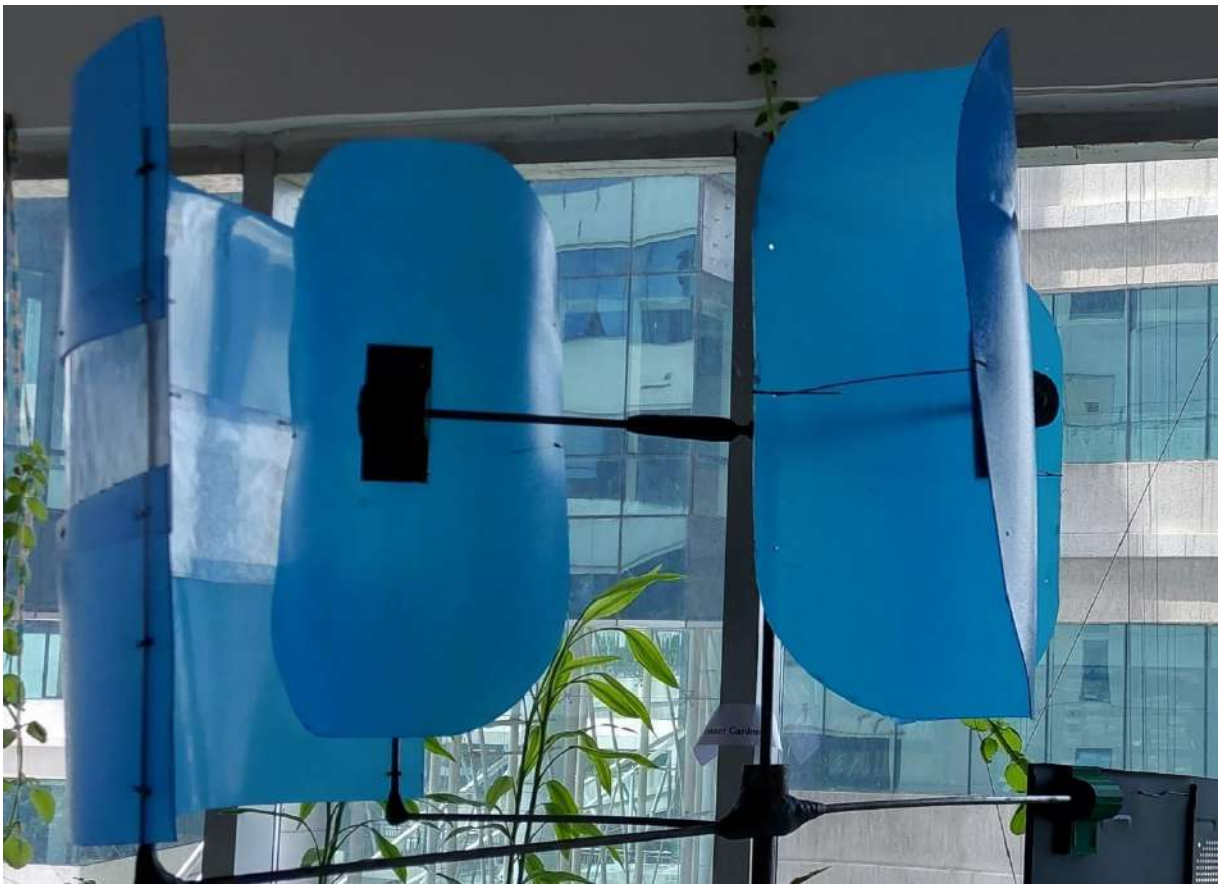
Faculty Pi: Souhridya Bhattacharjee

Student Pi: **Spandan Sarkar**

Project Title: **HYBRID MODULAR TREE FOR GREEN ENERGY GENERATION**

Description: The presented structure is a low-cost hybrid modular tree that can be used for generating electrical energy. The presented tree can be fitted to the rooftop of any skyscraper and countryside locations pertained by nominal wind speed and solar irradiation. Initially, it has the capacity to generate 25 W DC and it can be further enhanced using more efficient solar modules. Moreover, the vertical structure of the wind turbine makes it more reliable to produce wind power irrespective of the wind direction. As a future scope, this structure can be further modified and widely manufactured to generate more green energy at a large scale.

Image:



HYBRID MODULAR TREE FOR GREEN ENERGY GENERATION

Project Cost: 50,000/-

Project Duration: Nov 2022- Present

Faculty Pi: Priti Das, Arghya Roy

Project Title: MACHINE OVERHEAT DETECTOR WITH ALERT

Description: This proposed system is used to detect temperature of devices that are overheated. This project is very beneficial, especially in places like factories or industries consisting of big machines where it is very necessary to take some action in case the machine is overheated. The system uses a digital temperature sensor in order to detect temperature and pass on the data to the microcontroller. The Atmega 328 microcontroller processes data and sends the temperature to be displayed on an LCD screen. The system uses a 12VDCadaptor to supply power to the system. We can set a limit to the temperature and in case if the system exceeds the temperature limit, an alarm rings to indicate that the system has exceeded the set temperature.

Image:

MACHINE OVERHEAT DETECTOR WITH ALERT

Project Cost: 8,000/-

Project Duration: Dec 2022- Jan 2023

Faculty Pi: Asmita Biswas

Student Pi: **Sayan Bardhan**

Project Title: AERIAL FOREST RANGER

Description: A new drone technology has been developed to aid in conservation efforts and forest fire detection. The drone is equipped with cameras and sensors that can capture live video feeds of animals and detect forest fire signs such as smoke and high temperatures. In case of a fire, the drone can quickly locate the source and transmit the information to the authorities. This technology makes it an efficient tool for monitoring wildlife and protecting natural habitats while providing an early warning system for forest fires.

Image:

AERIAL FOREST RANGER

Project Cost: 20,000/-

Project Duration: Dec 2022- Jan 2023

Faculty Pi: Sourab Ghosh

Student Pi: **Nirban Roy**

Project Title: AIR QUALITY REGULATOR

Description: The air in sucked into the air chamber where the gas sensors detect the parameters of the atmospheric air. The parameters are displayed on the Blynk-IOT app with the help of the data streams. The air is then filtered and then again, an MQ135 sensor measures its quality. The air is then sucked out of the air chamber. The voltmeter measures the voltage at all times so as to monitor the voltage. Thus, is to ensure that the voltage does not surpass the limit upto which the components can work efficiently.

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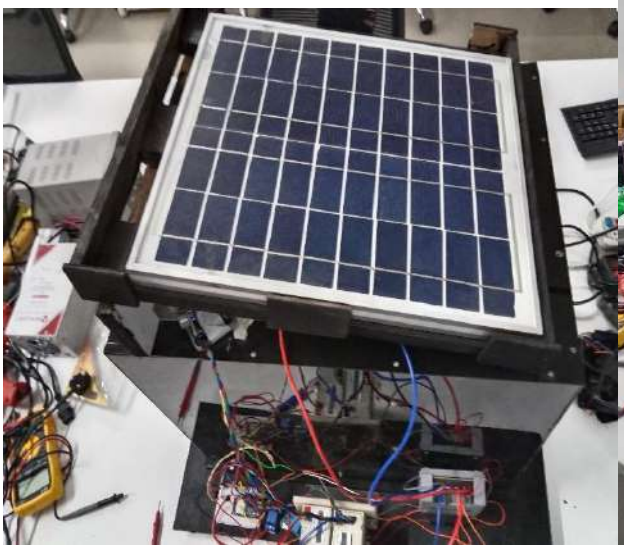
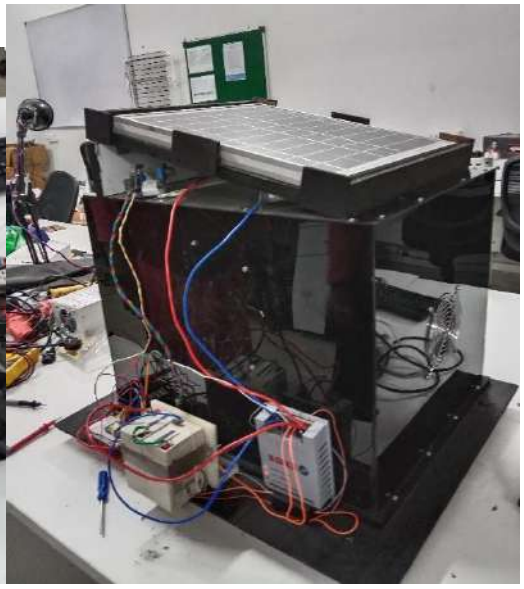




AIR QUALITY REGULATOR

Project Cost: 15,000/-

Project Duration: Nov 2022- Jan 2023

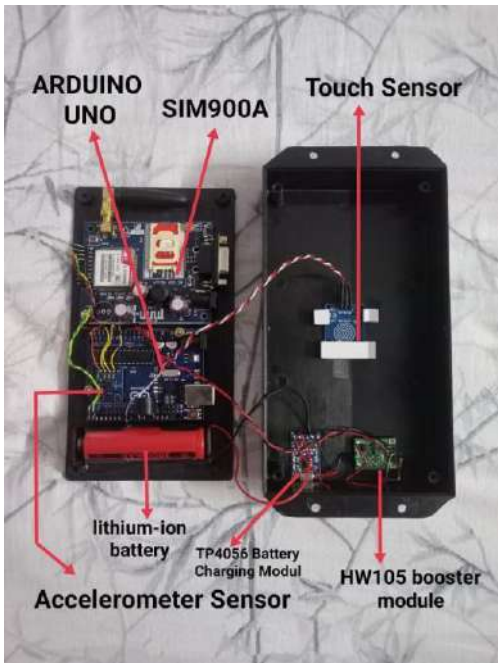
Faculty Pi: Ayan Kumar Ghosh

Student Pi: **Soumanka Sarkar**

Project Title: EMERGENCY PROTECTION FOR WOMEN'S SAFETY

Description: Women are less safe and face several security-related difficulties in the modern world. They must endure a variety of trying circumstances and consistently demonstrate their mettle under pressure. Therefore, the government has given social security through laws and regulations for their security and safety purposes. Despite the fact that there are many systems already in place for security purposes, the need for sophisticated smart security systems is growing. A smart security system for women is created to address these issues. This project uses an Arduino controller and sensor to create a safe and secure electronic system for women. In this project, an accelerometer, GSM, and GPS are utilized. The gadget uses an accelerometer to detect movement when the ladies are in danger. The gadget activates when the sensor exceeds the threshold limit and uses the GPS module to determine where the victim is. The victim's location is sent to the registered contact number via the GSM module.

Image:



EMERGENCY PROTECTION FOR WOMEN'S SAFETY

Project Cost: 7000/-

Project Duration: Jan 2023

Faculty Pi: **Trisha Paul**

Student Pi: Siddhartha Bhattacharjee

Project Title: MOTORIZED SKATEBOARD

Description: A motorized skateboard, also known as an electric skateboard, is a cutting-edge personal transportation device that combines the thrill of skateboarding with the convenience and efficiency of electric propulsion. It is equipped with an electric motor and a rechargeable battery pack, which powers the skateboard and eliminates the need for pushing or kicking off the ground. Motorized skateboards offer a thrilling and eco-friendly alternative for short-distance commuting and recreational riding. They provide the freedom and excitement of traditional skateboarding while adding the convenience and ease of electric power, making them a popular choice for urban commuters, adventure enthusiasts, and skateboarders looking for an electrifying twist.

Image:

MOTORIZED SKATEBOARD

Project Cost: 22000/-

Project Duration: Feb 2023- Mar 2023

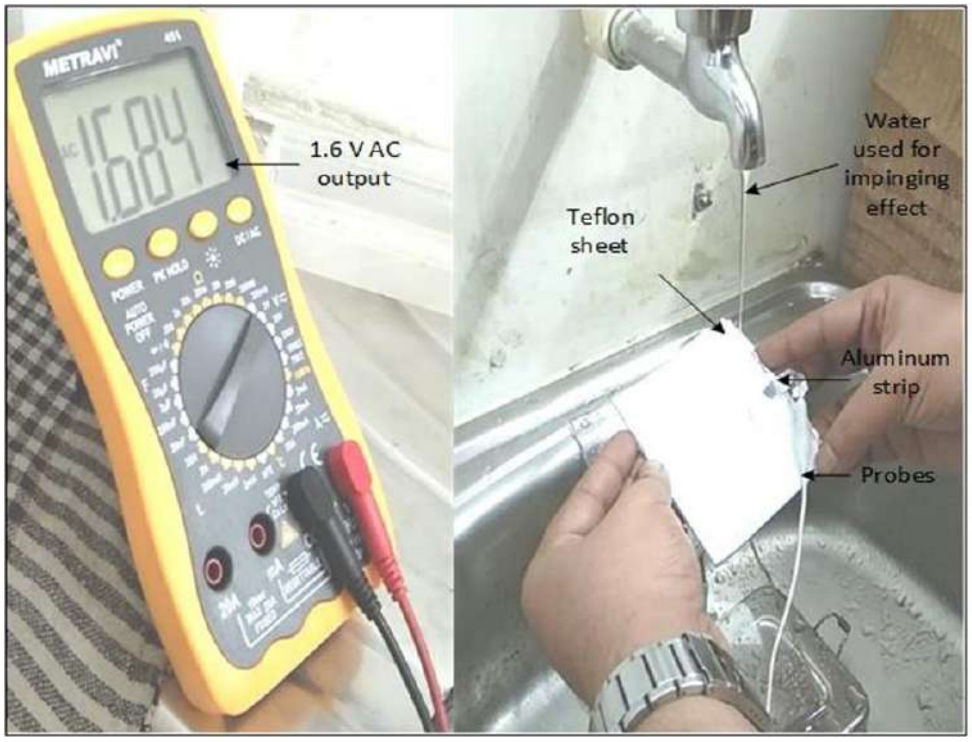
Faculty Pi: Souhridya Bhattacharjee

Student Pi: Arghya Roy

Project Title: FABRICATION OF A TRIBOELECTRIC ENERGY CELL EMPLOYING VARIOUS SOURCES OF WATER

Description: Research and development efforts are being carried out to harvest energy from water in the forms of rain, river tides, and ocean waves. Traditional power generation systems are inefficient and cost-consuming to achieve a high density of electrical energy. As an alternative, utilizing the triboelectric energy generation principle, a device comprising of three components: the upper electrode layer, polymer film (insulating layer), and the lower electrode layer is fabricated to harvest energy from impinging water droplets by using an architecture that comprises a polymer film (insulating layer) on a lower electrode layer plus an upper electrode layer. The impinged water droplet bridges the disconnected components into a closed-circuit electrical system on spreading. The water-droplet-based energy cell works following the principle of contact electrification and electrostatic induction between water droplets and polymer film (insulating layer).

Image:



FABRICATION OF A TRIBOELECTRIC ENERGY CELL EMPLOYING VARIOUS SOURCES OF WATER

Project Cost: 5000/-

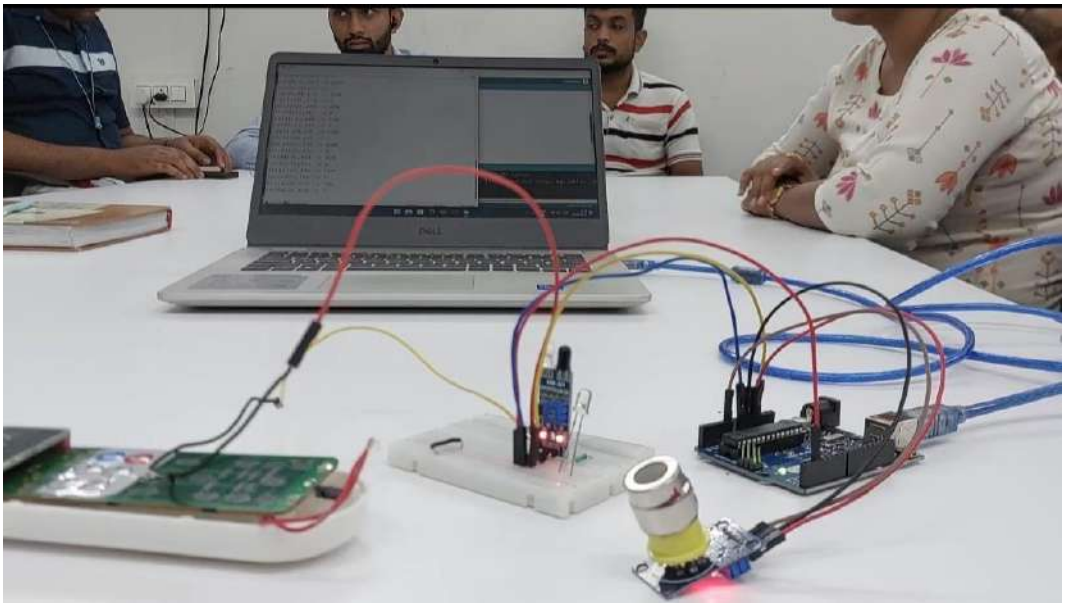
Project Duration: Feb 2023- April 2023

Faculty Pi: Ayan Kumar Ghosh, Priti Das, Sourab Ghosh

Project Title: CROWD-BASED AIR TEMPERATURE AND VENTILATION CONTROL USING A SMART DEVICE

Description: The present invention is designed and implemented as a smart device to operate an air conditioner's cooling system automatically. By using this device, the proper ventilation of a closed surface area can be maintained. The device can ventilate and monitor the air quality of a room by evaluating the PPM value of at least one noxious gas in the air. The smart device integrates different control units to obtain the desired output. In the present device, the air-quality sensing unit controls the temperature modulation unit and further activates the signaling unit that is used for transmitting the electric pulse to the air conditioner. This sensor-based smart device can keep the air in the closed room clean, and it can also be used to eliminate stuffiness and discomfort. The smart device is also cost-efficient, power savers, portable, and lightweight.

Image:



CROWD-BASED AIR TEMPERATURE AND VENTILATION CONTROL USING A SMART DEVICE

Project Cost: 6000/-

Project Duration: April 2023

Faculty Pi: Trisha Paul, Priti Das

Student Pi: Arpan Goswami

Project Title: WI-FI-BASED SMART PROJECTOR SCREEN

Description: In this modern era, technological advancement has taken a great leap forward in the field of education. People prefer the use of technologies for information sharing rather than books themselves. The projector and its screen are the most used devices for such purposes. As per the project's requirement, the team was required to design and calculate a smart motorized projector screen. Different concepts and ideas were generated and individually analyzed for their reasonability, feasibility, ease of use practicality. At last, an idea was selected among many, and design calculations were done. The final outcome was the Wi-Fi-based motorized projector screen, which was easier to operate. The main advantage was that the mechanism could be used in older projector screens, making it motorized with Wi-Fi control to help users operate through a smartphone.

Image:

WI-FI-BASED SMART PROJECTOR SCREEN

Project Cost: 15000/-

Project Duration: May 2023

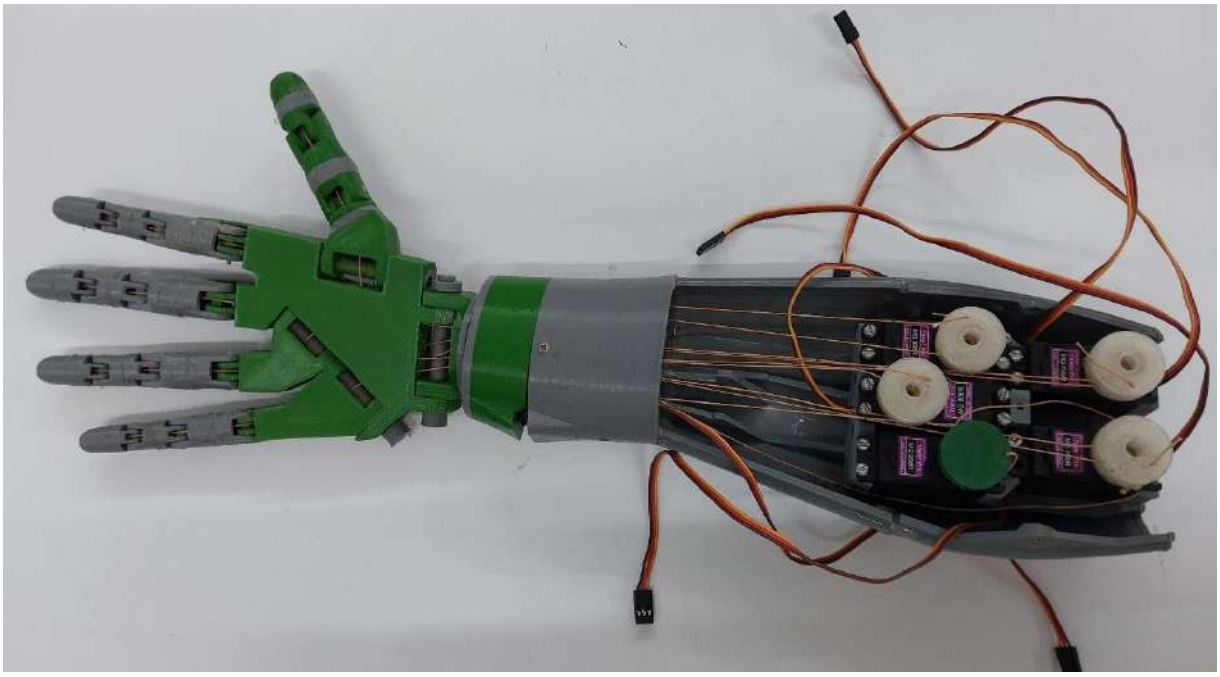
Faculty Pi: Trisha Paul, Souhridya Bhattacharjee, Somnath Hazra, Dibakar Roychoudhury

Student Pi: Aritri Das, Nilava Kundu, Agamani Roy Chowdhury, Pallabi Debnath, Akash Paul, Kaustav Ghosh

Project Title: PROSTHETIC ARM

Description: A prosthetic arm is an artificial limb designed to replace a missing or non-functional arm. It is a prosthetic device used to restore upper limb functionality and mobility for individuals who have undergone amputation or have congenital limb differences. Prosthetic arms significantly improve the quality of life for amputees by restoring their ability to perform everyday tasks, such as eating, dressing, and carrying objects. They also enhance independence and confidence in individuals with limb loss, allowing them to engage in work, hobbies, and recreational activities. All the parts of the prosthetic arm, like sockets, joint parts, grippers, hooks etc, are printed using our 3D printer. We will use bio-sensors to control our prosthetic arm.

Image:



PROSTHETIC ARM

Project Cost: 35,000/-

Project Duration: May 2023

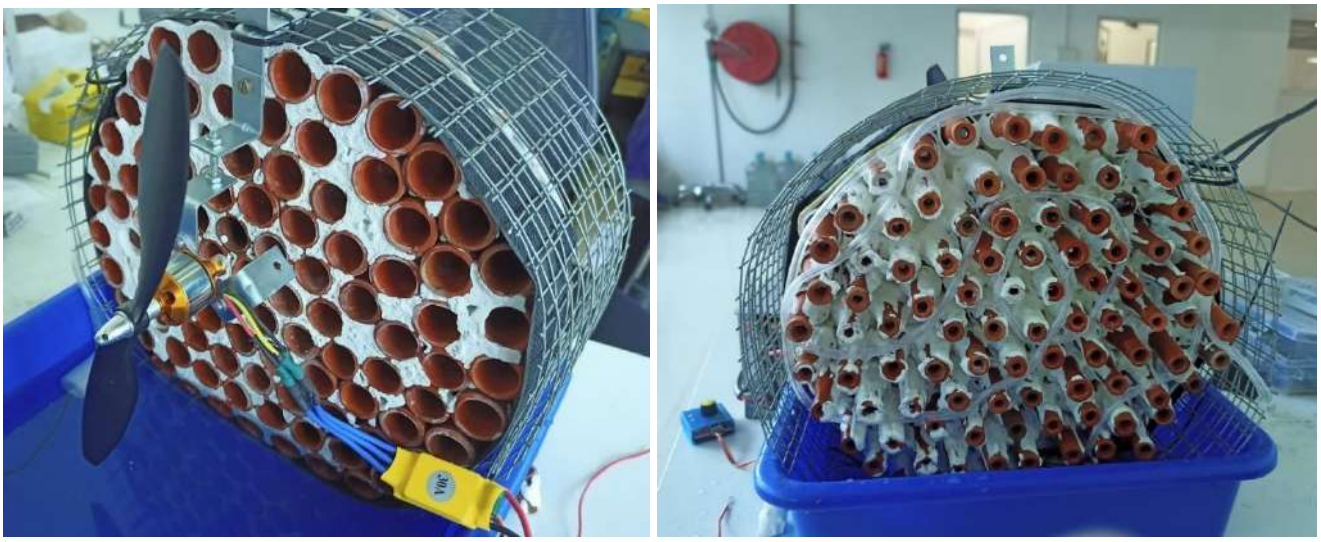
Faculty Pi: Trisha Paul, Dibakar Roy Choudhury

Student Pi: Md. Mustafa Abdulla, Nirban Roy

Project Title: TERRACOTTA-BASED AIR COOLER SYSTEM

Description: The Terracotta-based air cooler system is an innovative and sustainable solution for cooling indoor spaces. It utilizes the natural properties of terracotta, a porous clay material, to provide effective and energy-efficient cooling. The system consists of a terracotta body with a water reservoir, an air inlet, and an exhaust. As hot air passes through the wet terracotta, it undergoes evaporative cooling, resulting in a pleasant and refreshing indoor environment. The terracotta's porous structure facilitates the evaporation process, and the system operates without the need for harmful refrigerants or high energy consumption. With its eco-friendly design and ability to provide affordable cooling, the terracotta-based air cooler system is a sustainable alternative to traditional cooling methods.

Image:



TERRACOTTA-BASED AIR COOLER SYSTEM

Project Cost: 3500/-

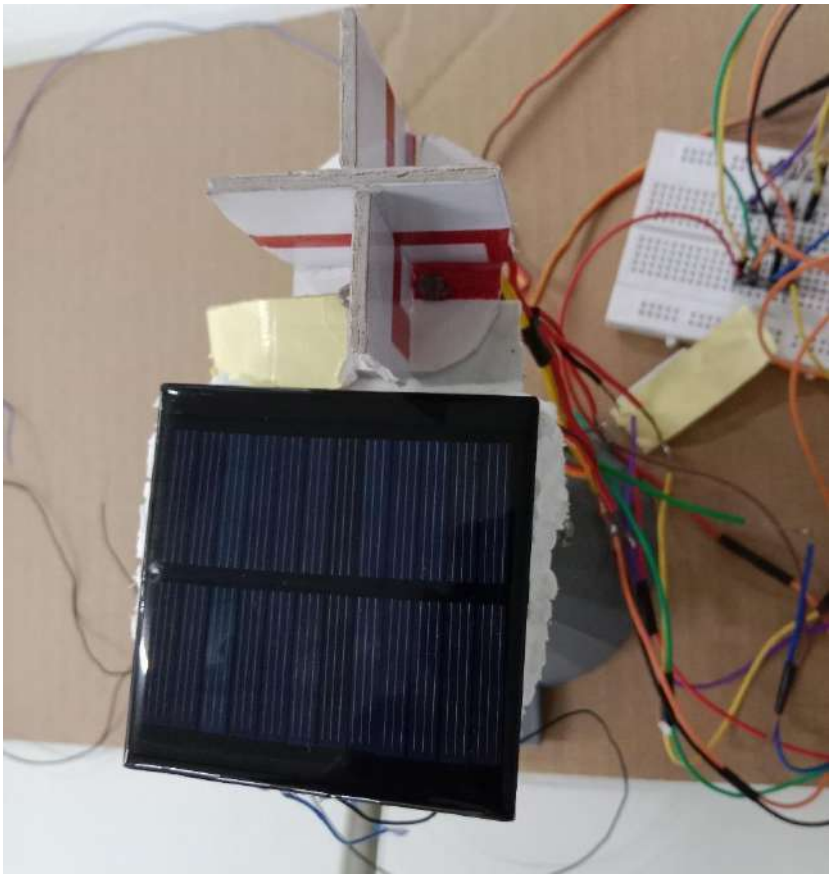
Project Duration: May 2023

Faculty Pi: Souhridya Bhattacharjee, Dibakar Roy Choudhury

Project Title: SUNFLOWER: A SOLAR TRACKING SYSTEM

Description: A sunflower solar tracking system is designed to optimize solar panels' efficiency by aligning them with the sun's position throughout the day. The name "sunflower" derives from how sunflowers naturally turn their heads to face the sun. The primary purpose of a solar tracking system is to maximize the amount of sunlight falling onto the solar panels. By tracking the sun's movement from east to west, the system ensures that the panels always face the most direct sunlight, which results in increased energy generation.

Image:



SUNFLOWER: A SOLAR TRACKING SYSTEM

Project Cost: 1000/-

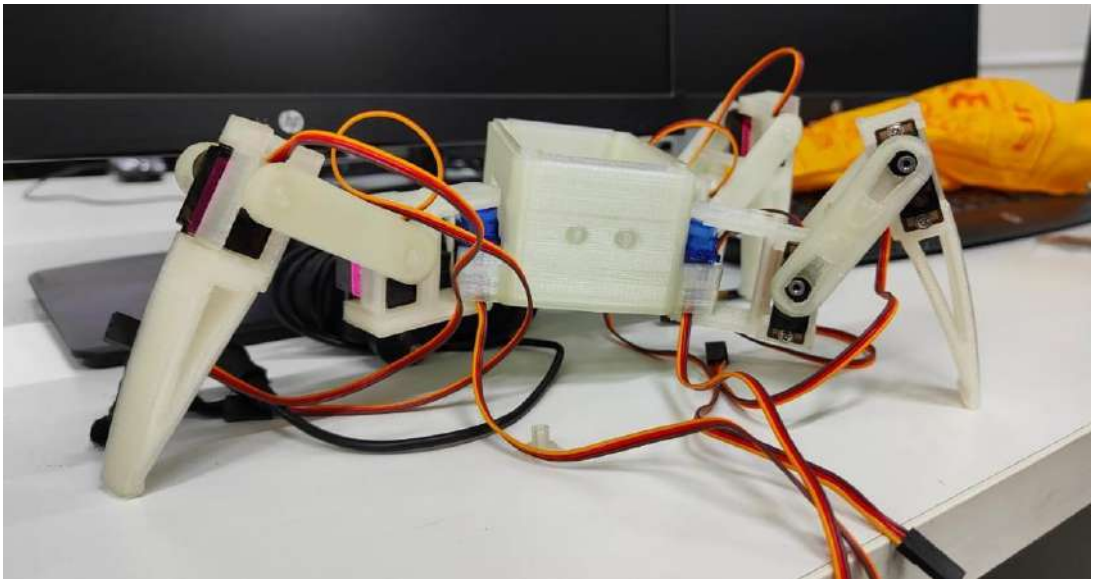
Project Duration: July 2023 – August 2023

Faculty Pi: Asmita Biswas, Dibakar Roy Choudhury

Student Pi: Avhishek Nandi, Barnali Paul, Sayan Bardhan

Project Title: MULTITASKING SPIDER ROBOT

Description: The Multitasking Spider Robot is an innovative and versatile robotic system designed to mimic the characteristics and movements of a spider while incorporating various sensors for enhanced environmental awareness. This product is suitable for a wide range of applications, including search and rescue operations, environmental monitoring, and industrial automation. It incorporates a comprehensive array of sensors to effectively perceive and interact with its surroundings. Various types of sensors include temperature, humidity, ultrasonic, gas, and LiDAR. The robot is equipped with onboard processing capabilities to analyze sensor data in real time. It uses advanced algorithms to interpret the sensory inputs, make decisions, and adapt its movements accordingly. The Multitasking Spider Robot has numerous applications across various domains, including search and rescue, environmental monitoring, surveillance, and security. As technology continues to advance, the Multitasking Spider Robot holds immense potential for further development and integration with emerging technologies like artificial intelligence and wireless communication.



MULTITASKING SPIDER ROBOT

Project Cost: 7000/-

Project Duration: August 2023

Faculty Pi: **Trisha Paul**

Student Pi: Subham das, Rajdip Biswas

Project Title: UNMANNED AIR VEHICLE ASSEMBLY

Description: Unmanned Air Vehicle (UAV) assembly integrates electric motors, power electronics, and propellers into the aircraft structure. Electric and servo motors, driven by batteries, provide propulsion without traditional fuel. The lightweight design enhances flight efficiency, extends endurance, and reduces environmental impact. Electric UAVs offer quieter operation and simplified maintenance, making them ideal for various applications, such as surveillance, mapping, and cargo delivery. Integrating electric motors enables eco-friendly, cost-effective, and versatile UAV platforms, revolutionizing aerial missions and fostering sustainable aviation advancements.

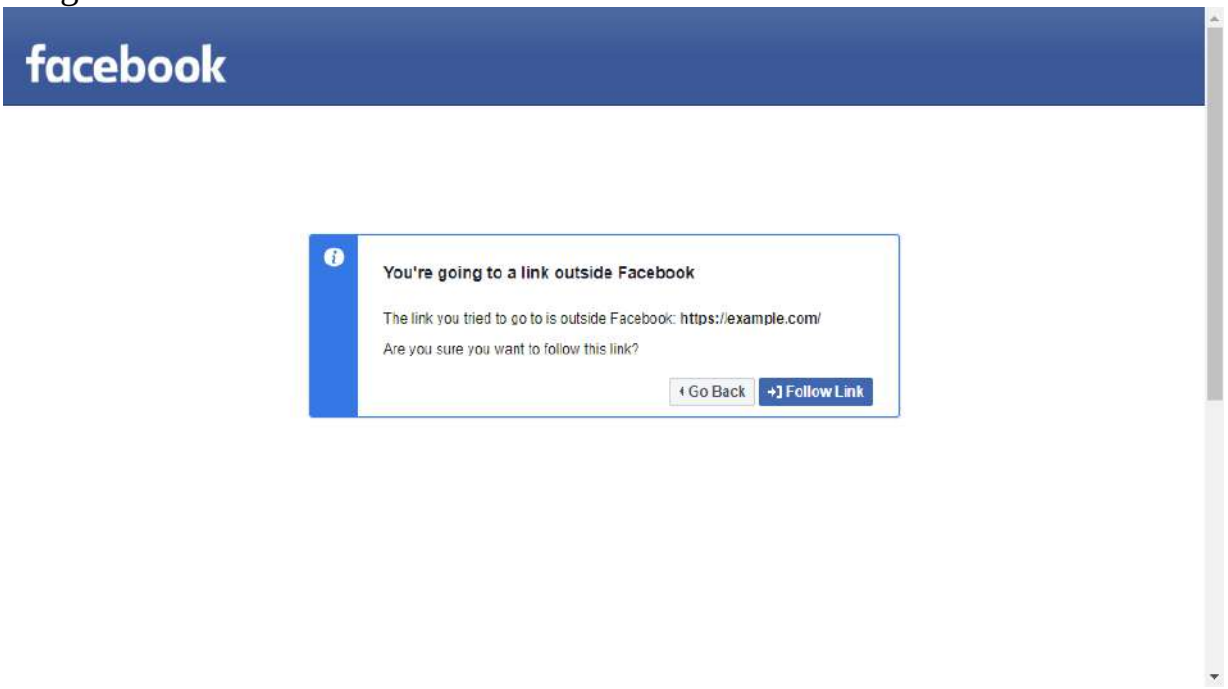
Image:

UNMANNED AIR VEHICLE ASSEMBLY

Project Title: FACEBOOK OPEN-REDIRECTION VULNERABILITY WITH LINKSHIM HASH CAPTURING

Description: For example, the url is something like this:
https://facebook.com/l.php?u=https://example.com/
When one tries to visit the link, a redirection notice is issued by the browser which is notifying the user about the redirection. The redirection notice looks something like this. For example, the url is something like this:
https://facebook.com/l.php?u=https://example.com/
When one tries to visit the link, a redirection notice is issued by the browser which is notifying the user about the redirection. The redirection notice looks something like this.

Image:



FACEBOOK OPEN-REDIRECTION VULNERABILITY WITH LINKSHIM HASH CAPTURING

Project Cost: Nil

Project Duration: Mar 2022- April 2022

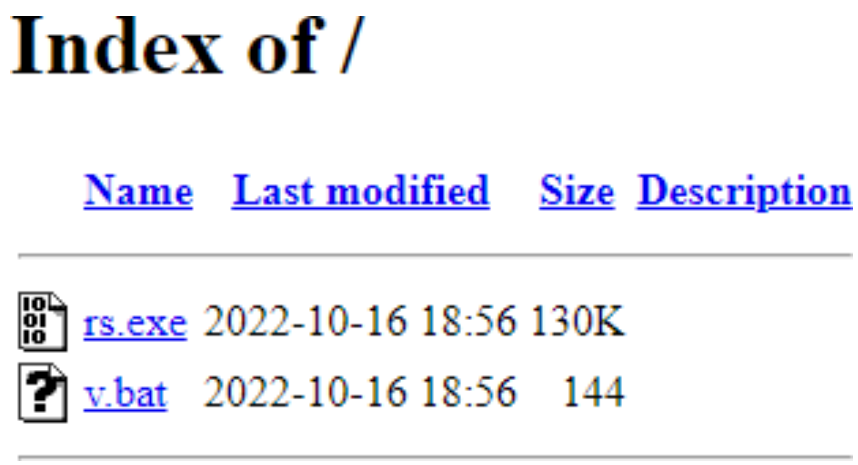
Faculty Pi: Dibakar Roy Choudhury

Student Pi: Arjun Ghoshal, Rittik Lal

Project Title: POWERSHELL TROJAN THAT CAN EVADE WINDOWS DEFENDER

Description: A Trojan horse is any malware that misleads users of its true intent. The trojan developed by me consists of a PowerShell payload, which on execution on the victim system, triggers a reverse shell back to the attacker system's IP address, giving the attacker full access to the victim system. Trojans are a common form of malware found in today's society. However, the following trojan holds the power to evade Windows Defender (built-in windows antivirus). This attack can be used for penetration testing and further practices like privilege escalation, reconnaissance, etc. Downloading and executing the v.bat file will automatically download and execute the trojan, i.e., the rs.exe file. The trojan has been obfuscated in such a way that Windows Defender is not able to detect it and hence, allows it to run on the victim machine.

Image:



POWERSHELL TROJAN THAT CAN EVADE WINDOWS DEFENDER

Project Cost: Nil

Project Duration: April 2022- May 2022

Faculty Pi: Dibakar Roy Choudhury

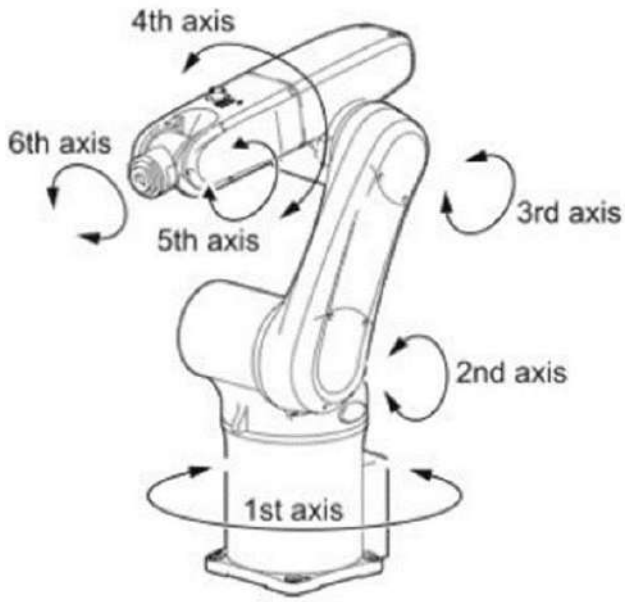
Student Pi: **Arjun Ghoshal, Rittik Lal**

Project Title: DUMM-E

Description: It is a type of articulated 6 axis robots and the most common for industrial manufacturing. They provide the flexibility, strength, and reach needed to complete most applications. Six-axis robots can move in the x, y, and z planes. In addition, they can perform roll, pitch, and yaw movements. This makes the movements of these robots like that of the human arm. Our robot will be able to perform pick and drop, Welding, Soldering, Drilling, and screwing and unscrewing; with manual command as well as voice command.

Link: https://youtu.be/hdJXvbDt2Hk

Image:



DUMM-E

Project Cost: 15,000/-

Project Duration: Sep 2022- Nov 2022

Faculty Pi: Dibakar Roy Choudhury

Student Pi: **Shouryam Dutta**

Projects for Software Domain (IIC-IEM):

Project Title: IIC Management Website

Description: A Development project for IIC to resolve the ID issues, automated email system, membership proof, and security check-in and out. In addition to this, it will provide a certificate issued by the admin users, which will be a proof of Internship Certificate for MAR Points.

Working Layout:

Firstly, we will concentrate on the users' hierarchy and privilege. The hierarchy (Top to Bottom) follows:

a) **Super-User-**
   The top heads, who will issue an offer letter to the selected candidates after the approval request from the mentor/ admin. These users will have the authority to remove any member or accept any member after the approval of admin users.
   The database lists will be provided to the super-users, including admin users, faculty mentors, student users and security user with its unique id and role.

b) **Mentor (Faculty Members)-**
   These users do not have any role basically but can see the list of admin users & student user.
   They can view the dashboard & specialists of particular users for future project planning. We will provide a temporary timing chatbot (notified in emails) for project acceptance/approval.

c) **Admin User-**
   These users who played the major role from interviews to project session. These users have unique features:
   - Sending aid of advice for any member approval request to the super-user.
   - Can view the mentor (Faculty Members)
   - Can also send a removal of membership request.
   - Can make project groups along with student users for particular team.
   - Can issue direct certificates to the student user, which will be notified to the super user immediately via mail.
   - Any research project send to the student user, the admin user will get the notification of the 'send project request'.

d) **Student User-**

They are the normal users having id and dashboard with full details. They will be able to log in & log out at their time and also give attendance through the portal.

** Functionalities are still user maintenance.

e) **Security User-**

**Functionalities not decided yet

Image:

(To be made yet)

Project Duration: **Jan 2023 – Present**

Faculty Pi: Trisha Paul

Student Pi:

1. **Mriganka Paul**
2. **Arpan Ghosh**
3. **Bishal Ghosh**
4. **Sumana Karmakar**
5. **Dipta Karar**
6. **Bareesh Chatterjee**
7. **Rituparna Debnath**
8. **Portia Basak**
9. **Proshant Mondal**
10. **Arijit Paul**
11. **Anirban Mitra**
12. **Sandip Sain**

Project Title: IIC RESOURCE APP (INITIAL PHASE)

Description: This app will act as a study material supplier for freshers at IIC-IEDC. Multiple courses will enable students to learn at their own pace (the technology of their choice).

Super-users/admins will have access to add the best possible materials so that everyone can access them. There will be course materials available in doc, pdf, and word format & also, there will be multiple YouTube playlist links for added benefits. Admins can also add/remove members on joining/leaving the organization.

Image:

https://drive.google.com/drive/folders/1Y8rGm-D8ETBwnS7BS6Zi0jEicIrw3gvr?usp=share_link

Project Duration: **Jan 2023 - Present**

Faculty Pi: Dibakar Roy Choudhury

Student Pi:

1. **Mriganka Paul**
2. **Arpan Ghosh**
3. **Dipta Karar**
4. **Bareesh Chatterjee**
5. **Sumana Karmakar**
6. **(More Team Members will be added as the project is still in the formation phase)**

Project Title: SIGN COMPANION: A REAL-TIME SPEECH TO SIGNED LANGUAGE CONVERSION SYSTEM

Description: The sign companion: a real-time speech-to-signed language conversion system designed for converting speech into signed language in real time. The system also provides the implementation of a website or Android application. For those who are deaf or hard of hearing, a speech-to-signed language conversion technology encourages inclusion, accessibility, and successful communication. Bridging the communication gap between spoken and signed language promotes comprehension and equitable participation in various social, academic, and professional situations.

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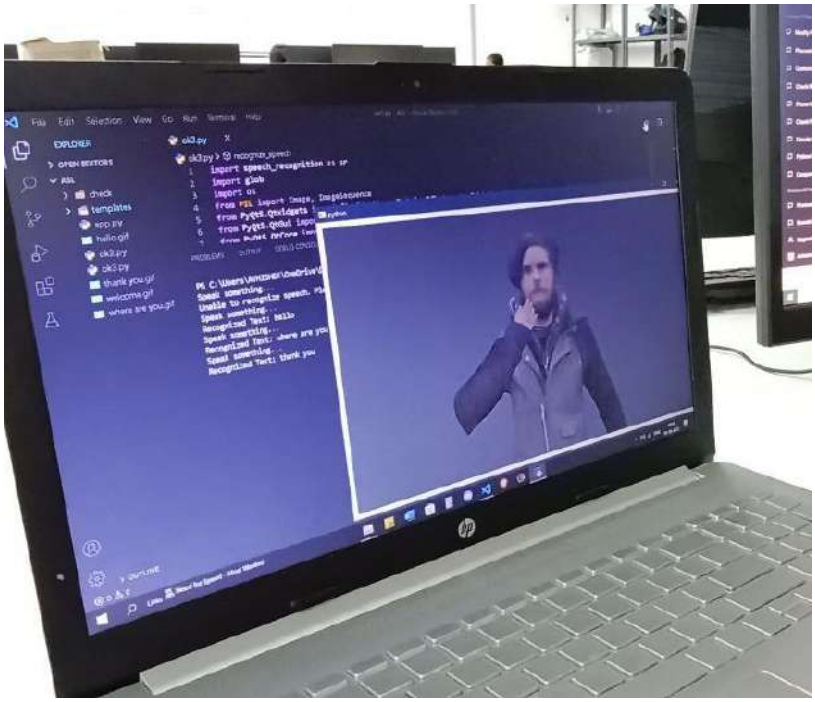


SIGN COMPANION: A REAL-TIME SPEECH TO SIGNED LANGUAGE CONVERSION SYSTEM

Project Duration: April 2023 - Present

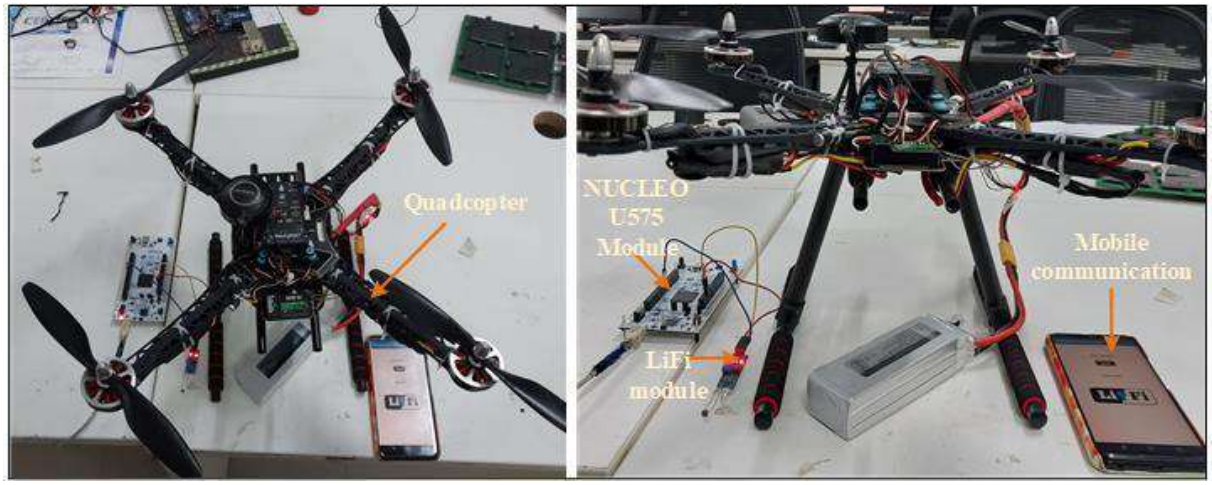
Faculty Pi: Asmita Biswas, Dibakar Roy Choudhury

Student Pi: Avhishek Nandi, Barnali Paul, Sayan Bardhan

Project Title: LiDAR– LiFi COMMUNICATION SYSTEM FOR DEVELOPMENT IN DISASTER MANAGEMENT

Description: Climate change and disaster mitigation are some of the G20 goals. In the project work, the integration of LiDAR-LiFi technology has great potential to handle disaster management concerns by providing precise data gathering, rapid communication, early warning systems, effective response, and sustainable planning. Here, the Search and rescue, damage assessment, and infrastructure planning are aided by LiDAR-created 3D maps. This project proposes a robust LiDAR-LiFi integrated communication architecture for SAR response to natural disasters using VTOL drones. Using NUCLEO-U575ZI-Q with a GIS database enhances LiDAR area mapping for aerial surveillance and remote monitoring. Here, each network server's availability function determines LiFi's viability. A fixed-wing quadcopter drone is designed for the entire surveillance. The system detects the optimal route for reaching disaster-affected individuals.

Image:



LiDAR– LiFi COMMUNICATION SYSTEM FOR DEVELOPMENT IN DISASTER MANAGEMENT

Project Cost: 20,000/-

Project Duration: Present

Faculty Pi: Priti Das

Student Pi: Kaustav Laskar, Debmalya Das, Rajdeep Biswas, Subham Das

Applied Materials Research Laboratory

Members	Research Area
Dr. G. S. Taki	ECR Ion Source Technology, nano-materials synthesis and modification
Dr. S. R. Bhattacharyya	(i) Sputtering and Sputter-induced surface morphology (ii) Ion beam mixing of metallic thin films (iii) Swift heavy ion interaction on solid surfaces(iv) Deposition of nanocluster thin films and the effect of ion irradiation on it
Prof. Soumik Kr. Kundu	g-C_3N_4 synthesis by Magnetron Sputtering for photo-catalytic application.
Prof. Samit Karmakar	Graphene synthesis by ECR PE-CVD method for bio-sensing & energy storage device application

Experimental Facilities	• **2.45 GHz ECR-PECVD system operating during graphene growth**	**Indigenously developed**	**IEI-IEM Funded**
	• **Magnetron Sputtering Setup**	**Indigenously developed**	**IEI-IEM Funded**
	• **Quadrupole Mass Analyzer**	**Pfeiffer Vacuum**	**AICTE-RPS-IEM Funded**
	• **De-Ionized Water Plant**	**TN10HITD**	**AICTE-RPS-IEM Funded**
	• **Automatic Spin Coater**	**EZspinA1**	**AICTE-RPS-IEM Funded**
	• **Compound Microscope with Camera**	**ESAW**	**AICTE-RPS-IEM Funded**
	• **Silvaco TCAD**		**IEM Funded**
	• **CST Microwave Studio**	**Dassault**	**IEM Funded**

Grant-in-Aid					
Ongoing Projects					
Funding Organization	**Project Investigator -**	**Scheme/Proposal**	**Department**	**Sanction No. & Date**	**Sanctioned Amount**
AICTE (2020)	**Dr. G. S. Taki**	**RESEARCH PROMOTION SCHEME (RPS)**	**AMRL Lab, ECE Dept.**	**File No. 8-235/RIFD/RPS (POLICY-1)/2018-19**	**Rs. 16,00,000/-**

UGC-DAE-CSR (2022)	**Dr. G. S. Taki**	**Collaborative Research Scheme (CRS) Project of UGC DAE CSR**	**AMRL Lab, ECE Dept.**	**Ref: CRS/2021-22/02/519**	**Rs. 45,000/- per year**
Institute of Engineering and Management (2022)	**Prof. Samit Karmakar**	**IEM Grant-in Aid Project Scheme**	**AMRL Lab, ECE Dept.**	**Ref: IEM NOTICE/13 - April-2022**	**Rs. 1,50,000/-**
Institute of Engineering and Management (2022)	**Prof. Soumik Kumar Kundu**	**IEM Grant-in Aid Project Scheme**	**AMRL Lab, ECE Dept.**	**Ref: IEM NOTICE/13 - April-2022**	**Rs. 50,000/-**

Project Title: Portable solar-powered EV charging station

Description: This project is a technology demonstration prototype for an electric vehicle that doubles as a solar powered off-grid power supply which is capable of charging other smaller electric vehicles like two-wheelers. The design incorporates mechanical and electrical features and facilities to perform as a portable charging station. It is capable of charging at a rate of 1500 watts, enough to charge 3-4 electric scooters. It is capable of a speed of 50 km/h, with foldable solar panels deploying outwards at the site of charging. The power supply may be used for other purposes as well, which require a load less than or close to 1500 watts.

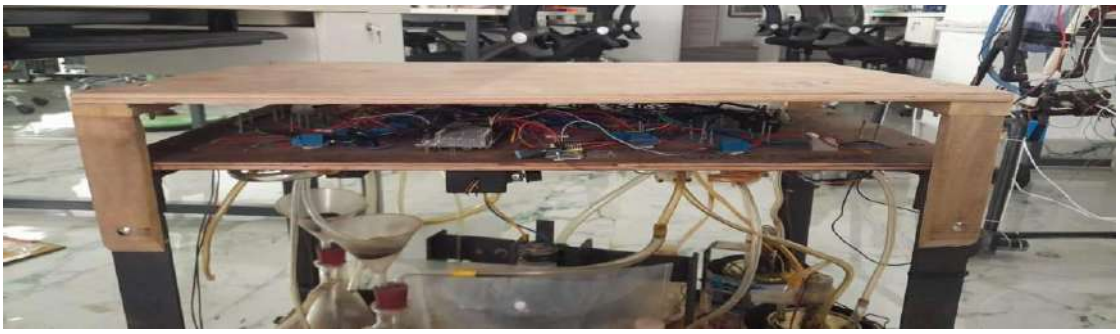
Portable solar-powered EV charging station

Cost: INR 300000
Faculty PI: Arghya Roy
Duration: 5 Months
Students: Khandakar Nafees Hossain, Dhritiman Bera, Souvik Chel, Tanvi Jesmi.

Project Title: Waste Oil Recycler

Description: This project focuses on the development of an apparatus and methodology to convert waste engine lubricant or oil into usable fuel oil via multiple chemical and physical processes. The system comprises of mechanical chambers to treat the waste oil with acid, base, and other chemicals, as well as a specially designed centrifuge and filtration system to convert the waste oil into a usable fuel oil. The device is fully automated, to reduce user exposure to dirty oil.
The end product, NABL tested, is a usable low-sulphur fuel oil that behaves similar to marine fuel oil or diesel. Thus, a viable fuel can be produced from a resource that was previously deemed as unusable toxic waste.

Images:



Waste Oil Recycler

Cost: INR 30,000
Duration: 5 Months
Faculty PI: Mr. Arghya Roy (Technical Mentor)
Students: Shyantan Kundu, Adrija Ghosh, Suvojit Maity

Project Title: Simple cost-effective electric wheelchair

Description: A robust and simple electric wheelchair primarily focused on heavy load carrying capacity, long range, easy maneuverability, and low cost overall compared to other wheelchairs in the market. The product is capable of speeds of 15 km/h, with a load carrying capacity of 150 kg, and an effective battery range of 150 km.

Images:

Simple cost-effective electric wheelchair

Cost: INR 37,000
Faculty PI: Arghya Roy
Duration: 3 Month

Project Title: Mini Electric Plough

Description: The Mini Electric Plough is a portable, battery-powered agricultural tool designed to address the challenges of traditional farming methods and support India's push toward net-zero emissions. This innovative device offers a cost-effective solution for small- scale farmers, combining efficiency and sustainability.

Significance:

The plough reduces dependency on manual labor by automating tasks such as plowing, planting, and weed control. Its compact design makes it accessible for small landholders, enhancing productivity and crop yields. Powered by a rechargeable battery lasting 5–6 hours, it minimizes greenhouse gas emissions, aligning with environmental goals.

Key Features:

Made from Air Leaf spring material, the plough resists corrosion and erosion, ensuring durability for up to 8 years. Its sprocket-chain-driven motor ensures consistent performance in varied soil conditions.

Impact:

By fostering mechanization, reducing costs, and supporting sustainable farming, the Mini Electric Plough empowers small farmers, boosts rural economies, and contributes to modernizing Indian agriculture. Its scalability holds promise for broader adoption across regions.

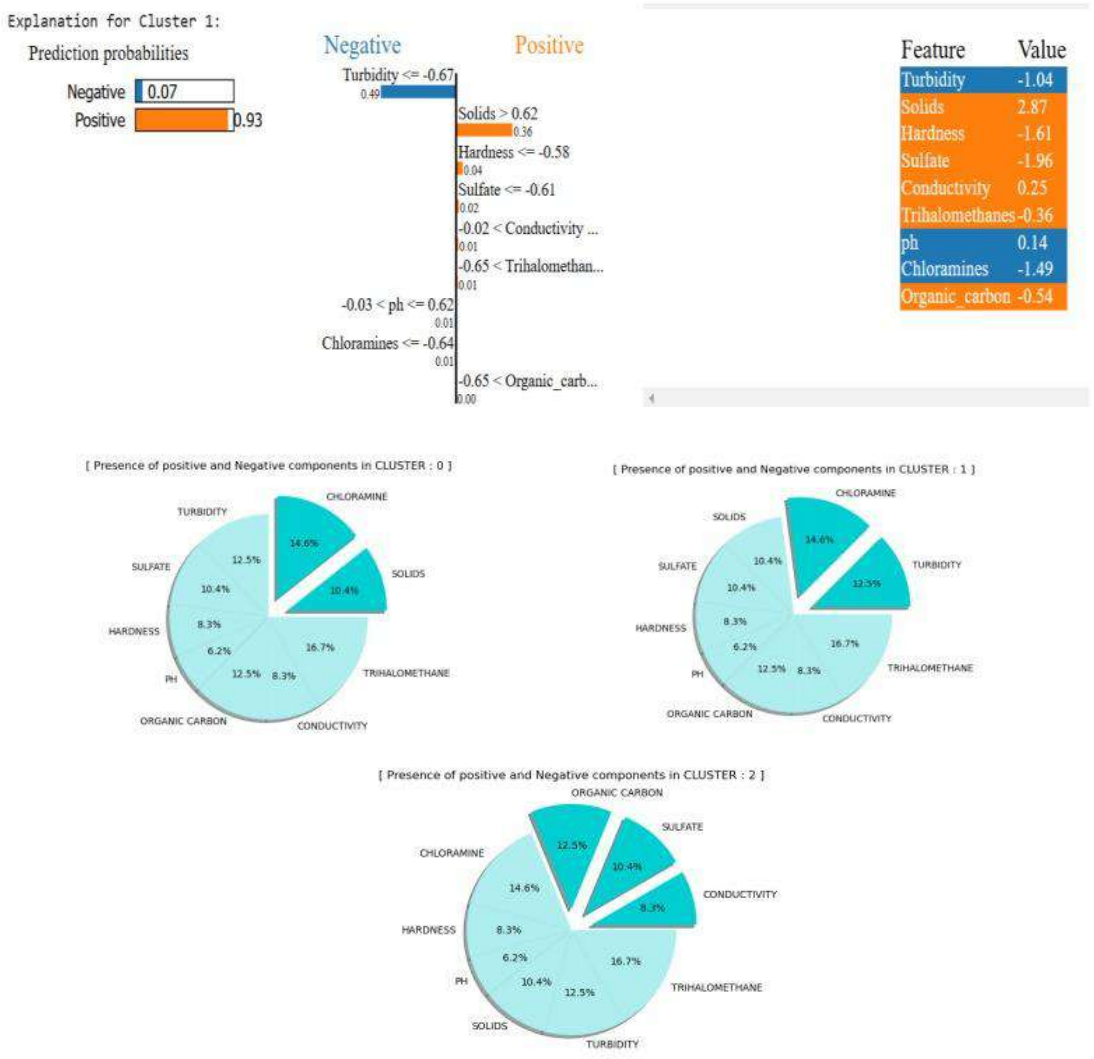
Project Supervisor: Dr. Bikash Choudhuri Project Cost: 2 Lakhs

Images :

Mini Electric Plough

Project Title: A System Framework for Assess the Water Quality and Health Risk Management

Description: This project develops an integrated framework for real-time water quality monitoring and health risk assessment using IoT sensors, predictive analytics, and machine learning. The system evaluates key water parameters, detects anomalies, and provides actionable insights through a user-friendly interface. It supports decision-making for sustainable water management and public health safety in diverse environments.



Snapshots from the Software

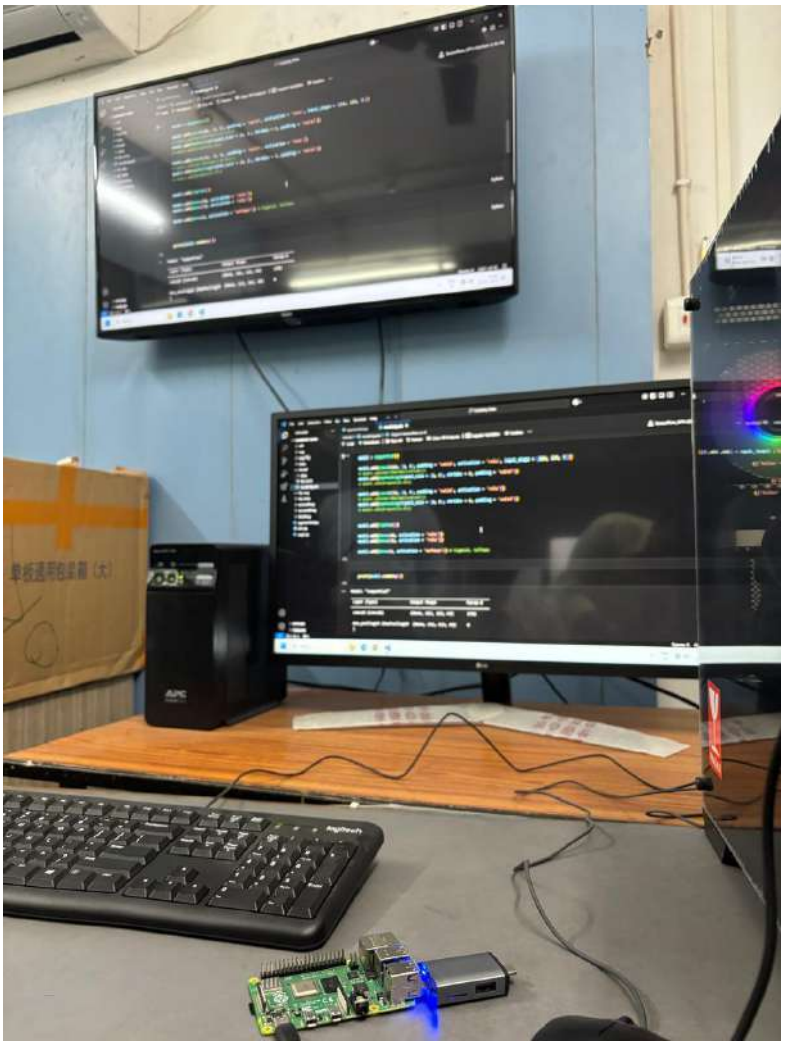
Project Cost: 2500/-

Project Duration: May 2024- ongoing

Faculty Pi: Dr. Biswajit Maity

Project Title: Vision Mate: AI-Powered Glasses for the Visually Impaired

Description: Vision Mate is an innovative project aimed at empowering visually impaired individuals with the aid of artificial intelligence and modern technology. These AI-powered glasses integrate multiple advanced features to enhance accessibility and safety, offering a seamless experience both for the user and their caregivers.



Vision Mate: AI-Powered Glasses for the Visually Impaired

Project Cost: 6000/-

Project Duration: Jan 2025- ongoing

Faculty Pi: Dr. Biswajit Maity, Kaustav Sarkar, Pritha Banerjee

Project Title: IoT Enable Remote Patient Health Monitoring based on Symptom Analysis

Description: The suggested system responsible to gathers various symptoms from patient via proper GUI application and restore it to cloud module for further analysis. This methodology provides a better remedial solution to optimize treatment mechanism based on health data and symptoms by continues observation. As a result, proposed technique reduces the treatment cost, effort and improve patient safety as well as boost up the healthcare service through easily access tools.

IoT Enable Remote Patient Health Monitoring based on Symptom Analysis

Project Cost: 4500/-

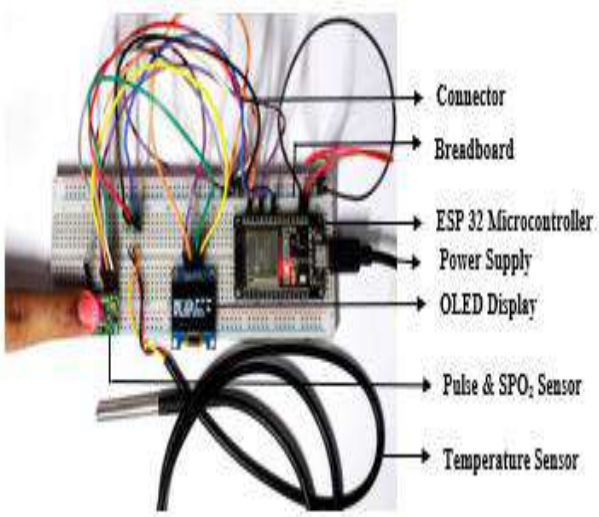
Project Duration: Aug 2024- ongoing

Faculty Pi: Manab Kumar Das

Project Title: IoT Enable Secure Remote Patient Health Monitoring for Treatment Optimization

Description: In this research work IoT-enabled healthcare system for remote patient monitoring based on real-time data analysis is the primary goal. This study includes sending patient data, as well as various test results like temperature, heart rate, and SPO2 to cloud server via WiFi module. Here biomedical data are encrypted before store in cloud module and a unique phone number can be used by the medical practitioner to access the patient's details through an appropriate interface. At the doctor's end, the healthcare data are first decrypted and then displayed in tabular form. The doctor's recommendation plays a vital role in this suggested methodology, which may generate printable versions. Effective testing ensures the reliability of this study in both local and wide area networks, promising seamless remote health monitoring and enhanced communication between patients and healthcare providers.

Image



IoT Enable Secure Remote Patient Health Monitoring for Treatment Optimization

Project Cost: 3000/-

Project Duration: Jul 2024- Dec 2024

Faculty Pi: Manab Kumar Das

Project Title: IoT Enable Secured Indoor Environment Monitoring System for Patient Care

Description: Using an ESP32 microcontroller, this suggested approach gathers heterogeneous environmental data, including ambient temperature, air quality, light intensity, sound level, humidity, and object movement, in addition to the patient's personal information. Furthermore, AWS Lamda is used to store sensitive information on cloud servers in an encrypted fashion. Medical personnel can view the room's internal environmental parameters using a graphical user interface (GUI) and press the "Alert" button to inform the nearest healthcare support authority for emergency assistance if any abnormal values are detected through pop up notification.

Image

IoT Enable Secured Indoor Environment Monitoring System for Patient Care

Project Cost: 3500/-

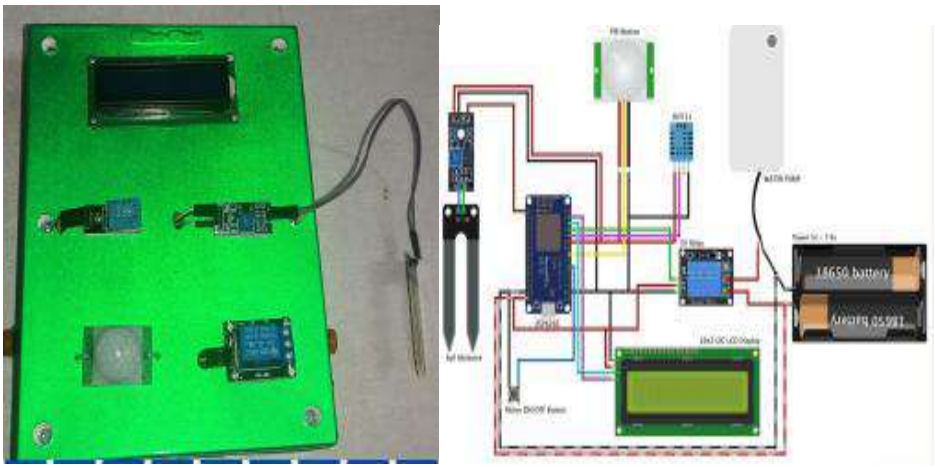
Project Duration: Sep 2024- ongoing

Faculty Pi: Manab Kumar Das

Project Title: IoT based Model for Soil and Environmental Parameters Monitoring in Modern Agronomy

Description: Agriculture is crucial for national development, yet conventional methods face challenges like dependency on human labor, weather conditions, and outdated technology. To address these, an IoT-based smart agriculture system is introduced, utilizing wireless sensors (e.g., motion detectors, temperature, humidity, and soil moisture sensors) connected to an ESP 8266. These sensors monitor critical factors like water, moisture, and temperature, sending alerts via SMS and updating a website for real-time data access. This system optimizes resource use, reducing waste and enhancing crop yields, ultimately benefiting farmers, and improving agricultural productivity.

Images



IoT based Model for Soil and Environmental Parameters Monitoring in Modern Agronomy

Project Cost: 4500/-

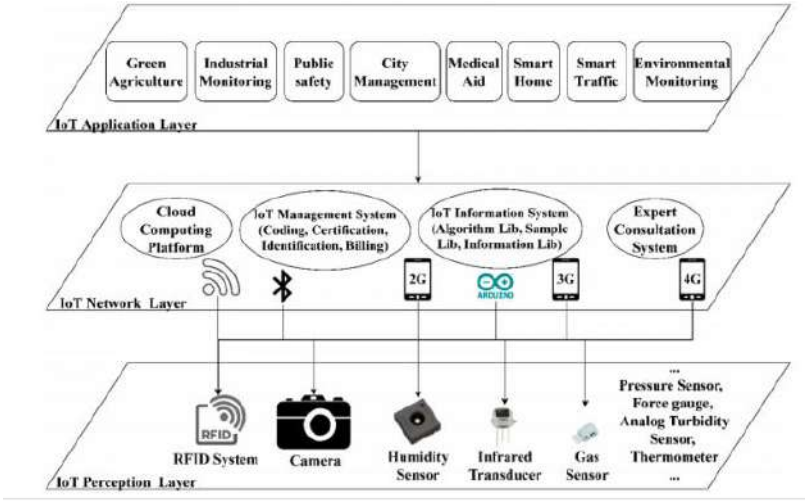
Project Duration: Sep 2024- ongoing

Faculty Pi: Manab Kumar Das

An IoT based Decentralized Kalman Filter with Event-Triggered Average Consensus for Environmental Monitoring

PI: Sanjoy Mondal, Nirban Kumar Saha, Sahitya Roy

Atmospheric pollutant concentrations such as, fine particulate matter (PM2.5) and other volatile organic compounds caused by motorized vehicles emission are essentially the key issue factors influencing air quality status. In this project we will addresses the problem of obtaining high accuracy measurement for air quality monitoring and prediction through the deployment of resource-limited wireless sensor network. In order to discern biases in the emissions of the pollutants, measurement data fusion approach from local sensors is proposed using an optimal Kalman flitering approach. Data fusion problem is then solved in a decentralized way using a event-triggered distributed average consensus (ETDAC) algorithm where event-triggered communication scheduling will be developed for sensor network. In this decentralized scheme, no continuous communication is needed in either the distributed filter algorithm or the triggering detection. The feasibility of the ETDAC will be guaranteed by a comprehensive theoretical demonstration of the convergence by using discrete Lyapunov function. The framework will be applied to a case study featuring many monitoring sensors or nodes over a busy area with traffic and constructions, to obtain spatial distribution of PM2.5 over the region.



IoT based Decentralized Kalman Filter with Event-Triggered Average Consensus for Environmental Monitoring

Prof. Dr. Arun Kumar Bar
Principal

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Institute of Engineering & Management
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