GEETHANJALI INSTITUTE OF SCIENCE & TECHNOLOGY
(AUTONOMOUS)
Gangavaram (V), Kovur (M), S.P.S.R. Nellore – 524137
Accredited with NAAC 'A' Grade & NBA (B. Tech - ECE, EEE & MECH)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

TECHNICAL MAGAZINE

TECH SPARK

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(JAN-JUN)

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GEETHANJALI INSTITUTE OF SCIENCE AND TECHNOLOGY

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www.gist.edu.in

Editorial Message

Well-written technical articles contribute to the total body of knowledge for the engineering community and will potentially help many engineers. Articles do not need to be detailed “academic-level” work. In fact, some of the most popular articles are “down to earth” practical applications of existing or new technology.

Editorial Board

VISION-MISSION

VISION

To evolve as a leading computer science and engineering centre producing competent technocrats to meet the demands of ever-changing industry and society.

MISSION

DM1: Imparting quality education through innovative teaching learning processes

DM2: Motivating students to upgrade their technical expertise by promoting learner centric activities.

DM3: Inculcating ethical values and interpersonal skills in the learners.

DM4: upgrading knowledge in cutting edge technologies keeping pace with industrial standards.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

Graduates of B. Tech in Computer Science and Engineering program shall able to

PEO1: Outperform in professional career or higher learning by upgrading skills in Computer Science and Engineering stream.

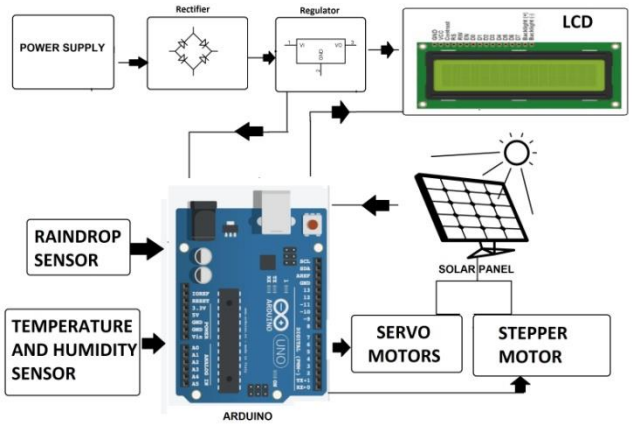
PEO2: Competent Provide computing solutions for complex problems to meet industry demands and societal needs.

PEO3: Offer ethical, socially sensitive solutions as professionals and as entrepreneurs in Computer Science and other engineering disciplines.

PEO4: Leverage new computing technologies by engaging themselves in perpetual learning.

DUAL AXIS SOLAR TRACKING SYSTEM WITH WEATHER SENSOR

Solar power is the fastest growing means of renewable energy. The project is designed and implemented using simple dual axis solar tracker system. In order to maximize energy generation from sun, it is necessary to introduce solar tracking systems into solar power systems. A dual-axis tracker can increase energy by tracking sun rays from switching solar panel in various directions. This solar panel can rotate in all directions. This dual axis solar tracker project can also be used to sense weather, and it will be displayed on LCD. This system is powered by Arduino, consists of servo motor, stepper motor, rain drop sensor, temperature and humidity sensor and LCD.



Hardware Specifications

- Atmega Microcontroller
- Solar Panel
- Servo Motor
- DC Motor
- Rain Sensor
- Humidity Sensor
- Temperature Sensor
- Resistor
- Capacitors
- Transistors
- Cables and Connectors
- Diodes
- PCB and Breadboards
- LED
- Transformer/Adapter
- Push Buttons
- Switch
- IC
- IC Sockets

Software Specifications

1. Arduino Compiler

Programming Language:

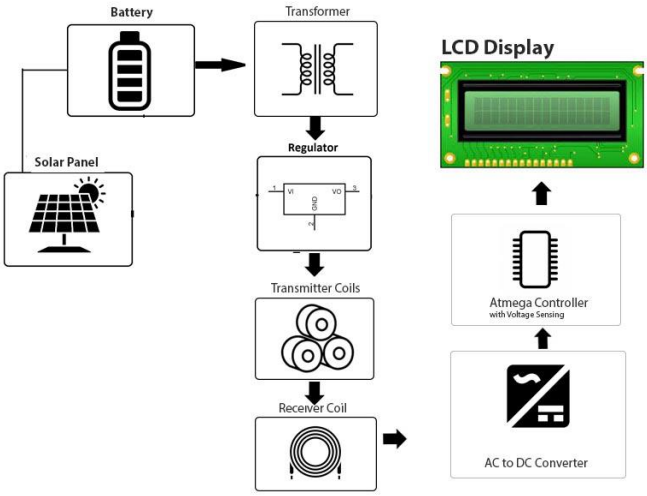
- C

Kaduru Mounika(172U1A0579)

WIRELESS EV CHARGING SYSTEM

Electric vehicles have now hit the road worldwide and are slowly growing in numbers. Apart from environmental benefits electric vehicles have also proven helpful in reducing cost of travel by replacing fuel by electricity which is way cheaper. However electric vehicles have 2 major disadvantages:

1. Long charging time – 1-3 hours required for charging
2. Non availability of power for charging stations in off city and remote areas.



Well here we develop an EV charging system that solves both these problems with a unique innovative solution. This EV charging system delivers following benefits:

1. Wireless charging of vehicles without any wires
2. No need to stop for charging, vehicle charges while moving
3. Solar power for keeping the charging system going
4. No external power supply needed
5. Coils integrated in road to avoid wear and tear

The system makes use of a solar panel, battery, transformer, regulator circuitry, copper coils, AC to DC converter, atmega controller and LCD display to develop the system. The system demonstrates how electric vehicles can be charged while moving on road, eliminating the need to stop for charging.

The solar panel is used to power the battery through a charge controller. The battery is charged and stores dc power. The DC power now needs to be converted to AC for transmission. For this purpose we here use a transformer.

The power is converted to AC using transformer and the regulated using regulator circuitry. This power is now used to power the copper coils that are used for wireless energy transmission. A copper coil is also mounted underneath the electric vehicle.

When the vehicle is driven over the coils energy is transmitted from the transmitter coil to ev coil. Please note the energy is still DC current that is induced into this coil. Now we convert this to DC again so that it can be used t charge the EV battery.

We use AC to DC conversion circuitry to convert it back to DC current. Now we also measure the input voltage using an atmega microcontroller and display this on an LCD display. Thus the system demonstrates a solar powered wireless charging system for electric vehicle that can be integrated in the road.

Motapotula Bhavitha(172U1A0531)

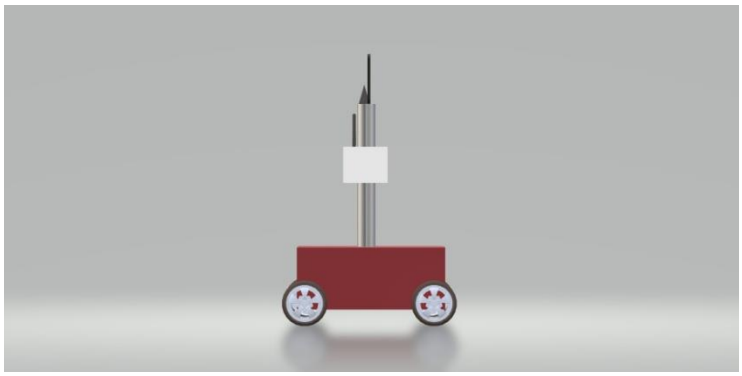
IOT VIRTUAL DOCTOR ROBOT

Doctors are usually needed to work at every hospital and emergency centre every now and then. But it is not feasible for every doctor to be available at every place at desired time. The problem with video calling is that video calls need to be done from a PC or laptop on a desk. This limits the doctors capacity to view patient or around operation theatre at will or even move through hospital rooms as needed.

Front View

To help solve this issue we here develop a virtual doctor robot that allows a doctor to virtually move around at a remote location at will and even talk to people at remote location as desired. This robot provides a whole lot of advantages for doctors:

- Doctors ability to be at anyplace anytime
- Doctors can move around in operation theatres
- Doctors can move around the patient with ease
- Doctors can see medical reports remotely via video calls



Side View

- Doctors can move around in other rooms at will

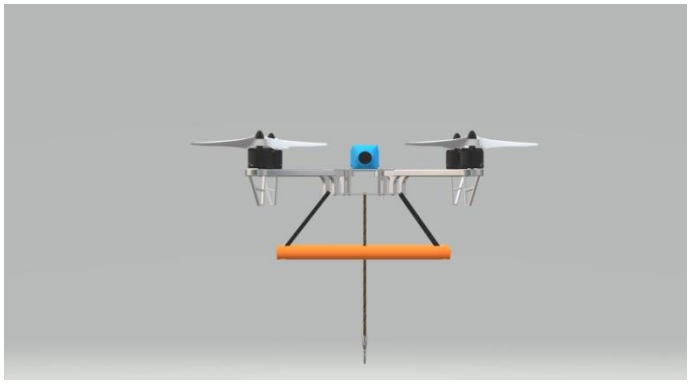
3-D View

The system makes use of a robotic vehicle with 4 wheel drive for easy navigation. The robot also includes a controller box for circuitry and a mounting to hold a mobile phone or tablet. The mobile or tablet is used to hold live video calls.
The doctor can use an IOT based panel to control the robot. The control commands sent Online are received by the robot controller. The robot controller operates over wifi internet. The received commands are received in real time and the robot motors are operated to achieve the desired movement commands. Also the root has other functions including battery status alert to remind of battery charging on time.

Shaik Abdul Raqeeb(172U1A0547)

Fish Catcher Drone

Fishing is currently done by two ways either by using fishing boats trawlers or by sitting on lake shores. Majority of fishes as well as large fish usually reside away from shores in lakes as well as in the seas. So here we propose a unique fishing drone that is incorporated with a floating panel allowing it to land and sit in water with a fishing hook and fly away with the caught fish onto the shore.



Front view

This drone would bring a whole new dimension to fishing making it a lot more fun and easier. A person may fish in the centre of lake just by sitting on the lake shore.

The fishing drone offers a wide variety of advantages including:

- Ability to fly to any corner of lake as per the fisherman
- Water landing ability
- Catch fish in the deep sea while sitting on sea shore
- No risks of using boats for fishing
- Fly away with caught fish instantly
- Easy to operate and use

Side view

The drone makes use of 4 drone motors along with 4 propellers to enable flight on the drone. We use a controller to manage drone flight and stability in motors. The controller is integrated with esc's to manage motor speeds and achieve desired flight.

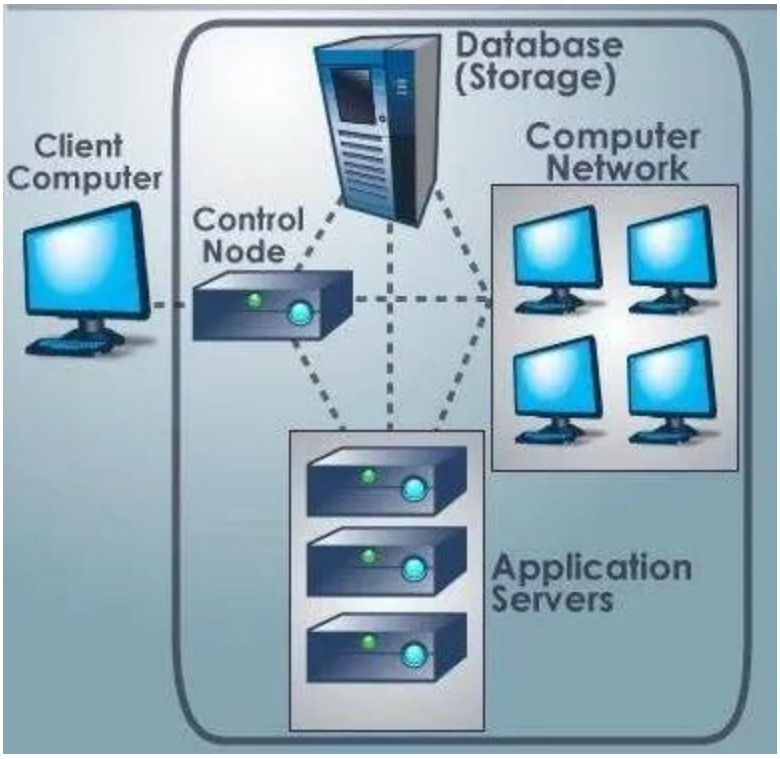
The drone is integrated with a camera for viewing live footage on an android phone. The camera footage is wirelessly transmitted to the user phone. The user operates a rf controller to control the drone wirelessly. The movement commands transmitted by remote are received by the drone receiver and the controller operates the motors to operate the drone flight.

3D view

Kota Lalitha Hansika(172U1A0589)

CLOUD COMPUTING AND SERVICES OF CLOUD

Cloud computing refers to any situation in which computing is done in a remote location (out in the clouds) rather than your portable device or desktop wherein the computing power is tapped over an internet connection. At a basic level cloud computing is simply a means of delivering IT resources as services. Almost all IT resources can be delivered as a cloud service: applications, compute power, storage capacity, networking, programming tools, communication services even collaboration tools. Cloud computing began as large-scale internet service providers such as Google, Amazon, and others built out their infrastructure. A new architecture emerged: A massively scaled, horizontally distributed system resources, abstracted as virtual IT services and managed as continuously configured pooled resources. This new model was applied to internet services.



The architecture of cloud computing

When talking about a cloud computing system, it is helpful to divide it into three sections: the front end, the central system, and the back end. They connect to each other through a network, usually the Internet via a set of protocols. The front end is the side the computer user, or client. The back end is the "cloud" section of the system.

A central server administers the system, monitoring traffic and client demands to ensure everything runs smoothly. It follows a set of rules called protocols and uses integration software called middleware. Middleware allows networked computers to communicate with each other via web services or REST APIs. Middleware software can run on-premise or on the cloud. The best example for an on-premise middleware is Tibco software and for cloud-based, there are many like Oracle Fusion Middleware, Mulesoft, Red Hat JBoss Fusee, etc. Most of the cloud-supported software support on-premise too.

Image showing hybrid, private and public clouds

Vellamunji Bhargav(192U1A05B7)

ARTIFICIAL INTELLIGENCE IN MACHINES

Artificial Intelligence best suits the phrase "Simplify Human Work". Building new machines, applications, smart infrastructure, and software – all these innovations are to simplify or reduce human work. Artificial Intelligence is all about feeding intelligence to machines or software to get the desired output and to automate things so that less human intervention is required.Artificial intelligence (AI) is an ever-evolving field that is constantly improving and introducing new and innovative techniques to the world. In recent years, AI has made incredible strides, thanks to advances in machine learning, deep learning, and natural language processing. A recent innovation is a chatbot, ChatGPT developed by OpenAI which is capable of generating articles, language translations, engaging in conversations, and many more as it is further developed and trained.John McCarthy an American computer scientist, and a Stanford University graduate known to be one of the founders of Artificial Intelligence used the term Artificial Intelligence for the first time in 1956. But, It took decades to experience the wonders that AI can do. The present era is only dominated by AI. Today AI is everywhere, be it online shopping, online search, factory automation, healthcare, education, robotics, metaverse, cybersecurity, virtual assistants – you name an industry AI is already there.

Advantages

Increased efficiency and productivity: AI can automate routine and repetitive tasks, freeing up time for humans to focus on higher-level tasks that require creativity and problem-solving skills.

Improved accuracy and precision: AI algorithms can process vast amounts of data and perform complex calculations with speed and accuracy, reducing the risk of errors that can occur with human input.

Cost savings: AI can help organizations save money by reducing labor costs and increasing efficiency, allowing for faster and more effective decision-making.

Disadvantages of AI

Cost: Developing and implementing AI can be expensive, especially for small businesses or organizations.

Unemployment: AI can potentially automate jobs and replace human workers, leading to unemployment and social disruption.

Darsi Chandrasekhar(182U1A0518)

Metaverse

Metaverse app development is the process of making apps and experiences that work in virtual and augmented reality. As the metaverse continues to grow, businesses are looking for ways to capitalize on this new digital frontier. In 2023, the metaverse is expected to become more important for business operations, opening up new chances for growth and new ideas. To build a stable future in the metaverse, you need to know a lot about the latest technologies and user experience design. Companies that invest in metaverse app development now will be well-positioned to take advantage of the many benefits it offers in the years to come

Metaverse app development technologies

1. Virtual Reality (VR) and Augmented Reality (AR) technologies allow users to experience and interact with computer-generated environments and objects. VR provides a fully immersive experience where users are completely surrounded by a digital world, while AR blends digital objects with the real world. These technologies provide the foundation for creating immersive and interactive metaverse experiences, allowing users to explore and interact with virtual environments in new and innovative ways.
2. 3D modeling and animation tools are essential for creating and manipulating virtual objects and environments in the metaverse. These tools allow designers and developers to create and shape digital objects, characters, and environments in three dimensions. With 3D modeling and animation tools, it's possible to create highly detailed and realistic virtual experiences that closely mimic real-world environments and objects. These tools are used to create the assets and environments that make up the metaverse, giving users a sense of presence and allowing them to interact with virtual objects and environments in meaningful ways.
3. Cloud computing and edge computing are important technologies for supporting high-performance and scalable metaverse applications. Cloud computing offers a centralized and remote infrastructure for storing, processing, and distributing data and applications, while edge computing offers a decentralized and local infrastructure for processing data and applications closer to the user. These technologies work together to provide the infrastructure needed to support high-performance and scalable metaverse applications, allowing users to access and interact with virtual environments and objects in real-time, regardless of their location. By leveraging the power of cloud computing and edge computing, metaverse applications can provide an immersive and responsive experience for users, making it easier to create and explore virtual worlds.
4. Artificial Intelligence (AI) and Machine Learning (ML) technologies help to create intelligent and responsive virtual environments and characters in the metaverse. AI and ML algorithms allow virtual objects and characters to respond to user interactions and make decisions based on data and patterns. This creates a more immersive and interactive experience for users, as virtual environments and characters can adapt and evolve based on user behavior. AI and ML also help to create more realistic and lifelike virtual characters, providing a more engaging and believable experience for users. These technologies are essential for creating a metaverse that is both intelligent and responsive, allowing users to interact with virtual environments and objects in new and innovative ways.

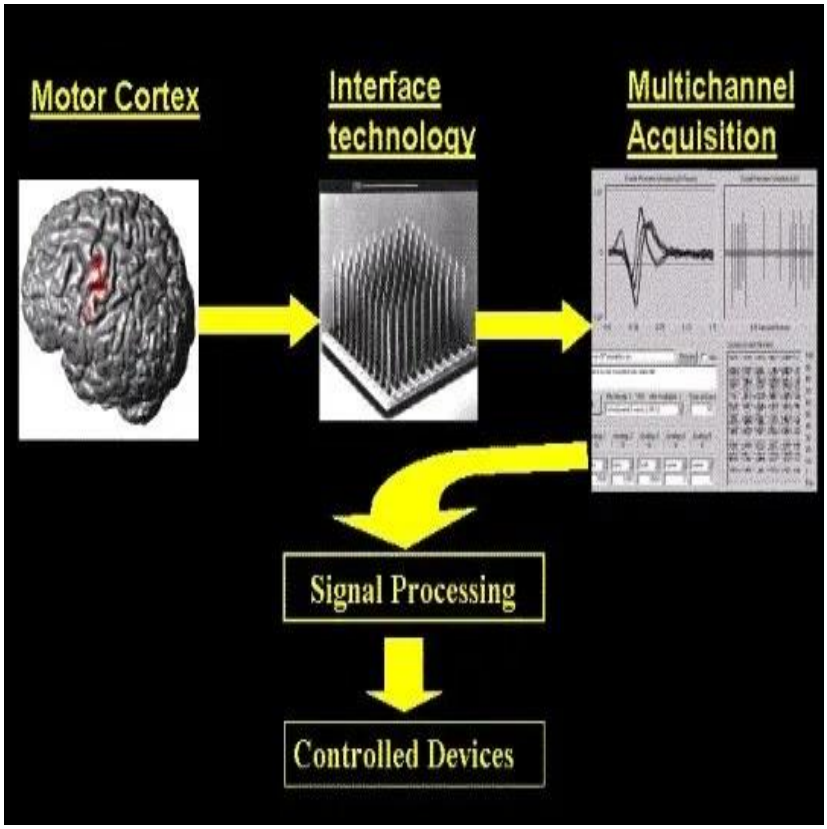
Kaluva Pravallika(182U1A0535)

BRAIN CONTROLLED CAR FOR DISABLED USING ARTIFICIAL INTELLIGENCE

A brain computer interface (BCI), sometimes called a direct neural interface or a brain-machine interface – is a direct communication pathway between a human or animal brain (or brain cell culture) and an external device. In one-way BCIs, computers either accept commands from the brain or send signals to it (for example, to restore vision) but not both. Two-way BCIs would allow brains and external devices to exchange information in both directions but have yet to be successfully implanted in animals or humans.

Sample car for disabled people

Brain-computer interfaces will increase acceptance by offering customized, intelligent help and training, especially for the non-expert user. The development of such a flexible interface paradigm raises several challenges in the areas of machine perception and automatic explanation. The teams doing research in this field have developed a single-position, brain-controlled switch that responds to specific patterns detected in spatiotemporal electroencephalograms (EEG) measured from the human scalp. We refer to this initial design as the Low-Frequency.



Brain-to-Machine Mechanism

The EEG is then filtered and run through a fast Fourier transform before being displayed as a three-dimensional graphic. The data can then be piped into MIDI compatible music programs. Furthermore, MIDI can be adjusted to control other external processes, such as robotics. The experimental control system is configured for the particular task being used in the evaluation. Real Time Workshop generates all the control programs from Simulink models and C/C++ using MS Visual C++ 6.0. Analysis of data is mostly done within Mat lab environment.

Menati Sreenivasulu(182U1A0553)

Wise Words

Don’t Quit

When things go wrong, as they sometimes will, when the road you're trudging seems all up hill, when the funds are low and the debts are high, and you want to smile, but you have to sigh, when care is pressing you down a bit, Rest! If you must; but don't you quit.

Life is queer with its twists and turns, as every one of us sometimes learns, and many a failure turns about when he might have won had he stuck it out; don't give up, though the pace seems slow; you might succeed with another blow.

Often the goal is nearer than it seems to a faint and faltering man, often the struggler has given up When he might have captured the victor's cup. And he learned too late, when the night slipped down, how close he was to the golden crown.

Success is failure turned inside out; the silver tint of the clouds of doubt; and you never can tell how close you are, it may be near when it seems afar; so stick to the fight when you're hardest hit; it's when things seem worst that you mustn't quit.

M. Thanuja(192U1A0566)-III CSE

P. Rishitha(192U1A0588) II CSE

G. Premkrishna(182U1A0523) III CSE

D. Abhishek(182U1A0520) III CSE

PROGRAM OUTCOMES (POs)

Engineering Graduates will be able to:

PO1. **Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2. **Problem Analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with anunderstanding of the limitations.

PO6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clearinstructions

PO11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES

PSO1: Apply the expertise in adaptive algorithms to develop quality software applications..

PSO2: Get employed or become an entrepreneur through their capabilities in basic and advanced technologies.