AAVARTAN'23-24

VIGYAAN
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

PROBLEM STATEMENTS

ECE01.   Smart Traffic & Transit Optimization System

Design a hardware and software based smart traffic monitoring system to optimize traffic flow and public transportation efficiency, reduce congestion in urban areas as well as to reduce accidents.

- Controls traffic lights based on the density of traffic.

- Image processing techniques can be used.

- System will count the number of vehicles at each lane and give time accordingly to that lane.

ECE02.   Automated Pool Cleaning Robot with Water Quality Monitoring

Design a pool cleaning robot that not only cleans the pool surfaces but also monitors water quality, ensuring safe and pristine swimming conditions.

ECE03.   Automated Greenhouse System

Design an automated greenhouse system that leverages advanced sensors, actuators, and control algorithms to optimize and maintain ideal environmental conditions for the cultivation of various plants. The system should monitor and regulate factors such as temperature, humidity, light intensity, soil moisture, pH of soil light, CO_2 level and air quality to ensure optimal growth and yield. Additionally, the solution should incorporate remote monitoring and control capabilities, enabling users to adjust settings and receive real-time updates to facilitate efficient management and cultivation within the greenhouse environment.

ECE04.   Solar Powered Floor Cleaner Robot

Develop a solar-powered floor cleaning robot with navigation and obstacle avoidance which can auto dump the garbage to the specified location provided in the navigation. It provides a hands-free and eco-friendly solution for maintaining outdoor cleanliness in residential and commercial environments.

ECE05.   Affordable Indoor Air Quality Monitor with Integrated Filtering System

Develop an affordable indoor smart air quality real-time monitoring system to track essential parameters such as temperature, humidity, particulate matter (PM2.5 and PM10), volatile organic compounds (VOCs), carbon dioxide (CO2), and potentially other pollutants. It should also have an integrated filtering system capable of removing particulate matter and airborne pollutants, enhancing the air quality in real time as well as providing timely alerts for maintaining healthy indoor environments. (Can be used in industries, mining-vehicles etc.)

ECE06.   Real-time Language Translation

Create a portable and affordable language translation device with as low as latency that uses speech recognition and machine translation to facilitate communication between people speaking different languages. It can be made for only some languages like English-to-Hindi/Chinese-to-Hindi or as much as language translation.

Foreigners can use it and as well as a person of India itself who is living/traveling in a different region.

ECE07.   <u>Smart Crop Monitoring Drone</u>

Create a drone equipped with sensors and camera which monitor real-time data and analysis to provide insights into crop health, growth patterns, identify pests, and optimize agricultural practices. The data collected by the drone should be transmitted in real-time to the farmer's computer or mobile device.

ECE08.   <u>Water Quality Monitoring via Robotic Fish</u>

Design and develop a cost effective and automated system that can collect water quality parameters in real-time, contributing to timely pollution detection and informed decision-making for water resource management and conservation which can be used for large water bodies like for rivers, lakes and oceans.

ECE09.   <u>Smart Parking Management System</u>

The increasing challenges of traffic congestion and driver frustration due to limited parking spaces have led to a pressing need for an innovative parking management solution. To address this issue, the development of smart parking systems that utilize advanced sensors and communication technologies is essential. Design a smart parking system using sensors and communication technologies can guide drivers to available parking spaces in nearby regions, reducing traffic congestion and frustration of drivers.

ECE10.   <u>Smart Lighting Control System</u>

Develop a hardware and software based smart lighting system that adjusts brightness based on real-time traffic flow and pedestrian presence to save energy.

(Which can be used for street lights, industries as well as households.)

ECE11.   <u>Smart Pollutant Guard</u>

Create a wearable environmental monitoring device that integrates electronic sensors to measure personal exposure to pollutants and harmful substances. The device should communicate with smartphones or other devices to provide users with real-time information about their surroundings, enabling them to make informed decisions and take necessary precautions to safeguard their health and well-being in polluted environments.