THE TECHNOCRACY
STUDENTS' TECHNICAL COMMITTEE, NIT RAIPUR

AAVARTAN'23-24

VIGYAAN
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

PROBLEM STATEMENTS

ECE01 <u>Smart Traffic & Transit Optimization System.</u>

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. <u>Automated Greenhouse System.</u>

Design an automated greenhouse system with environmental control features like temperature, soil moisture, humidity, pH of soil light etc. to create the optimal growth environment for plants.

ECE03. <u>Automated Pool Cleaning Robot with Water Quality Monitoring.</u>

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

ECE04. Solar Floor Cleaner Robot Solar Floor Cleaner Robot.

Prepare a robot to help cleaners clean large open spaces without any physical effort and without the need to charge the robot.

ECE05. Indoor Air Quality Monitor.

Develop a low-cost indoor smart air quality monitoring system to track pollutants and to filter out the pollutants as well as provide 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. Smart Crop Monitoring Drone.

Create a drone equipped with sensors and cameras to monitor crop health, identify pests, and optimize agricultural practices.

ECE08. Water Quality Monitoring via Robotic Fish.

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. Smart Parking Management System.

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. Smart Lighting Control System.

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. Smart Pollutant Guard.

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.