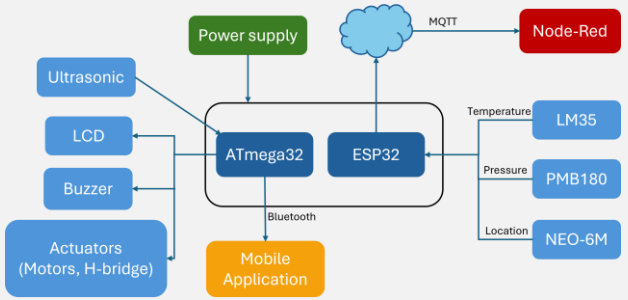
Integrated Smart Vehicle Management System (ISVMS)

13 july, 2025 Zagazig university, Faculty of Engineering, Department of Electronic and Communication Engineering

Project Overview

Develop an advanced vehicle management system to enhance driving safety, automation, and real-time monitoring using IoT and embedded systems which reduces human error in driving.

System Architecture



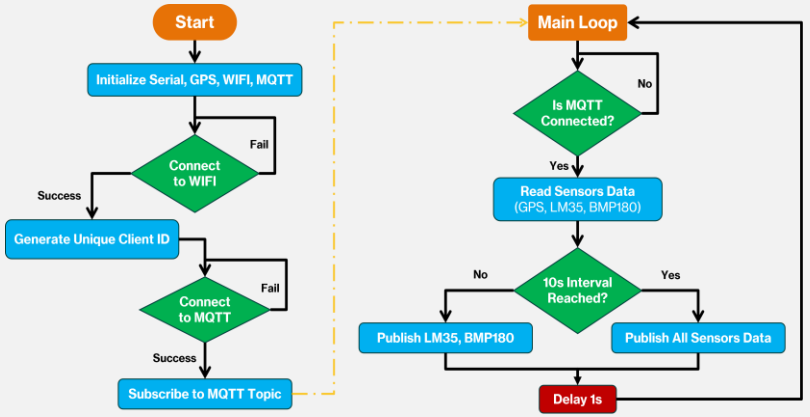
Collision Avoidance

- The two ultrasonics checks the distance in front and behind the robot. If an object is too close (≤20 cm) while moving, it either activates a buzzer (warning) or stops the robot and turns off the buzzer if the object is very close (≤10 cm).
- These distance readings are also sent to the mobile application for display.

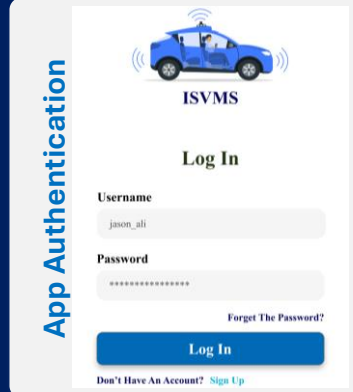
Forward Distance:	33 cm
Backward Distance:	26 cm
Right Distance:	17 cm

IoT & Maintenance

The ESP32 connects to WiFi and publishes GPS, temperature (LM35 & BMP085), and pressure data to an MQTT broker. It sends GPS updates every 10 seconds and continuously monitors sensor values on node-red dashboard.

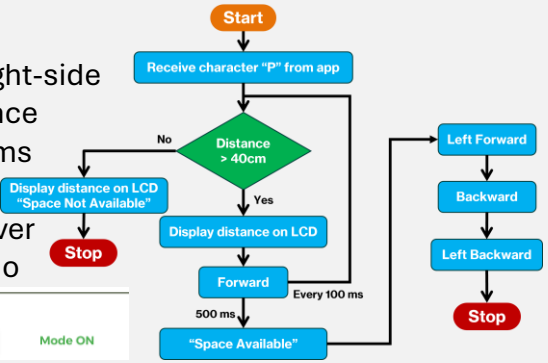


App Authentication



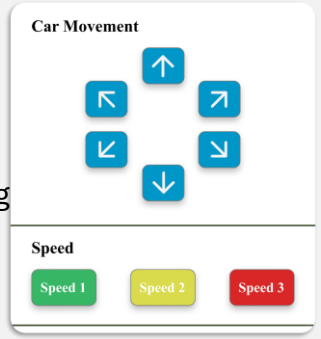
Auto Parking

The car automatically parked by checking the right-side distance using an ultrasonic sensor. If a free space (≥30 cm wide) is detected consistently, it confirms availability, displays "SPACE Available" on the LCD, and executes a predefined parking maneuver using a sequence of directional movements. If no space is found, it displays "NO SPACE".

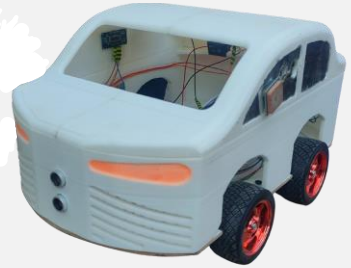


Vehicle Control

The microcontroller received command to control the car movement and motor speed. It executes actions like moving turning, stopping, or changing speed based on the received command.



Our Car



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