



RAPID RESCUE:

Vehicle Crash Sensing and Emergency Solutions



THE TEAM...

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PROBLEM STATEMENT

Delays in reporting vehicle accidents and unclear location data can hinder timely emergency response, risking severe outcomes.

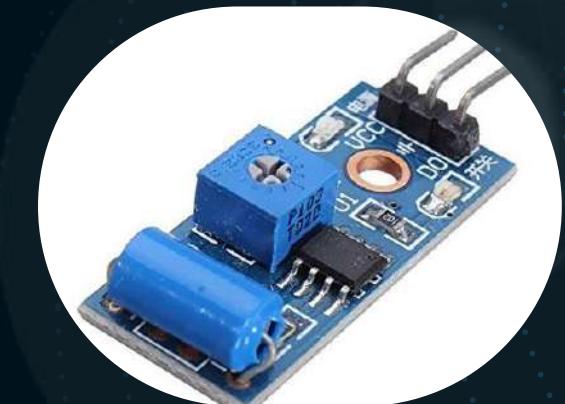
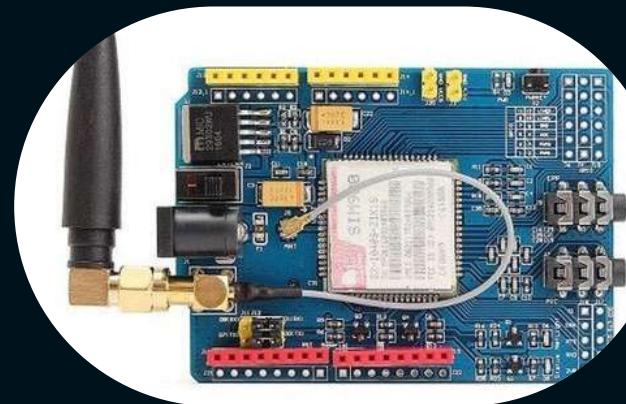
A system is needed that detects accidents instantly, locates them accurately, and alerts emergency services for rapid rescue.

Introduction

Rapid rescue vehicle technologies represent a significant innovation in emergency response systems. These technologies are designed to detect vehicle crashes promptly and mobilize emergency services effectively. The integration of sensors and communication systems enables real-time data transmission, reducing response times significantly.



Components and Tools



Arduino Uno – manages movements and sensor controls

GPS module v1.0 – Location Tracking

GSM module Sim900D – enabling wireless communication (sms)

Vibration Sensor SW420 – detects sudden vibrations or impacts

IR Sensor SW420 – Seatbelt Detection



MQ3 Gas Sensor – Alcohol Detection

Relay Module – Controlling the motor

Buzzer – Alert Alarm

LM016L – LCD Display

Simple DC Motor

Working

- 1) **Accident Detection:** GPS module captures latitude and longitude from satellites when an accident occurs.
- 2) **Data Processing:** Location data is sent to Arduino Uno for processing.
- 3) **Local Display:** Processed data is shown on an LCD screen.
- 4) **SMS Alert:** GSM modem sends accident location to a registered mobile phone via SMS.
- 5) **Web Dashboard:** Displays nearby hospitals for quick access by emergency services.
- 6) **Notifications:** Sends accident details to emergency responders, insurance companies, and relatives/friends.

Use Cases and Applications

Accident Detection: Sensors trigger alerts after detecting impact or deceleration.

Emergency Alerts: Sends SMS with accident details and location.

Health Monitoring: Alerts for unsafe conditions like seatbelt or alcohol use.

Insurance Reporting: Automatically sends accident data to insurers.

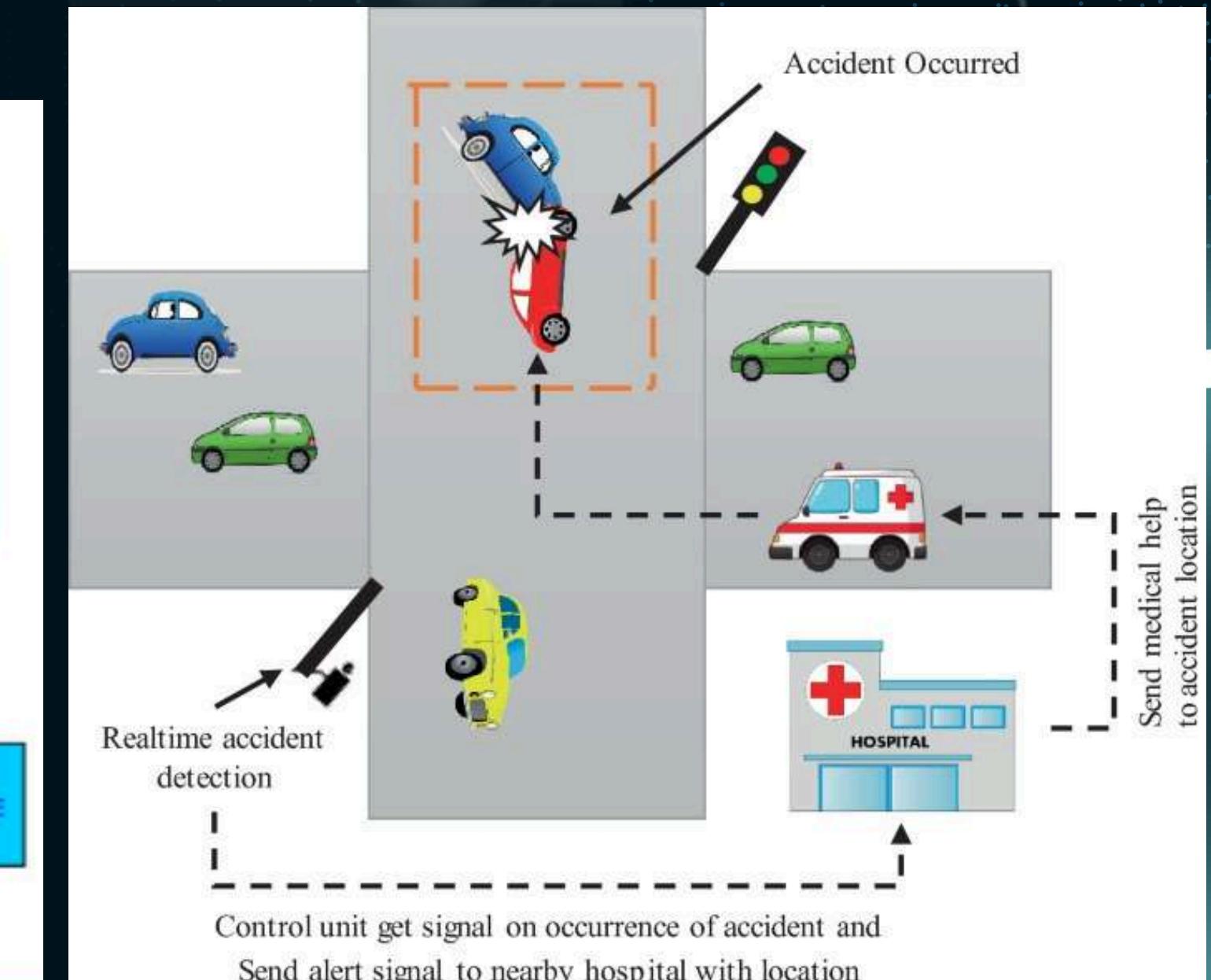
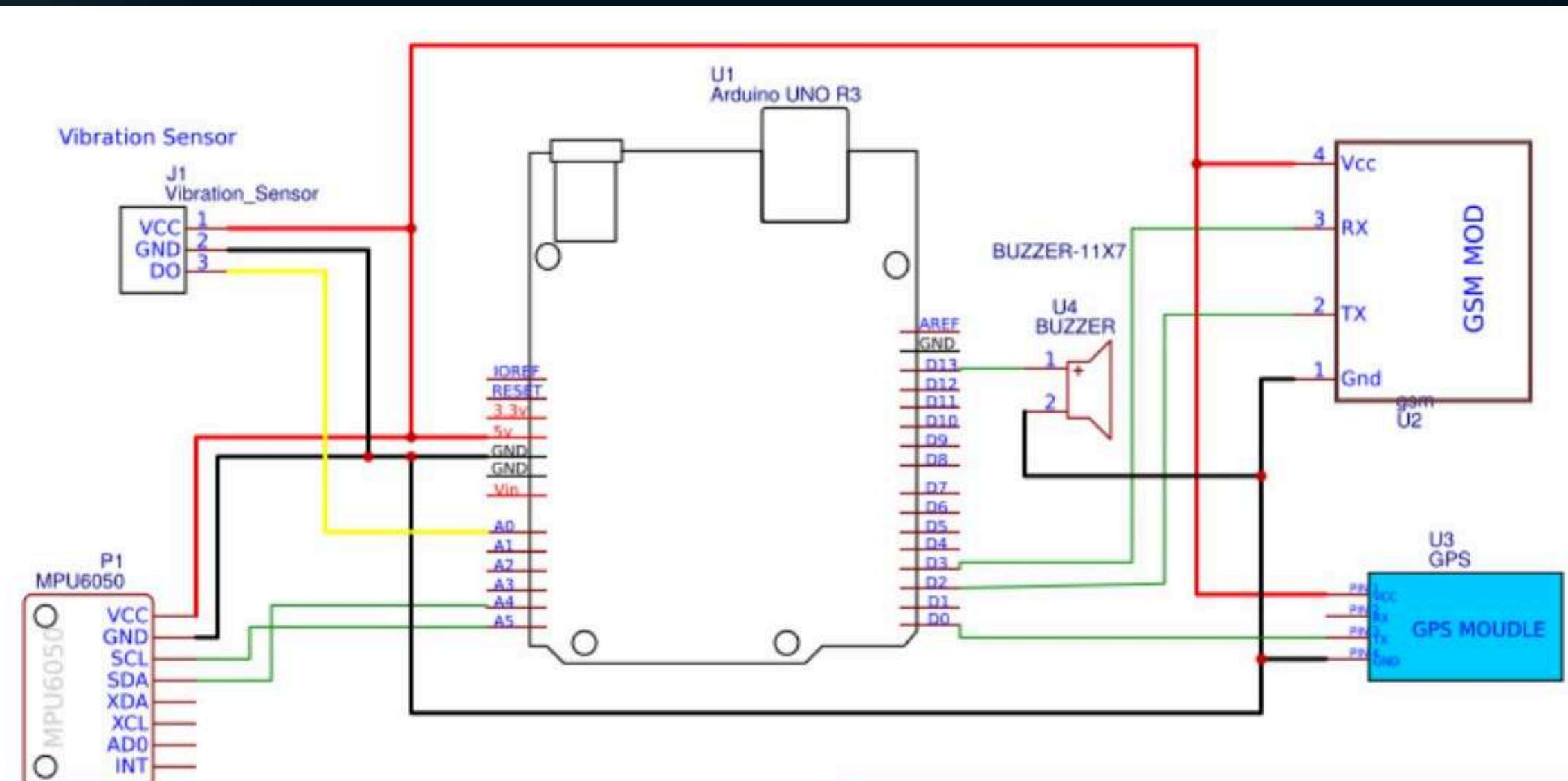
Rescue Coordination: Connects with nearby rescue services.

Accident Data Analysis: Data helps improve vehicle safety and crash research.

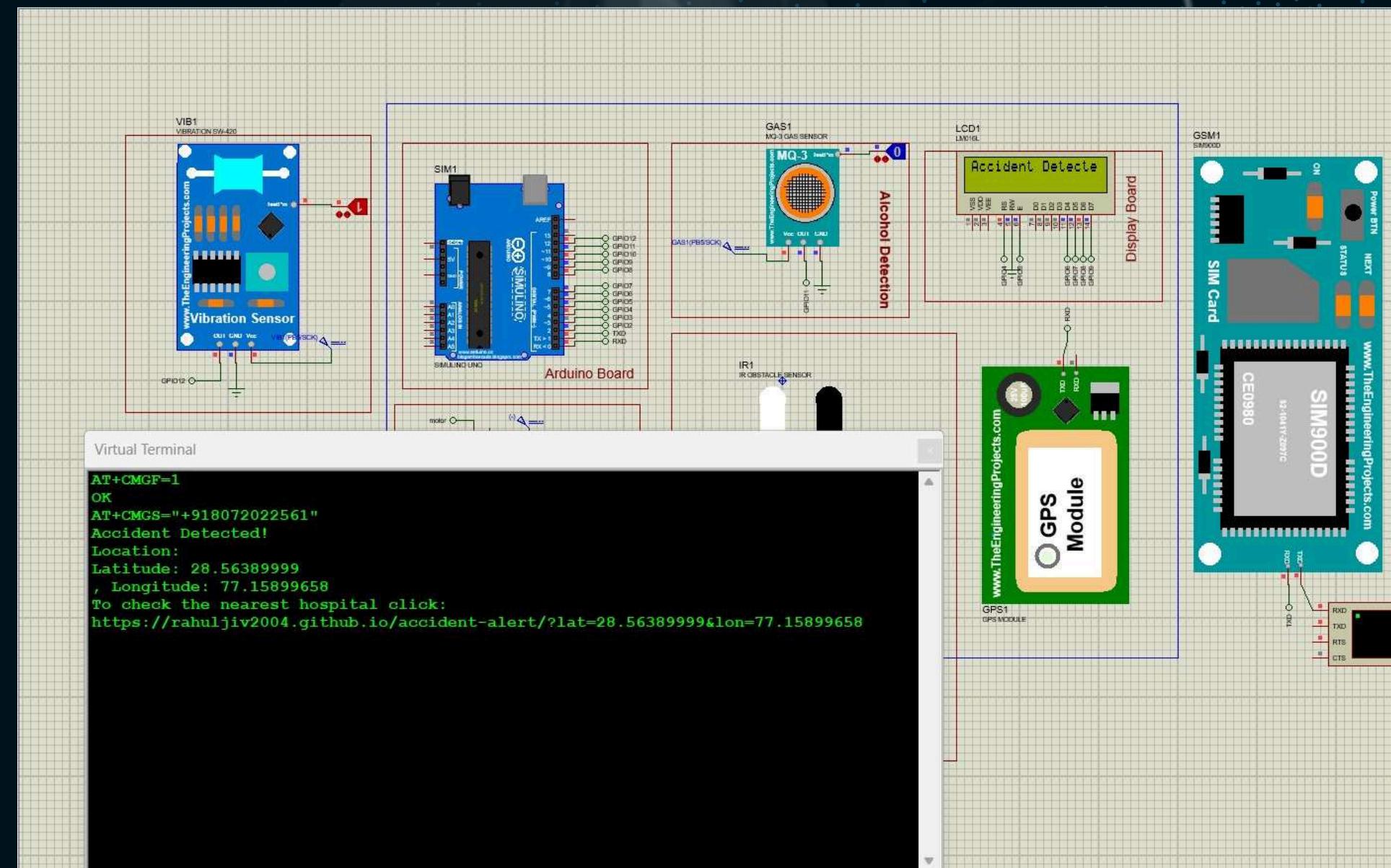
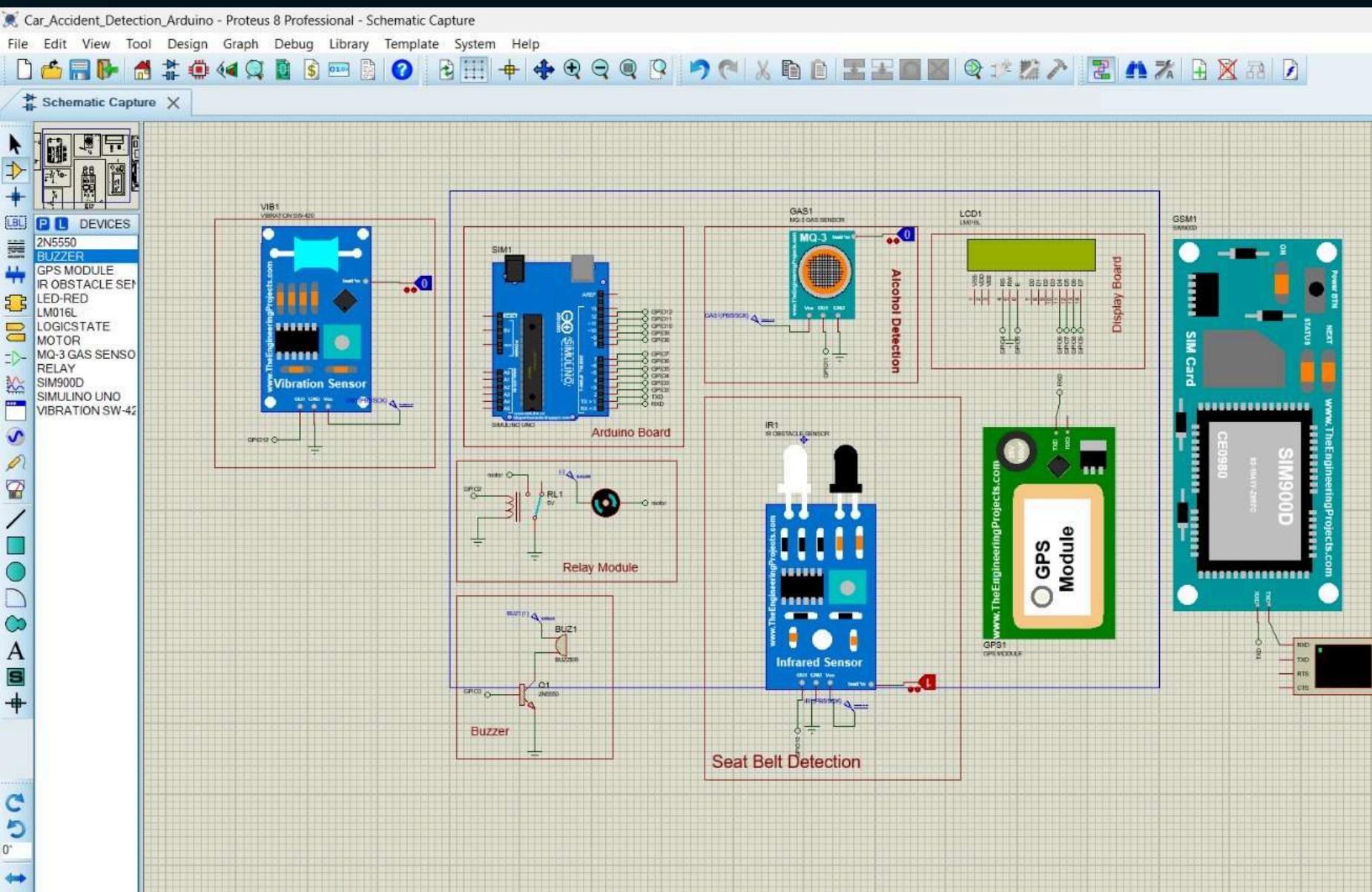
Public Safety: Enhances safety in public transport and fleets.



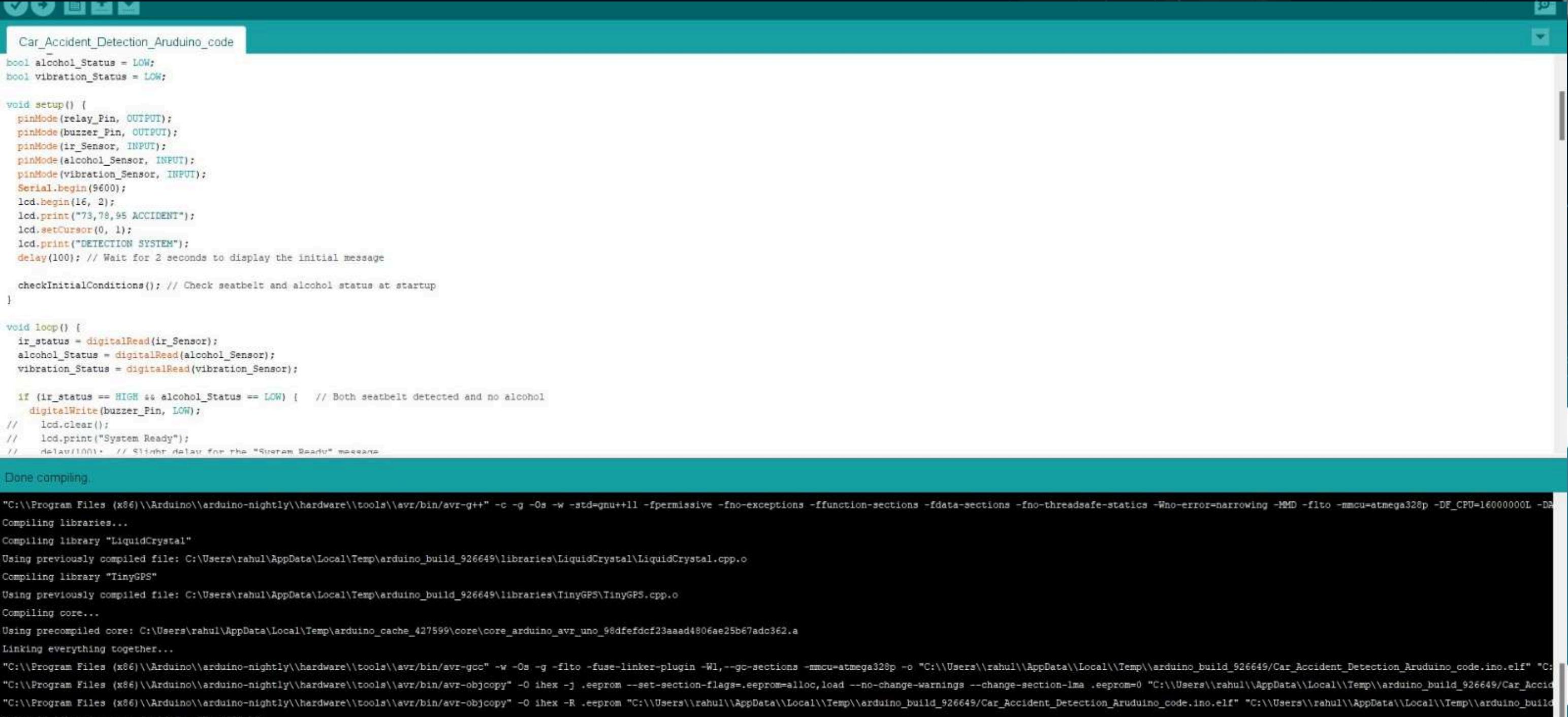
Schematics & WorkFlow



Simulation Images



Simulation Images



The screenshot shows the Arduino IDE interface with the following details:

- Title Bar:** Car_Accident_Detection_Arduino_code
- Code Area:** Displays the C++ code for the Arduino sketch. The code initializes pins, sets up LCD display, and defines sensor and relay behaviors. It includes logic to detect both seatbelt and no alcohol simultaneously.
- Output Area:** Shows the terminal output of the compilation process. It includes the command used ("avr-g++"), the path to the core file, and the paths for libraries like LiquidCrystal and TinyGPS. The output ends with the message "Done compiling".

Working

Use Cases and Applications

Schematics & WorkFlow

Simulation Images

DashBoard

Dashboard

Nearby Hospitals

rahuljiv2004.github.io/accident-alert/?lat=28.7041&lon=77.1025

73,78,95 ACCIDENT ALERT SYSTEM

Nearby Hospitals

Kanta Sethi Hospital
Distance from accident spot: **0.48 km**
[View More](#)

Family Hospital
Distance from accident spot: **0.51 km**
[View More](#)

Tamish
Distance from accident spot: **0.54 km**
[View More](#)

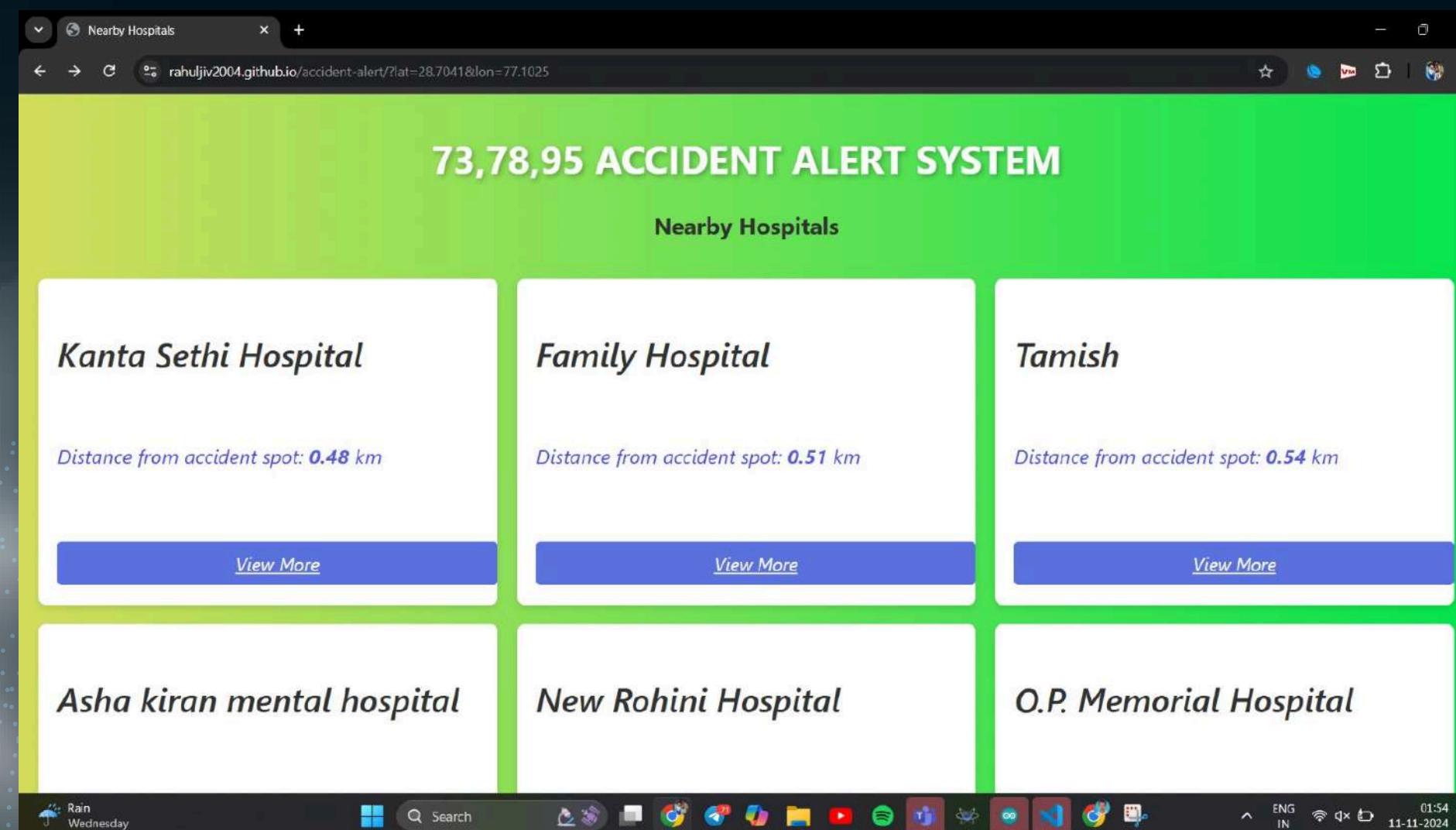
Asha kiran mental hospital

New Rohini Hospital

O.P. Memorial Hospital

Rain Wednesday

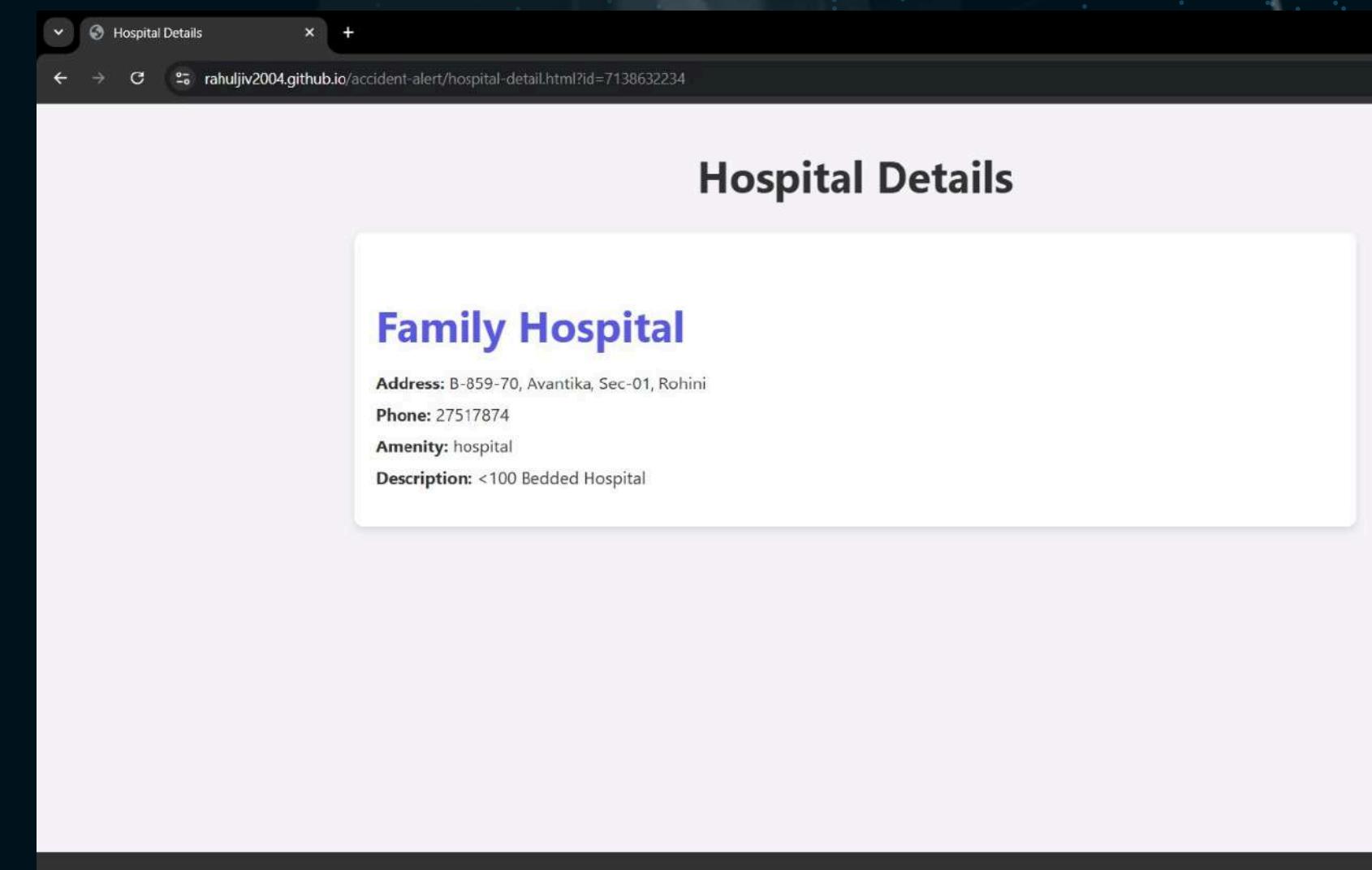
01:54 11-11-2024



Hospital Details

Family Hospital

Address: B-859-70, Avantika, Sec-01, Rohini
Phone: 27517874
Amenity: hospital
Description: <100 Bedded Hospital



Working

Use Cases and Applications

Schematics & WorkFlow

DashBoard

Future Scope

Future Scope

- 1. MPU6050 Gyroscope Integration:** Replacing vibration sensors with the MPU6050 gyroscope and ML models can enhance accident severity detection.
- 2. Real-time Impact Analysis:** ML can predict injury severity, vehicle damage, and secondary collisions for better crash-response.
- 3. Predictive Prevention:** ML can forecast accidents based on driver behavior and vehicle data.
- 4. Autonomous Vehicle Integration:** ML systems will ensure safety in autonomous vehicles by detecting and assessing accidents.
- 5. Multi-sensor Fusion:** Combining sensor data can improve detection accuracy.
- 6. Crowdsourced Data:** Crowdsourced data can enhance ML models for real-time accident prediction.



Literature Survey

- **Pachipala Yellamma (2021):** Yellamma, P. (2021). "Arduino-based Automatic Accident Detection and Location Communication System." International Journal of Engineering Research & Technology (IJERT), 9(4), 1–6.

This paper discusses a low-cost Arduino-based system for accident detection and communication.

- **Souvik Roy (2020):** Roy, S. (2020). "Automated Accident Alert System Using Arduino UNO." International Journal of Computer Applications (IJCA), 175(3), 22–26.

This research focuses on an automated system to alert family members during accidents using sensors and GPS.

- **Adnan M. Al-Smadi (2019):** Al-Smadi, A. M. (2019). "Collision Detection and Prevention System for Vehicles Using Ultrasonic Sensors." International Journal of Advanced Research in Computer Science and Software Engineering, 9(4), 25–30

This paper explores a collision detection system using ultrasonic sensors to prevent accidents.

- **P. Ramya (2018):** Ramya, P. (2018). "Driver Fatigue and Alcohol Detection System for Accident Prevention." International Journal of Science and Research (IJSR), 7(5), 56–60.

The study focuses on detecting driver fatigue and alcohol consumption to prevent accidents.



THANK
YOU

