24CYS333 – Internet of Things

Team: IoT#05

1. Fine – Tuned Project Topic:

GPS-Enabled IoT Taxi Safety and Route Monitoring System with Office Alert Integration.

2. Hardware Resource Mapping:

1. **Arduino:**

Acts as the central microcontroller for processing and managing input from various sensors and modules.

2. **GPS Module:**

Tracks the vehicle's real-time location and transmits coordinates for route monitoring.

3. **GSM/GPRS Module:**

Facilitates wireless communication by sending alerts, location data, and emergency notifications to the central office or preconfigured phone numbers.

4. **ESP32:**

Serves as a microcontroller with built-in Wi-Fi and Bluetooth capabilities for advanced connectivity.

Reduces the need for additional modules due to its multifunctionality.

5. **Speed Sensor:**

Measures the vehicle's speed and provides data for monitoring driving behavior.

6. **Alert Button (Push Button)**

Serves as a manual trigger for sending distress signals to the central office.

7. **Accelerometer/Gyroscope**

Detects sudden movements, tilts, or impacts, indicating accidents or unsafe driving behavior.

8. **Power Supply (Li-ion Battery Pack or Vehicle Power Adapter)**
   Provides power to all system components for uninterrupted operation.

   Ensures system reliability during vehicle ignition off-state.

   Supports portable operation in emergencies with a rechargeable battery pack.

3. Literature Survey

1. Existing Solutions

- Many GPS systems track vehicle routes and send updates if the taxi goes off track (e.g., *Transight*).
- Ride-hailing apps like Uber and Ola let users share trip details with contacts for safety.
- Fleet management systems monitor location, speed, and driver behavior, with alerts for route issues.
- SOS buttons are commonly found in public vehicles and apps for emergencies.

2. Research Gaps

- **No Alerts to Offices**: Most systems alert passengers or their contacts but don't notify offices directly for quick action.
- **High Costs**: Many tracking systems are expensive and unaffordable for small taxi operators.
- **Limited Features**: Few solutions combine GPS, speed monitoring, and alert systems into a single, simple device.
- **Basic Alerts**: Existing systems lack smart alerts that combine route deviations, sudden stops, or an emergency button press.

3. Why Is This Project Important?

- **Better Safety**: Sending alerts directly to offices ensures faster responses to emergencies or route problems.
- **Affordable Design**: Using low-cost, multifunctional hardware like ESP32 makes the system affordable and easy to expand.

- **Easy to Use**: The hardware doesn’t rely on smartphones, making it ideal for taxis in areas with limited tech infrastructure.