Department:: **electrical**  Program: **BEE**

**OOP LAB PROJECT**

**Monday 11:45-E806**

# GROUP MEMBER NAME

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# Title**:**  real-time traffic analysis and notification alert system

**Objective:**

Develop a real time traffic analysis and notification system that provides users with timely alerts about traffic conditions accidents, emergency and road closures .the system should also offer a user friendly interface to visualize traffic data and send notification based on user defined parameters .

Ensuring the accuracy and time lines of traiffic data .

Managing user privacy and data security .

Handling high volumes of data and notification efficiently .

Safety alerts .

Real time traffic data .

# **Problem Statement:**

The goal is to improve overall traffic management and enhance road safety for all users .the system will utilize advanced algorthim to analze traffic data and identify risky paths in real time.it aim to provide users with actionable notification to help them make informed travel decisions.

**My solution**:

1. Improved traffic management.
2. Cost .
3. AI technology continuously learns from new data, improving the accuracy of traffic predictions over time .
4. Road conditions are updated in real-time, allowing for immediate rerouting.
5. Provides data on all types of roads.

**Functional requirement:**

* Safety Notifications: The system must issue alerts for hazardous conditions, such as severe weather or road construction.
* User Preferences: The system must allow users to set preferences for the types of notifications they wish to receive (e.g., accidents, heavy traffic) and the distance for alerts.
* User Location Tracking: The system must allow users to share their location to receive personalized traffic alerts based on their current position.
* Traffic Alerts: The system must send notifications to users about traffic conditions, including accidents, road closures, and congestion levels.
* Real-Time Data Collection: The system must collect real-time traffic data from various sources, including traffic APIs, GPS data, and user reports.

**Non functional requirement:**

* Performance: The system must process and deliver traffic data and notifications within a specified time frame (e.g., under 5 seconds).
* Usability: The user interface must be intuitive and easy to navigate, allowing users to access information quickly.
* Reliability: The system must ensure high availability and uptime, with minimal downtime for maintenance or updates.
* Security: The system must implement robust security measures to protect user data and comply with data protection regulations

**List classes, obejects, method:**

|  |  |  |
| --- | --- | --- |
| **Class Name** |  | **Method** |
| **user** | -userId - name - location - preferences (notification types, distance) | - updateLocation() - setPreferences() - receiveNotification() |
| **Traffic data** | - dataId - timestamp - location - trafficCondition | - fetchData() - analyzeData() - getHistoricalData() |
| **notification** | - notificationId - userId - message - timestamp | - createNotification() - sendNotification() - scheduleNotification() |
| **Traffic analyze** | - analysisId - trafficDataList | - processTrafficData() - predictTrafficPatterns() - generateAlerts() |
| **map** | - mapId - currentView | - displayTrafficConditions() - updateMap() - zoomIn() - zoomOut() |
| **report** | - reportId - userId - reportType (accident, closure, etc.) - description | - submitReport() - fetchReports() - updateReport() |

**Procedure:**

User Registration and Setup: Users create an account and provide necessary information (name, email). Users grant location access and set notification preferences (types of alerts, distance).

Data Collection: The system continuously collects real-time traffic data from various sources (traffic APIs, GPS data, user reports).

Notification Generation: Based on processed data and user preferences, the system generates relevant notifications (e.g., accidents, road closures). Notifications are created and scheduled for delivery.

User Notification: The system sends alerts to users via push notifications or in-app messages. Users receive notifications on their devices, informing them of significant traffic events.

User Interaction: Users can view traffic conditions on the map interface and take appropriate actions (e.g., rerouting). Users can report traffic incidents or conditions back to the system.

Feedback Loop: User-reported data is collected and integrated into the system for real-time updates. The system updates its database with new information to improve future analyses.

Continuous Monitoring: The system continuously monitors traffic conditions and user locations, repeating the data collection and processing steps as needed.

## **Workflow diagram**

START:

user open application

END :Update data

Processing

process

Decision: user preference set?