DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
Project Based Learning (PBL)

Project Report

Batch No.B8

Project Title   : SAFETY AREA PREDICTION SYSTEM

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Class / Section   : CSE-B

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SAFETY AREA PREDICTION SYSTEM

Problem Statement:

Background

Ensuring personal safety has become a critical concern in today's world, especially for individuals traveling alone or in unfamiliar areas. Many urban and rural locations lack reliable systems to inform people about the safety of their surroundings. Women, in particular, often face heightened risks, making it imperative to have solutions that provide real-time safety assessments and enable immediate communication with trusted contacts during emergencies.

Current Challenges

Lack of Awareness: People are often unaware of crime-prone areas due to limited access to localized safety data.

Inefficient Alert Mechanisms: Existing safety solutions often rely on backend services or third-party integrations, making them less accessible to the average user.

Emergency Communication Delays: In unsafe situations, notifying family or friends about one's location and the risk can be time-consuming and challenging.

High Dependency on Expensive APIs: Many safety applications depend on costly APIs for geolocation, SMS, or notifications, making them inaccessible for free use.

Existing System:

In the current landscape, several systems and applications aim to enhance personal safety by leveraging technology. These systems typically provide features such as real-time location tracking, safety status updates, and emergency alert mechanisms. However, these solutions often come with limitations that make them inaccessible, impractical, or unaffordable for a significant portion of the population.

Components of Existing Systems:

Location Tracking and Safety Status:

Many mobile applications integrate GPS and map services (such as Google Maps) to provide location-based safety information. These systems rely on databases of reported crimes or community feedback to evaluate the safety of a particular area.

Emergency Alerts and Notifications:

Existing safety applications often include emergency alert features, allowing users to send SMS, emails, or app notifications to predefined contacts during a crisis. These alerts usually include the user's location and a brief message requesting help.

Crowdsourced Safety Data:

Some applications depend on user-contributed data, such as incident reports or safety reviews, to inform others about potentially unsafe areas.

Paid APIs and Subscription Services:

Many solutions rely on APIs for SMS services (e.g., Twilio, Textbelt) or mapping services (e.g., Google Maps API). These often come with costs, making the services unaffordable for users who require free or budget-friendly solutions.

Drawbacks / Disadvantages of existing system:

Cost and Accessibility:

Many existing platforms require paid subscriptions, usage-based APIs, or premium features, limiting accessibility for users who cannot afford such services.

Dependency on Internet Connectivity:

Existing solutions heavily rely on internet access, making them ineffective in remote or poorly connected areas.

Complexity in Implementation: Setting up and maintaining backend services, API integrations, or multi-step processes can be challenging for non-technical users or small-scale implementations.

Limited Customization:

Most applications offer generalized safety assessments, ignoring the specific needs of individuals or localized concerns.

Delayed Responses:

Manual or multi-step alert systems often delay crucial emergency notifications, reducing their effectiveness during critical moments.

Privacy Concerns:

Centralized storage of user data increases the risk of unauthorized access or misuse, discouraging adoption by privacy-conscious users.

Urban-Centric Focus:

Existing systems are often tailored to urban areas, neglecting the unique challenges of rural or semi-urban regions.

Proposed System:

The proposed Location Safety Tracker system aims to overcome the limitations of existing solutions by offering a lightweight, user-friendly tool that prioritizes accessibility, cost-effectiveness, and efficiency.

This system integrates real-time geolocation tracking, safety status evaluation, and emergency alert functionality into a single platform. Users can determine the safety level of their current location based on crime data and share their live location with trusted contacts through WhatsApp, enabling immediate assistance in unsafe areas.

Unlike existing systems, the proposed solution eliminates the need for expensive APIs, backend infrastructure, or subscription fees. It leverages free and open-source mapping services to provide safety assessments and bypasses SMS services by using WhatsApp, a widely used messaging platform, to send alerts.

The system is designed to be accessible on any device with a browser, ensuring usability without additional installations or complex setups. It prioritizes user privacy by processing all data locally without storing personal information on external servers.

By focusing on simplicity and effectiveness, the proposed system ensures that users can quickly access safety information and alert their contacts during emergencies, bridging the gap left by current solutions.

Features of Proposed System:

Real-Time Safety Assessment:
The system uses geolocation to evaluate the safety of the user's current area based on preloaded crime data and displays the result on a user-friendly map.

Emergency Alert via WhatsApp:
Users in unsafe areas can send an emergency alert to their trusted contacts, sharing their live location through WhatsApp for immediate assistance.

Free and Open-Source:
The system relies on free mapping services and WhatsApp's API, eliminating costs associated with premium APIs or SMS services.

Ease of Use:
Designed as a browser-based tool, the system ensures accessibility without requiring complex installations or technical expertise.

Privacy Focused:

All data is processed locally without external storage, ensuring that user privacy is maintained.

Suggestions for Unsafe Areas:

The system provides actionable safety tips and alternative options when a user is in an unsafe area, empowering them to make informed decisions.

Lightweight Implementation:

The solution is lightweight and doesn't require backend infrastructure, making it suitable for individual users or small communities.

System Design / Prototype / Flowchart:

User opens the application.

The system detects the user's location.

The system evaluates the safety of the area based on crime dataset.

If unsafe:

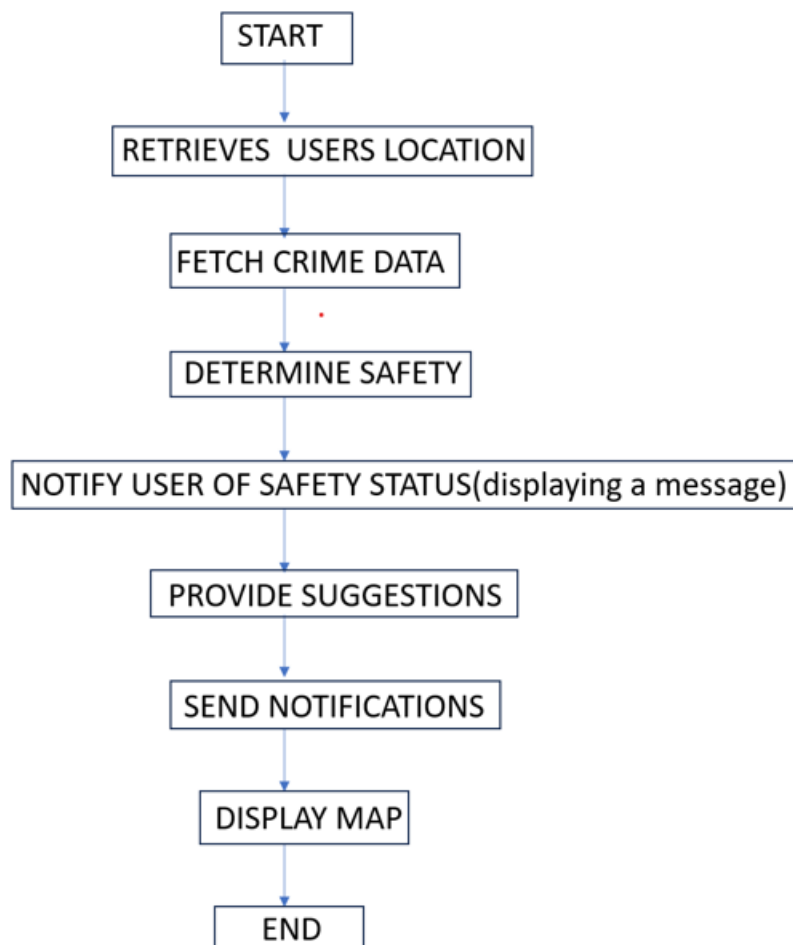   Displays a warning message.

      Provides safety suggestions.

      Enables the emergency alert button.

      Optionally allows the user to view nearby safer locations.

If safe:

      Displays a safe message.

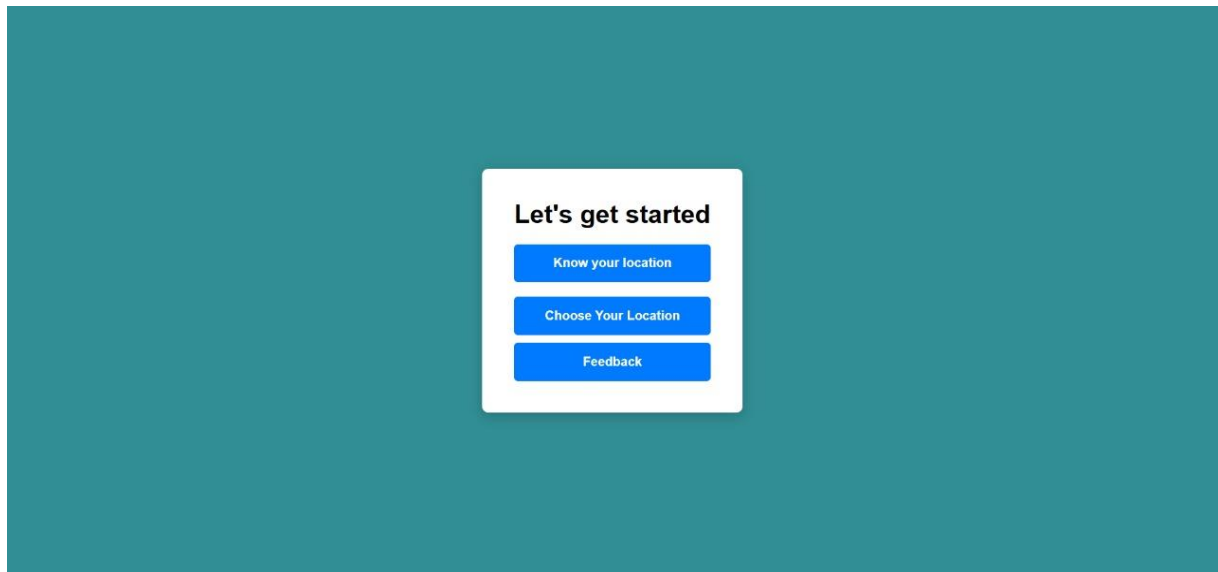   Optionally allows the user to view nearby safer locations.

```
                  ┌─────────────┐
                  │    START    │
                  └─────────────┘
                         │
                         ▼
          ┌──────────────────────────────┐
          │  RETRIEVES  USERS LOCATION    │
          └──────────────────────────────┘
                         │
                         ▼
             ┌────────────────────────┐
             │    FETCH CRIME DATA     │
             └────────────────────────┘
                         │
                         ▼
             ┌────────────────────────┐
             │    DETERMINE SAFETY     │
             └────────────────────────┘
                         │
                         ▼
   ┌─────────────────────────────────────────────────────┐
   │ NOTIFY USER OF SAFETY STATUS(displaying a message)   │
   └─────────────────────────────────────────────────────┘
                         │
                         ▼
             ┌────────────────────────┐
             │   PROVIDE SUGGESTIONS   │
             └────────────────────────┘
                         │
                         ▼
             ┌────────────────────────┐
             │    SEND NOTIFICATIONS   │
             └────────────────────────┘
                         │
                         ▼
                ┌──────────────────┐
                │   DISPLAY MAP    │
                └──────────────────┘
                         │
                         ▼
                  ┌─────────────┐
                  │     END     │
                  └─────────────┘
```

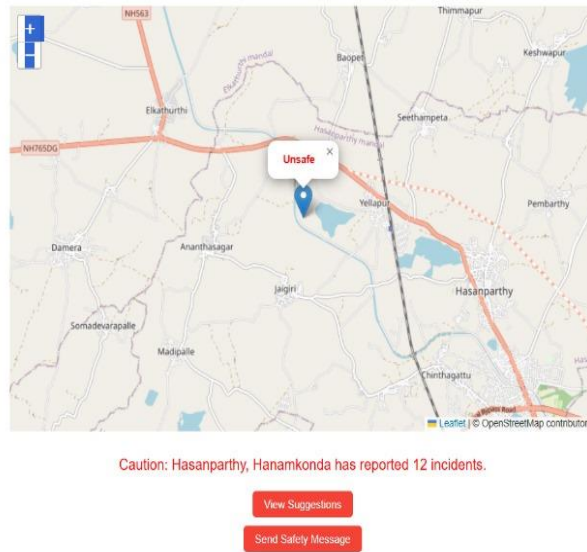## System Output / Screenshots

Fig 1: Home page
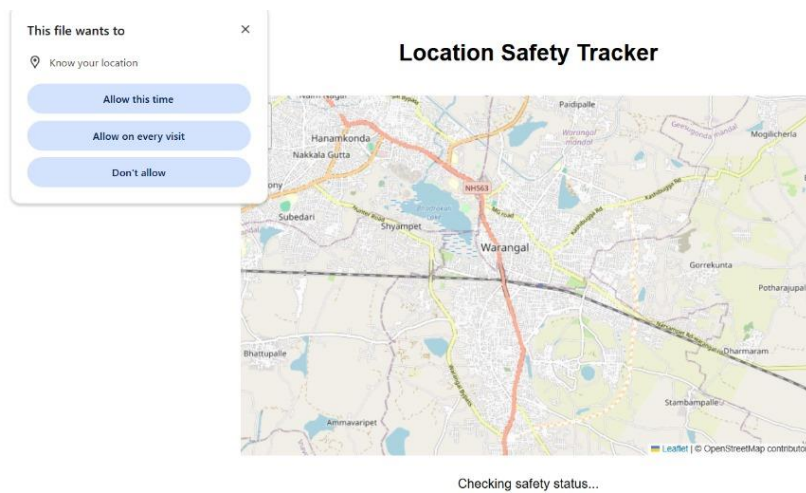
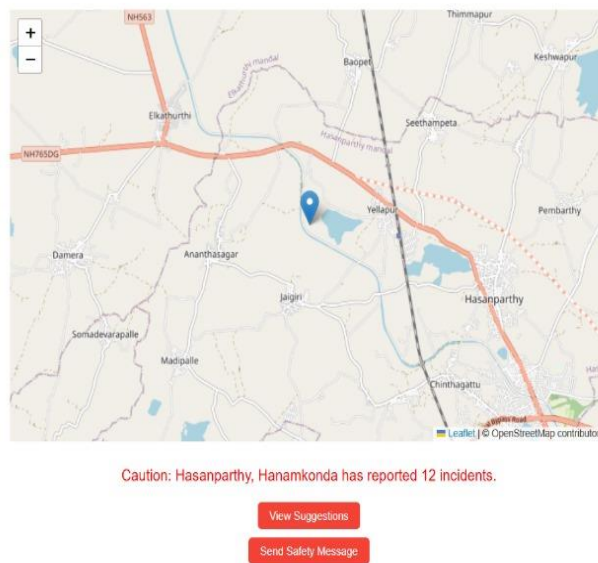Fig 2: Location Tracker

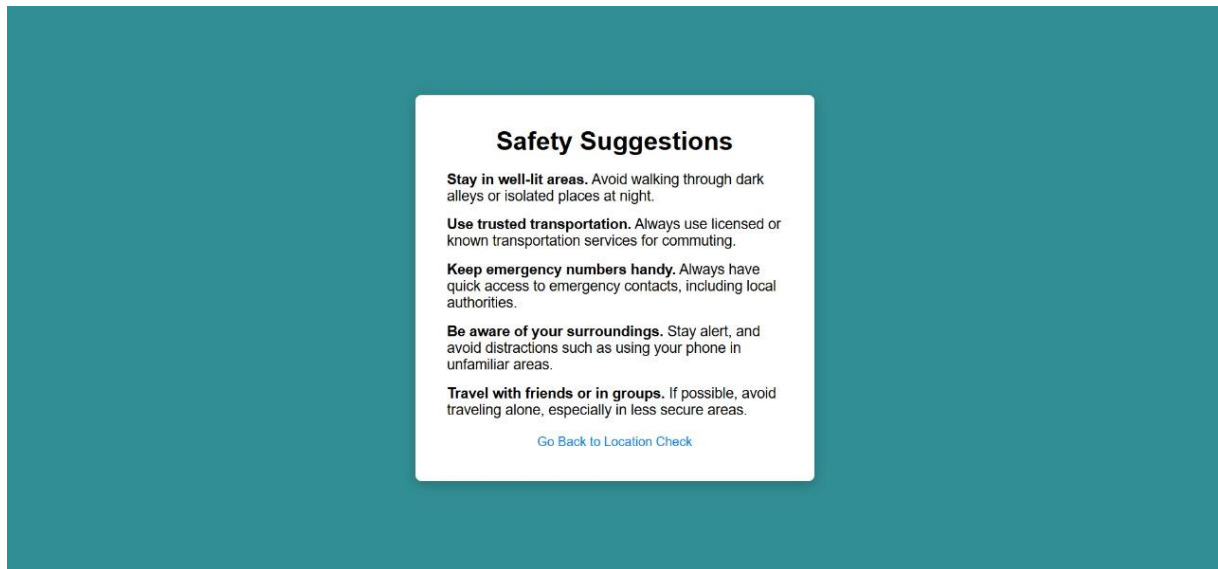Fig 3a: Geo-Safety Tracker

Fig 3b: Risk alert tracker

Fig 4: Precautionary Advice
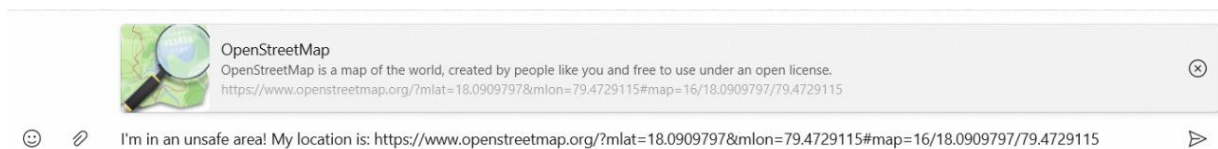
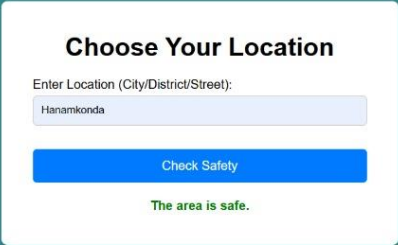Fig 5(a): Send Location via WhatsApp
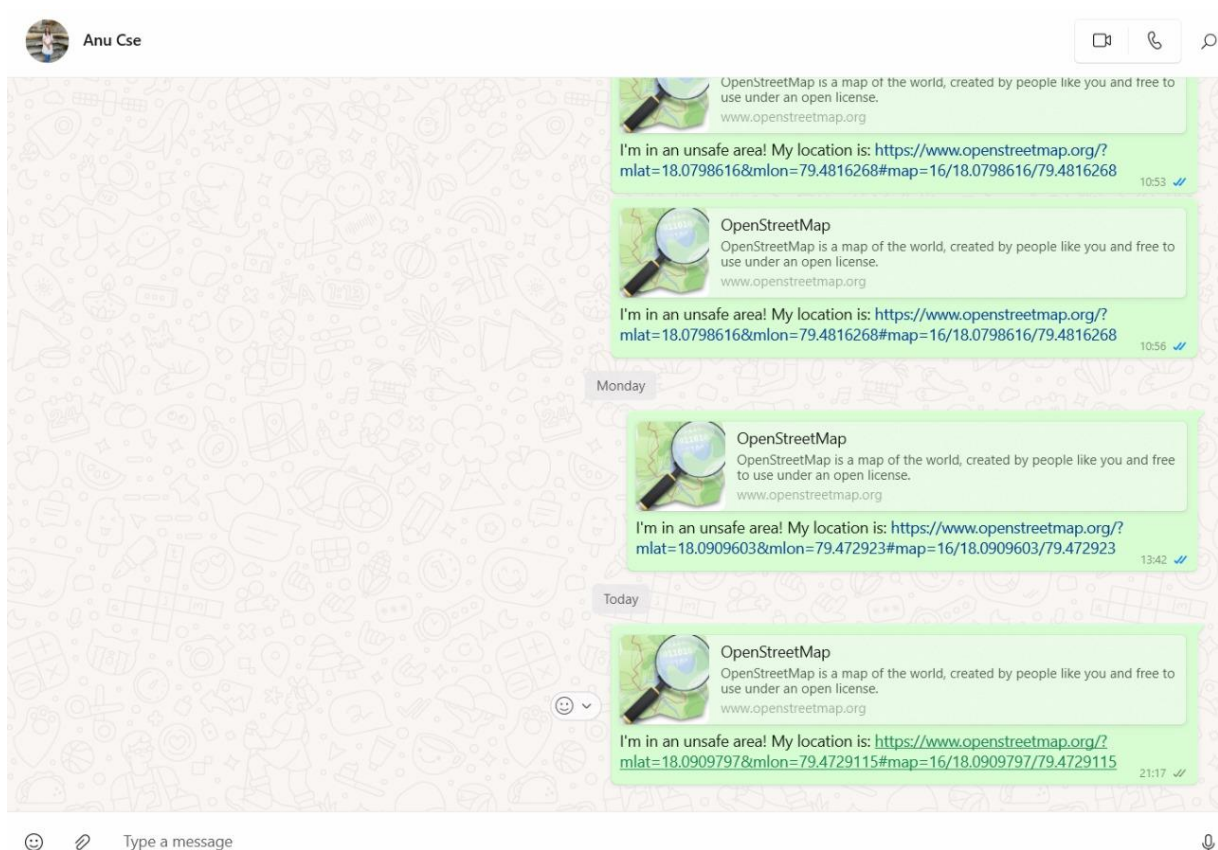
Fig 5(b): Real-Time Location Tracking via WhatsApp
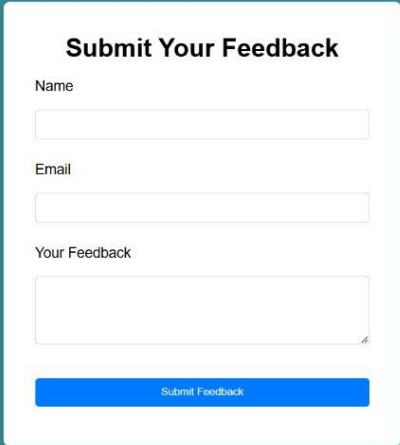
Fig 6: Searching a Risk-free area

Fig 7: Feedback form

Conclusion & Future Scope:

The Location Safety Tracker provides a cost-effective, user-friendly solution for enhancing personal safety. By integrating real-time safety assessments and emergency alerts through WhatsApp, the system addresses the limitations of existing platforms while prioritizing accessibility and privacy. Its lightweight, browser-based design makes it a practical tool for individuals without requiring technical expertise or costly infrastructure.

In the future, the system can be expanded to include additional features such as community-driven safety reports, integration with wearable devices, and AI-based crime prediction models. Partnerships with local authorities could provide real-time updates on crime incidents, further improving the system's accuracy. The inclusion of multi-language support and offline capabilities would ensure broader accessibility, especially in remote areas with limited connectivity.

By continuously evolving, the Location Safety Tracker has the potential to become a comprehensive safety solution, empowering individuals and communities to navigate their environments confidently.