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# ROAD SAFETY AND ACCIDENT ALERT PLATFORM

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## ABSTRACT

Road accidents are a major cause of injuries and loss of life, particularly in developing countries. One of the main reasons for high accident fatalities is the delay in reporting accidents and providing emergency assistance. Many existing accident alert systems rely on GPS tracking, live map services, or paid APIs, which increases development cost and makes them unsuitable for students and small-scale implementations.

This paper presents a Road Safety & Accident Alert Platform, a web-based system that enables users to report road accidents using a manual static map interface. By clicking on the map, the system captures X-Y coordinates, identifies the nearest predefined emergency contact, and sends an instant alert notification. The proposed system is simple, cost-effective, and independent of costly third-party APIs. It is developed using standard web technologies and is suitable for academic projects and small-scale real-world applications.

## I. INTRODUCTION

Road safety is one of the most critical concerns in modern transportation systems. With the rapid growth in the number of vehicles, road accidents have increased significantly, resulting in loss of human life, serious injuries, and economic damage. According to various studies, a major reason behind high fatality rates is the delay in reporting accidents and providing timely emergency assistance. In many situations, accident victims are unable to communicate their location, and bystanders may not have access to a quick and reliable reporting mechanism. With the increasing availability of web technologies, web-based solutions have emerged as a practical alternative for developing cost-effective and accessible applications. Web applications can be accessed easily through browsers without requiring additional hardware or software installation. However, most existing web-based accident alert systems still rely on live GPS data or map APIs, which again increases cost and complexity. To address these challenges, this project proposes a Road Safety & Accident Alert Platform, a simple and efficient web-based system designed to report road accidents without using GPS or paid map services. The proposed system uses a manual static map interface, where users can report an accident by clicking on the location displayed on the map. The system captures the X-Y coordinates of the click, processes them on the server side, and identifies the nearest predefined emergency contact from the database.

## II. METHODOLOGY

The methodology adopted for the development of the Road Safety & Accident Alert Platform follows a systematic and structured approach to ensure reliability, scalability, and ease of implementation. The system is developed using a modular methodology, where each phase is carefully planned and executed to achieve the desired objectives. The complete methodology is divided into the following stages:

### 1. Requirement Analysis

The first phase involves analyzing the problem of delayed accident reporting and studying existing road safety and accident alert systems. Various solutions based on GPS, IoT devices, and live map APIs were reviewed to understand their advantages and limitations. From this analysis, key requirements of the proposed system were identified, such as low cost, simplicity, minimal dependency on third-party services, and ease of use for common users. Functional and non-functional requirements were documented to guide the system design and development process.

**2. System Design** In this phase, the overall architecture of the system is designed. The system follows a three-tier architecture consisting of a presentation layer, application layer, and database layer. The design focuses on modularity to simplify future enhancements and maintenance. User interaction flow, data flow, and alert

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generation mechanisms are clearly defined. Static map layout, coordinate capturing logic, and nearest contact identification strategy are planned during this stage.

**3. Frontend Development**

The frontend of the system is developed using HTML, CSS, and JavaScript to provide a clean and user-friendly interface. A static road map is displayed to the user for accident reporting. JavaScript event handlers are used to detect mouse click events on the map and capture the corresponding X-Y coordinates. The interface is designed to be simple and responsive so that users can report accidents quickly without technical difficulty.

**4. Backend Development**

The backend logic is implemented using PHP / Python / Java, depending on the system configuration. The backend processes the captured coordinates received from the frontend and performs calculations to identify the nearest predefined emergency contact. Business logic for alert generation, data validation, and system security is handled at this layer. Server-side scripting ensures efficient processing and accurate decision making.

**5. Database Design and Integration**

A MySQL database is used to store user information, predefined emergency contacts, and coordinate data. Database tables are designed to efficiently manage location information and contact details. SQL queries are used to retrieve and compare coordinate values to determine the nearest emergency contact. Secure database connectivity is ensured to prevent unauthorized access.

**6. Alert and Notification Mechanism**

Once the nearest contact is identified, the system generates an instant alert notification. This alert can be implemented using email notifications or internal system alerts. The alert message contains essential information related to the accident location and time, enabling faster response. This mechanism plays a crucial role in reducing emergency response time.

**7. Testing and Validation**

The system undergoes multiple testing phases to ensure accuracy and reliability. Functional testing is performed to verify correct working of each module. Integration testing ensures smooth communication between frontend, backend, and database components. User testing is conducted to evaluate usability and system responsiveness. Errors identified during testing are corrected to improve overall system performance.

**8. Deployment and Evaluation**

After successful testing, the system is deployed on a web server for real-time access. System performance is evaluated based on response time, accuracy of nearest contact identification, and ease of use. Feedback is collected to identify possible improvements and enhancements for future development.

## III. MODELING AND ANALYSIS

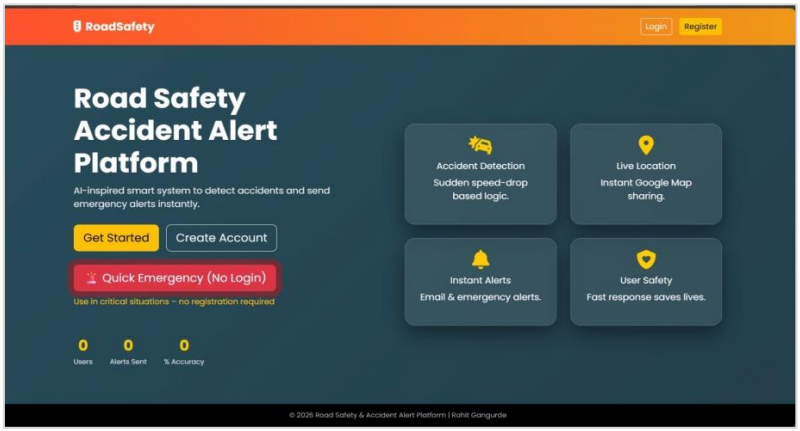


**Figure 1:** Project Home Page.

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**WORKING**

Project Overview:

The Road Safety & Accident Alert Platform is a web-based emergency alert system designed to reduce the delay in reporting road accidents and improve response time. The project focuses on providing a simple, cost-effective, and user-friendly solution for accident reporting without relying on costly GPS devices or paid map APIs.

The working of the proposed system is explained in the following steps:

- User accesses the web application.
- A static road map is displayed on the screen.
- User clicks on the accident location on the map.
- The system captures X-Y coordinates of the click.
- Backend logic processes the coordinates.
- The nearest emergency contact is identified.
- An instant alert notification is sent.

Expected Outcomes:

Faster accident reporting compared to manual or traditional methods. Reduced dependency on costly GPS devices and third-party map APIs. Simple and user-friendly interface suitable for non-technical users. Accurate identification of the nearest predefined emergency contact. Improved emergency response time due to instant alert notifications. Cost-effective solution suitable for students and small-scale applications. Scalable system architecture that allows future enhancements.

## IV. RESULTS AND DISCUSSION

The Road Safety & Accident Alert Platform was implemented and tested to evaluate its performance, usability, and effectiveness in reporting road accidents. The system was tested under different scenarios such as map click detection, coordinate capturing, nearest contact identification, and alert notification generation.

**System Performance Results**

During testing, the system successfully captured the X-Y coordinates when the user clicked on the static map. The backend processed these coordinates accurately and identified the nearest predefined emergency contact stored in the database. The alert notification was generated and sent instantly after accident reporting.

The system showed stable performance even when multiple accident reports were submitted. Since the platform does not depend on GPS or live map APIs, the response time remained consistent and was not affected by network delays related to third-party services.

**Discussion**

The results clearly indicate that the Road Safety & Accident Alert Platform achieves its primary objective of reducing accident reporting delay. The use of static map-based click detection proves to be an effective alternative to GPS-based systems. While the system is currently designed for small-scale use, it offers a strong foundation for future enhancements such as GPS integration and real-time map support.

Overall, the proposed system demonstrates that efficient road safety solutions can be developed using basic web technologies, ensuring accessibility, affordability, and reliability.

## V. CONCLUSION

The Road Safety & Accident Alert Platform presented in this project provides a simple, efficient, and cost-effective solution to the problem of delayed accident reporting and emergency response. The system successfully demonstrates that road safety applications can be developed without relying on costly GPS devices or paid map APIs, making it suitable for students and small-scale implementations.

By using a manual static map interface, the system allows users to report accidents easily by clicking on the map. The captured X-Y coordinates are processed to identify the nearest predefined emergency contact, and an

instant alert notification is generated. This approach significantly reduces accident reporting time and improves the chances of receiving timely emergency assistance.

The results obtained during testing show that the system performs reliably and provides a user-friendly interface that can be used even by non-technical users. The absence of dependency on third-party services ensures consistent performance and reduces overall development and maintenance cost.

Overall, the proposed platform achieves its objective of improving road safety through a web-based emergency alert system. The project highlights the effective use of basic web technologies such as HTML, CSS, JavaScript, and MySQL to address real-world problems. The system also offers a scalable foundation for future enhancements, making it a practical and valuable solution for academic, prototype, and small-scale real-world applications.

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