A Real-Time Web-Based Road Accident Alert System Using Python Full Stack

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ABSTRACT

Road accidents remain a major public safety concern due to delayed communication between victims and emergency responders. This paper presents a real-time web-based Road Accident Alert System developed using a Python full-stack architecture to enable instant reporting and efficient coordination among emergency services. The proposed system allows users to report road incidents through a web interface, which are immediately routed to role-specific dashboards for police, ambulance, and fire departments. Flask is used for backend processing, while MongoDB ensures scalable and flexible data storage. The system eliminates manual reporting delays and provides structured incident logging, improving emergency response time and operational efficiency. Experimental results demonstrate that the system offers reliable real-time alerting and role-based access control, making it suitable for deployment in both urban and rural environments.

KEYWORDS

Road Safety, Accident Alert System, Flask, MongoDB, Web Application, Emergency Response

INTRODUCTION

Road accidents cause significant loss of life and property worldwide, often due to delays in emergency response. Conventional accident reporting methods rely heavily on phone calls, which are prone to miscommunication and response delays. With the increasing availability of web technologies, there is a need for a centralized, real-time platform that directly connects the public with emergency services. This paper proposes a web-based Road Accident Alert System that enables users to report incidents instantly and allows emergency departments to monitor

and respond through dedicated dashboards. By leveraging modern full-stack technologies, the system ensures fast communication, secure access, and structured data management.

LITERATURE SURVEY

Several studies have explored technology-driven solutions for accident detection and emergency alerting. GPS- and GSM-based systems automate accident detection but depend on specialized hardware and lack public accessibility. IoT-based traffic monitoring solutions provide real-time insights but require costly infrastructure, limiting scalability in low-resource regions. Crowd-sourced navigation applications allow hazard reporting but are not integrated with official emergency services.

These limitations highlight the need for a lightweight, web-based, multi-role emergency alert platform that does not depend on external hardware and supports direct public participation.

EXISTING SYSTEM

The existing road accident reporting system mainly relies on manual communication methods. Accident information is usually reported through phone calls or emergency helplines. There is a significant delay between accident occurrence and emergency response. Human dependency in reporting leads to inaccurate or incomplete information. Emergency services often receive limited location details. Traffic police and ambulance services operate independently with poor coordination. Many accident victims do not receive timely medical assistance. Traditional systems lack real-time monitoring capabilities. There is no centralized digital platform for accident data management. Accident data is often stored in offline or paper-based records. Existing systems do not support automated alerts to nearby hospitals. Public witnesses may hesitate or fail to report accidents promptly. GPS-based location tracking is rarely integrated. Accident severity assessment is done manually. Data analysis for accident-prone zones is limited. Existing systems cannot provide live status updates to authorities. Scalability issues arise during high traffic or disaster situations. Lack of integration with web and mobile technologies reduces efficiency. There is minimal use of cloud infrastructure for reliability. Overall, the existing system is inefficient, time-consuming, and prone to human error.

PROPOSED SYSTEM

The proposed system is a real-time Road Accident Alert System that enables civilians to report road emergencies

through a web interface. Reports are instantly stored in the database and displayed on dashboards specific to police, fire, and ambulance departments.

SYSTEM ARCHITECTURE

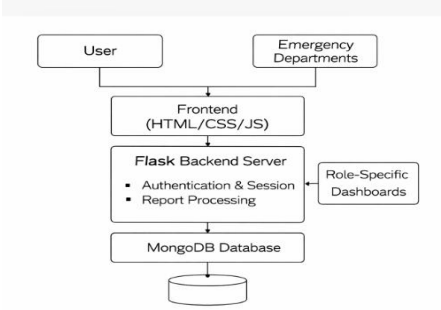

Fig 1: Architecture of A Real-Time Web-Based Road Accident Alert System

METHODOLOGY DESCRIPTION

The proposed Road Accident Alert System allows users to report road accidents through a web interface after secure login. The frontend collects incident details and sends them to the Flask backend for validation and processing. The backend categorizes the incident and stores it in the MongoDB database. Based on the type of emergency, alerts are automatically routed to the respective police, ambulance, or fire department dashboards, enabling real-time monitoring and faster response.

RESULTS AND DISCUSS

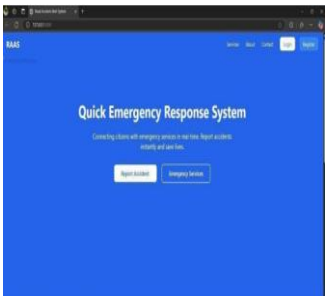

Fig 2: Login Page

The home page of the Road Accident Alert System provides a simple and user-friendly. It allows users to instantly report accidents and access emergency services, ensuring fast response and improved public safety.

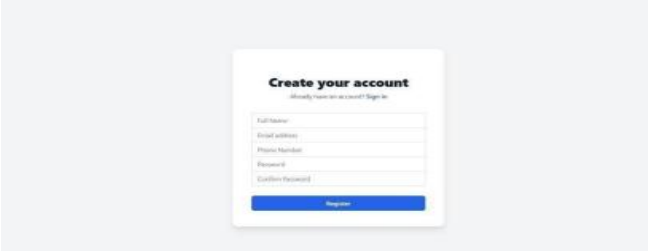

Fig 3: User Registration Page

The user registration page allows new users to create an account by entering basic details secure. This ensures secure access to the system and enables authenticated users to report emergencies.

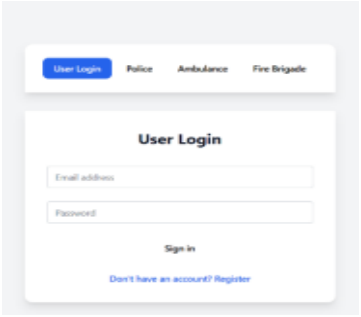

Fig 4: login Page

The user login page provides secure access for users and emergency departments through role

After successful authentication, users are redirected to their respective dashboards to report or manage emergencies.

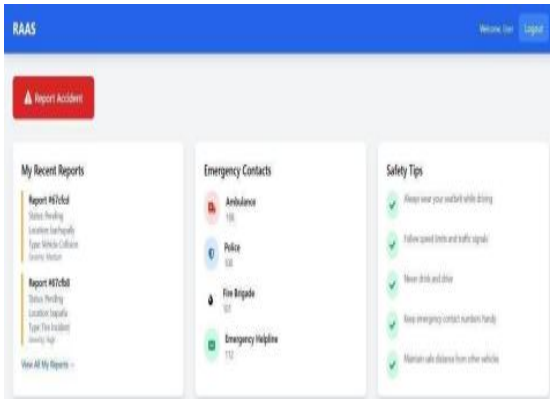

Fig 5: Home Page

The user dashboard displays recent accident reports, emergency contact details.

It helps users quickly report new incidents and stay informed about emergency services and road safety guidelines.

Fig 6: User Report Page

The report accident page allows users to submit emergency details such as location, incident type, and severity. Once submitted, the information is instantly sent to the backend and displayed on the respective emergency department dashboard for quick response.

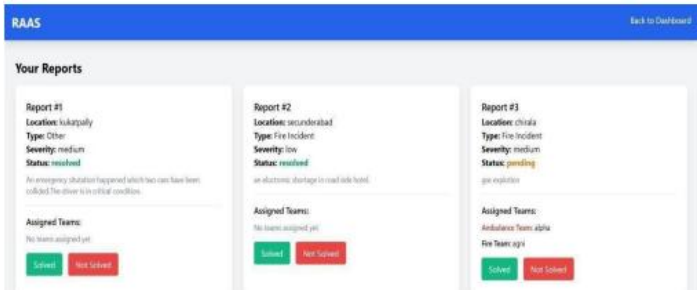

Fig 7: Reports Page

The reports page displays all accident reports submitted by the user along with their status. It helps users track whether incidents are solved or pending and shows the assigned emergency teams for each report.

CONCLUSION

The Road Alert System provides a centralized, role-based platform to handle different types of emergencies efficiently. Through its streamlined login, reporting, and routing mechanism, the system ensures that incidents are categorized and delivered to the appropriate department—ambulance, fire, or police—without delay. The project simplifies emergency communication, reduces response time, and promotes quick decision-making. By using a lightweight architecture and logical flow instead of complex dependencies, it ensures

ease of implementation and deployment for real-time emergency management.

FUTURE SCOPE

The Road Accident Alert System can be enhanced in the future by integrating GPS-based location tracking to automatically capture the exact accident location. A mobile application with push notifications can be developed for faster reporting and instant alerts. The system can also incorporate AI-based severity prediction to prioritize emergencies and improve response efficiency. Additionally, data analytics and reporting dashboards can be added to analyze accident patterns and support better road safety planning.

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