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Smart Accident Reporting System

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Abstract: ***The Smart Accident Reporting System is designed to address this problem by enabling rapid accident reporting and efficient coordination between citizens, police, and ambulance services. The system allows users to report accidents using GPS-based location capture, ensuring accurate identification of the incident site. It provides role-based dashboards for citizens, police, and ambulance personnel, enabling each user type to access relevant information and respond effectively. Real-time updates are implemented using WebSocket technology to ensure instant notification and communication among responders. Additionally, integrated map routing helps emergency responders navigate quickly to the accident location. The system is developed using a modern web technology stack including Node.js and Express for backend services, MySQL for database management, Socket.IO for real-time communication, and HTML, CSS, and JavaScript for the frontend interface. Capacitor is used to enable mobile compatibility. By combining location tracking, real-time communication, and role based management, the system aims to reduce emergency response time and improve the efficiency of accident management.***

Keywords:
Accident Reporting, Location Capture, Data Processing, Real-time Notification, Emergency Dispatch, Map Routing, Incident Response, Status Tracking.

I. INTRODUCTION

Road accidents often result in serious losses due to delays in reporting and emergency response. The Smart Accident Reporting System provides a fast and reliable solution by enabling citizens to report accidents using GPS-based location tracking. The system notifies nearby police and ambulance services in real time, ensuring quick response. It includes role-based dashboards, real-time communication, and map routing for efficient coordination. Developed using Node.js, Express, MySQL, Socket.IO, and Capacitor, the system improves emergency response time and helps save lives.

II. SYSTEM ANALYSIS

A. *Existing System*

Accident reporting relies on traditional methods such as phone calls, informing nearby police, or bystanders sharing information. Sometimes, general apps are used to manually send location details. These methods are mostly manual and depend on human communication, with no centralized system to connect citizens and emergency responders in real time. This leads to delays in identifying the exact location and dispatching the nearest help.

B. *Proposed System*

Smart Accident Reporting System enables citizens to report accidents instantly using GPS-based location tracking. The system automatically notifies nearby police and ambulance services in real time. It provides role-based dashboards, real-time updates, and map routing to ensure quick response and efficient accident management.

III. DEVELOPMENT ENVIRONMENT

A. *Hardware Requirements*

- Processor : Intel i5
- RAM : 16 GB
- Hard Disk : 256 GB

B. *Software Requirements*

- Operating System : Windows 10
- Frontend : HTML, CSS, JavaScript, Android capacitor

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- Backend : Node.js, Express.js
- Database : MySQL
- Tools : VS Code, Web Browser, Android studio

IV. MODULE DESCRIPTION

A. Citizen Interaction

Users can register and log in to the system to access accident reporting features. They can report accidents by selecting the type of incident through a simple interface. The system automatically captures GPS-based location and time details for accuracy. The report is then sent to the server, and users can view status updates.

B. Police Response

This module enables police personnel to receive real-time accident alerts from the system. It provides a role-based dashboard where officers can view accident details, including location and type. The module includes map view and routing features to help officers quickly navigate to the accident site. It also supports status updates and coordination with other emergency services for efficient response.

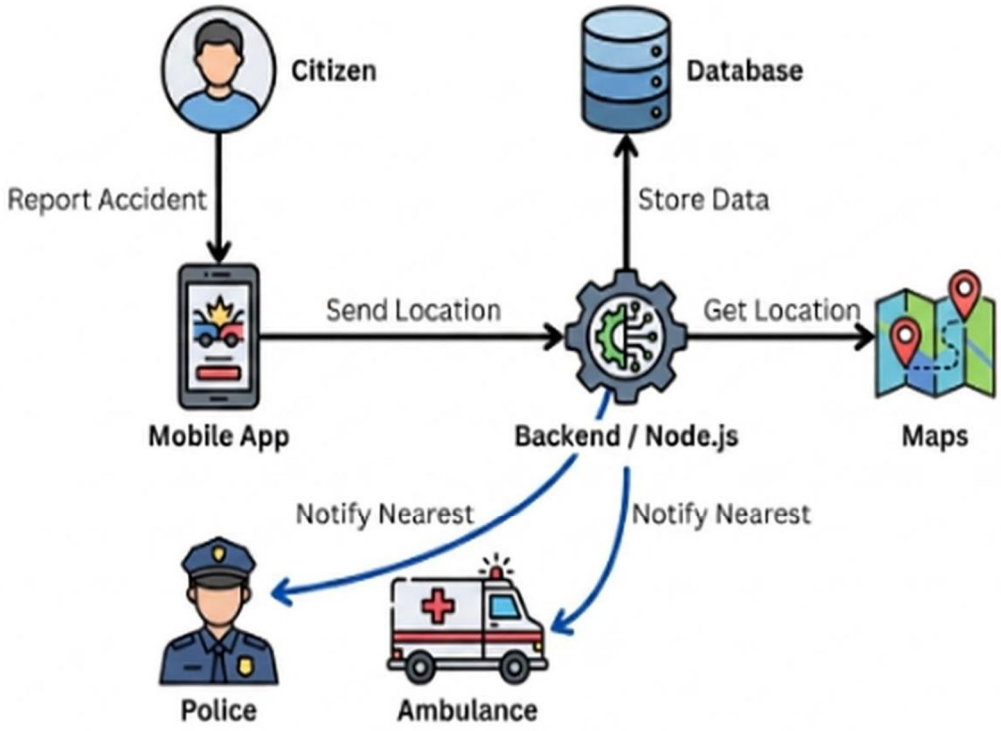
C. Ambulance Response

The Service Management Module records all service-related details, including service dates, spare parts used, and technician information. Service history is updated after each service to maintain accurate and complete records.

D. Location and Mapping

This module captures the accident location using GPS for accurate positioning. It displays accident locations on a map interface for better visualization. The module provides routing and navigation to help emergency responders reach the site quickly.

V. SYSTEM ARCHITECTURE



VI. CONCLUSION

The Smart Accident Reporting System improves emergency response using GPS tracking, real-time communication, and role-based dashboards. It reduces delays and enhances coordination. Map routing helps responders reach accident sites quickly. Overall, it minimizes response time and helps save lives.

VII. FUTURE ENHANCEMENT

The Smart Accident Reporting system can include advanced push notification mechanisms to instantly alert police and ambulance personnel. By ensuring immediate delivery of accident information, responders can take quicker action, further reducing response time and improving emergency handling efficiency

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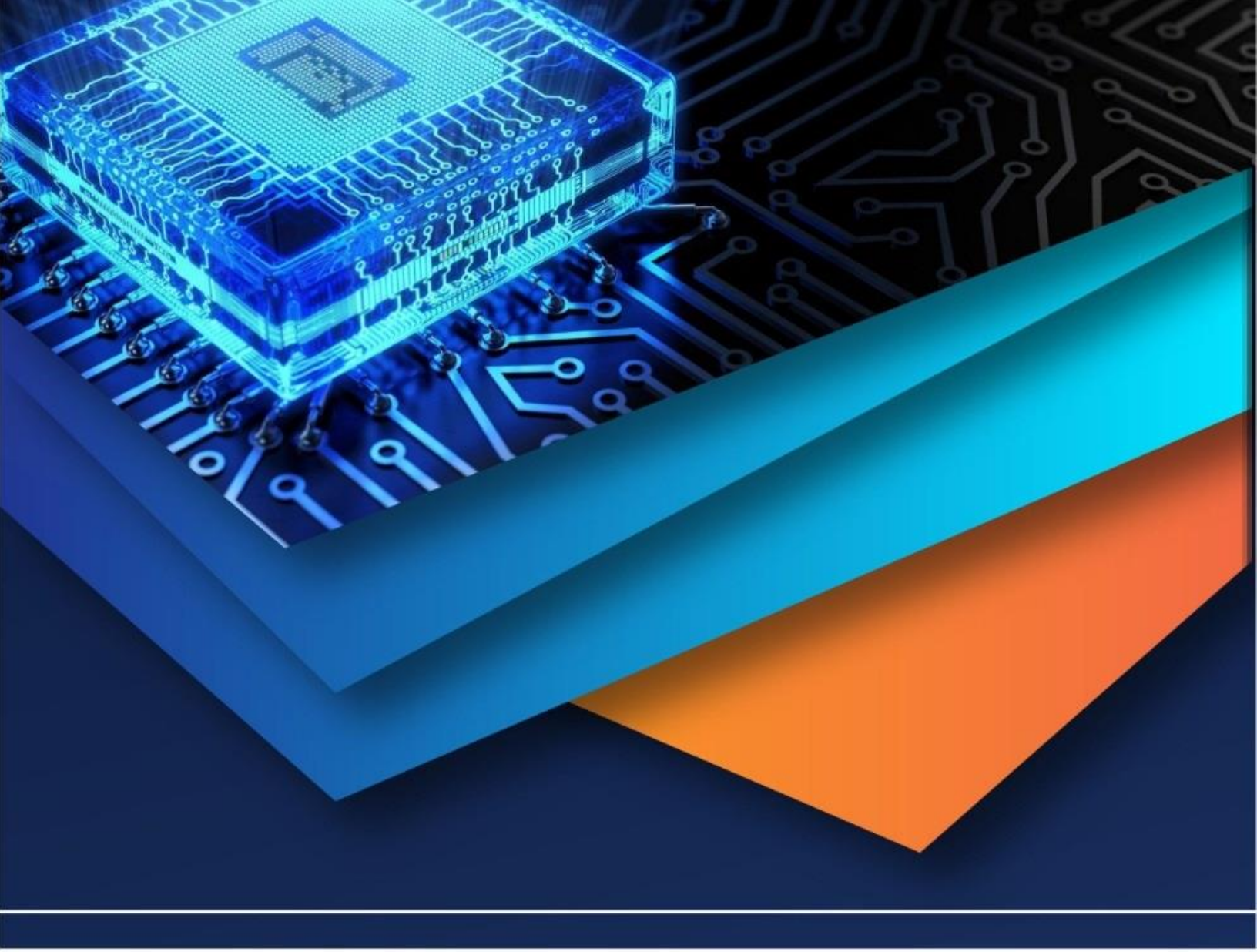

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