Real-Time Road Accident Reporting and Complaint Registering Website

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Abstract—

This project introduces a web application centered on users, transforming road safety incident reporting through advanced technology and user-friendly design. Redefining traditional reporting methods, the application envisions a future where intelligent and swift responses to road incidents become the standard. The intuitive interface facilitates seamless accident reporting for both civilians and law enforcement, complemented by an intelligent Optical Character Recognition (OCR) License Plate Recognition system that ensures precise information extraction, triggering instant alerts to nearby emergency services.

The initiative transcends conventional reporting by fostering collaboration between users and law enforcement. A dedicated police portal allows for comprehensive reporting, contributing valuable data to a centralized incident database. Automated notifications, powered by real-time updates and communication channels, bridge the gap between civilians, law enforcement, insurance companies, and nominated contacts.

This project goes beyond mere reporting by introducing a collaborative paradigm where law enforcement actively participates in accident confirmation and reporting. A dedicated police portal facilitates comprehensive reporting, contributing valuable insights to a centralized incident database. Automated notifications, driven by real-time updates and communication channels, bridge the gap between civilians, law enforcement, insurance companies, and nominated contacts.

In a dynamic world, this application serves as a catalyst for change, prioritizing safety, efficiency, and collaboration on the roads. It goes beyond being just an application; it is a collaborative tool shaping a future where road incidents are met with intelligent and coordinated responses.

Index Terms— Road Safety, Intelligent Accident Reporting, Optical Character Recognition (OCR), License Plate Recognition, User-Friendly Interface

I. INTRODUCTION

High traffic density fuels road accidents due to the liberty allowed for drivers, which cause damage that are normally fatal. The incidences of accidents related to heavy cargo vehicles are not diminishing even with the calls for responsible actions and obeying the rules like moderating speed according to changing weather phenomena and congestion.

The primary objective is to prevent road accidents through the implementation of various laws, advanced technology, and thorough inspections by law enforcement officers.

This project revolutionizes road safety by introducing an innovative web application designed for intelligent accident reporting and prompt emergency response. It addresses the crucial requirement for a responsive reporting system, seamlessly integrating cutting-edge technology and a user-centric approach. Envisioning rapid and intelligent responses to incidents, the application promotes a safety culture that goes beyond conventional methods. Users are empowered to effortlessly report accidents, activating real-time alerts to emergency services through an intelligent Optical Character Recognition system. Law enforcement actively engages through a dedicated portal, contributing to a centralized incident database.

Ultimately, this initiative aims to reshape the future of road safety by championing efficiency, collaboration, and intelligent responses to incidents, fostering a safer road safety.

Its primary goal is to transcend traditional reporting methods, envisioning a future where swift and intelligent responses to road incidents become the norm. Beyond being just an application, it represents a commitment to nurturing a culture of safety and collaboration on roads, revolutionizing the way accidents are reported and handled.

This initiative introduces a collaborative paradigm where law enforcement actively participates in accident confirmation and reporting. A dedicated police portal allows for comprehensive reporting, contributing valuable insights to a centralized incident database. Automated notifications based on real-time updates and communication channels bridge the gap between civilians, law enforcement, insurance companies, and other essential contacts.

In a world that's continuously in motion, this application aims to drive transformative change—a change that places safety, efficiency, and collaboration at the forefront of road incident responses, thereby setting a new standard for road safety initiatives.

II. RELATED WORK

 The study conducted by Dr. Gufran Ahmad Ansari and Dr. M. Alshabi in 2012 focused on employing Unified Modeling Language (UML) for a comprehensive Traffic Accident Reporting System. It showcased UML's efficacy in addressing scientific and research problems, specifically in modeling such systems. Their work presented a complete model of this reporting system through UML, offering visualized results in the form of bar chart graphs. Notably, their model emphasized simplicity and reusability, enabling easy adaptation and updates in response to evolving data needs. Importantly, they highlighted the potential for expanding this foundational work into the realms of data mining using UML and expert systems.

On a separate note, the 2014 paper authored by Mohamad Fahmi Bin Hussin and Mohamad Huzaimy Jusoh delved into an Accident Reporting System facilitated by an iOS application. Unlike traditional paper-based reporting, this application focused on design and simulation, showcasing its efficiency and detailing its advantages. Although it didn't cover the exhaustive depth of standard paper forms, it encapsulated crucial accident details, enhancing the ease and efficiency of reporting. The application's benefits were notable, including reduced delays, simultaneous submission of reports to various departments, simplified reporting mechanisms, and easy transmission via email. The significance of this application lay in its capacity to improve the timeliness of accident reporting, promoting swift investigation and action, particularly in occupational safety and health sectors.

III. PROPOSED METHODOLOGY

Existing methods in accident reporting include manual paper-based forms, emergency hotline calls, and basic online reporting forms. These methods often rely on individuals to physically fill out accident report forms, leading to delays and potential inaccuracies in information. Emergency hotline calls, while immediate, might face delays in relaying information accurately or struggle with high call volumes during peak times. Basic online reporting forms lack detailed real-time reporting capabilities and may not facilitate simultaneous submissions to multiple departments.

Moreover, these methods may not incorporate GPS technology to locate accident spots swiftly, leading to delays in emergency response times. They also lack integrated systems for immediate communication with emergency services or streamlined ways to fetch crucial civilian details promptly. The absence of intelligent recognition systems, like License Plate Recognition (LPR), for quick data extraction from accident scenes hampers efficient reporting.

In summary, traditional methods of accident reporting suffer from delays. The absence of advanced technologies intelligent recognition systems impedes the timely and efficient handling of reported accidents.

IV. MATERIAL USED

1. Hardware:
   -Window11, 16gb RAM

2. Software:
   - Text editors or IDEs for coding: Visual Studio Code.
   - Database management tools: Firebase Console
   - Version control systems: Git, GitHub
   - OCR libraries or tools for text extraction: Tesseract.

3. Technological Stack:
   - Document the technologies and frameworks used in your project, such as:
   - React.js for the frontend.
   - Python for the OCR model.
   - Firebase for backend, authentication, and database management.

4. Libraries used:
   -React.js
   -Firebase SDK
   -For OCR: numpy, COCO API, tensorflow, Tessaract OCR

V. METHODOLOGY

The methodology encompasses the development of a user-centric web application, aiming to streamline accident reporting and response mechanisms. It comprises eight core components focusing on efficiency, accuracy, and collaboration in handling reported incidents.

Efficient Accident Reporting prioritizes a user-friendly interface, simplifying the submission process for accident details. Accurate Optical Character Recognition (OCR) enhances identification by precisely extracting license plate numbers from uploaded images.

OCR technology is widely used to enhance data entry, document management, and information retrieval processes. It enables the digitization of printed or handwritten text, making it easier to store, edit, and search for information. OCR systems use algorithms to analyze and recognize characters, even in challenging conditions like poor image quality or complex layouts.

User Account Management provides a personalized dashboard for users to monitor incident statuses, fostering engagement. Scalability and Adaptability enable accommodating growth and future tech advancements, ensuring relevance over time.

Collaborative Reporting allows police contributions, bolstering accuracy in incident records. Real-time Updates via Socket.io technology enhance stakeholder communication, ensuring timely information dissemination.

This methodology aims to establish a comprehensive, adaptable, and collaborative accident reporting system, fostering a culture of safety and efficiency on the roads.

VI. IMPLEMENTATION MODULES
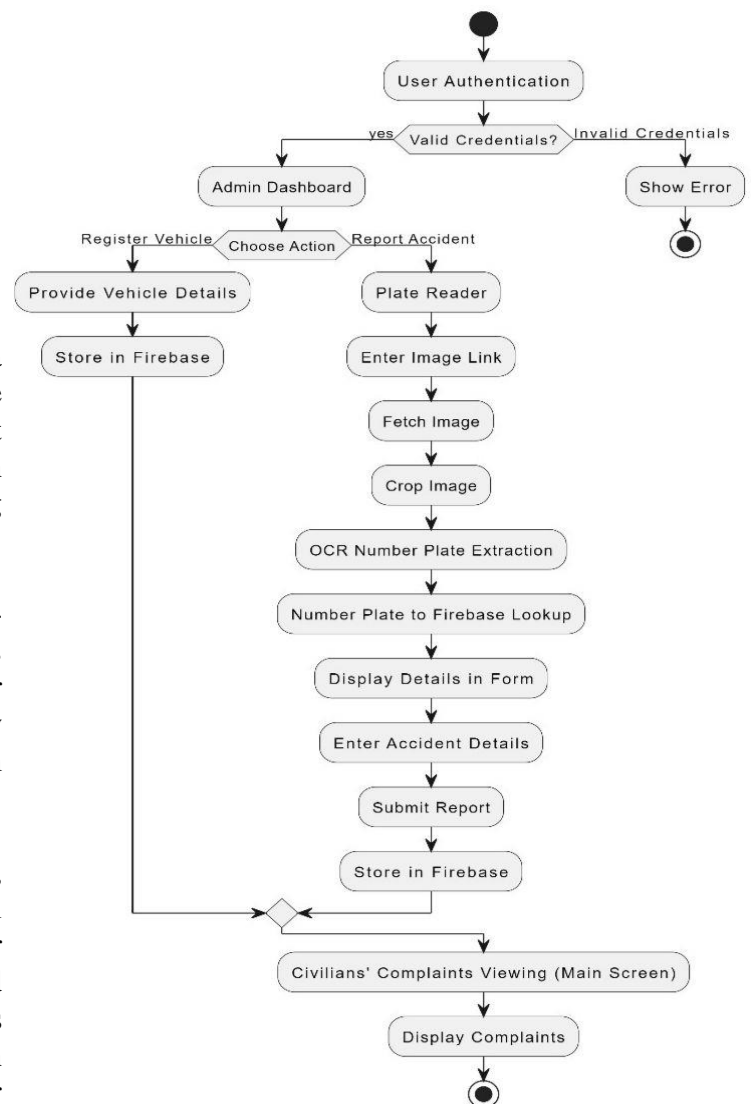
-This systematic approach to system design and implementation ensures that the intelligent accident reporting and emergency response application aligns with its revolutionary goals, fostering a culture of safety and collaboration in the road safety landscape. The emphasis on advanced technologies and user-centric design contributes to reshaping societal attitudes towards road safety, marking a significant step towards a safer future.

1. ACCOUNT GENERATION

-The user-centric design approach is crucial to the success of the road safety initiative. The UI/UX design focuses on creating an intuitive and user-friendly interface for the web application.

2.CIVILIAN REGISTRATION
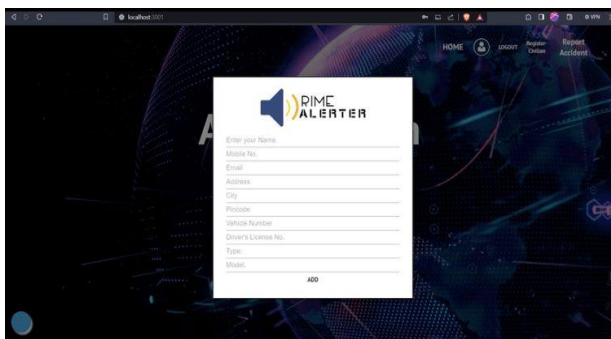
3.ADMIN DASHBOARD

4.PLATE READER

The database schema is designed to store information extracted by the License Plate Recognition (LPR) system, user details, incident reports, and communication logs.
The backend ensures the seamless coordination of various components to deliver an intelligent and responsive system.
The integration testing phase validates the interoperability of different modules within the system. It ensures that the OCR system communicates effectively with the database, real-time alerts are triggered accurately, and automated notifications function as intended.
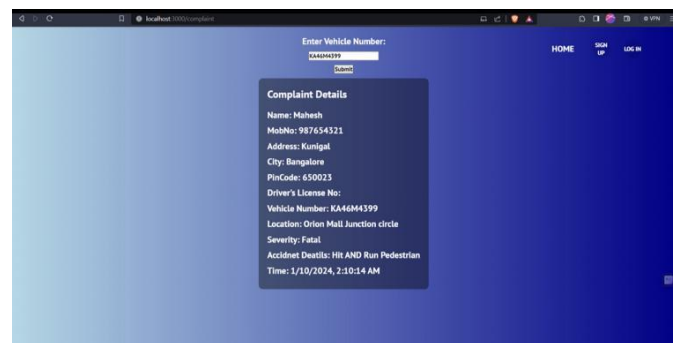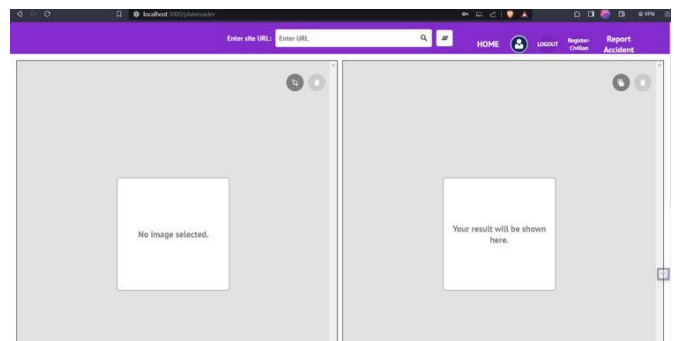
In the final phase, preparations are made for project demonstrations. A presentation is crafted to showcase the innovative features, emphasizing how the web application transforms accident reporting and emergency response. The demonstration highlights the collaborative paradigm, involving law enforcement and the seamless communication channels that bridge stakeholders for a more coordinated approach to road safety.

VII. FUTURE SCOPE

In its evolution, the accident reporting website can advance by refining its OCR model for more precise number plate extraction and exploring edge computing to expedite image processing directly on user devices. Augmenting the system with NLP algorithms would enhance the extraction of crime details from user inputs, refining the reporting process. Real-time notifications to emergency services, coupled with advanced analytics for proactive safety measures, promise quicker response times and insightful accident trend analyses. A mobile-responsive design or a dedicated app would ensure broader accessibility, while prioritizing robust security measures and stringent privacy features remains a key focus for future development, fortifying user trust and data integrity.

This future scope encompasses technological enhancements like optimized OCR and NLP, alongside a focus on user accessibility through mobile responsiveness and stringent security measures, aiming to streamline reporting processes and enhance overall user experience while ensuring data security and privacy.

VIII. CONCLUSION

In conclusion, our project has primary objective as facilitate prompt emergency response and accident reporting and real time updates which will empower stakeholders with advanced functionalities.

The project's meticulous phases, from strategic planning to iterative development, ensure the creation of a comprehensive and impactful accident reporting website. Leveraging React.js, Python for OCR implementation, and Firebase, the admin-exclusive dashboard empowers efficient civilian vehicle registration and streamlined accident reporting. The Plate Reader's OCR model efficiently extracts number plates from linked images, cross-referencing the database for pertinent vehicle details.

This user-centric design extends to a civilian-accessible complaints registry on the main screen, emphasizing functionality and user convenience. Embracing a collaborative and iterative approach, the project doesn't merely aim

for functionality but strives to create an application that deeply resonates with users, ultimately contributing to positive change in road safety through technology-enabled solutions.

IX. ACKNOWLEDGEMENT

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