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Accident Detection and Alert System Android App

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***Abstract*— This Android application, developed with Kotlin in Android Studio, pioneers a holistic approach to road safety by seamlessly integrating Admin and User interface. The Flow Admin module empowers administrators with secure login, hospital management, user request tracking, and rapid SMS alert dissemination to designated medical facilities. On the User side, seamless registration, login, and a personalized dashboard enhance the overall user experience. Leveraging mobile phone accelerometers, the app introduces an innovative accident detection system. Abnormal accelerometer values automatically trigger support requests to administrators, ensuring swift assistance during emergencies. This pioneering system amalgamates cutting-edge technology with responsiveness, significantly contributing to the proactive identification of accidents and the timely dispatch of assistance in critical situations. The project aims to develop an Accident Detection and Alert System Android app. It intends to integrate accelerometer technology in mobile phones to detect accidents and send requests for support to administrators. The project is selected to address the critical need for timely assistance in road accidents. It will be helpful in reducing emergency response times and improving accident victim outcomes. The implementation can commence upon completion of development and testing phases. Beneficiaries include road users, emergency responders, and medical personnel, who will benefit from expedited assistance and improved coordination during accidents. Accident Guardian is an innovative Android application engineered to bolster road safety through its robust accident detection and alert system. Harnessing cutting-edge sensor technologies seamlessly integrated within smartphones, Accident Guardian continuously monitors the vehicle's dynamics and surrounding environment. Leveraging GPS, accelerometer, gyroscope, and microphone sensors, the app employs sophisticated algorithms to analyze data in real-time. This analysis enables the app to swiftly identify potential accident scenarios, such as sudden deceleration, impact forces, or anomalous sounds indicative of collisions. . In the event of an accident, Accident Guardian promptly triggers alerts, disseminating instant notifications to pre-defined emergency contacts. *Keywords— Security Measures, Encryption, Secure Authentication, Multi-Factor Authentication, Cyber Threats*

Introduction

Android accident detection and alert system project is to develop a onboard sensors of a Smartphone to detect vehicular accidents and report it to the nearest emergency responder available and provide real time location tracking for responders and emergency victims which will drastically increase the chances of survival for emergency victims, and

The proposed system comprises two distinct user roles: Admin and User. Admin functionalities include login, hospital addition, viewing requests, and sending SMS alerts to hospitals. Users can register, log in, and access their dashboard. Within the user dashboard, an Axilometer monitors vital signs, triggering an alert when readings exceed specified thresholds. Alerts are relayed to the admin for timely intervention. This system streamlines hospital management, ensuring prompt responses to critical health incidents. Efficient communication between users and administrators enhances patient care and facilitates proactive healthcare administration. The escalating frequency of accidents, predominantly attributable to increased vehicle utilization and speeding, underscores the critical necessity for advanced accident prevention measures.

This paper introduces an Automatic Accident Detection and Alert System, which endeavors to curtail accident rates by swiftly notifying registered mobile devices, medical facilities, and law enforcement agencies via wireless communication technologies. Employing Arduino as its central processing unit, the system facilitates seamless message dissemination across multiple platforms. Upon detecting an accident, a vibration sensor triggers the GSM module to dispatch alerts to predefined contacts, while GPS functionality assists in accurately identifying the accident location. Through the integration of smartphone sensors such as GPS and Accelerometer.

The scope of the ”Android accident detection and alert system” is to prevent casualties which happen due to lack of medical assistance in time. Certainly, if the accident happens due to other cases, the used electronic devices will be able to provide the spontaneous message and exact location to police and ambulance in order to recover victims. Avoiding casualties caused by road accidents.

The main goal of this paper, with the help of Accelerometer and GPS present in the mobile phones. Based on the data collected from these sensors, which are present in most mobile phones, the location of the accident is sent at the same time of the accident to the friends and relatives which the user allowed and stored,and also to rescue and emergency services.

factor authentication systems in their system for human transactions on the Internet

I. LITERATURE REVIEW

The escalating frequency of accidents, predominantly attributable to increased vehicle utilization and speeding, underscores the critical necessity for advanced accident prevention measures. This paper introduces an Automatic Accident Detection and Alert System, which endeavors to curtail accident rates by swiftly notifying registered mobile devices, medical facilities, and law enforcement agencies via wireless communication technologies. Employing Arduino as its central processing unit, the system facilitates seamless message dissemination across multiple platforms.

Through the integration of smartphone sensors such as GPS and Accelerometer, the system promptly notifies designated recipients and emergency services upon collision detection, thus mitigating the risk of fatalities resulting from delayed medical intervention. Furthermore, the system's streamlined architecture enables efficient accident detection and notification, thereby enhancing overall efficacy in accident prevention and response. Future enhancements may encompass the incorporation of on-site medical assistance provisions and advanced preemptive alert mechanisms to proactively avert accidents. In summary, the proposed system offers a cost-effective, secure, and user-friendly solution to mitigate accident-related casualties effectively..

Traffic accidents are a global public health concern, causing numerous injuries and fatalities annually. This paper discusses the significant impact of road collisions, particularly on young individuals, and highlights the need for prompt emergency response to improve survival rates. Traditional accident detection and notification systems face limitations such as high costs and environmental factors affecting sensor performance. To address these challenges, researchers are exploring smartphone-based solutions due to their ubiquity, advanced capabilities, and costeffectiveness.

The Vehicle accidents are major concern today in traffic management systems which result in an increasing number of deaths. India is currently in top position in road accidents around the globe. This leads to a huge number in future with growing population and other causes e.g. bad road conditions, reckless driving, delay in medical help, etc. To overcome these, a proper accident detection and notification system is required. Here comes our android app based on IoT sensors (Accelerometer, Gyroscope) of smartphones used in our daily lives. The app automatically detects an accident from sensory data and sends notification to emergency numbers so that victims receive immediate medical assistance. The app covers most of the solutions in this regard in post-accident scenarios, such as accident detection, sending notifications, and a few which are applicable for 5 CHAPTER 2. LITERATURE SURVEY alerting people about accidents and handling traffic congestion scenarios

Later includes warning drivers while entering an accident-prone zone, suggesting an alternate route to avoid congestion in the accident occurrence area, etc. The performance is analyzed by delay time, false alarm rates and it outperforms the existing systems in terms of different features. Thus, it is user-friendly, reliable, and cost effective.

Android smartphone app will automatically detect the accident that will be occurred. The app immediately retrieves the GPS location and activates an alarm screen. With one tap, the user can request emergency assistance. The app calls the local emergency number and sends SMS alerts to predefined contacts. The alerts provide accident details including location coordinates, number of passengers, and crash characteristics.

Development challenges include accurately identifying crashes across varying conditions while minimizing false positives, integrating with onboard vehicle systems for additional data, addressing cybersecurity risks, optimizing for minimal battery usage, and easing privacy concerns over data collection. If technical obstacles can be overcome, such an automated crash detection and emergency alert app could help expedite emergency responses and improve road safety outcomes. Intended as an low-cost, scalable supplementary crash alert system, it has the potential to save lives worldwide.

This paper proposes a new approach to detect as well as prevent car accidents using inbuilt mobile sensors with bio-inspired optimized algorithm (BIOA).In this paper particle swarm optimization (PSO) algorithm is used. A recent survey shows that the rate of vehicle accidents is widely increasing, due to rash driving like over speeding, not following traffic rules, etc. On proper time the provision of first-aid medical service can help in saving lives. Hence, there is a need for an application which detects and prevents vehicle accidents. The main goal of the system is to alert the nearby medical services about the accident so as to provide immediate medical aid. The application can make use of a sensor (accelerometer) in mobiles, to sense the tilt of the vehicle. Thus, the system will make the decision to alert the admin (owner of the vehicle or family members) and it will send the information through the mobile app..

The Rapid growth of technology and infrastructure has made our lives easier. The advent of technology has also increased the traffic hazards and the road accident take place frequently which causes huge loss of life and property because of the poor emergency facilities. India brought the problem of road accidents resulting in injury and fatalities to road users. India was number 9 killer in the year 1990 in the world is expected to emerge number 3 killer by year 2020 in road accident. Although road transport safety is a worldwide problem but it is more severe in India. India needs to improve road safety measures to reduce road accidents.Nowadays, the rapid evolution in transportation technologies makes the necessity for avoiding and reducing traffic accidents to increase road safety.

Android-based driver alert system is a real-time application which is used for detecting driver drowsiness and alerts the driver to reduce the possible accidents. In this paper, the detection is based on the results of face and eye region or the pupil of the eyeball to determine whether the driver is in the drowsy condition or not.

.A new approach is introduced for detecting driver drowsiness by using Google API and OpenCV library. My system uses a modified implementation of the Viola-Jones algorithm for faces and eye detection of the driver. Detection is performed on the basis of the symptoms related to eye and face region of driver. In this method, face detection module, motion detection module, on road motion detection module, GPS module are used for extracting the symptoms of driver drowsiness. Android-based smart phones are equipped with several sensors that can help to assist in safety development for drivers on the road.

The speed of our lives has been boosted with the advancement in the transportation system. In the present time, road traffic accidents have become a global concern all over the world. Road traffic accidents are considered as one of the prominent reasons for the reduction of life period, loss of lives, properties, and time.

The death rate among people is rapidly increasing with the rapid increment in road accidents. For the victims, an accident acts as a catastrophic condition in the case when it occurs at the highways. In this article, an intelligent accident detection has been developed to detect accidents on the road.

Intelligent accident detection involves location tracking as well as notification systems that detect the accidents immediately through the GPS location. The sensor connected to the vehicle gets activated in the case of any accident. Phone calls and notification messages will be sent to the nearby hospital, police station, and family members through the Global System for Mobile Communication (GSM).

II. EXISTING SYSTEM

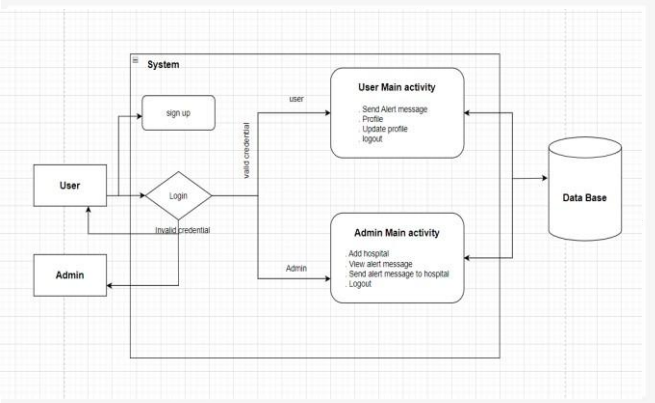


Fig. 1. Overview of the authenticator Android app

In today's world, the inventions of powerful automobile engines have increased the speed of transportation. As a result, the situation has become more vulnerable to fatal accidents. To reduce these fatalities, the Emergency Medical Service (EMS) has to be quick and efficient enough. To make emergency services faster, an Accident Detection and Notification System is required.

The research work aims at the development of such robust Accident Detection and Notification System. The approach focuses on the development of two subsystems. One of the subsystems is Accident Detection System (ADS). Another subsystem is a Notification System. ADS is implemented on separate hardware and it is responsible for accident detection and estimation of severity and direction of an impact.

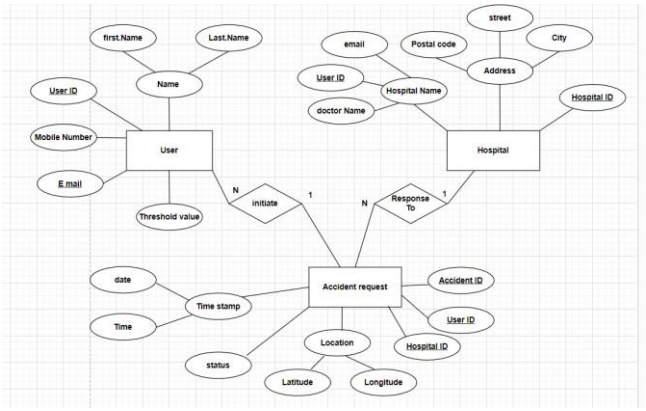


Fig. 2. User verification from use case diagram for Accident detection and alert system

III. PROPOSED SYSTEM AND ARCHITECTURE

The input design is the link between the information system and the user. It comprises the developing specification and procedures for data preparation and those steps are necessary to put transaction data in to a usable form for processing can be achieved by inspecting the computer to read data from a written or printed document or it can occur by having people keying the data directly into the system.

The design of input focuses on controlling the amount of input required, controlling the errors, avoiding delay, avoiding extra steps and keeping the process simple. The input is designed in such a way so that it provides security and ease of use with retaining the privacy. This design is important to avoid errors in the data input process and show the correct direction to the management for getting correct information from the computerized system.

The escalating frequency of accidents, predominantly attributable to increased vehicle utilization and speeding, underscores the critical necessity for advanced accident prevention measures. This paper introduces an Automatic Accident Detection and Alert System, which endeavors to curtail accident rates by swiftly notifying registered mobile devices, medical facilities, and law enforcement agencies via wireless communication technologies.

The methodology for developing an accident detection and alert system Android app encompasses several comprehensive stages. Initially, requirement gathering and analysis involves thorough discussions with stakeholders, including users and emergency services, to identify both functional and non-functional requirements. t

A. Advantages of our Proposed System

- Prevent BruteForce attacks
- Automated keys generated
- Multi factor authentications
- User-Friendly Interface
- Versatility
- Scalability
- Continuous Improvement Potential

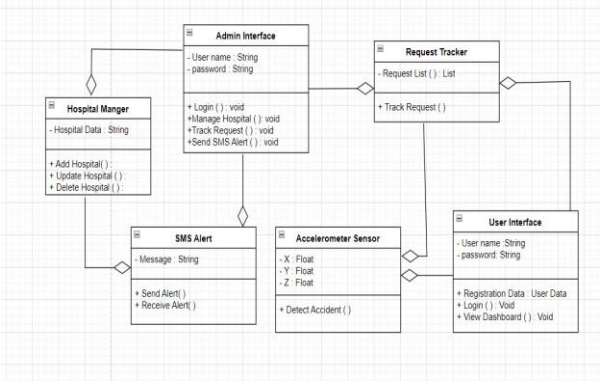


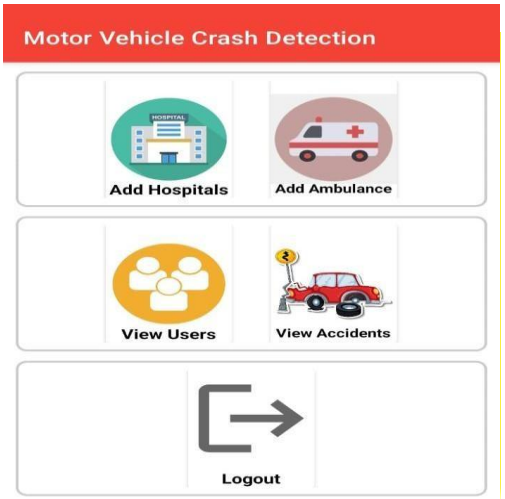
Fig.3. Authenticator's classification.

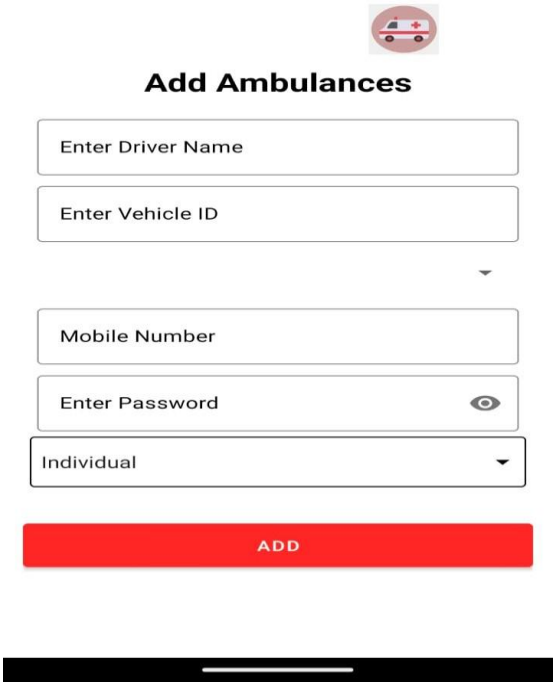
IV. Implementation of Proposed Work

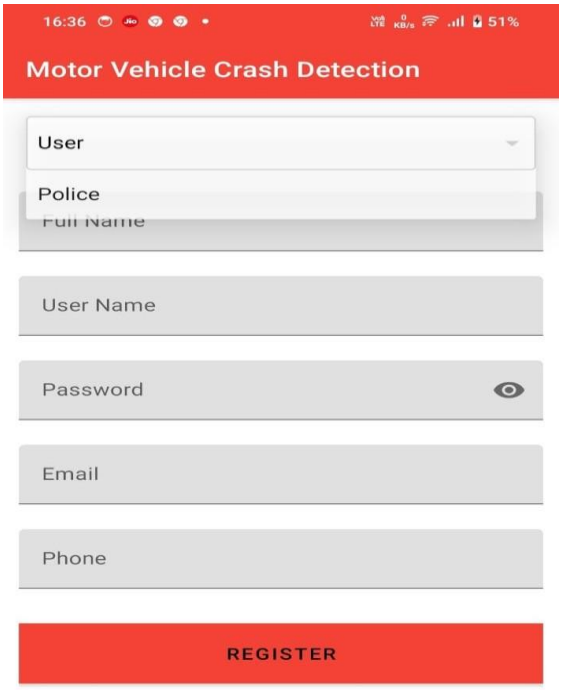
Documentation and Knowledge Sharing Ensuring smooth operation and support The admin module comprises functionalities such as login, enabling access to the system. Administrators can add hospitals to the network, view incoming requests from users, and send SMS alerts to hospitals in case of emergencies. This module ensures efficient management and coordination within the healthcare system.

The user module facilitates registration and login for users, granting access to personalized dashboards. Users can monitor their health status through the dashboard, and if vital signs exceed predefined thresholds, the system automatically sends a support request to the admin. This module empowers users to proactively seek assistance when needed, enhancing overall healthcare responsiveness

Fig.4. User Interface of CODE SAFE PAY







Setting up an Android development environment involves several key steps to ensure you have the necessary tools to build and test Android applications. First, you need to install Android Studio, which is the official Integrated Development Environment (IDE) for Android development. Android Studio provides all the tools required for app development, including a code editor, emulators, and debugging tools. It's available for Windows, macOS, and Linux, and can be downloaded from the official Android developer website.

In the android project, testing and quality assurance play a vital role. These activities ensure that the application is reliable, secure, and functions as intended. This section covers the

V. Results and Modules

The project is composed of several key modules, each with specific roles that contribute to the overall functionality of the proposed system

VI. Conclusion

In conclusion, the proposed healthcare management system presents significant advancement in addressing the communication and monitoring challenges prevalent in existing systems. An Accident Detection and Alert System Android app plays a crucial role in enhancing road safety by leveraging real-time detection and swift alert mechanisms. By integrating sensors, GPS, and communication technologies, the app ensures that accidents are detected promptly, and emergency services are notified immediately. The system helps minimize response time, potentially saving lives and reducing the severity of injuries.

The inclusion of SMS alerts ensures timely notifications to hospitals, facilitating swift responses to critical health incidents. With these features, the system holds great promise in optimizing healthcare administration, improving patient outcomes, and fostering a more responsive and proactive approach to healthcare management.

For administrators, robust tools to manage alerts, users, and system performance are essential to ensure that the app operates smoothly and efficiently. Ensuring the security and privacy of user data, seamless communication between various stakeholders, and accurate detection and reporting are key aspe cts of the system's success. By continuously testing, refining, and adapting the app based on feedback and technological advances, this system can become a pivotal part of road safety infrastructure, offering real-time support when it's most needed.

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