



Accident Detection System ADS and Messaging System

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ABSTRACT

A large number of deaths are caused by traffic accidents worldwide. The global road safety crisis can be seen by observing the significant number of deaths and injuries that are caused by traffic accidents. In many situations, family members or emergency services are not notified in time. This results in delays in the response time of an emergency service that may result in death or cause of an individual severe injury. The purpose of this work is to reduce the response time of emergency services in situations such as traffic accidents or other emergencies such as fire, theft/robbery and medical emergencies. By using on-board smartphone sensors to detect traffic accidents and report them to the nearest paramedic available and providing real-time location tracking for emergency responders and victims will significantly increase the chances of survival for emergency victims and also helps save time and resources of emergency services. Some work in this direction has already been achieved by researchers and in this paper, such work was studied. A system is also proposed from the revision in which it can detect an accident using sensors and alert the nearest ambulance to seek immediate help. Relatives of victims can also be informed using this system.

Keywords:

Accident Detection System (ADS), Accelerometer, Gyroscope, Global Positional System (GPS), Road Safety, Vehicle Safety

I. INTRODUCTION

These days, there has been a growing interest in increasing safety and reducing the impact of accidents on individuals and communities. Accidents on roads, industrial sites and public places can cause serious injuries, loss of life and significant economic effects. Quick detection and timely response are key factors in minimizing the impact of an incident and providing effective emergency assistance. This research paper focuses on the development of accident detection systems that use advanced technologies such as sensor data recording, real-time monitoring, and intelligent response mechanisms to enhance safety and emergency response. The system uses the power of machine learning and mobile technology to provide correct accident detection. This research paper reviews the existing literature, examines relevant case studies, and conducts experiments to develop a proposed accident detection system in improving safety, reducing response time, and minimizing the consequences of accidents. In this , we will address the technical aspects of system development, including the selection and evaluation of machine learning algorithms. Overall, this research paper contributes to the field of accident detection and emergency response systems by providing insights into the design, development, and evaluation of intelligent crash detection systems. Using technology and data-driven approaches, the proposed system is expected to significantly increase the effectiveness and efficiency of accident reporting, emergency response coordination, and overall safety in various situations. Car accidents are a leading cause of death and injury worldwide. According to the World Health Organization, road traffic accidents result in approximately 1.35 million fatalities and up to millions of injuries each year. Response times are critical in reducing the severity of injuries and improving the chances of survival of the victim.

II. LITERATURE REVIEW

1. Research conducted by NHTSA focused on the safety of young drivers and provided valuable information on the importance of accident investigation. The report highlights the need for technology to improve road safety, including ADS. It highlights the importance of addressing the unique challenges faced by young drivers and the potential impact of exploring the urgency of reducing road fatalities.
2. Research Examining the Effects of Urgent Investigations Report on Road Accidents. Although it predates the smartphone era, it provides insight into the importance of incident detection and timely response. This study paves the way for further research in this area by demonstrating the benefits of using advanced diagnostic tools and techniques in reducing mortality.
3. This Utah Department of Transportation report reviews collision detection algorithms for collision detection systems. While not specific to smartphone sensors, it provides useful information about various algorithmic methods for event detection. This assessment provides a basis for understanding the effectiveness and efficiency of various search algorithms, guiding the development of ADS algorithms.
4. Patel's research explores the public good use of Android smartphones using advanced crash detection techniques. It demonstrates the accident detection potential of smartphones and offers a system that

integrates ADS and emergency services. This study highlights the role of messaging in ADS by emphasizing the importance of timely communication and timely treatment in emergencies.

III. OBJECTIVES

Accident Detection System (ADS) is a visionary research field with huge scope in the future with the road safety department. The goal of the system is providing quick emergency support and emergency alerts to the contacts. This will help to reduce the risk of victim life. It can be summarized into above major points:

- A. Development of ADS:** The primary objective is to develop a system that provide accident detection and sends emergency alerts with location in no time. This will be achieved while developing the ADS.
- B. Automatic Emergency Alerts:** This ADS system aims to provide service in the Road Safety Department. Once an accident is detected, the app will automatically send the emergency alerts to the contacts given by or set by users while creating a profile.
- C. Location Tracking:** The ADS accident detection system must track the location of the accident and users accurately. With emergency alerts to the contacts. The is to enhance the efficiency of the emergency response in accident situation
- D. Data Collection:** This project can collect the data related to the accident such as location and time of the collision. This data can be used for many things like statistical analysis and accident patterns. It will help in reducing chances of accidents.

IV. TECHNOLOGIES

A. Machine Learning

Machine learning is a subfield of artificial intelligence that includes machines that mimic human behaviour to perform complex tasks. It is used in applications such as human performance recognition, where models are trained on sensor data to accurately predict performance. Various algorithms and techniques can be used, including supervised learning and deep learning. Feature extraction and selection are important steps to improve accuracy by identifying relevant features from sensor data.

B. Java

Java is a programming language that is commonly used to create web applications. Java has been the preferred choice of developers for over 20 years and is now used in millions of Java applications. Java is a cross-platform, language-oriented, web-oriented language that can use itself as a platform. It's a fast, secure, and reliable programming language for coding everything from mobile apps and enterprise software to big data applications and server-side technologies.

C. Android

Android Studio is the official integrated development environment (IDE) for Google's Android operating system, based on JetBrains' IntelliJ IDEA software, and designed specifically for Android development. It is available for download on Windows, macOS and Linux based operating systems. It has replaced Eclipse Android Development Tools as the leading IDE for native Android application development. Android Studio has many features that make it an ideal IDE for Android development.

D. Firebase Realtime Database

Firebase Realtime Database is a cloud-hosted database that allows you to store and synchronize real-time user data. This is a NoSQL database, meaning it has no predefined processes. This makes it easy to store and store all kinds of information. It is the best choice for applications that need to keep data in sync across multiple devices. For example, you can use it to create interactive apps, share edited files, or play games. It is also very easy to use. Firebase SDK provides a simple API to easily connect to a database and start collecting and storing data.

V. CONCLUSION

In conclusion, the objective of this study was to identify opportunities and challenges in the Machine Learning Technology and road safety Department. This Project identifies some key challenges in the road safety and ML technologies. We offer an automated car crash detection approach to the user for his safety .. Finally, we provide the results of our simulation studies, which show that our proposed techniques can detect vehicle coincidence in no time with 90 percent accuracy. With this project we can say we can minimize the chances of death or major injuries caused by the road accident and try to provide immediate medical help. Key features to consider when developing an Android app for crash detection include real-time collision detection, measurement of captured data (such as GPS location and measurements), integration with emergency alerts, and user authentication.

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