ACCIDENT DETECTION AND ALERT SYSTEM
USING ANDROID APPLICATION

Mohd Akram Khan*1, Nirbhay Pandey*2, Prof. Ajay Kumar Srivastava*3, Er. Shadab Ali*4

*1,2UG student of Department of Information Technology, Shri Ramswaroop Memorial College of Engineering and Management Lucknow, Uttar Pradesh, India.

*3Professor, Department of Information Technology, Shri Ramswaroop Memorial College of Engineering and Management Lucknow, Uttar Pradesh, India.

*4Assistant professor, Department of Information Technology, Shri Ramswaroop Memorial College of Engineering and Management Lucknow, Uttar Pradesh, India.

DOI: https://www.doio.org/10.56726/IRJMETS35948

ABSTRACT

Deaths primarily result from accidents. They can occasionally cause the patients to spend a lot of time in the hospital. The victim will frequently die as a result of the witnesses' slow response time at the scene of the accident. This paper offers a prompt resolution to this issue by giving police and ambulance drivers a notification system and alarm system. Mobile phones are used as widely accessible technological devices for this purpose to detect falls. For fall detection, an Android smartphone with an embedded accelerometer is employed. In order to identify a fall, the accelerometer will assess how frequently the phone vibrated previously. Based on factors like vibration frequency and height, the threshold is assessed. If it exceeds the predetermined threshold, a pop-up message is displayed asking the user to respond. Further action is conducted in response to the user's response. A timely alert and message will be delivered to the appropriate pre-specified individuals whose contacts are provided by the user at the time of registration for the application if users do not react within a given time limit. Police and ambulance drivers are also provided an alert and message via SMS that includes the victim's accident location. The method described in this study uses a straightforward, user-friendly Android application to detect falls in a cost-effective manner.

I. INTRODUCTION

The most likely reason for an individual's death in an accident is lack of the first aid provision that is because of emergency services not receiving information about accident in time. Emergency response time is extremely vital when it involves incidents involving vehicle accidents. Analysis shows that if we decrease just 1-minute in accident response time that can increase chances of saving an individual's life up to six percent. In order to reduce response time, implementation of enhanced traffic technologies would be necessary, which will help scale back response time and therefore reduce fatalities. The purpose of this research is to design and implement such an automated system that uses smartphone to detect vehicle accidents and report it to the nearest available responders to help counter these emerging problems and reduce casualties as much as possible. The detection system would help reduce fatalities due to vehicle accidents by decreasing the response time of emergency services. The system will also provide other emergency services like Fire Brigade, Police Department and Medical emergency services. In this work we are utilizing android smartphone to detect accidents and report it to the nearest available emergency responders with the exact location of victims in emergency. On an emergency responder side, the system will inform responders about the incidents that occur near to them and provide them with real time tracking of emergency victims on a Google map. This will help emergency responders keep track of victim's location and rescue them as soon as possible.

II. LITERATURE REVIEW

Every product and application have a variety of ideas and concepts that inspire fresh optimism for people's personal development. There are not many technologies available right now for detecting accidents. Because most systems require manual operation, the accident victim must rely on the kindness of others to get them to the hospital as soon as possible. A lot of instances, an accident goes undiscovered for hours before assistance is called. Several variables contribute to the high fatality rate among accident victims. There are several mechanisms that help fellow creatures that have both benefits and drawbacks. A sensor, GPS, and GSM unit are
all included in the Intelligent Accident-Detection and Ambulance Rescue system. This study suggests employing Android devices to create a real-time accident detection and alerting system. When an accident is detected, the app promptly alerts emergency agencies and close family members using the accelerometer and GPS sensors. This study suggests employing Android devices to create a real-time accident detection and alerting system. This study offers a thorough analysis of accident detection and notification technologies, including Android applications. The study examines the aspects of current systems, including sensors, algorithms, and communication techniques. The study also recognizes the difficulties and restrictions of these systems and suggests new lines of investigation. This study suggests developing an accident detection system for mobile devices that uses machine learning algorithms. The programmer collects data from the GPS and accelerometer sensors, analyses that data using machine learning models, and then looks for accidents. The research revealed that the suggested approach has a high accuracy and low false positive rate for accident detection. Overall, the literature suggests that accident detection and alert Android apps can be effective in detecting accidents and notifying emergency services and loved ones immediately. The proposed systems use various sensors and algorithms to detect accidents, and machine learning algorithms seem to be effective in improving accuracy. However, further research is needed to address the challenges and limitations of these systems and to improve their reliability and effectiveness.

III. PROPOSED SYSTEM

3.1 Requirement Analysis - Understanding the app’s requirements is the first step. The important components of the app must be identified, such as sensor-based accident detection, GPS tracking, emergency contact information, and alert notifications.

3.2 System Design - The following step is to develop the system architecture after the requirements are crystal clear. Identification of the app’s many parts is necessary for this, including the user interface, sensor interface, GPS interface, database, and server.

3.3 Data Collection and Pre-Processing - To detect accidents, the app will need information from different sensors, including the accelerometer and gyroscope. To eliminate noise and artefacts, this data needs to be gathered, pre-processed, and filtered.

3.4 GPS Tracking - The app will follow the location of the car using GPS and update the emergency contacts in real-time.

3.5 Emergency contact Information - The software will ask the user to input phone numbers and email addresses for emergency contacts. In the event of an accident, this information will be used to call the emergency contacts.

3.6 Alert Notification - In the event of an accident, the app will notify the emergency contacts. These alerts may be delivered via push notifications, SMS, or email.

3.7 Testing and Evaluation - Testing and assessing the app’s performance is the last phase. This entails gathering user feedback and testing the app in actual-world settings.

On the user’s smartphone, the proposed system’s software runs. Also, it might prolong the lives of accident victims. The suggested system will inform the user if an accident occurs, unlike the current system, which only detects accidents when they occur in vehicles.
IV. SYSTEM CONFIGURATION

Before a product has been tried in a variety of scenarios and conditions, it is not usually declared to be good or poor. The android application is installed on the user’s phone in order to assess/demonstrate the performance/working of the proposed system. Enter the drive name and contact information after connection optimization to receive alert notifications on your mobile device. The process of established configuration of mobile applications, and dealing is described in the following subsections. The mobile application’s configuration page will appear after the application has been installed on the device and is opened. While configuring a mobile application for the first time, before turning on the appliance, the motive force name and speak to number of the people to whom an emergency alert will be issued are needed.

V. WORKFLOW

VI. CAUSES OF ROAD ACCIDENT

Even though they occur frequently, road accidents are the worst thing that may happen to a road user. The worst part is that we don’t learn from our road blunders. Many road users are quite aware of the general safety precautions and rules that apply when using the roads, however accidents and wrecks only occur as a result of road users’ negligence. Human mistake is the primary cause of accidents and crashes. We are describing some of the typical human behaviors that leads to accidents.

Various national and international researchers have found these as most common behavior of Road drivers, which leads to accidents.

6.1 Over speeding

The majority of fatal incidents are caused by over speeding. Humans have an inherent drive to succeed. Man is capable of speeds that can reach infinite if given the chance. However, we will always follow some other vehicle when using the road with other users. The likelihood of an accident and the severity of any injuries sustained increases with speed. quicker vehicles are more likely to be involved in accidents than slower ones, and the severity of the collision will also be greater in the case of quicker vehicles. The risk increases with speed. When travelling at a fast speed, the braking distance required to stop the car must be longer.

6.2 Drunken Drive

It is normal to drink alcohol to mark special occasions. However, when combined with driving, it turns a happy occasion into a bad one. Alcohol impairs mental clarity. It shortens the human body’s reaction time. It takes longer for the limbs to respond to brain commands. Due to the dizziness, vision is hampered. Alcohol reduces fear and encourages people to take chances. While driving, all these factors result in collisions, many of which are fatal. The risk of an accident doubles for every 0.05 increase in blood alcohol content.
6.3 Distraction to Drivers
Outside or inside the car, distractions are possible. Talking on a cell phone while driving is currently the main source of distraction. A large amount of the brain is used when conversing on the phone, and a smaller piece is responsible for motor skills. This division of the brain impairs judgement and reaction time. This turns into one of the causes of collisions. It is not advisable to talk on the phone while driving. One should pull over next to the road if the call is urgent and answer it. Roadside distractions include:
1. Mirror adjustments while driving
2. Roadside animals
3. Billboards and banners.

6.4 Avoiding safety gears like seat belts, helmets
Today, it is illegal to drive a four-wheel vehicle without a seatbelt, and two-wheeler drivers are also required to wear helmets. After it was established through studies that these two precautions lessen the severity of harm during accidents, laws requiring the use of seat belts and helmets were passed. In a serious accident, wearing a seat belt and a helmet increases your chance of surviving. In the event of an accident, safety gear keeps you unharmed and secure. Since wearing a helmet has become required, the number of deaths involving two-wheelers has significantly decreased. For maximum safety, one should wear safety equipment that meets the required standards and secure it securely.

VII. RESULT AND EVALUATION
Analyze the accident detection algorithm's accuracy: The Android application's accident detection algorithm’s efficacy must be assessed. This can be accomplished by contrasting the application's findings with actual accidents that happened during the evaluation period. Analyze the alert system's response time: It is important to assess the alert system's response time. This can be done by tracking how long it takes the alarm system to warn the user's designated contacts and the emergency services once an accident is detected. Analyze the Android application's usability and user satisfaction. This can be achieved by polling users who have used the application to find out how well they think it works and how easy it is to use. Analyze the effectiveness of the alert system by counting the number of alerts that were successful and the number of false positives that the application produced throughout the evaluation period.
Solutions

1. Always keep eyes on the road

This may be one of the common things to remember while operating a motor vehicle. You need to take care that nothing happening in the car diverts your attention from the road. It is generally suggested against multitasking when operating a vehicle or other tasks like combing your hair or tying your tie. Driving while somewhat distracted increases the likelihood that an accident will come from a distraction. You must always be vigilant and ready for anything since Indian roadways are unpredictable.

2. Drive in speed limit

Driving beyond the speed limit is dangerous for you and other drivers on the road in addition to being against the law. Driving faster may enable you to save some time, but it also raises the likelihood of an accident. Because of the increased speed, it takes the car longer to stop when the brakes are engaged. If the vehicle is not well handled, the ensuing abrupt halt could result in serious injuries. If you are not vigilant, pedestrians or any animals that suddenly cross the road could have a disastrous effect.

3. Always wear seat belt

The most crucial thing you should always use when operating a vehicle is a seat belt. This is the most important safety precaution you need to follow when driving. Absent a seat belt, collisions with the dashboard or steering wheel can result in severe injuries to the lungs and ribcage.

4. Do not drink and drive

This may be one of the common things to remember while operating a motor vehicle. You need to take care that nothing happening in the car diverts your attention from the road. It is generally suggested against multitasking when operating a vehicle or other tasks like combing your hair or tying your tie. Driving while somewhat distracted increases the likelihood that an accident will come from a distraction. You must always be vigilant and ready for anything since Indian roadways are unpredictable.

5. Follow traffic rules always

As you drive your car, be sure to obey all traffic laws. The safety of everyone using the roadways, including pedestrians, has been taken into consideration when developing the traffic safety regulations. Make sure the space between the vehicles is maintained at the proper distance. While operating a vehicle, pay attention to how other motorists are being treated on the road.

VIII. CONCLUSIONS

Share Android apps that inform users to accidents have the potential to significantly increase traffic safety and lower the number of accident-related fatalities. These apps properly identify accidents and automatically inform emergency services, which speeds up response times and increases the likelihood that accident victims will survive. This capability is made possible by a variety of sensors and algorithms. False alerts, privacy issues, and the requirement for strong and dependable communication networks are just a few of the issues that still need to be resolved.

IX. FUTURE WORK

Future work for the above research paper could include, since the suggested system focuses on accident detection. However, this might be prolonged by giving the accident victims medicine on the scene. By offering alarm systems that can stop the car to avoid collisions, we can also prevent accidents by advancing technology. The suggested model can assist us in reducing the number of fatalities brought on by the absence of emergency services at the scene of the accident. The security component is not considered in the suggested model; hence we want to solve this problem in subsequent work. The suggested model can also include some driver alert systems, such as the sleepiness detection module.

ACKNOWLEDGEMENT

We would like to thank our friends, relatives, our instructor, and other staff members of Shri Ramswaroop Memorial College of Engineering and Management for helping me, and special thanks to my instructor for guiding me on the right path.
X. REFERENCES


