



AUTOMATIC ACCIDENT DETECTION USING DEVICE

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ABSTRACT

Safe journey is a big concern nowadays. As a result of road accidents, many people lose their lives due to delayed medical assistance. Early detection and timely action will help a lot in such situations. There exist many accident prevention systems which can prevent accidents to a certain extent. Here we propose an idea that helps to detect accidents, avoid falling in dings and humps as well as alert the first responders (hospitals and police) of these accidents. A device which consists of Gyroscope and Accelerometer is embedded in the automobile. The user has set an intensity value beforehand and when the intensity of the hit exceeds this particular value, an alert message will be sent to the nearby hospital and police station along with the user's location. It also alerts the user about humps, dings and even hairpin and dangerous bends. This paper proposes a method to increase the efficiency of one of the most vital parts of this sequence called the 'emergency response.' This process also assists the paramedics in deciding which hospital is best equipped to handle the severity of the wounds incurred, prepare for extrication if necessary and gather other resources to conduct a complete and thorough evaluation of the victim. The research presented in this paper is motivated by the fact that emergency medical service personnel would perform better if equipped with the knowledge of the kind of accident they are dealing with before arriving at the accident scene. Here we propose an idea that helps to identify humps, dings and even hairpin and dangerous bends. A device is attached to the automobile for detecting the accidents. An alert message is sent to the authority when an accident has occurred and thereby providing medical services as fast as possible.

Key words: IoT- Internet of Things, Gyroscope, Accelerometer, Android

1.INTRODUCTION

1.1 IOT

An IoT system consists of sensors/devices which "talk" the cloud through some kind of connectivity. Once the data is sent to the cloud, software processes it and then might

decide to perform an action, such as sending an alert or to detect the automatically adjusting the sensors/devices without the need of the user. The Internet of things is a system of interrelated devices, mechanical and digital machines provided with unique identifiers and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction.

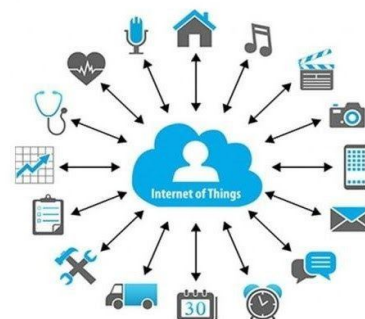


Figure 1: IOT Diagram

Road accidents have been one of the top contributors towards human fatality for decades. Traffic accidents are the leading cause of mortality for individuals. This paper proposes a method to increase the efficiency of one of the most vital parts of this sequence called the 'emergency response.' This process also assists the paramedics in deciding which hospital is best equipped to handle the severity of the wounds incurred, prepare for extrication if necessary and gather other resources to conduct a complete and thorough evaluation of the victim. The research presented in this paper is motivated by the fact that emergency medical service personnel would perform better if equipped with the knowledge of the kind of accident they are dealing with before arriving at the accident scene. Here we propose an idea that helps to identify humps, dings and even hairpin and dangerous bends. A device is attached to the automobile for detecting the accidents. An alert message is sent to the authority when an accident has occurred and thereby providing medical services as fast as possible.

1.2 ANDROID APPLICATION

Android software development is the process by which new applications are created for devices running the

Android operating system. Google states that "Android apps can be written using Kotlin, Java, and C++ languages" using the Android software development kit, while using other languages is also possible. An Android app is a software application running on the Android platform. Because the Android platform is built for mobile devices, a typical Android app is designed for a smartphone or a tablet PC running on the Android OS. Android Studio is the official integrated development environment for Google's Android operating system, built on JetBrains' IntelliJ IDEA software and designed specifically for Android development. It is available for download on Windows, mac OS and Linux based operating systems.

2.MOTIVATION

Although different governmental and non-governmental organizations all around the world carry out workshops and other training programs to make people aware of the effect of careless driving, yet this whole process has not been very successful till the day we live. In Our Country, deaths due to International Conference of Soft Computing and Pattern Recognition traffic accidents became a major problem adding to those emergency actions by hospitals or police that are not provided at the place of accident at required time, ignoring the fact that these people's lives could have been saved. Basically, in the event of a road accident, the Real Time Traffic Accident Detection System proposed can intelligently inform the site of the accident through a wireless interface, reporting it to the proper authorities. Also, informing the type and the amount of emergence services needed, and approximately the number of injured people.

3.RELATED WORK

The implementation of an automatic road accident detection and information communication system in every vehicle is very crucial. This paper presents a brief review on automatic road accident detection techniques used to save affected persons. An automatic road accident detection technique based on low cost ultrasonic sensors is also proposed. Statistics show that the leading cause of death by injury is road traffic accidents. A survey report by the World Health Organization highlights that every year more than 30,000 people in Pakistan die due to road traffic accidents. There are a number of causes for which an accident can occur, some of them are; lack of training institutes, use of mobile phone while driving, unskilled drivers, driving while intoxicated, bad road condition, overloading, and poor traffic management. However, most of the time it has been observed that the deaths occurred in the road accident are due to the late arrival of the ambulance to the accident spot. Although in most cases the injury is not severe and we could save the affected lives, however, due to late arrival of the rescue team, the injuries

turn fatal[1]. The number of fatal and disabling road accidents are increasing day by day and is a real public health challenge. Many times, in the road accidents, human lives will be lost due to delayed medical assistance. Hence road accident deaths are more prominent. There exist many accident prevention systems which can prevent accidents to certain extent, but they do not have any facility to communicate to the relatives in case an accident happens.

In this paper, the authors made an attempt to develop a car accident detection and communication system which will inform the relatives, nearest hospitals and police along with the location of the accident. Previous research has shown that the installation of airbags in vehicles significantly reduces crash related deaths, but these analyses have used statistical techniques which were not capable of controlling for other major determinants of crash survival. (ABS): The most effective chassis control system for improving vehicle safety during severe braking is anti-lock braking system (ABS). Anti-lock braking mechanism prevents the locking of wheels at the time of panic braking to maintain atractive contact with the road and thereby decreasing the braking distance of the vehicle. Anti-lock Braking can prevent accidents, but it will not communicate. The automatic Accident prevention systems have recently been a part of many modern cars to reduce injuries and casualties on the road. However, these systems are limited to high-end luxury vehicles only, due to high cost of components and equipment. In this paper we have developed an affordable and reliable system using Arduino UNO R3 [2]. Major accidents on highways, freeways and local roads can lead to huge social and economic impacts. Minor accidents may be resolved by the passengers themselves and do not require escorting to hospitals whereas major accidents where airbags are deployed require immediate attention of authorities. Automatic Smart Accident Detection (ASAD) is an auto-detection unit system that immediately notifies an Emergency Contact through a text message when an instant change in acceleration, rotation and an impact force in an end of the vehicle is detected by the system, detailing the location and time of the accident. The idea is that as soon as an accident is detected by the system, the authorities should immediately be notified to prevent further car congestion as well as allow the passengers to be escorted to the hospital in a timely fashion. The system involves the use of fuzzy logic as a decision support built into the smartphone application that analyzes the incoming data from the sensors and makes a decision based on a set rules [3]. Road accidents are one of the leading causes of mortality. While most accidents merely affect the exterior of the cars of the drivers involved, some of them have led to serious and fatal injuries. It is imperative that the Emergency Medical Services (EMS) are given as much information about the crash site as possible before their arrival at the scene. In this paper, a mobile phone application is developed that, when placed inside a car, intelligently classifies the type of accident it is involved in and notifies the EMS team of this classification along with

the car's GPS location. The classification mechanism is through a collection of data sets from a simulation of three types of collisions, which creates a knowledge base for an artificial intelligence-based classifier software.

4.SCOPE

Road traffic injury is a major global public health problem. Rapid motorisation in low and middle- income countries along with the poor safety quality of road traffic systems and the lack of institutional capacity to manage outcomes contribute to a growing crisis. The system helps in early detection of accidents. Accident rates could thus be reduced to much lower levels. IoT is a system of interrelated computing devices, mechanical and digital machines, objects, animals or people that are provided with unique identifiers and the ability to transfer data over a network without requiring human to human or human to computer interaction. Devices and objects with built-in sensors are connected to an IoT platform, which integrates data from the different devices and applies analytics to share the most valuable information with applications built to address specific needs. These powerful IoT platforms can pinpoint exactly what information is useful and what can safely be ignored.

5.PROBLEM STATEMENT

Road accidents are a major cause for concern in the present times. Despite rules and regulations and fines, the death toll and casualty rate caused by road accidents alone are still astounding. There is an urgent need for solutions that increase efficiency of emergency response in these situations. Although car manufacturing companies offer viable solutions with their built-in accident notification systems, these are expensive and could be rendered obsolete with changing technology. Continuous growth of population all over the world creates a great challenge to the transport management systems. The conventional methods are no longer effective enough for solving complex and challenging transportation management problems.

More economical, more efficient and thus more intelligent methods have to be developed to deal with these challenging problems. Knowledge from different research areas is needed for developing these systems. Very often complex transportation systems require integration of different methods from different branches of science. Due to the increased amount of vehicles, it is necessary to take effective steps in order to control the traffic and hence avoid all types of losses that is caused due to traffic. The study aimed at detecting accidents and providing necessary medical services and thereby reducing accidents, congestion of traffics etc. A problem statement is a concise description of an issue to be addressed or a condition to be improved . It identifies the gap between the

current state and desired state of a process or product. Traffic density now a day is huge. Accident detection and rescue system is essential for every vehicle. To scale well and to reach to masses, its architecture should address 4 V's of Big Data. System development should not be a one time job. It should improve continuously.

6.PROPOSED APPROACH

The proposed system consists of a database shared between the hospital, police and user. The parties can store as well as retrieve information from it. When there is an emergency, notifications will be sent to both emergency services and police so that they can reach the location in time. Thus, it helps to detect accidents.

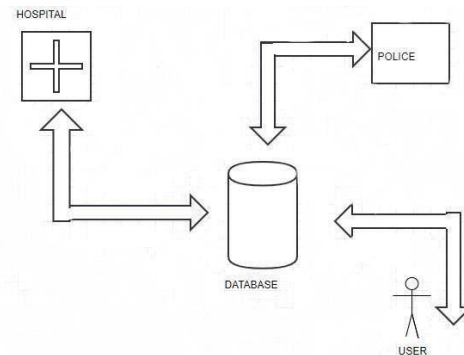


Figure 2: System Architecture

System designing in terms of software engineering has its own value and importance in the system development process as a whole. The device which consists of gyroscope and accelerometer is embedded to the automobile, which in turn sends an alert message to nearby emergency departments when an accident occurs. The user has set an intensity value beforehand and when the intensity of the hit exceeds this particular value, an alert message will be sent to the nearby hospital and police station. On the receiver side, the emergency departments get the notification on their application and a response is sent immediately. The emergency departments will be able to track the location of the person. Thus, help is provided to the user.

7.TESTING

Testing is the process of evaluating a system with the intent to find whether it satisfies the specified requirements or not. Software testing is the process of evaluating a software item to detect differences between given input and expected output. Testing assesses the quality of the product.

TCID	FEATURE TESTED	TEST PROCEDURE	EXPECTED RESULT	ACTUAL RESULT	STATUS
1	Create Account	Enter the username and password , click the create account button	Display the account creation page	Displayed the account creation page	successful
2	Login	Enter the username and password , login button	Display the account creation page	Displayed the login page	successful
3	Detection of digs based on intensity values	The intensity value is compared with the actual set intensity value	If it is greater then set the intensity value	Digs are detected	successful
4	Detection of humps	The intensity value is compared with the actual set intensity value	If it is greater then set the intensity value	Humps are detected	successful
5	Alert message to first responders	When the vehicle is met with an accident an alert message is send	Send alert message	Alert message is send to the first responders	successful

Table 1: Test Cases

8.RESULT

In the proposed system, a device is attached to the automobile.

The components in the device will help detect an accident and it will notify the first responders so that help could be prevented to the affected person. It is easy to implement, accurate and cost effective. The system is very helpful as accidents are a common occurrence these days and delayed responses often result in deaths. Iot is a trending topic in the world of technology and it plays a major part in the system. The system responds well to the given dataset and hence it could be considered successful.

9.RESULT ANALYSIS

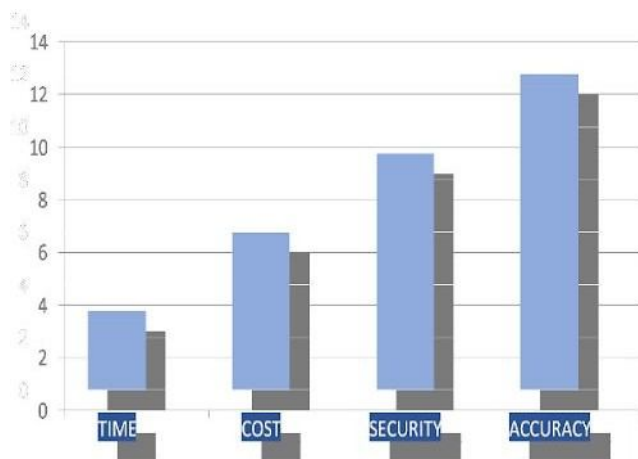


Fig 3: Result Analysis

10. CONCLUSION

The proposed system deals with the detection of accidents. It can also detect humps, dangerous curves and can notify the user about it. The system can also detect occurrence of

accidents and send alerts to nearby emergency services like police stations, hospitals etc. The emergency departments can then track the location of the accident and send help immediately. In the future, the system can be modified in such a way that it will be also helpful to prevent accidents and not just detect them.

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