Road Mishap (Accident Detector)

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Abstract - *Nowadays road accidents are increasing day by day on a fatal number and it is a real public health challenge. In the road accidents, many times due to delayed medical assistance human lives will be lost. Hence road accident deaths are very prominent. There are many accident preventions systems which prevent accidents to a certain extent, but they do not have any type of facility to communicate or to contact the relatives, friends in case accident occurs. An automatic accident detection system process that initiates itself and alerts the registered contacts whenever an accident occurs and also provides the live location of the victim. This system will be deciding whether an accident has occurred or not. An android application is developed that detects and sends alerts message to the concerned emergency contacts. External pressure change, sudden jerk on the device, will be observed using pressure sensor, accelerometer, and GPS respectively.*

Key Words: Accelerometer, Gyroscope, GPS, Pressure sensor, accident detection, alert message.

1. INTRODUCTION

Due to the increased number of transportation, it has given rise to more number of road accidents. Many road accidents are increasing day by day and have been a great challenge put in front of community public health. In the newspaper every day we come up with the news only of accidents. Today's population deaths are prominent because of road accidents. In 2017, 1.27 Lakh people died on Indian roads in 4.64 lakhs accidents reported during 2017. There are so many reasons for road accidents happening like due to the increasing count of vehicles, improper construction of road and their maintenance. Mostly the younger generation is losing their lives in road accidents because of drunk and drive, rash driving and many other reasons which are a great loss for our nation. In 2015, there were about 5 lakhs road accidents in India, which killed about 1.5 lakh people and injured about 5 lakh people. Traffic collisions in India are a major source of deaths, injuries and property damage every year. The three highest total number of facilities were reported in Uttar Pradesh, Maharashtra, and Tamil Nadu and together they accounted for about 33% of total Indian traffic facilities in 2015. In many accident cases, the victims suffer serious injuries where time plays a very crucial role in saving lives. If the accidents have happened in a remote area where there are no pedestrians or no people nearby to report an accident, also those who meet with an accident in early mornings or late night, when there is nobody around to witness and call for help at that time

this device will be a blessing to the victims of Hit-n-Run accidents. To process this we need an initiative as soon as an accident occurs and so minimum time is wasted, as every second in wait of medical help can be fatal. There are many applications which are developed for this purpose but they all are based on hardware. The approach of this system is different and is based on smartphone devices. It will use all the hardware installed on a smartphone device such as accelerometer, gyroscope and many more which can detect an accident on itself.

2. RELATED WORK

Using smartphones to identify road traffic accidents is not a new subject. There are many algorithms for systems which utilizes accelerometer as well as GPS to detect vehicle accidents using smartphones. Because there is already done on this subject, what we decided to do was to develop a complete system that is more reliable and have and have more functionality than the existing ones.

[1] In this paper the accident is detected by the vibration and gyroscope sensors and immediately a message is sent to the emergency contact numbers using GSM module along with the location identifies by the GPS module. If the vehicle gets any head-on collision the vibrations are produced. If the vibrations exceed threshold value they are detected. The central processing unit in the system will sense that an accident has occurred.

[4] In this paper, they have determined a two-way identification step to check whether the accident has occurred or not. The first is accelerometer through which it will identify that any sudden tilt of the vehicle in case of an accident occurs. Then the heartbeat sensor will sense the heartbeat rate of the victim and determine the seriousness of the accident based on changes in the heartbeat, a message will be sent along with the location of the accident to the control room and emergency contacts. The android application will also send a text message to the nearest medical hospital along with the location of the accident with the help of GPS which will help in saving crucial time.

[2] In this paper the system consists of an accident detection and alerting system along with an android application. A hardware device will be mounted on the motorcycle all times. It consists of an Arduino, accelerometer, two vibration sensors, a motor, a GPS module, and a GSM module. Based on an algorithm, the decision of whether an accident has occurred or not will

be done. In case of an accident occurs the system will send an alert message to the nearest medical center informing that an accident has occurred along with the message and the current location of the vehicle. For Anti-Theft purpose, the user will get an alert message whenever the engine of the vehicle is starting and he can start or stop the engine on his command in case of theft.

3. TECHNOLOGIES UTILIZED

3.1 Smartphones

Smartphones are a class of mobile phones and multipurpose mobile computing devices. They have considerably a lot of functionality than a regular mobile phone. It is a cellular telephone with an integrated computer. It is being used as a all in one device for our system to utilize all the pre-installed hardware on the device.

3.2 Android

Android, a mobile operating system, by Google. It is a Linux kernel-based open-source mobile operating system which was developed by Google for phones, tablets, watches, TVs, cars, and other electronic devices. It can be used as a platform for the application

3.3 Android Studio

Android studio is the primary android integrated development environment. It provides all the necessary tools of an android developer to develop an android application. Java and XML are the only languages required to create android applications with android studio. It does not have any alternatives worth considering.

3.4 Accelerometer

An Accelerometer is an electromechanical device, instrument for measuring the acceleration of moving or vibrating body. In mobile phones, it is used to detect the orientation of the phone and to measure acceleration forces. The basic principle of operation behind the MEMS accelerometer is the displacement of a small proof mass etched into the silicon surface of the integrated circuit and suspended by small beams.

3.5 Gyroscope

Gyroscope is a device that uses Earth's gravity to help determine orientation. It is used to detect the orientation of the phone, it adds dimension to the information supplied by the accelerometer by tracking rotation or twist. It works on the principle that angular momentum changes in the direction of Torque.

3.6 GPS

The Global Positioning System is a network of about 30 satellites orbiting the Earth at an altitude of 20,000 km. It

is used in military applications and by emergency crews to locate people in need of assistance

4. SYSTEM DESIGN

Whenever the accident happens it develops an sudden jerk that can cause a phone to fly off or be stationary at all. This can be detected by the accelerometer from the phone. Once the jerk has been detected by the accelerometer the gyroscope comes in action to verify that accident has really happened.

Gyroscope checks for the change in orientation of the phone, if the accident ever happens the phone gets burst of or falls with the victim which changes its orientation.

To apply the mechanism to avoid the false alarm to be generated false accident mechanism has been implemented where the user will have 10-15 sec to press 'I am fine' button on the app and disabling the app from sending the alert to the emergency contacts.

If the button is not pressed and all other conditions are satisfied the accident is confirmed to happen. At that time the location is detected using the GPS mechanism from the phone. Once the Location is obtained the pre-generated SMS added with current location is then send to the registered contact for emergency support.

5. FLOWCHART
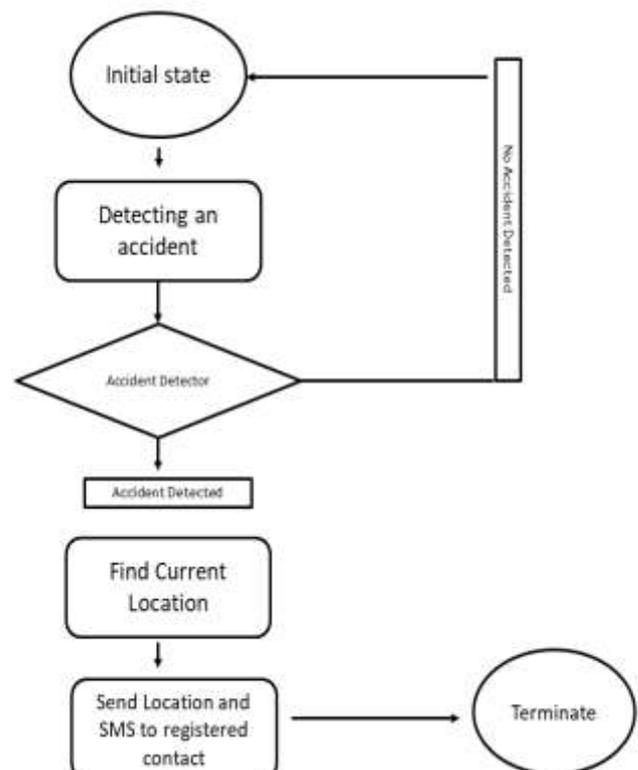
6. CONCLUSIONS

In this research, we developed accident detector as smartphone application and communication system which uses accelerometer sensor to detect the accident and it will generate an emergency alert message and send it to the registered emergency contact number along with the location coordinates of the accident. With the real-time location tracking for both the victim and the responder, the system will provide emergency aid in time for an accident victim which will increase the survival rate of the victim.

For future work, we can provide an alternative option of hospital contact number where the system will send the message to the nearest hospital authorities and ambulance.

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