

Car Accident Detection Using Smartphone

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Abstract - Nowadays, nobody in this world is ready to look what's around them even though; if any accident occurs no one cares about it. The common reasons of accidents are rush driving, drunk driving, pothole, etc. The existing system has lot of issues and it was based on hardware with high cost. So, there is need to have an effective road accident detection and information communication system that sends information message to nearby emergency services about accidents location. So, we proposed system which uses embedded sensors in smartphones, that is accelerometer and gyroscope to capture differences in centripetal acceleration due to vehicle dynamics.

Key Words: Accelerometer and Gyroscopes, Notification Google Map, Car Accident Detection.

1.INTRODUCTION

Road safety as an important area for research and action programmed has received a great deal of scientific attention in recent years.

Traffic accidents are a major public issue worldwide. The huge number of injuries and death as a result of road traffic accident uncovers the story of global crisis of road safety. In system all accident detected using the different hardware Like (Controller, GPS, GSM, Sensor, etc), so development cost is high. In this proposed methodology is the automatic system which will provide the solution for identifying the accident location and sends message to relatives, nearest hospital, police station.

2.PROBLEM STATEMENT

The problem associated that the victims depend upon the mercy of nearby people. There is a chance that there may be no one nearby the accident spot or people who are around, neglects the accident. This is the flaw in the manual system. So, there is new technique based on android application for accident detection using smart phones.

3.RELATED WORK

[1] Traffic accidents are a major public issue worldwide. Now day's large number of injuries and death as a result of road traffic accident uncovers the story of global crisis of road safety. Second leading cause is road collisions of death for people between the ages of 6 and 30 and third leading cause for people between 29 and 44. According to statistical projection of traffic fatalities, the two-year comparison of total driver participation in mortal crashes presented a three percent increase from 43,840 in 2011 to 45,337 in 2012. Additionally 184,000 young drivers (15 to 20 years old) were injured in vehicle crashes, in 2012, an increase of two percent from 180,000 in 2011.

[2] In this paper, the most obvious reason for a person's death during accidents is unavailability of the first aid provision, which is due to the delay in the information of the accident being reached to the ambulance or to the hospital. Thus, in the case of incidents involving vehicular accidents, response time is crucial for the timely delivery of emergency medical services to accident victims and is expected to have an impact on fatalities. Moreover, each minute is passed while an injured crash victims do not receive emergency medical care can make a large difference in their survival rate, for example, analysis shows that decreasing accident response time by 1 minute correlates to a six percent difference in the number of lives saved.

[3] Thus, the reduction in response time would occur with widespread implementation of enhanced traffic technologies that are used to reduce the response time and thus reducing traffic fatalities. The early experiences with these technologies are concerned with development Advance traffic management system and development automatic car accident detection and notification system built-in vehicles in United States. The ATMS is based on traffic sensors that are used to monitor the traffic and detect the accidents. These traffic sensors are installed in main highway; some of them are installed under the surface of the road such as loop detectors.[3] However, in this system, finding the traffic sensors in every roads process is impossible, since the traffic sensors are installed in main highways only, besides, the installation cost of these sensors are high. Apart from that, these traffic sensors are affected by the environment. For example, some of traffic sensors are not perform well in the snow environment.

[4] Other systems, the automatic accident detection and notification systems are equipped with the most recent manufactures vehicles, such as BMW and General Motor (GM), which depend on the vehicle on-board sensors to detect the accident and utilize the built-in radio cellular to notify the emergency responders [4]. However, the fast evolution of the technology requires the upgrading the software or even some hardware features of the vehicles in order to install the automatic accident detection and notification system, while the installation cost of these system inside the vehicles are expensive. Also, these systems are not considered as a standard option for all vehicles in U.S and other countries, these systems are just equipped with specific type of the vehicles in U.S such as BMW and GM.

In [5], the authors develop car accident detection and notification system that combines smartphones with vehicles through a second generation of On-Board-Unit interface to achieve smart vehicle modeling, offering the user new emergency services. The authors have developed an Android application that in case of accident detection sends an SMS to a pre-specified address with relevant data about the accident and an emergency call is automatically made to the emergency services. The only requirement to achieve the goal of this system is that the vehicle supports the OBD-II standard. The OBD-II standard is mandatory 2001 in U.S and there is also a European version of this standard, thus this solution is applicable to all vehicles in U.S and European countries and is not available in all vehicles in other countries. Besides that, the maintenance or upgrading process of this system is expensive operation.

Pseudo code:

4.PROPOSED METHODOLOGY

Step 1: Start.

Step 2: User login in system.

Step 3: user press car drive mode button.

Step 4: The accelometer sensor checks acceleration constantly. it has constant threshold value

Step 5: When the value of accelometer sensor greater threshold value then system generates false alert. else, go to step 4.

Step 6: If user cancel the false alert then to go step 4, else go to step 7.

Step 7: Capture photo using front camera.

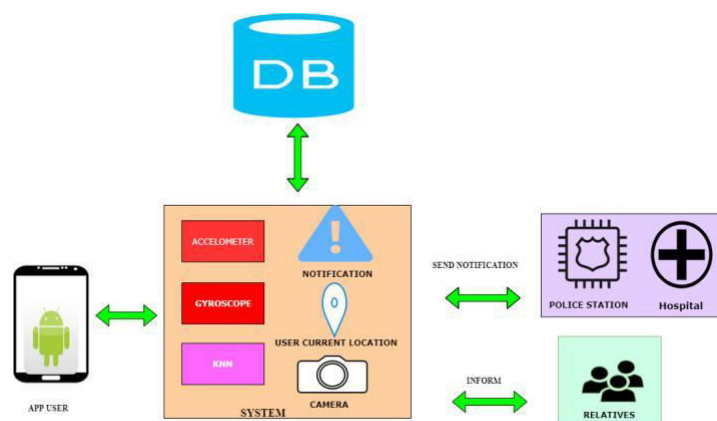
Step 8: system search nearest hospital and police station using KNN.

Step 9: system send message to nearest police station, hospital and relatives who stored in user registration

Step 10: If the step 9 is completed, it will go to the step 4.

Step 11: Stop

5.PROPOSED SYSTEM



In proposed system user place his/ her mobile on desk at the time of driving. Accident is detected with the help of

accelerometer sensor. When accident occurred, it checks accident is occurred or not. Its check false alert by sending alert message to application use. If user not respond then system take photo from front camera and send to the nearest police station. System also inform to nearest hospital, user relatives.

6. MODULES

1. User:

In this module user register into the system. All information of user stored in database. User place the mobile in car.

2. Accident detection:

In this module accident is detected with the help of accelerometer sensor. After detecting accident, system will alert to user and if any case the user does not respond to the system then the system will automatically further step.

3. Take photo:

If accident is detected then system takes photo from front camera.

4. Inform Nearest Hospital and police station:

System working at the background searches the nearest location of police and hospital. Once the searching is done, system requests is successfully sent to that police station. Here user's current location is used to find the nearest hospital and police station.

5. Inform to relatives:

After detecting accident, System inform to relatives by sending SMS. Relative's mobile number is store at user registration.

7. DESIGN PROCESS & ALGORITHM DEVELOPMENT

KNN (K-nearest neighbors) Algorithm:

- step1: Determine parameter K = number of nearest neighbors.
- step2: Calculate the distance between the query-instance and all the training samples
- step3: Sort the distance and determine nearest neighbors based on the K -th minimum distance
- step4: Gather the category y of the nearest neighbors

- step5: Use simple majority of the category of nearest neighbors as the prediction value of the query instances

8. MATHEMATICAL MODEL

- Let 'S' be the system

Where $S = \{I, O, P\}$

Where,

- I = Set of input (information of user and accelerometer data)
- O = Set of output (detect accident and inform to nearest police station, hospital, user's

relatives)

- P = Set of technical processes

Let „S“ is the system S

$= \{\dots\dots\dots\}$

- Identify the input data S_1, S_2, \dots, S_n

$I = \{(current\ location, accident\ photo, accelerometer\ data)\}$

- Identify the output applications as O

$O = \{detect\ accident\ and\ inform\ to\ nearest\ police\ station, hospital, user's\ relatives\}$

- Identify the Process as P

KNN for inform to nearest police station and hospital

9.RESULT

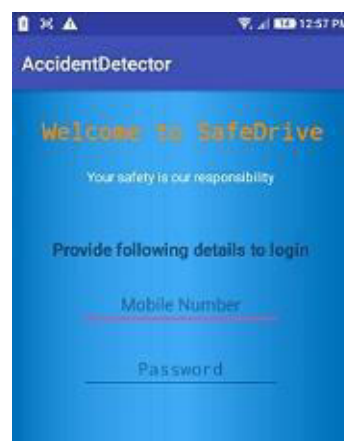


Fig. Login Page

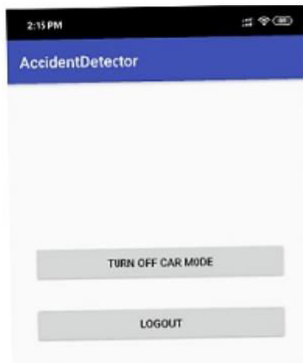


Fig.Driving mode ON



Fig, Accident Detection

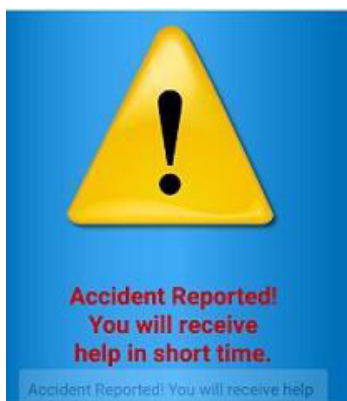


Fig.Accident Report Notification

This app consists of a login screen followed by the home screen. It consists of various events for Accident detection system. This mobile application allows the user to monitor and control the accident detection system via locally or remotely. Whenever the values the sensor crosses the maximum or threshold value it generates alerts the user by push notifications and allows the user to send message to hospital, police station and relatives for the help.

10. CONCLUSION

In the present world the percentage of accident has increased so widely because people were not helping when accident occurs even if the person is fallen in front of their eyes. After development of this system in future if accident of person is happened, he would not have depended on other people for help. One more advantage will be that, by using this application the location of nearby hospital and police station acknowledged to the user and message will be send to nearby hospital police station and relatives.

11. FUTURE WORK

In future this module is extended using the health analysis. Once the accident is detected then the SMS includes the current location with current heartbeat rate of the user using the variable sensor. We also enhance the system based on RFID technique to detect the vehicle number plate information for further process.

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