ISSN 2395-1621

Car Accident Detection Using Smartphone

[#1]Heena Singh, [#2]Kalyani Khandelwal, [#3]Nalini Salunke,
[#4]Prof.Swati Narkhede

[1]heenasingh121998@gmail.com
[2]kittob19@gmail.com
[3]nalinisalunke14@gmail.com
[4]narkhrdeswati37@gmail.com

[#1234]Information Technology,
Savitribai Phule Pune University, Maharashtra
Dhole Patil College of Engineering, Wagholi, Pune, Maharashtra.

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 accelometer and gyroscope to capture differences in centripetal acceleration due to vehicle dynamics.

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

ARTICLE INFO

Article History

Received: 25th August 2019

Received in revised form :

25th August 2019

Accepted: 30th August 2019

Published online :

9th September 2019

I. 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.

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.

II. LITERATURE SURVEY

[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 since 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.

III. PROPOSED SYSTEM

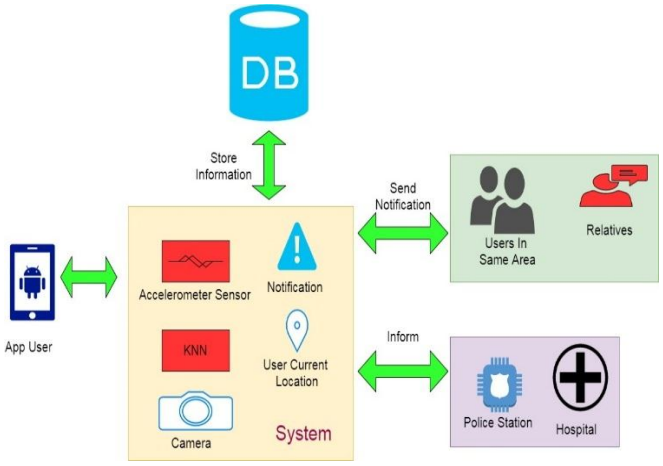

Fig 1. System architecture

System modules:

1. User
2. Accident detection
3. Take photo
4. Inform Nearest Hospital and police station
5. Inform to relatives and other user:

Module Description:

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

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.

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

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 send to that police station. Here users current location is used to find the nearest hospital and police station.

Inform to relatives and other user:
After detecting accident, system inform to nearest user to avoid the traffic. System also inform to relatives by sending SMS. Relative's mobile number is store at user registration.

A. Algorithm:

K-nearest neighbors KNN algorithm:
Proposed algorithm provides the accurate result to the system, this algorithm used to find out the nearest police station, nearest hospital from the current accident location.

1. Load all police and hospital details to the system S= (police station details, hospital details)

2. Analysis and determine parameter K = number of nearest neighbors from the current location.

3. Search and Calculate the distance between the current query instance and all the loaded training samples of police and hospital.

4. Filtering and sorting the distance and determine nearest neighbors function based on the K^{th} minimum distance.

5. Collect all the category of the nearest neighbors result from the filtering and sorting function.

6. Last we use simple count of the category of nearest neighbors as the prediction value of the query instance.

B. 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 = {……
- Identify the input data S1, S2, …. , Sn
  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, hospital and other user in same area

IV. REFERENCES

[1] "National Highway Traffic Safety Administration", Dept. of Transportation, "Traffic safety facts 2012: Young Drivers", Washington (DC), April 2014.

[2] Evanco and William M., "The Impact of Rapid Incident Detection on Freeway Accident Fatalities", June 1996. in

[3] Peter T. Martin, Joseph P. and Hansen B.," Incident Detection Algorithm Evaluation ", Vol. 1, Issue 1, Part 122 of MPC report, March 2001.

[4] Chris T., White J., Dougherty B. , Albright A. and Schmidt DC.," WreckWatch: Automatic Traffic Accident Detection and Notification with Smartphones ", International Journal of mobile network and application, Springer., Vol. 16, Issue 3, PP. 285-303, March 2011.

[5] Jorge Z., Carlos T. , Juan C. and Pietro M., "Providing Accident Detection in Vehicular Networks through OBD-II Devices and Android-based Smartphones", IEEE, PP. 813-819,October 2011.

[6] Bannister G., Amirfeyz R., Kelley S., Gargan M., " Whiplash injury", International journal of British Editorial Society of Bone and Joint Surgery, Vol.91 , No. 7, PP. 845-850, July 2009.

[7] Sneha R.S. and Gawande A. D., "Crash Notification System for Portable Devices", Vol.2, No-3, PP.33-38, June 2013.

[8] Patel K.H., "Utilizing the Emergence of Android Smartphones for Public Welfare by Providing Advance Accident Detection and Remedy by 108 Ambulances, Vol.2, Issue 9, PP 1340-1342, September – 2013.

[9] Krafft M., Kullgren A., Malm S. and Ydenius A.," Influence Of Crash Severity On Various Whiplash Symptoms: A Study Based On Real-Life Rear-End Crashes With Recorded Crash Pulses", June 2005.

Author Profile

Prof. Swati Narkhede received the BE degree in 2013 from Government College of Engineering ,Aurangabad.
Heena Singh, Kalyani Khandelwal, Nalini Salunke are pursuing Bachelor of engineering in Information Technology from Dhole Patil College Of Engineering,Wagholi, Pune, Maharashtra.

