International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 05 Issue: 05 | May-2018 www.irjet.net p-ISSN: 2395-0072

Go Safe: Android application for accident detection and notification

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Abstract - *With the rapid development of society, there are some side effects including the increasing number of car accidents. On average one out of every three motor vehicle accidents results in some type of injury. Traffic accidents are one of the leading causes of fatalities in most of the countries. As number of vehicle increases mean while the accident also increases. The government has taken number of actions and so many awareness program also contacted even though the accident increases as population increases. The Propose system can detect accident automatically using accelerometer sensors and notify all the nearest applications user and emergency points (Police station, Hospital).*

***Key Words*: GPS,Mobile Interaction, Accelerometer Sensor,Smartphone,OBD.**

1. INTRODUCTION

1.1 Problem Statement

GoSafe; a smartphone application for enhancing road safety and road management. This application can be used to report and receive warnings about accidents or other road events using voice commands and voice notifications. Our application will show good power performance when embedding a combination of network based and GPS-based localization.

1.2 Background

Now a days there are many deaths because of the Road Accidents. In Accident saving of the person is very important. But lack of services it cannot be possible. For providing that services to the person i.e. Police and Hospital we implement the Accidental System application.

1.3 Introduction to System

In this project, we present GoSafe application, a lightweight, flexible and power-efficient smartphone based vehicle to infrastructure communication system for improving road safety and enhancing the driving experience. This system notifies motor vehicle drivers about events that may be encountered while driving, this application will alert user's if there is any accident happen on road. So that other vehicle will choose another path/route. Using accelerometer sensor ,velocity and speed of that particular vehicle will be calculated.

2. LITERATURE SURVEY

[1] Attila Bonyar,Oliver Krammer et al; The paper is given overview on the existing eCall solutions for car accident detection. Sensors are utilized for crash sensing, for notification. eCall is an emergency call that can be generated either manually by passenger or automatically via activation of in-vehicle sensors when a serious accident detects. When system activated the in-vehicle eCall system established a 112 voice connection directly to the nearest safety answering point. Even if passenger is not able to speak, a minimum set of data (MSD) is sent to safety point which include location of crash site, the triggering mode, the vehicle identification number, timestamp, and current location. This way of information that is valuable for emergency res ponder to reaching them as soon as possible.

[2]Girts Strazdins, Artis Mednis, Georgijs Kanonirs et al; The paper showed one of the most popular smartphone platforms at the moment, and the popularity is even rising. Additionally, it is one of the most open and edible platforms providing software developers easy access to phone hardware and rich software. API. They envision Android-based smartphones as a powerful and widely used participatory sensing platform in near future. The paper they had examines Android smartphones in the context of road surface quality monitoring. They evaluated a set of pothole detection algorithms on Android phones with a sensing application while driving a car in urban environment. The results provide rest insight into hardware differences between various smartphone models and suggestions for further investigation and optimization of the algorithm, sensor choices and signal processing.

[3] Jorge Zaldivar, Carlos T. Calafate et al;The paper combine smartphones with existing vehicles through an appropriate interface they are able to move closer to the smart vehicle paradigm, offering the user new functionality and services when driving. In this paper they propose an Android based application that monitors the vehicle through an On Board Diagnostics (OBD-II) interface, being able to detect accidents. They proposed application estimates the G force experienced by the passengers in case of a frontal collision, which is used together with airbag triggers to detect accidents. The

application reacts to positive detection by sending details about the accident through either e-mail or SMS to pre-end destinations, immediately followed by an automatic phone call to the emergency services. Experimental results using a real vehicle show that the application is able to react to accident events in less than 3 seconds, a very low time, validating the feasibility of smart-phone based solutions for improving safety on the road.

[4] Joaquim Ferreira, Arnaldo Oliveira et al;The paper gives the information of wireless vehicular networks for cooperative Intelligent Transport Systems (ITS) have raised widespread interest in the last few years, due to their potential applications and services. Cooperative applications with data sensing, acquisition, processing and communication provide an unprecedented potential to improve vehicle and road safety, passengers comfort and efficiency of track management and road monitoring. Safety, efficiency and comfort ITS applications exhibit tight latency and throughput requirements, for example safety critical services require guaranteed maximum latency lower than 100ms while most infotainment applications require QoS support and data rates higher than 1 Mbit/s. The mobile units of a vehicular network are the equivalent to nodes in a traditional wireless network, and can act as the source, destination or router of information. Communication between mobile nodes can be point-to- point, point-to-multipoint or broadcast, depending on the requirements of each application. Besides the adhoc implementation of a network consisting of neighboring vehicles joining up and establishing Vehicle-to-Vehicle (V2V) communication, there is also the possibility of a more traditional wireless network setup, with base stations along the roads in Vehicle-to-Infrastructure (V2I) communication that work as access points and manage the owe of information, as well as portals to external WANs.

[5]JCheng Bo,Xuesi Jian et al;The paper dense a critical task of dynamically detecting the simultaneous behavior of driving and texting using smartphone as the sensor. They propose, design and implement texive which achieve the goal of detecting texting operations during driving utilizing irregulaties and rich micro movements of user. Without relaying on any infrastructures and additional devices, and no need to bring any modification to vehicles, Texive is able to successfully detect dangerous operations with good sensitivity, specificity and accuracy by leveraging the inertial sensors integrated in regular smartphones.

[6] Brian Dougherty, Adam Albright, and Douglas et al; The paper shows how smartphones in a wireless mobile sensor network can capture the streams of data provided by their accelerometers, compasses, and GPS sensors to provide a portable black box that detects traffic accidents and records data related to accident events, such as the G-forces (accelerations) experienced by the driver. It also present architecture for detecting car accidents based on WreckWatch, which is a mobile client/server application we developed to automatically detect car accidents. How sensors built into a smartphone detect a major acceleration event indicative of an accident and utilize the built-in 3G data connection to transmit that information to a central server. That server then processes the information and notices the authorities as well as any emergency contacts.

[7]Deepak Punetha, Deepak Kumar, Vartika Mehta et al; The paper shows how An accident is a deviation from expected behavior of event that adversely affects the property, living body or persons and the environment. Security in vehicle to vehicle communication or travelling is primary concern for everyone. The work presented in this article documents the designing of an accident detection system. The accident detection system design informs the police control room or any other emergency calling system about the accident. An accelerometer sensor has been used to detect abrupt change in g-forces in the vehicle due to accident. When the range of g- forces comes under the accident severity, then the microcontroller activates the GSM modem to send a pre-stored SMS to a preened phone number. Also a buzzer is switched on. The product design was tested in various conditions. The test result confirms the stability and reliability of the system.

[8] Alexandra Fanca,Adela Puscasiu et al; The paper gives the information about implementation of system, able to achieve a set of information from the user, information that associated with a location using a GPS tracking system and creates an accident report. The system sense the Gps coordinates of the person, display the coordinates on map and computes the shortest root to the accident site. Also, the system is automatic detect the accident when occurs. The paper focuses on mobile part of the system.

3. PROPOSED SYSTEM

Architectural Design

Many build-in systems are used to detect and report car accidents. Built-in sensors in the car can be used to detect changes in acceleration, or even to detect weather an airbag was ejected, which is clear indication that a car accident has occurred. These dedicated system due to their design and implementation minimizes false positives, i.e. False accident detections. Unfortunately these systems are expensive and available only on luxury cars. In System The mobile phone is communicating through GPS to find out the coordinates of the current location of the user able to retrieve the correct location. The user need to register on the application when started driving. If GPS not working properly then system will not Able to detect the accident location.

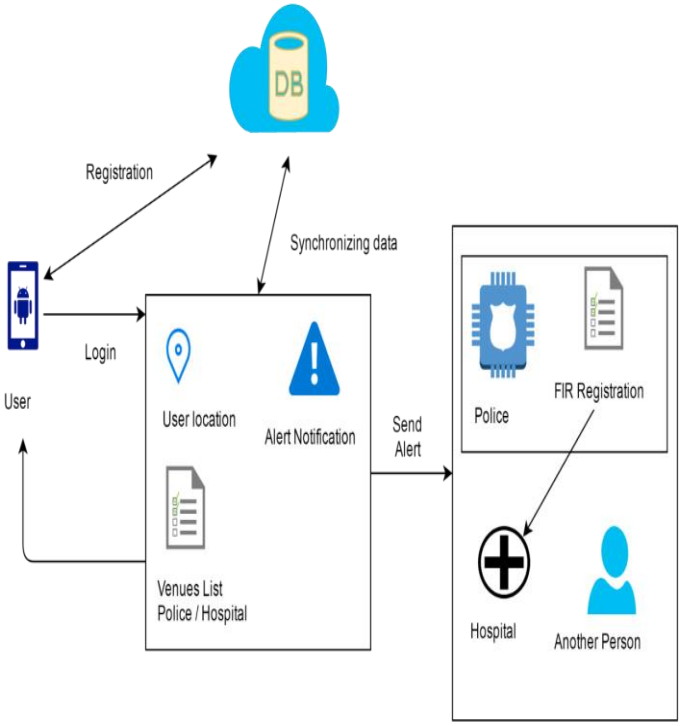
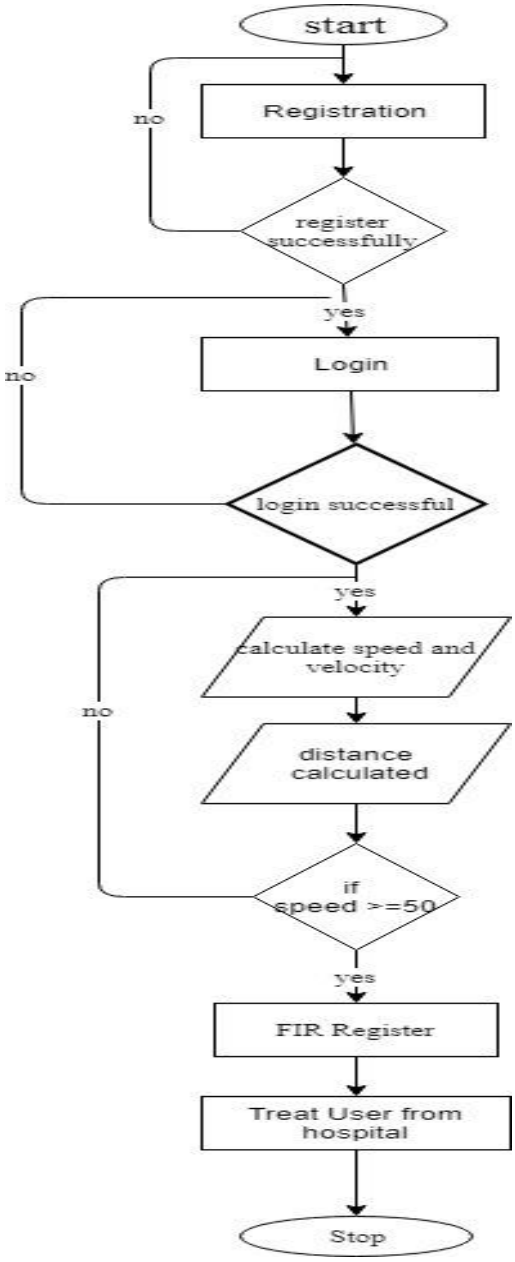


Fig1: System Architecture

Flowchart



4. ALGORITHM

Proposed Architecture

A. Android Application

In this system user need to register to the system, after registration his/her data will be stored in database. When user registers to system his/her location will be recorded by GPS. When user is met with an accident and have injury then system will automatically send message to the Nearest Vehicles and police station then police station will register FIR and send it to the nearest hospital. After receiving message from Police station Hospital will treat that patient. If there is no accident then user need to decline the Alert notification message within the second, so that the further process gets stop.

B. Police Station

This is a swing java based desktop application which will receive the notification when any accident occurs. The Police station will get an alert if accident detected along with the map link which will contain the exact latitude and longitude details of the location. Police station will also receive the vehicle number along with the victim contact number for cross checking the reality of accidents.

C. Hospital

Hospital System will get an FIR from the police station contain the exact latitude and longitude details of the location. It will also receive the vehicle number along with the victim contact number for cross checking the reality of accident. With the help of these details the ambulance can be discharged to the accident location and reduce the time to save the victim which needs the emergency treatment. Our application will use a common android phone which will immediately notify the concerned people about the accident. Because of the android platform, our system will be available at low cost and even low end vehicle owners can afford to use it. As the application will be released in Android Market the scope will extend to users worldwide.

5. SYSTEM IMPLEMENTATION

The Accident Detection and Notification System is Implemented to detect an automatic Accident and send notification to the nearest Emergency points With the help of In-built Accelerometer sensor in Mobile device the system is able to detect an Accident and sends emergency notification with the users location to the nearest emergency points with the help of GPS.

The system is composed of two parts. The first part is a Server with the secured access with Login credentials and the second part is the application running on mobile terminals.

The mediator part between the server and the mobile application is the database where the data is saved. All these parts are important and if one of them does not work then all the applications system will be compromised. The mobile phone is communicating through radio signals with a satellite in order to get the location. GPS receiver is able to retrieve location because GPS is more accurate, transmitting to the database the exact coordinates where the user is but if the GPS is not working ,the system will not able to communicate the location even if the automatic detection of the accident is active. The information is transmitted through PHP services to the database.

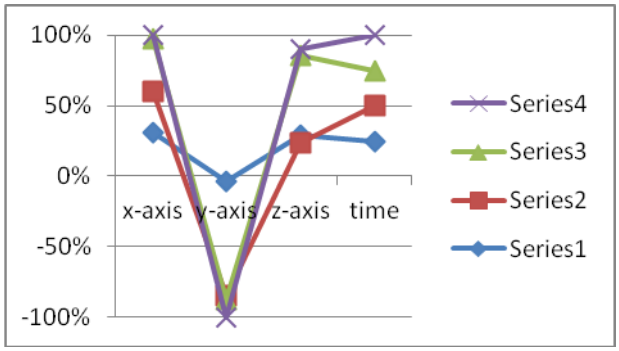
Google Maps API is included in both mobile and server application for showing a route on a map. Using this API nearest hospital and police station will easily found.

6. EXPERIMENTAL RESULTS

This section describes experimental results of test performed by the accident detection system. The following graph shows the different accelerometer reading for x-axis,y-axis,-axis depending on the speed time and direction of the vehicle. The accident can be detected by the system with the help of threshold value. The threshold value of the sensitivity can be set. The acceleration experienced during driving the vehicle is shown in following graph. The x-axis indicating that x-axis was perpendicular to the ground and the changes in the x-axis, y-axis,z-axis ae variant due to the speed in milliseconds.

Acceleration of all three axis may changes in milliseconds. acceleration during driving is different than acceleration while vehicle is constant. This information is used to better understand that how acceleration changes when vehicle is on different speed and whether the change in sudden

acceleration may result to help the system to identify the accident condition is occurred or not.



7. RELATED WORK

Many built-in Systems are used to detect and report car accidents. Built-in sensors in the car can be used to detect changes in acceleration or even to detect whether an airbag was ejected, which is clear indication that a car accident has occurred. Unfortunately these systems are expensive and available only on luxury cars. On the other hand, some accident detection systems which uses mobile phones for cars that do not have these expensive built-in systems. For example in order to detect an accident. Accident reporting and guidance system is trying to implement an automatic crash detection an notification service for portable devices. The solution implemented by the accident reporting and guidance system take into account for detecting the accident the signal received from the accelerometer and the speed given by GPS.it can use two phones in order to reduce the false positive incidence near to 0.The main purpose of the Accident reporting guidance system is to find the nearest medical units from the accident location.

In our system the solution take into accounts in order to detect an accident and send the immediate help to the user by providing necessary information to the nearest police station and the hospital and also the relatives of the user and nearest users near the accident place in order to avoid the traffic and get immediate help to the accident met people and if the accident not happen then user can itself need to close the false alarm generated by the system. The application is under development. In the future, the application will be implemented for the motorcycles and the Accident detection system will be improved with the features.

8. CONCLUSIONS

It has been realized that the smartphone based car accident detection system is not an easy task to handle. It is really surrounded with many obstacles that prevent the researchers from achieving 100% accurate detection system. The main purpose of the system is to find the nearest emergency points from the accident location this was achieved by using some feature that the GPS receiver and google maps are providing. Traffic notification is provided by the system to the nearest app users to get the information about the accident place with the help of that they can choose different route to avoid the traffic.

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