

Survey on Accident Detection using smartphone sensors and rescue System

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ABSTRACT

In the world every day a large percentage of people die because of traffic accidents. An effective approach for reducing traffic problems is: first building automatic accident detection system, second, is by minimizing the time to provide the medical and other emergency services. Recent technologies are using built-in vehicle automatic accident detection and notification system. Even though these applications work fine, their installation cost is more expensive, maintenance complex task, and are not available in all cars. On the other hand, the ability to detect accidents using smartphones has only become possible due to the advances in the processing power and built-in sensor in smartphones. Many smartphone-based accident detection systems depend on the high speed of the vehicle (extracted from the smartphone GPS receiver) and the G-Force value extracted from smartphone accelerometer sensor to detect an accident. From many researches has confirmed that most of the road- accidents occur at low speed of the vehicle. Hence, in addition to the high-speed accident detection, this system concentrated on low speed car accident detection. The main problem which is to encounters the low speed accident is how to check whether the driver is inside the vehicle or outside the vehicle, walking or slowly running. The effect of this obstacle is minimized, in this work, by a proposed mechanism that distinguishes between the speed variation of low speed vehicle and walking or slowly running person. This system consists of two Modules: first one is detection module which is used to detect car accident in low and high speeds. The notification module is second module and immediately after an accident is indicated, it is used to send detailed information accident location, etc. to the emergency responder for fast recovery.

Keyword: - Mobile Computing, GPS, Accident Detection, Android Device, Health Industry

1. INTRODUCTION

Large number of human life's are lost by Traffic accidents worldwide. The worldwide crisis of road safety can be observed by the number of deaths and injuries that are caused by road traffic accidents. (119,860 deaths in 2008, 126,896 deaths in 2009, 133,938 deaths in 2010).

In most of the situations the family members or emergency services may not be informed in time. This results in delayed response time, due to lack of emergency service or medical resources it can lead to an individual's death or severe injury. The purpose of this work is to reduce the response time of emergency services in situations like traffic accidents.

By utilizing onboard sensors of a smartphone to detect vehicular accidents and report it to the nearest emergency responder available. Provide real time location tracking for hospital and ambulance responders and emergency victims, will increase the chances of survival for victims, and also help save medical services time and resources.

2. LITERATURE SURVEY

2.1 Automatic Ambulance Rescue System by Prof. R.K. Moje, Amol Kumbhar, Ramesh Shinde, Shrishailya Korke, April 2016 [1]

The road accidents in the present era is increased to greater extent due to increase in number of vehicles. The number of human life lost due to accident must be avoided. Traffic congestion is the main fact that cause delay to ambulance. In order to save human life from accidents this system introduce a scheme called ITLS (Intelligent Traffic Light system). The main concept behind this scheme is to minimize the delay for emergency services like ambulance to reach Hospitals, caused by traffic congestion by providing a smooth flow for the emergency vehicles.

Limitations:

1. GSM Modules are needed to be interfaced which increases the system cost.
2. Many a times the SMS Do not get delivered in timely manner.

2.2 Automated Accident Intimation and Rescue System for Vehicles by Supriya Sawwashere, Ashutosh Lanjewar -May 2015 [2]

Now a days, automation and advancement within the system is enforced all over. All the automobile industries are working to vie with the others. Also there is much more development in technologies, which are commonly offered in the vehicles. The services provided with the vehicles such as self-start, auto-gear, battery chargers, remote controls, etc. are commonly provided with all the vehicles. Everyone uses their own vehicle for travelling and transportation as there is a vast growth in the nearby areas of the cities.

There has been tremendous increase in the traffic due to urbanization and especially due to population in India, resulting in the growth in automobile industries. This heavy traffic has also amplified the problems like traffic congestion, resulting in the rule violations. Also it has increased the fuel consumption. These are the main reasons behind the accidents on the roads. Vehicle accidents are one of the foremost causes of death in the India. An effective approach for dropping traffic sufferers, is the time minimization between when an accident occurs and as it is responded by people, such as medical personnel, are dispatched to the scene of the accident. Also public avoid to help the victims on the road as there is the problem of Police enquiry.

Wireless Sensor Networks (WSN) is a major part of this system. The well-known field, where WSN is used is the Traffic Signal System for gathering the information about the arriving flow of traffic, traffic load on a particular road.

To control the traffic load on roads and at traffic intersections, WSN is installed along the road.

Limitations:

1. This system does not have any mechanism for informing ambulance and does not have ambulance unit for carrying patient from location to hospitals for medical aid.

2.3 Optimized Rescue System for Accidents and Emergencies by Sagar Wadhwa, Preeti Wadhwa, Sahil Mirchandani, Richard josephi-2017 [3]

As the rapid growth of technology and infrastructure, it has increased traffic hazards, road accidents and harmful situations which cause huge loss of health and life because of the late arrival of emergency services. In this paper, we propose a system that will provide an optimized solution to this drawback by coordinating between emergency facilities to increase efficiency of rescue process. It requests for immediate help in case of any emergency situations with a single click of a button. Our system will verify all the request by taking real-time snapshots of the incidents. These snapshots will then be processed in central server for verification purposes. This

system will then contact the nearest hospitals to the site of the emergency and route the ambulance using shortest path algorithm.

In this system, the person passing by the accident will detect and initiate the process of rescuing the victim by sending us an image, then our system will bring coordination between the ambulance and the hospitals, by searching the best hospital nearby according to the type of incident and also clearing the traffic and making the way for the ambulance, with the help of police.

Limitations:

1. The system is based on camera images being captured at accident locations which is not feasible at night times.
2. The system does not have any mechanism for informing police station to take care of legal procedures while accidents occur on roads.

2.4 An Automated System for Accident Detection by Asad Ali and Mohamad Eid,2017 [4]

Major accidents on highways, freeways and local roads can lead to huge social and economic effects. Minor accidents may be looked over by the passengers themselves and do not require to take the victim 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 instantly 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 thus found by the system, detailing the location and time of the accident. The idea is that no sooner an accident is detected by the system, the authorities should immediately be notified to prevent further car overcrowding 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 studies the incoming data from the sensors and decides based on a set of rules. The results show a 98.67% accuracy of the system with failures resulting from the “gray regions” of the variable values.

ASAD functions as a detection and notification service that can be installed in a vehicle and in case of accident detection, requires the smartphone of the driver to send a text message to the emergency service team. The detection of an accident is based on Mamdani fuzzy logic that evaluates, using four parameters (force, acceleration, rotation and speed) to calculate a collision index and if the threshold of the index is met, the smartphone issues and sends a notification text message. This eliminates the need of the passing by drivers or bystanders to notify to the police about the accident. In addition, ASAD records the sensor data over a specific time interval as a text file in This full text paper was peer-reviewed at the direction of IEEE Instrumentation and Measurement Society prior to the acceptance and publication.

3. PROPOSED SYSTEM

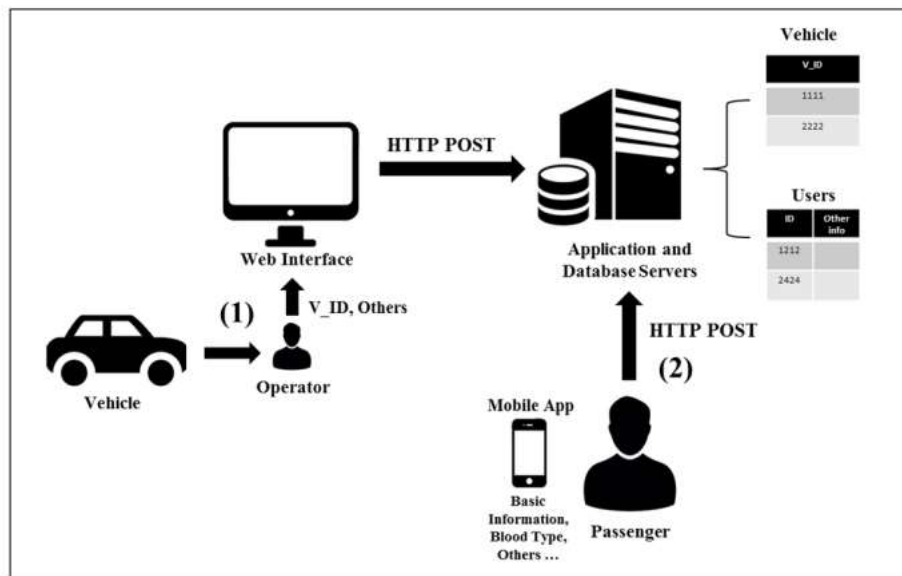


Fig. 1 – System Architecture

4. METHODOLOGY

The system comprises of a mobile device and its services (accelerometer, GPS, SMS). The system is connected to a server which stores the data of all the Hospitals, Police Stations, Ambulance and the User. The accelerometer sensor monitoring algorithm computes the G-Force (acceleration force) which helps to detect the accident like situations. After detection of such situation, the user will be alerted with a popup to cancel the SOS service call if it's not the actual accident. But if accident is occurred, the user details (Location, Name, Blood Group, Gender, Emergency Contacts) will be sent to nearby Medical Services (Hospital, Ambulance) as well as nearby Police Station from the server. Shortest Path Algorithm (Geo Distance Algorithm) is used to find the medical services nearby to the accident location. The location of the user after accident is recorded and the algorithm finds the nearest Medical Services. Due to less human interaction in this complete scenario, the proposed method will help to provide medical help to the victim as soon as possible.

5. CONCLUSION

We have analyzed the previously proposed methods and mentioned their limitations. In our proposed method we are trying to overcome the limitations at present. Various methods tried to overcome the limitations in their own way but still have been found to have further scope of improvement in hardware as well as providing proper medical service in time, so there has to be a system which will work on the limitations. So, the proposed system will be focusing on implementing the improvements detected.

6. REFERENCES

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