Open access Journal International Journal of Emerging Trends in Science and Technology

Smart Accident Detection & Assistance System

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Abstract

The numbers of deaths due to road accidents are increasing day by day. Even the vehicles are becoming more sophisticated with features like GPS navigation and airbags for safety. In spite of this the victims of the accidents which occur at remote locations do not get prompt medical service. There are several cases where the accident victims lose their lives due to lack of medical assistance. These victims may get serious injuries due to which the might not be able to move or communicate to the rest of the world. In such situations the advancements in technology and the sophistication of the vehicles do not seem to be useful. Smart Accident Detection and Assistance Systems overcomes this limitations as it will automatically detect an accident and notify the nearest emergency response services i.e. Hospitals and Towing services which will enable the accident victim to receive instant medical help and assistance. In today's day roads are the most used medium for traveling. A large number of road accidents take place every year around the globe. Most of the accidents on highways may prove fatal; sometimes the victims go unattended and even lose their lives. So, this system proposes a solution to this problem which detects accident of the vehicle and alerts the ambulance service, insurance company, towing services so as to provide instant medical help.

Keywords- *Accident Detection System, Android, Arduino, Assistance System.*

INTRODUCTION

The system uses various technologies developed along the years like GPS, GPRS, and Android Device to serve as a tool to reduce the count for number of deaths due to road accidents. It incorporates automatic detection of an occurrence of accident with the vehicle, records the location of the car at the time of accident and uses it to facilitate the emergency services to reach at the accident location and provide instant medical help. Along with this the system will further provide post-accident assistance like providing a towing service, notifying the insurance services for easy claims and notifying the relative of the victim. In today's day, vehicles with smart assistance systems are heavily in demand due to different reasons like Dense Traffic and Fatal Accidents. This proposed system solves this problem using a touch screen panel (Android Smartphone) as the basic interactive unit. It will have an android applicationinstalled in it which will help in the accident reporting. Speed is one of the basic reasons for vehicle accident. Many lives could have been saved if emergency service could get accident information and reach in time.

Nowadays, GPS has become an integral part of a vehicle system. This system proposes to utilize the capability of a GPS receiver to detect accident using the Switch and send accident location to a Central Ambulance Service Centre, Towing Services and Insurance Services. The Accident Detection Circuit will be installed in the vehicle which, when the accident occurs will be triggered due to the physical impact. This circuit will include multiple switch and Arduino- which is a microcontroller. The system will then send the accident location acquired from the GPS along with the time, user's registration

details to the Centralized Online Server by utilizing the GSM network via GPRS or further technology. This data will then be processed and required operations will be performed to notify the nearest ambulance service, towing service and the insurance companies. Upon receiving the notification of the Accident along with its location the Application at the Central Service Centre will find the nearest Ambulance Service provider and notify it with the accident location. The same procedure will be carried out at the Central Vehicle Towing Service Provider and along with this the Insurance Companies will be notified with the Accident details including the time. This will help rescue service to each in time and save valuable human life.

SYSTEM DESIGN

A. Hardware module for Accident Detection

This will include a set of limit switches and the Arduino, which is a microcontroller.

B. Web based Central Registration System

This Application will register new users, vehicles, Ambulance Service providers, Vehicle Towing Service providers and the Insurance Companies.

C. Android Application for controlling the Circuitry and User Interaction in the Vehicle

This will include an Android Application which will be installed on the Android Tablet that will raise the alarm and ask the user for the conduction of further procedures. This Application will carry out the further procedures by contacting the Online Server using the user's android smartphone.

D. Web based Service for the Central Assistance Centre

The Hospital/Ambulance centre will be logged on to the web based service in order to receive notifications regarding the occurrence of an accident. Once logged on to the web based service the hospital/ambulance centre will automatically receive notifications via pop-up messages even if the browser has been switched out.

E. Web based Service for the Central Vehicle Towing Centre

The Towing centre will be logged on to the web based service in order to receive notifications regarding the occurrence of an accident. Once logged on to the web based service the towing centre will automatically receive notifications via pop-up messages even if the browser is minimized.

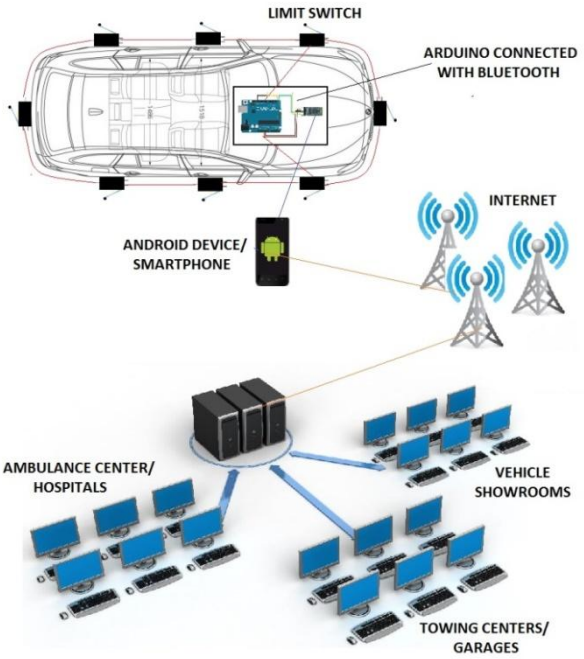

Fig: System Architecture of Smart Accident Detection & Assistance System

WORKING

1. When a customer gets a new vehicle, the customer gets registered onto our server. All his details including Name, Address, Contact No., Next of Kin Details, Vehicle Registration number are registered via. the vehicle showroom.
2. Along with the customer, all the hospitals/ ambulance centre, vehicle towing centres are registered along with their respective GPS location details.
3. When the vehicle collides with another object or vehicle, the limit switch gets pressed and it establishes a circuit and the signal passes to the Arduino.
4. The Arduino is connected to the limit switches and the Bluetooth module which is further connected to the driver's Android Smart Phone.

5. An Android application should be already installed on the driver's android smart phone which uses the GPS of the smartphone to acquire the current location and then uses the internet to send the notification along with the GPS details.
6. Arduino continuously monitors for a signal from the limit switches. Upon receiving a signal, the Arduino forwards it to the android app via Bluetooth module.
7. The Android application is connected to a website which receives the accident notification from the android application and notifies the ambulance centre/ hospital and the towing center.
8. The Hospital/Ambulance Centres and the Towing Centres need to be logged on to the web based service to receive the accident notifications.
9. After receiving the notification, the ambulance center and towing center deploy their respective vehicles and provide emergency service/roadside-assistance to the victims.
10. The Ambulance Center/Hospital changes the status of accident-notification from NEW to ATTENDED.
11. The Relatives of the victim are informed regarding the accident and admission of the victim at the hospital.

IMPLICATION

- This system tends to minimize the time gap between
  the accident and the arrival of assistance services.
- The status of the victims can be tracked periodically.
- It can be installed in any kind of vehicle and can prove to be a useful technology in today's day.

CONCLUSION

Smart Accident Detection & Assistance System,

- Automatically detects accident of the vehicle.
- Finds the exact location of the vehicle.
- Informs the central server about the accident and notifies the assistance services automatically.

ACKNOWLEDGEMENT

Thank You, Prof. Amol D. Potgantwar, our Head of Department, for your guidance and support. We will forever remain grateful for the support and guidance extended by our guide, for the completion of this paper.

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