Smartphone Application for Accident Detection

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Abstract: The paper is mainly for the detection of accident automatically with the help of GPS system. For this system i.e. Android application for accident integrated with emergency alert via SMS. The system receives the input from the smart phone sensor namely accelerometer, magnetometer and gyroscope. With the help of this application user get aware of road hazard, warnings caused or issued by other vehicles on the road user can cancel the countdown for the false accident detection alarm.

1. Introduction

Even though there is progress in automotive industry, road accidents still responsible for thousands of casualties each year. To overcome these problem new technologies are introduced in automobiles. This is leading to Intelligent Transport System (ITS) that is good for road safety and travel efficiency.

With the help of these communication between vehicles is able to provide data with more information about their surroundings. This system mainly aiming towards the road safety and efficiency.

There are some high end automobiles which offer ITS services. Some of these services turn GPS navigation system, traffic, weather and entertainment applications, accident detection system on.

When accident occur a person mentality and physical stability is disturbed. So the person is not in such state that he can call for help him on the accident spot by its own. At the same time, if person does not get help at required and stipulated time then the person might lose his life. Person should get help and proper treatment in stipulated time so this application has been developed by today’s upcoming and leading smart technology that is smart phones.

There are many technologies such as intelligent transport system call system aiming to provide road safety, reduce vehicles travel. Technologies efforts are going to minimize the car accident but it can’t be stopped completely. Our motive is to reduce the casualties’ inconvenience which is caused after accident. In future multiple system is going to be upgraded with launching its upgrade version with an aim of only one to detect the accident and to provide help in stipulated time.

There are number of technologies such as intelligent transportation system, call system aiming to provide road safety, reduce vehicle accidents and lead to efficient and safer vehicle travel. Technologies efforts are going to minimize the car accidents but it cannot be completely eliminated. In future multiple system is going to be upgraded with launching its upgrade version with an aim of only one, to detect the accidents and to provide help in emergency time.

Now rest of paper is written as follows, first section includes literature survey where number of paper are studied and analyzed thoroughly. Further section include actual system implementation in detail and final section come up with conclusion and aim that we learn from this work.

2. Literature Survey

A literature survey plays important role in research problem as it provide summary, description of research problem is being investigated. It is used to gain knowledge and overview about particular domain in which research is going to be implemented. To demonstrate the existing system it is necessary to understand the domain of system thoroughly. Understanding to system properties and implementation is difficult as it required consistent focus and creative thinking. If we are unable to understand the system procedure, then we are diverse from solution and it aim. Analyzing and conducting survey of a system is important to achieve complete understanding of system statistics.

Number of application with difficult implementation technique has been implemented in order to promote road safety and human safety. eCall System is proposed in aim to provide emergency help on occurrence of accident European Commission State that from October 2015 there will be eCall equipped car. The Europe emergency sin number 112 is called when accident is detected by eCall system. eCall state that when you need a emergency support it is better to be connected rather to being alone. eCall is one of the big approach in the world of automation[2]. In this automatic accident detection system with android one of the important parts is...
sensor fusion data. Multiple sensors are required to sensed vibration of car multiple sensors output might be different, inacquaril , inconsistent, noisy methodologies apply proper filtering and procedure on generated output for the ease of system. System has audio output with the delay, high accuracy and clarity. In Android Sensor fusion data concept of android API reference is one of the important approach [5].A VANET (Vehicular Ad-hoc Network) is one of the leading technology in automobile industry. This system also gives future alert by messaging location and severity of accident. On basis of notification, driver can change the route and thus the traffic congestion is avoided. Such function is implemented by audio controller which gives audio output to nearby vehicle in order to avoid collision on basis of changing the vehicle route. To demonstrate this wireless communication analysis of network infrastructure is essential. It leads to qualify communication wirelessly [9]. In vehile to vehicle communication security of data is also a system which detect the accident on basis of vibration of vehicle. In ad-hoc network of maintain high network performance consistently is assumed to be difficult task. As everything is connected via network (i.e. wirelessly) it is difficult for network infrastructure to manage multiple routing protocols, sensor fusion data, network topology and countdown activity especially [1]. As the number of user, consistently increases it leads to degrade in the system performance. A security strength, latency and performance quality also decreases. In such case many system with different algorithm and smart technique has been investigated as a advanced version of current system such as ICSI (Intelligent Co-operative Sensing for Improving Traffic efficiency) such system with its new architecture and implementation technique intelligently performed task successfully [7]. In this paper, we have proposed a system which detects the accident based on security of gravity provided. If accident is detected the timer is launched. False alarms detection is also provided to void false detection. If timer is not interrupt then system send notification and voice call to nearby hospitals, blood bank and to the stored emergency contact of user. In this way system focuses on achieving road and human safety with the help of smart technologies. In survey conducted, we studied few papers and concluded aim was that to avoid car accidents different systems with different testimonials are developed. Even there are such systems which come up with combination of advantageous of all other system functionalities to provide better and more efficient system.

3. System Implementation

The system aims to provide accident detection mechanism a native android application was developed should be connected to internet while user is driving the car.

The main features of the platform useful for this are availability of a Global Positioning System (GPS) receiver.

3.1. Modules

- **Smart phone:**
  A smart phone was chosen to act as a Application Unit(AU) due to its hardware and software (programmable) the sensor i.e. accelerometer.

  The GPRS capabilities are also useful for tracking the location.

  In our application there are mainly two modules:
  1) This keeps track of database of user.
  2) Activities of user.

  In the first module user have to first register in our system for using application. First module helps in using keeps track of the database of user.

  The second module is mainly for the accelerometer which helps to track the pressure exerted on the vehicle.

- **Accident Detection Algorithm**

  The Accident Detection Algorithm (ADA) is the core part of our system and it aims to provide the application with the means to automatically detect the accident happen to be vehicles.

  This algorithm implements basically from the sensor caused accelerometer. This sensor is present in the mobile phone when the pressure above 4g is exerted on the mobile then the countdown starts. If there is no harm to user then user can stop the timer.

  If timer is not interrupted then the SMS is sent to nearby hospitals, police station and emergency contact of the victim with the current GPS location.

  The ADA (Accident Detection Algorithm) is the core part of system and is explained as below:
  a) Application checks the sensors fusion data.
  b) The 4g (g=9.8) constantly get checked.
  c) If the threshold is above 4g then the system detects the collision.
  d) Once the collision is detected the countdown gets started.
  e) If timer is get interrupted then system resets itself.
  f) If not then the current GPS location is sent to the all emergency contacts.
3.2. Performance Measures

1) Robust:
Robustness is the quality or condition of being strong and in good condition i.e. the ability of system to cope up with errors during execution. Our system is robust because if any accident is occurred but it doesn’t harm victim then the victim can stop the countdown timer.

2) Timely:
Timely means availability of the system at the best possible moment. Our system provides timer to the user by providing the help to victim within a very stipulated.

3) Cost:
Cost of our system is not so high; user should have the smart phone with internet connection. User should have to first install application.

4) Resources:
Our system mainly bounded to the two resources i.e. smart phone and internet connection.

5) Effective decision:
The system should take effective decisions whenever any problem occurs during the execution. Our system aims to provide the effective decisions power to the user.

6) Outcome:
The outcome of system depends upon the action taken by the user at that time.

7) Action:
Our system gives outcome only when users have taken an appropriate action.

8) Consistent:
Our system is consistent because it consistently tracks the GPS location of the user. These are the performance measure terms which satisfy our application. They are described in such manner which will are related to our application.

3.2.1. Figures and Result

Following are the screenshot of our applications which defines the applications working flow.

1) Start Page:

2) Accident jerked page:

3) Message sending page:
4. Acknowledgements

I would like to express my gratitude to all those who helped me to complete the preliminary project. I want to thank project guide for her continuous help and generous assistance. I have furthermore to thank Project Coordinator, to encourage me to go ahead and for continuous guidance. I am also grateful to Head of Computer Engineering Department, Anantrao Pawar college of Engineering And Research Parvati, Pune for his indispensible support, suggestions. Last but not least I am grateful to Principal Sir and my parents, for all their support and encouragement.

5. References

[3] eCall Driving Group, “Recommendations of the dg ecall for the introduction of the pan-european ecall.”