



Intelligent Safety Information Gathering System using A Smart Black Box

M.Vedaraj¹, P.Srinitha², M.Suhasini³, P.Soundarya⁴
Assistant professor¹, BE Student^{2,3,4}
Department of CSE
R.M.D. Engineering College, Chennai, India

Abstract:

The vehicle monitoring technology (black box) is growing rapidly in the world and many different forms of this technology are now available. Essentially, it monitors how, when and where a vehicle is being driven, records the data, and provide an analysis as feedback to the driver and/or other parties. Some also offers in-vehicle alerts if predefined parameters are exceeded (eg, hard acceleration). In this paper, the black box created will be connected to the cloud to provide continuous updates, which helps to inform the nearest hospital of a crash instantly.

1. INTRODUCTION

The vehicle accident could be a major public drawback in several countries, notably in India. Despite the awareness campaign, this drawback remains increasing attributable to rider's poor behaviours like speed driving, drunk driving, riding without adequate sleep, etc. The number of death and incapacity area unit terribly high, those who got into the accident. These cause social and economic burdens to folks concerned. Therefore, many analysis clusters and major motorbike makers have developed safety devices to protect riders from accidental injuries. However, the smart guard for vehicles is troublesome to implement and really pricy [2]. On the route driver sometimes keep a secure distance from each other. On the opposite hand, attributable to the driver's interruption, long-time driving weariness, or a fast break applied by another automotive, a severe collision can occur. A detailed report will be given to the user containing the recorded data in the memory, wireless black box using MEMS accelerometer and GPS tracking system is developed for monitoring the accidents further more we are planning to make a website and a mobile application which would help in tracking the vehicle easily. The system consists of components such as a microcontroller unit, accelerometer, GSM module and GPS device. When an accident occurs, this wireless device will send mobile phone short message indicating the position of the vehicle by the GPS system to family members, Emergency medical service (EMS) and nearest hospitals. An emergency SOS service which can detect a collision in a car and will alert the provided emergency contact, the nearest hospital and the police in case there is an accident. Various sensors like accelerometer and gyroscope will be added to alert the driver of any threats. The device will have a GPS to track the car if stolen. Users will be able to check the data sent by different sensors through the website or android app. This project uses the concept of IoT.

2. LITERATURE SURVEY

All existing work contains many solutions for vehicular safety. For example, the in-vehicle monitoring technology has the potential to provide a wide range of safety benefits, including: Relatively inexpensive and continuous measurement of driving behaviour and vehicle use, which is otherwise difficult to

observe. More accurate and objective data about driving than, for example, responses to self-reported questionnaires or the short (one-hour) snapshot pictures gained from driving tests and assessments. Tools for employers to monitor and assess their staff, which drive for work, improve safety, reduce crash rates and operational costs, meet their legal obligations and reduce the risk of prosecution or civil action. A way to help young, novice drivers, parents and licensing authorities has to monitor and improve the driving. The insurance companies should devise a method to differentiate between drivers based on their risk, rather than just by gender or age, and to tailor their insurance premiums accordingly. A powerful research tool, which enables the collection of large amounts of real-life, natural driving behaviour and the effectiveness of safety interventions on that behaviour. A tool to inform further training and guidance needs data to help highway authorities to identify problem locations on their road network. [3]. Currently, the technology is mainly used by two groups: motor insurers and the young drivers who insure them and employers and their staff who drive for work.

3. PROPOSED SYSTEM

A. Overview

The proposed product includes various sensors like ultrasonic sensor, accelerometer, GPS, etc. and all the readings of these sensors are stored in the cloud every 3 seconds. The user can check the details whenever he wants. Whenever it detects an accident, an interrupt is triggered which immediately sends the location of the car to the nearest hospital, police and the person who's details are given as emergency contact.

B. Viewpoint of proposed system

The proposed system makes use of a behavioural pattern. Behavioural patterns change the way your classes behave by changing the way they interact with other classes and interfaces, and the way other classes and interfaces interact with them. It does not define a strict structure, but forces on implementing methods, i.e. channels of communications. Thus, our system which implements an Iot SOS Service makes use of this view point. It allows the user to communicate to the device through a server by receiving information or data dynamically.

C. Collision Detection

In day to day life, we tend to face several issues and plenty of times we tend to square measure helpless and want someone's help and that isn't attainable. Consider a state of affairs we tend to square measure going for a long drive and suddenly we tend to be caught in essential condition it will be an accident. If we tend to square measure ok and may facilitate ourselves, then it's ok, however what if we tend to can't. Contemplate another condition if we tend to found that our automobile has been purloined we tend to can't do something as fast action. We tend to square measure having such a large amount of technologies to beat such downside and supply, artificial intelligent based mostly system to help humanity in such a condition. Considering an automobile had associated accident the detector can activate automatically and begin its police work mode [5]. If the user is in order and may facilitate himself, then he can stop police work mode inside given fundamental quantity else system can contemplate user would like help and begin motorcar contacting with center and such person. Once the system started in help mode, first the system can gather the automobile location mistreatment GPS device within the sort of meridian and latitude. Then it records ,automobile details like automobile owner details, car number, car model, automobile speed if attainable and converts this knowledge into formatted SMS and send this knowledge to center and person's relative wherever person got to give contact person details manual.ly before beginning drive. For nearest hospital, auto service, police office and phone then to achieve at the accident location to assist out the person [6].

d. The model of the Proposed System The pictorial representation of the proposed system is given in Figure 1. The sequence and activity diagram of the same is shown in figure 2 and figure 3.

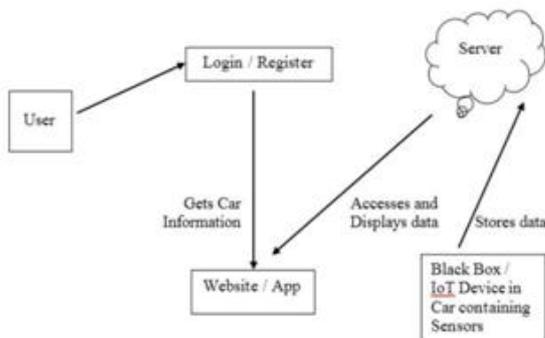


Figure.1. Block Diagram of a proposed system.

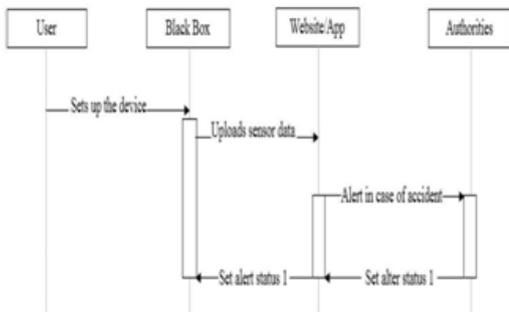


Figure.2. Sequence Diagram

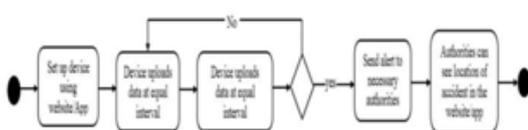


Figure.3. Activity Diagram

4. RESULTS AND DISCUSSIONS

Thus, the proposed IoT SOS Service is an innovative idea which, when implemented to its full potential can be very vital to our society and can be very beneficial to a wide range of audiences. Our implementation included a prototype with an interface that showed its working and extent to which it can be implemented. The description of all modules is provided which, when integrated provide a wide variety of functional requirements which include getting the location of the car, and informing respective authorities of a crash. Also the interface which is represented through a website is user friendly and provides the user with only the necessary and useful data that is required. As seen through our graph snapshot, we are able to receive data from our accelerometer 3-axis sensor through the GSM module via our cloud server and have displayed it in the form of a chart to indicate the car acceleration over a period of time. The sample screen shots are given in figure 4 and figure 5.



Figure.4. Application Screenshots



Figure.5. Website Screenshots

5. CONCLUSION

A basic prototype was made showcasing the gist of the proposed idea of vehicle collision detection. This has to be refined further and a design has to be made to make the product compact and easy to install in a car. Also, we could further use different sensors present in a car - like the contact sensor on all corners of a car for better collision detection and cutting manufacturing costs. Sensors like gas sensor are added to alert the driver if there is a gas leak or proximity sensors with cameras can be added so that the product can anticipate an accident and can control the car to avoid an accident before it occurs. This product can later be expanded to many industries, mainly logistics where we can use Geo fencing to assign a particular route to the delivery truck and the owner comes to know if the truck is going off route or has faced an accident.

6. REFERENCES

- [1]. Government of India. (2014, April 30), URL <https://data.gov.in/catalog/total-number-persons-killedroad-accidents-India>.
- [2]. Government of India. (2014, April 30), URL <https://data.gov.in/catalog/total-number-road-accidentsindia>.
- [3]. Poornesh Varma T. Varma, S.K.C. and Harsha. Automatic Vehicle Accident Detection and Messaging System Using GPS and GSM Modems. 2013.
- [4]. M. A. Shedid H. M. Sherif and S. A. Senbel. Real time traffic accident detection system using wireless sensor network. 6th International Conference of Soft Computing and Pattern Recognition (SoCPaR), pages 59–64, 2014. doi: 10.1109 /socpar.2014.7007982.
- [5]. J.C. Cano J. Zaldivar, C.T. Calafate and P. Manzoni. Providing accident detection in vehicular networks through obd-ii devices and android-based smartphones. International Journal of Scientific and Engineering Research, pages 813–819, 2011.
- [6]. M.B.I. Reaz S.S. Nasir M.S. Amin, M.A.S. Bhuiyan. Gps and ap matching based vehicle accident detection system. IEEE Student Conference on Research and Development (Microcontroller. SCOREd), Putrajaya, pages 520–523, 2013.
- [7]. Dr. P.A. Harsha Vardhini D. Bindu Tushara. Wireless Vehicle Alert and Collision Prevention System Design using Atmel
- [8]. Salwa Sheikh Nasir Md. Syedul Amin, Mamun Bin Ibne Reaz and Mohammad Arif Sobhan Bhuiyan. Low Cost GPS/IMU Integrated Accident Detection and Location System.