A Survey Paper on Car Post Crash Analysis and Emergency Rescue Alert System Using Android Phone

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Abstract - This paper presents currently traditional method of crash analysis which is being used in which cops need to visit accident site and check for signs of accident. Then they should check for evidences like skid marks, degree of damage, eye witness etc. Often, there is situation of insufficient evidences. Sometimes it may also possible that some clues got missed by police. This is very time consuming and complex process. By using this evidence collection system we could perform analysis of accident cases just from police station. Results obtained from analysis may also useful in driver training purpose, safety purpose, insurance issuing process etc. An Event Data Recorder is a device which is installed in vehicles to record information related to vehicle crashes or accidents.

Keywords - Black box, Micro Controller, GSM, Bump Switch, Different Sensors, LCD, Seat Belt.

I. INTRODUCTION

Vehicle accident is one of the major problems in almost all over the world. According to the World Health Organization, more than a million of people in the world die each year because of transportation-related accidents. In recent days, improving safety driving is an important objective that has led many organization and companies like vehicle manufacturers to invest significant amounts of resources, mainly in improving road infrastructure and to reduce the car crashes despite of many awareness campaigns, these problems keeps increasing day by day, due to several reasons such as drunk and drive, over speeding, riding without sufficient sleep and so on. Even though different vehicle manufacturers have taken several measures in improving the safety of the vehicle this problem tends to remain due to the above mentioned reasons. Due to the delay in the medical assistance the mortality rates is at the high level, this causes economic and social burdens to people who are involved. Like flight data recorders in aircraft, ”black box” technology now plays a very important role in the motor vehicle crash investigation. Good and the safety measures are very expensive and also it is difficult to implement so it is planned to implement in four wheelers using black box. Black box is defined as an electronic device which is used to record and store the information especially in the flights. We have used the same concept here in implementing the black box in car for the assistance. Here black box is used to record and to store vehicle accelerometer, temperature, pressure, alcohol sensor, ultrasonic sensor values in real time and also it stores the past driving history of a vehicle. We can also analyze and monitor the driving state of the vehicle and accident. We used analog to digital converter (ADC) to collect analog values collected by the sensors and convert them into a digital value to feed into the micro controller.

Black box is a device which is designed in such a way that it can withstand large impacts; due to this the data stored in it cannot be destroyed easily. That is why it is so important to have the black box in the car which records the information before, during and after a crash. Here in our project the black box will give us the complete information about the conditions of the car and it helps to monitor it by updating the values to the database for every 3 sec. suppose in the case of any crash or the physical anomalies the stored data can be accessed from the black box. This data can be used in forensics in the case of accidents or any other related crimes. Here in the proposed system we have designed the black box by using any conjunctive components such as accelerometer sensor, temperature sensor, pressures sensor, ultrasonic sensor, alcohol sensor, analog to digital converter (ADC), microcontroller unit, LCD display Global Positioning System (GPS) and Global System for Mobile Communications (GSM) module. For the implementation many components & the various types of sensors are used and it is implemented by using the embedded C programming. Embedded C programming not only helps in recording the data but also helps in retrieving the data from Micro Controller memory to an LCD which is used to display the output.

Let us consider a situation where there is an accident and there is no service for assisting the victims under this situation it will be so difficult to treat, keeping this idea we have designed a system where in such type of situation the car itself will switches into its surveillance mode immediately and intimates the family members, nearby emergency medical service and police station by sending a short message along with the exact location of the car.

In this project demonstration a database is maintained at a server end. This database is interfaced with a GSM. The database contains the contact detail of nearest police station and hospitals to any accident occurred site.

Whenever the accident occurs, the coordinates of the accident site is acquired by the on-board unit (OBU) of the concerned vehicle. Through the help of GSM module the acquired coordinates are sent to the database.

GSM is short form of Global System for Mobile Communications, one of the leading digital cellular systems. GSM needs narrowband TDMA, which allows eight simultaneous calls on the same radio frequency. OBU has tilt sensing android mobile which senses the tilt when accident occurs and sends the tilted coordinates which will be deviated from the normal coordinates. The Global Positioning System (GPS) is a space-based satellite navigation system that gives location and time information in all weather conditions, anywhere on or near the Earth where there is an unobstructed line of site of four or more GPS stations. The system gives critical capabilities to military, civil and commercial users around the world. The server maintaining the database, has a .NET based application with GSM unit to communicate with OBU, police stations, hospital, ambulance etc., The police station and hospitals are also equipped with mobile phone handsets. Ambulance is also equipped with cell phone or mobile phone handsets.

II. SYSTEM MODULATION

Figure 1. BLOCK DAIGRAM OF BLACK BOX

Block diagram in our proposed system is shown in Fig1. Black box contains the alcohol sensor, temperature sensor, ultrasonic sensor, accelometric sensor, LED indicator, slot sensor, toggle switch, DC motor, dump switch, GPS, GSM & 16x2 LCD. It detects the engine temperature, location (GPS), obstacle presences, acceleration & alcoholic content. The outputs are displayed on the LCD. This collected information's along are send to the police server, ambulance through the internet. GPS tracking system developed in this paper helps to track the vehicle in case of accident and enables authorities to extend immediate emergency medical service.

When accident occurs the microcontroller gets activated and starts collecting the information such as temperature, presence of obstacle, alcohol content respectively from the sensors. This collected informations are displayed and is sent to the police server through mail. By using this information police can easily know the accident spot and they get the correct proofs for the accident to provide justice.

III. PREVIOUS WORK

In the previous system, the process of police verification and accident analysis process was taking more time due to lack of information about accident. Due to this wastage of fuel and time was more. Rescue facility was not present, which was causing very serious situations in rescuing. And mainly Evidence Collection system was not present.

IV. PROPOSED METHODOLOGY

In the proposed methodology, we are using Evidence Collection system. Evidence Collection car can collect the crash or accident information to improve the safety of the vehicles. And emergency rescue system was implemented.

V. CONCLUSION

The proposed system makes good use of GPS and android applications by providing safe and secure travelling to the traveller's. This is done using wrong path alert mechanism. It helps to find the current location of vehicle. Traveller's safety mechanism is also provided using temperature, ultrasonic, smoke and accelerometer sensor. As per traveller's safety concern, the proposed system also gives alert massage to authorized mobile so that authorized person also knows about their traveller's safety.

VI. FUTURE SCOPES

Here we have developed a prototype module. In future, this paper can be taken to the product level. To make this project as user friendly and to avoid damage, we need to make it compact and cost effective. In future, most of the units can be embedded along with the controller on a single board with change in technology, thereby reducing the size of the system.

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