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AN EFFICENT DATA INTEGRITY SCHEME FOR PREVENTING FALSIFICATION OF CAR BALCK BOX

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ABSTRACT

This paper describes the design process of car black box system. Because it will be mandatory for every car to be equipped with Car Black Box, it is expected to be more efficient, less power consumption, fast and cheaper. The project is developed to record informational data, such as: Vibration, lat-long, Whether driver has drunk or not (alcohol sensor) etc. to revolutionize the field of motor vehicle accident investigation. It can also use for vehicle mapping with the help of GPS. When the vehicle met with an accident the vehicle details and the position of the car will be recorded. Position may be a located by using twenty four communications satellites that transmit signals globally round the clock. With a GPS receiver, one will quickly and accurately verify the latitude and longitude and in most cases the altitude to some extent. The project is developed using 8051 microcontroller.

I. INTRODUCTION

In today's world where science has made amazing advances so have the recent cars. These cars are more advanced than ever. They have more speed, state of the art engines and are very closely to these reasons there is a need to adapt a device which can continuously monitor all the various parameters of car. We have design such a system which, in case of accident will records all the parameters and also help us to prevent any accident to happen in certain extends.

Car black boxes help determine what has caused a car accident and the events that led to collision. They are particularly valuable when no witnesses are present at the scene of the accident and when each driver has his/her own version of the events. The benefits of car black boxes for reconstruction of the events before accident are also emphasized by accident investigators, the police and increasing number of insurance companies which now have a powerful tool to determine whether the claim is justified or not. So why would you want to install a device that can enable the insurance company to reject your claim? Well, the benefits of a car black box outweigh the drawbacks in virtually all aspects.

The car black box can get you into jail if you are a reckless driver but it can also save you from it. For example, an accident on an remote area without any witnesses present may be very difficult to reconstruct and it is possible to be put on trial even if you did not cause the accident. With a car black box, that cannot happen. Why? Because the small device that is installed in your vehicle under the seat, behind the dashboard or even better on the windshield records several key actions you have made before the collision including the speed of your engine, accelerating, braking, turning, etc. which typically reveals enough information to charge you for causing an accident or help you prove your innocence. Also, with a car black box that includes a camera there will be no longer your word against the police officer's, while your insurance claims will be approved a lot faster.

In addition to insurance companies and car accident investigators, car black boxes are also very useful for car rentals because any disputes about car damage can be easily resolved by reviewing the data from the device. These are typically stored on a secure digital (DS) card, while all accidents are stored automatically. However, this is good news for the customers as well because they will no longer be charged for car damage they have not done.

Car black boxes are also ideal solution for young drivers below the age of 25 who are at increased risk of getting involved into an accident. Studies have shown that young drivers are involved in about 40% of all accidents. With a car black box, parents can easily monitor their child's driving style and habits over the computer. They will no longer have to worry whether their child is driving carefully or not, or teach their children drive safely before the worst happens

II.   EXISTING TECHNOLOGY IN CAR BLACK BOX

According to the World Health Organization more than a million people in the world die each year because of transportation related accidents [1]. In order to react to this situation the black box system draws the first step to solve this problem that cross national boundaries and threaten safety and health of people's worldwide. To address this problem black box takes on the role of the investigator to determine the cause, thereby helping to propose measures to protect lives. The system also assists the insurance companies with their claim settlements [2]. The importance of such system drove the European Union (EU) to establish a policy that makes it mandatory for all vehicles to be equipped with black boxes [3].The Automobile Black Box exists partially in the form of Event Data Recorders (EDRs) and black boxes [4][5][6][7]. It is difficult to establish the exact cause of an accident from these [1]. To overcome this shortcoming, an Automobile Black Box system that combines both of these aspects is proposed. Apart from the accident analysis by objectively tracking what occurs in vehicles, the proposed system sends short message indicating the position of vehicle by GPS system to family member, emergency medical service (EMS) and nearest hospital so that first aid can be provided as early as possible [8]. The proposed system also incorporates a security module, which employs data encryption to secure the stored data on the SD card [9]. The proposed system aims to achieve accident analysis by strategically placed sensors, in and around the vehicle. Raspberry Pi and Arduino controllers are the main components of the system. They regulate the various sensors interfaced to them. The proposed solution in this paper is more efficient, less cost, lower power consumption and fast compare to block box made using Rasberry Pi and Arduino controllers.

Introduced to a part of the United States Market in 1999, The Black Box System proved to be efficient. However in the latter case the system was embedded in the vehicle. Therefore, in addition to improving the treatment of crash victims and the roads states in order decrease the death rate, constructing the safer vehicle, and helping insurance companies with their vehicle investigation. The main purpose is to develop a black box system that can be installed to any vehicle all over the world.

Like flight data recorders in air craft, black box technology can now play a key role in motor vehicle crash investigation .A significantly number vehicle currently on the road contain electronics system that records information in the event of crash that is why it is so important to have the recorders that objectively tract what goes on in the vehicle before, during and after a crash has a compliment to the subjective input that is taken usually from victims eye witness, police report.

This system is committed mainly to two approaches the first one is how to detect a record data from the vehicle .the second is how to present the recorded data to the user in a simplify way this program receives the data serially from the black box memory presented in the real time graphics and finally saves it to a formal excel report for future use.

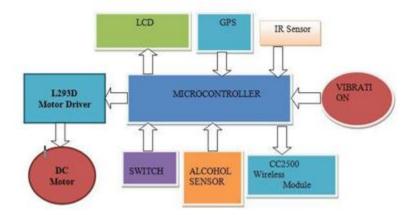## III.   PROPOSED CAR BLACK BOX ARCHITECTURE

The project is developed to record informational data, such as: Vibration, lat-long, Whether driver has drunk or not (alcohol sensor) etc. to revolutionize the field of motor vehicle accident investigation. It can also use for vehicle mapping with the help of GPS. When the vehicle met with an accident the vehicle details and the position of the car will be recorded. Position may be a located by using twenty four communications satellites that transmit signals globally round the clock. With a GPS receiver, one will quickly and accurately verify the latitude and longitude and in most cases the altitude to some extent. The project is developed using 8051 microcontroller.

The project has two modules known as transmitter and receiver. The transmitter module will be installed in a vehicle whereas receiver will be connected to PC to remotely monitor the status information provided by vehicle black box. The GPS Receiver interfaced with the transmitter will provide latitude and longitude information continuously, which in turn will be aired to the remote PC via CC2500 wireless module operating at 2.5 GHz frequency. This will be useful for vehicle mapping in case of accident or theft. The occurrence of accident is detected by the use of vibration sensor. The Flash magic will be used to program Microcontroller 8051.Flash Magic will convert the code in C to binary format.

In addition to the above, it will provide safety for driver where engine will start only if driver is not drunk. In this project, engine is represented by a DC motor, whereas information regarding alcohol detection is extracted by the help of alcohol sensor. A separate switch is used to switch on the DC motor. The other safety feature includes the use of IR sensor will be helpful for collision avoidance. The entire status of the project will be displayed in the LCD module interfaced with the transmitter module.
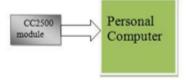
IV.   BLOCK DIAGRAM

Transmitter:

Receiver:

V.   HARDWARE & SOFTWARE REQUIREMENTS

Hardware components
Microcontroller
LCD Display
L293D Driver
DC Motor
GPS Module
CC2500 Wireless Module
Switch
Alcohol Sensor
IR Sensor
Vibration Sensor
Microcontroller Development Board
RS232 Cable
MAX232 IC

Software components
OS Win XP or better
100GB hard disk or higher
1GB RAM or higher
Free Serial port or USB ports (for embedded system programming and Interface)
Keil (IDE and complier for embedded system)
MS office (for Documentation)
Flash Magic Software (conversion of 'c' code into binary format)

VI.   CONCLUSION

Car black boxes help to determine what has caused a car accident and the events that led to collision. They are particularly valuable when no witnesses are present at the scene of the accident and when each driver has his/her own version of the events. The benefits of car black boxes for reconstruction of the events before accident are also emphasized by accident investigators, the police and increasing number of insurance companies which now have a powerful tool to determine whether the claim is justified or not. So why would you want to install a device that can enable the insurance company to reject your claim? Well, the benefits of a car black box outweigh the drawbacks in virtually all aspects. We are Providing More Efficient, Less Power Consumption, Fast and Cheaper Black Box for Easier Adoptability in Most Of The Cars.

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