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Vehicle Black Box Using AT89S51

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Abstract - *New communication technologies are integrated into modern automobiles, giving the better assistance for the injured people in traffic accidents. Communication capabilities should be supported by artificial intelligence systems capable of automating many decisions to be taken from emergency services. This reduces the security risk for the strength and relieve time of the accident. To respond to this situation and in order to overcome from this problem the concept of "black box" can be used. Car black box is an "Event Data Recorder". It records and store the details about a Vehicle such as Engine Temperature, acceleration, pressure and store the vehicle's driving history. The outputs of these parameters are displayed in LCD.*

Keywords—Vehicle, Black Box, Microcontroller, Computer interface.

I. INTRODUCTION

Car accident problem is increasing due to poor behavior of vehicle rider such as speed driving, drunk driving, riding without sufficient sleep, high speed and many more. The causes of car accident are not too difficult to investigate as plane crashes but there are cases that are very difficult to solve due to contradictory stories of drivers. Car black box helps to determine what has caused a car accident. They are particularly valuable when no witness is present at the scene of accident and when each drivers has its own version of event.

Car black box is digital electronics device, which records and store vehicles speed, vehicle pressure, vehicle temperature, vibration, and other vehicle status information. It helps to discover and to analyze the reason of an accident easily and to settle many disputes related to car accident such as crash and insurance settlements. The research was carried out to know type of sensors which should be installed into the vehicle and to identify the main information needed for better accident analysis. After filtering the information and taking into concern what could be done and what could help the most, the data were found to be the most important ones needed after an accident.

II. DESIGN METHODOLOGY

2.1 Digital processing:

In order to control all these sensors and their inputs, a digital process can be used. As prototype a micro controller is selected to control the black box. This will allow the control circuit to be realized by a minimum of circuits. AT89S51 is a low-power, high-performance CMOS 8-bit microcontroller with 4K bytes of In-System Programmable Flash memory.

a. Micro-controller's Connections:

The inputs to the micro-controller will contain information about the accident, which are distributed as follows:

- One forbrake switch
- Three for CAN controllers
- One for alcohol sensor
- One for collision sensor,
- GSM module
- four for the LCD data lines. The LCD will show the user about the recorded data when the accident has been occurred.

b. Micro-controller's Program:

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The main function of the micro-controller program is to take input samples from the different ports. These samples are taken from the sensors installed in the vehicle. After that, each sensor sample is saved into the micro-controller. Hence, after the accident all the data from the sensors is received by the micro-controller before it goes into the sleep mode. This data is used to analyze the accident. The choice of the micro-controller's transmission protocol was the standard asynchronous format using eight data bits, no parity bit and one stop bit with a 9600 baud rate as the complexity is in the interpretation of the data and not in the transmission.

2.2 Software Resources:

After the hardware part of the Black Box system, it is now time to look at the software details and how the user is shown the data before and after the accident. The main features of the project are to receive the data serially, cut off and finally display the results to the user in a clear and simple way. For the software implementation, we display two software packages. First one is the Keil µVision and the Second one is the Flash magic simulator.

III. BLOCK DIAGRAM

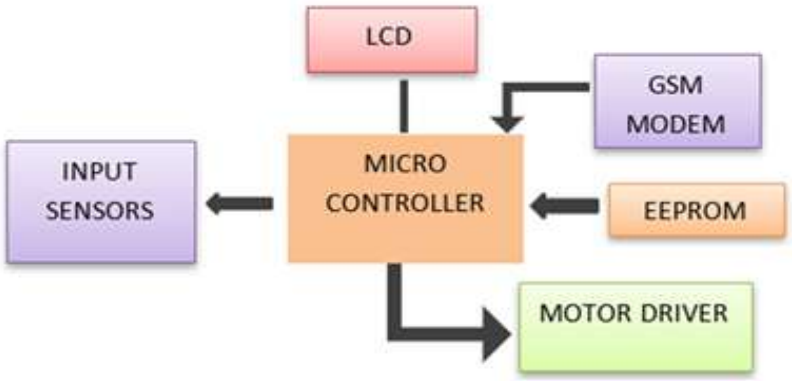

FIG.3: Block diagram of black box

IV. RESULTS AND DISCUSSION

After the accident some major components and different type of sensors will detect and record data from the vehicle. Then the data recorded to the user will be present in a simplified and easy way using Embedded C programming. This programming helps in not only recording the data but also recover the data from microcontroller memory to an LCD to display it.

V. CONCLUSION

This project is very cost efficient and marketable and the components used are very simple and easily available in market. The Black Box system built can be implemented in any vehicle. As the driver starts the motor, this system will start saving the events of the vehicle and the last values are saved in the Micro-controller of the Black Box, also in case of an accident, an additional 10 seconds of events after this accident will be saved. The data saved can be recover only after the accident for privacy purposes. The project aims to help accident investigators and insurance companies to become aware of the causes of the accident and to speed up their investigation process and also provide fast results.

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