



Design and Implementation of Car Black box for Evidence Collection System to Avoid the Collision

Yogesha K R¹ | Mrs. Shwetha M K²

¹Department of Computer Science Engineering, PES College of Engineering, Mandya, India.

²Assistant Professor, Department of Computer Science Engineering, PES College of Engineering, Mandya, India.

ABSTRACT

The vehicle accident is a major public problem in many countries. It is occurred due to rider's poor behaviors, Vehicle bad condition, bad weather situation and opposite vehicle mistakes. To predict those situations block box concept is introduced. The concept of the Car Black Box is similar to the Flight block box concept, which stores the vehicle condition such as engine temperature, speed, CO2 content, it also checks the car present condition before ignition the vehicle, brake condition, seat belt and also introduce the automatic speed controller to avoids crashing between the vehicles. It is a low cost system which provides solution to the existing automotive control systems. And it also monitors the vehicle current condition on Display of LCD. The design selects ARM 7 as embedded controller, UART (Universal Asynchronous Receiver Transmitter) is the common peripheral found on microcontrollers widely used for communication with the external devices and systems, I2C (Inter-Integrated Circuit) for on-board communication.

KEYWORDS: Sensors, Blackbox, ARM..

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I. INTRODUCTION

Now a days accident is increasing day by day. The numbers of death and disability are very high due to these accident. . In an important state of conditions several vehicles getting accident, the person will face who is sitting inside the vehicle so many problems due to this accident. To this heap of person lost their lives. Just like black boxes in aircrafts help determine the cause of an airplane accident, 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. Car black box is a storage device, which store vehicle speed, real time and vehicle's other status information such as vehicle engine temperature, CO2 content. 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 litigation, insurance settlements. 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. This particular design will allow analysts to determine whether the cause of the incident was a vehicle error, operating error, or environmental factors.. The causes of Vehicle accidents are not that difficult to investigate as plane crashes but there are cases that are very difficult to solve due to contradictory situations of the drivers or/and absence of witnesses of the accident. On the roadway driver usually keep a safety distance from one another. On the other hand, due to the driver's interruption, long-time

driving tiredness, or a sudden break applied by another car, a serious collision may occur. Even though the driver is in a conscious mind, he cannot respond immediately to control his/her vehicle. So here introducing the automatic Speed controller to reduce the Vehicle Speed along with distance.

II. SYSTEM ANALYSIS AND REQUIREMENTS

A. System Architecture

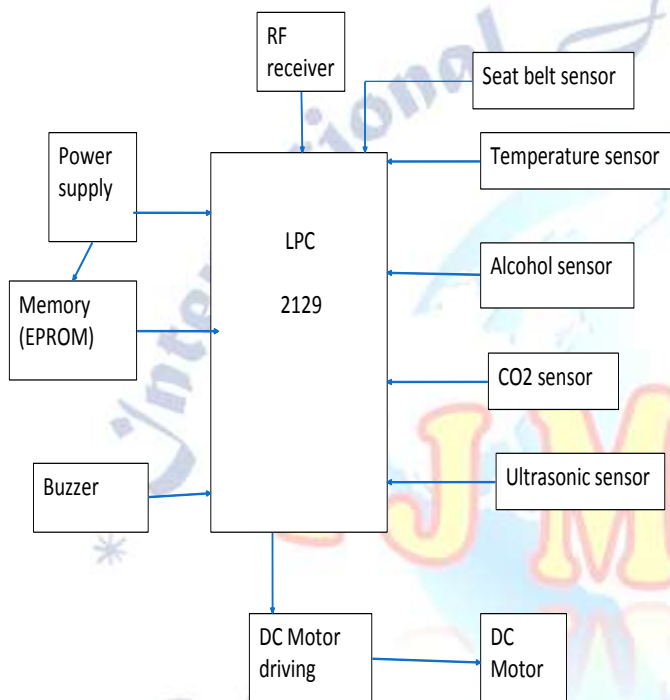


Fig 1: Over all Block Diagram of paper.

In fig1 shows the Block diagram of overall system Design and contains the Brake Sensor, Ignition key and Seat Belt sensor which are pre detection sensors and also contains the Ultrasonic Sensor, temperature sensor and Alcohol Sensor(CO2 Sensor) all components is connected to ARM7 Micro Controller. Here we have used 12V battery as Power Supply and it is step down to 3.3V for ARM7LPC2148, Black Box and Speed Controller as works DC Motor Driving Module and also using the Buzzer for Distance is very near to the vehicle it makes the sound, it helps to driver to take care of the vehicle.

B. Black Box

Vehicle Black Box is a electronic Memory Device to store sensor parameters like engine

temperature, Co2 Content Distance from obstacle, Brake status, CO2 Content, Alcohol content. Here using EPROM as a memory Device. This device is interfaced with microcontroller by I2C bus. I2C is “synchronous serial, Half Duplex, 2 wired bus communication protocols”. I2C supports “MASTER AND SLAVE CONCEPT”. Black Box is covered by the strong metal because once accident occurred means everything will be damaged. and it supports to fetch the information from black box to PC through Bluetooth, Cable.

Fig2 shows the Storage Device as EPROM to store the data of Vehicle information.



Fig2: EPROM (Black Box)

SYSTEM DESIGN

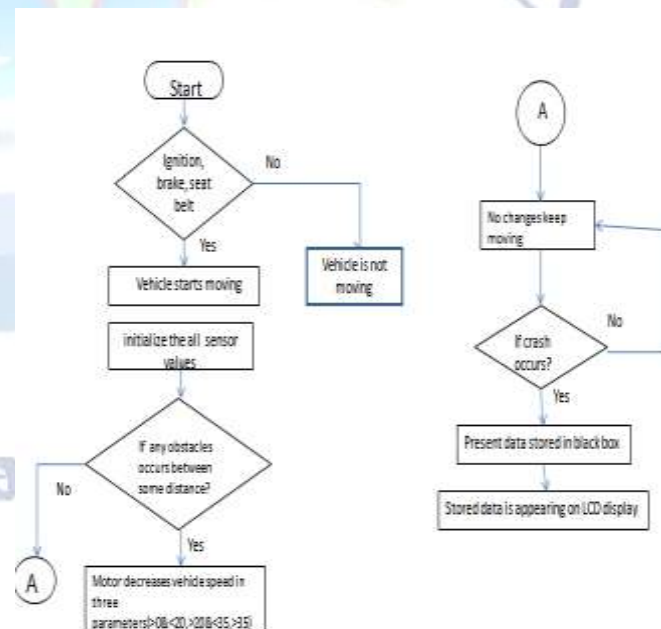


Fig3 : Over all Flow Diagram.

C. Temperature Sensor

Engine temperature is important in engine control unit, if this value goes to abnormal, some unwanted gases exhaust from vehicles due to

improper combustion. In this project, in order to obtain the vehicle engine temperature, we have used LM35 temperature sensor. This temperature sensor continuously reads the engine temperature and fed to the microcontroller. The output of LM35 is given to pin P0.28 of LPC2148. It converts temperature value into electrical signals. Its temperature sensing range is -55 to +150°C.

D. Alcohol Sensor

In this project, MQ-3 gas sensor is used for alcohol detection. It is high sensitive to alcohol, simple drive circuit, stable and long life. If driver has drunk, then alcohol sensor sends signal to microcontroller. The output of MQ-3 is given to pin P0.29 of LPC2148 and message is displayed on LCD.

E. Motor Driving Circuit

In order to control the speed of car voltage controlled method is used. The LM317 is an adjustable 3-terminal positive voltage regulator capable of supplying in excess of 1.5 A over an output voltage range of 1.2 V to 37 V is used to control output voltage. This voltage regulator is exceptionally easy to use and requires only two external resistors to set the output voltage. We have given 12V input to LM317 and we have used three BC548 transistors and three different resistors to adjust RPM of Motor. The Motor used in this project is 12V, 60 RPM (Revolutions Per Minute) Geared DC Motor

III. RESULT



Fig4.Overall system module

Fig 4 Shows the Overall System module, It is divided into three modules such Speed Controlling module, Storage Device module and Display Module.

IV. CONCLUSION

This paper has presented a new vision for the vehicles industry, which is the Black Box system and Automatic Speed Controller is used for vehicles. this system would serve as an effective source of information at the event of an accident. When any type of accident occurs due to any reason car black box provides necessary data of accident and about its causes. Here uses a memory storage device to continuously store the details obtained from the sensor like temperature value, alcohol content, Distance of the Obstacle. Before start the Vehicle it Checks the three important factors whether the seatbelts are fastened and Brake is failure and ignition key is off. If all three condition is true then vehicle will start to move otherwise vehicle could not start it is a pre accident detection Factors. It is very useful during insurance settlement after the accident.

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