Car Black Box System Using Fpga

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Abstract- *Electronic control units or sensors are becoming more advanced and standardized. These sensors can be used to communicate on standard networked protocols or with the server using GSM modems. The proposed automotive Car Black Box System design aims for storing and retrieving the data of various sensors or ECUs. The indications will be given to drivers in case of violating any parameters.The data thus stored and retrieved can be used for finding the cause of accident or unfortunate miss happening as well as damage with the vehicle.*

Keywords- Electronic control units (ECU), Sensors, GSM.

I. INTRODUCTION

Nowadays we don't have any system like a black box in cars. Thus after an accident, we don't come to know actually what was the reason behind the accidents. In today's era where science and technology has made amazing advances and improvements so have the recent cars. These cars are more advanced than ever.They have more speed, state of the art engines and are very costly due to these reasons there is a need to adopt a device which can continuously monitor all the various parameters of a car**.** This project aims to implement a system which, in case of an accident will record all the parameters and give the indications to the driver about it by ringing a buzzer. This project will help to prevent any accidents henceforth and determine the main reasons for accidents.

II. HARDWARE RESOURCES

A] Sensors

1. Temperature Sensor:

The LM35 series are precision integrated-circuit temperature devices with an output voltage linearly proportional to the Centigrade temperature. The LM35 device does not require any external calibration or trimming to provide typical accuracies of ±¼°C at room temperature and ±¾°C over a full −55°C to 150°C temperature range.[1]

2. Alcohol Sensor:

The alcohol sensor MQ-3 is suitable for detecting alcohol concentration on one's breath. It has a high sensitivity and fast response time. The sensor provides an analog resistive output based on alcohol concentration.[2]

3. Gas Sensor:

The MQ-2 gas sensor has sensitive material SnO2, which with lower conductivity in clean air. The MQ-2 gas sensor has high sensitivity to LPG, Propane, and Hydrogen. The detected value of the gas should give the precise reading.[3]

4. IR Sensor:

An IR sensor can detect the motion. The human eye blinking rate is detected by the IR sensor. RPM of the vehicle is also detected by the IR sensor only.[4]

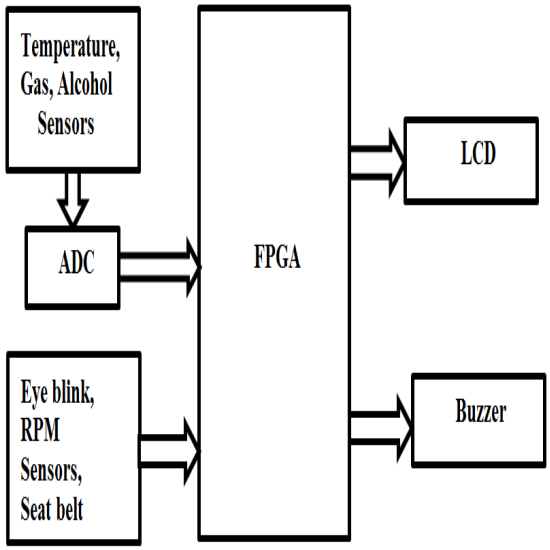

Fig. Block Diagram of Car Black Box System

B] FPGA Board

It is the heart of the system & it controls the overall system. The Spartan®-6 FPGA Evaluation Kit delivers all the basic components of hardware, design tools, IP, and reference designs enabling development right out of the box. This kit

provides a flexible environment for system design and provides pre-verified reference design and examples.[5]

III. METHODOLOGY

Here we have interfaced many sensors which help in detecting the conditions which can lead to an accident. We have Temperature, Gas, an alcohol sensor, RPM Sensor and Seat Belt which continuously sense for temperature, gas leakage, alcohol consumption, speed and seat belt respectively. As soon as any of the above parameters exceed the set point the µC will turn on the buzzer and a 20 second countdown timer is turned on indicating to the driver that the vehicle will stop after 20 seconds. After the sensors are detected the driver has 20 seconds to pull over the vehicle to the side.

In this way, we are avoiding an accident which could have happened because of gas leakage and alcohol consumption.Also, we are interfacing an eye blink sensor which continuously monitoring the blink rate of a driver. If the blink rate of the driver goes low or below a specific rate the µc assumes that the driver is feeling sleepy. The µC will turn on the buzzer and a 20-seconds countdown timer is turned on indicating to the driver that the vehicle will stop after 20 seconds. After the low eye blink rate is detected the driver has 20 seconds to pull over the vehicle to the side. In this way, we are avoiding an accident which could have happened because of night time driving.

IV. FUTURE SCOPE

We are finding the shortest path based on the distance of nearby hospitals but there may be a chance that the traffic will be more on that path. So we need to come up with some algorithm which gets the nearby hospitals with minimal distance and traffic. We may add some modules which will also let the system know about the traffic details and then find out which node will take less time to reach from the accident spot. We can also add some modules which will measure the injuries level or some additional information like blood group, heartbeats, current glucose level which may be sent to the hospitals in advance before the victims reach the hospitals hence improvise the performance of the proposed system.

V. CONCLUSION

This paper has presented a car black box system used for vehicles and gives a new vision to the automobile industry. A full and detailed description was made for every part of this system. The Black Box system built can be implemented in any vehicle. As soon as the driver runs the motor, this system will begin saving the events of the corresponding vehicle. This system is used in the analysis for determination of reasons and prevention of accidents.

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