

Wireless Black Box System for Vehicles

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ABSTRACT:

Our project is regarding “Wireless recorder for Cars”. The main purpose of making this project is to develop a vehicle black box system that can be installed into any vehicle all over the world. This paradigm is often designed with minimum range of circuits. Wireless black box is basically a device that will indicate all the parameters of a vehicle crash and will also store and display its parameters of every three second such as date, time, temperature, location, vibration, alcohol limit etc. Whenever the accident held the message will sent from the system built inside the car to the registered mobile numbers such as emergency numbers of police stations, hospitals, family members, owner etc. We have used various types of sensors like temperature sensor (DTH11), which is used to measure temperature and humidity. Vibration sensor measures vibrations felt by the car during accident. Alcohol sensors are located on the steering wheel which will indicate whether the driver is drunk. Gyroscopic sensor is used to indicate tilt during the accident. All the parameters sensed by the sensors will send the signal to Arduino mega328pu. GSM module, SD card module, GPS module are some of the devices used in our project which helped in accomplishing the output. The future enhancement of this project can be the addition of camera’s (capturing videos), voice recorder, voice-controlled system.

Keywords: Vehicle Black Box, Sensors, Arduino, GSM, GPS, Camera, Voice Recorder, Voice Controlled System.

INTRODUCTION

In science, computing and engineering, a **black box** is a device, system or object which can be viewed in terms of its inputs and outputs (or transfer characteristics) without any knowledge of its internal workings. Its implementation is "opaque" (black). Almost anything

might be referred to as a black box: a transistor, an algorithm, or the human brain.

To analyze something modelled as an open system, with a typical "black box approach", only the behaviour of the stimulus/response will be accounted for, to infer the (unknown) box. The usual representation of this black box system is a data flow diagram centred in the box.

The opposite of a black box is a system where the inner components or logic are available for inspection, which is most commonly referred to as a white box sometimes also known as a "clear box" or a "glass box. Due to the increasing numbers of traffic accidents and elderly drivers in recent years, it has become necessary to manufacture safer vehicles. The device is mostly used by law enforcement to determine whether an individual has been driving under the influence of alcohol. Police to develop a system to keep the vehicle secure and protect it by the occupation of the intruders following sensors are used Alcohol Sensor, Vibration sensor, gyroscope etc.

I. BLOCK DIAGRAM

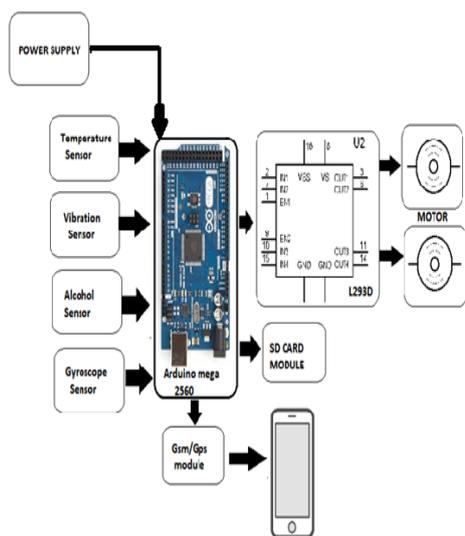


Figure 1: Block Diagram of the Project

II. IMPLEMENTATION

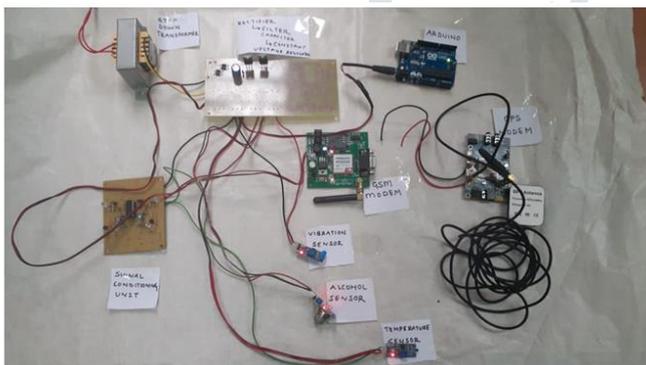


Figure 2: System of the Project

Wireless black box is basically a device that will indicate all the parameters of a vehicle crash and will also store and display its parameters of every three second such as date, time, temperature, location, vibration, alcohol limit etc. Whenever the accident held the message will send from the system built inside the car to the registered mobile numbers such as emergency numbers of police stations, hospitals, family members, owner etc.

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III. MAJOR COMPONENTS

- Arduino microcontroller set:



Figure 3: Arduino microcontroller set:

The proposed system is a part of a multi input control system a careful selection of the microcontroller unit is required. It represents the "brain" of the system. It must have special characteristic and specification to cover the required input/output ports and peripherals for the system design. Arduino ATmega328 is used for this purpose. The Arduino microcontroller is selected as the main controller of the system. Arduino is one of the energy friendly products.

ATmega 328 is basically an Advanced Virtual RISC (AVR) micro-controller. It supports the data up to eight (8) bits. ATmega-328 has 32KB internal built in memory. ATmega 328 has 1KB Electrically Erasable Programmable Read Only Memory (EEPROM). This property shows if the electric supply supplied to the micro-controller is removed, even then it can store the data and can provide results after providing it with the electric supply. Moreover, ATmega-328 has 2KB Static Random Access Memory (SRAM). Other characteristics will be explained later. ATmega 328 has several different features which make it the most popular device in today's market. These features consist of advanced RISC architecture, good performance, low power consumption, real timer counter having separate oscillator, 6 PWM pins, programmable Serial USART, programming lock for software security, throughput up to 20 MIPS etc. ATmega-328 is mostly used in Arduino

- **Alcohol Sensor**

The sensing element detects the alcohol content from the breath of the driver continuously and amplifies it to give a switching pulse output .it detects the alcohol content continuously to sense the drivers drunken state and alerts the driver. An alcohol sensor detects the attentiveness of alcohol gas in the air and an analog



Figure 4: Alcohol Sensor

voltage is an output reading. The sensor can activate at temperatures ranging from -10 to 50° C with a power supply is less than 150 Ma to 5V. The sensing range is from 0.04 mg/L to 4 mg/L, which is suitable for breathalyzers. The alcohol sensor (MQ3) is efficient among all the other sensors with fast response, high sensitivity, stable life and a simple drive circuit.



Figure 5: GSM

- **GSM**

GSM (Global System for Mobile communication) is a digital mobile telephony system that is widely used in Europe and other parts of the world. GSM uses a variation of time division multiple access (TDMA) and is the most widely used of the three digital wireless telephony technologies (TDMA, GSM, and CDMA). GSM digitizes and compresses data, then sends it down a channel with two other streams of user data, each in its

own time slot. It operates at either the 900 MHz or 1800 MHz frequency band.

IV. ADVANTAGES

1. Highly efficient and user friendly design.
2. Easy to operate.
3. Low power consumption.
4. Location of the vehicle/office cab can be known using GPS.
5. Works anywhere in the world (GSM availability).
6. In case of emergency intimation (accident) can be sent to predefined numbers.
7. Remote communication using GSM modem from anywhere in world.

V. APPLICATIONS

1. VIP Vehicle tracking.
2. Vehicle Monitoring and Alerting.
3. Vehicle Security Applications.
4. Ambulance Tracking.

CONCLUSION

Wireless black box is basically a device that will indicate all the parameters of a vehicle crash and will also store and display its parameters of every three second such as date, time, temperature, location, vibration & alcohol limit.

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