



e-ISSN: 2319-8753 | p-ISSN: 2347-6710

IJIRSET

International Journal of Innovative Research in
SCIENCE | ENGINEERING | TECHNOLOGY

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 11, Issue 5, May 2022

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 8.118

9940 572 462

6381 907 438

ijirset@gmail.com

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Implementing Vehicle Black Box System by IOT Base Approach

**Prof. Akshay Prakashrao Pundkar, Roshan Vairalkar, Swapnil Bhad, Abhinav Ganjiwale,
Prassana Ghulaxe, Ashutosh Jawanjal, Shushil Karale**

Assistant Professor, Department of Electrical Engineering, P.R.Pote collage of Engineering, Amravati,
Maharashtra, India

Degree student, Department of Electrical Engineering, P.R.Pote collage of Engineering, Amravati, Maharashtra, India

ABSTRACT: The Black Box concept is derived from the aviation industry, a flight recorder, colloquially known as a black box although it is now orange-colored for easy search, is an electronic recording device placed in an aircraft for the purpose of facilitating the investigation of aviation accidents and incidents. With the advancement in technology and cost coming down, in our project we attempt to build similar device for our cars, not only this device will help us in post-crash analysis but also it will help us in quicker emergency rescue operation. Our research has been targeted towards building an integrated system for emergency rescue services in the event of a road accident. The purpose of the project is to find the accident location using GPS module and to send this location by means of sending a message using GSM module to the pre-coded number. system is usually placed inside the vehicle. It reduces the time it takes for emergency rescue to arrive at the crash location.

I. INTRODUCTION

According to the World Health Organization, more than a million people in the world die each year because of transportation-related accidents. In order to react to this situation, the black box system draws the first step to solve this problem that crosses national boundaries and threatens the safety and health of people worldwide. 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 road status in order to decrease the death rate, constructing safer vehicles, and helping insurance companies with their vehicle accidents investigations, the main purpose of this paper is to develop a black box system that can be installed to any vehicle all over the world. Like flight data recorders in aircraft, “black box” technology can now play a key role in motor vehicle crash investigations. A significant number of vehicles currently on the roads contain electronic systems that record information in the event of a crash. That is why it is so important to have recorders that objectively

track what goes on in vehicles before, during and after a crash as a complement to the subjective input that is taken usually from victims, eye witnesses and policereports. This system is committed mainly to two approaches. The first one is how to detect and record data from the vehicle. The second is how to present the data recorded to the user in a simplified way. To implement the first approach, some major components and different type of sensors were used. While the second approach was implemented using a Visual Basic .NET computer program. This program receives the data serially from the black box memory, presents it in real-time graphics and finally saves it to a formal excel report for future use. In order to know what type of sensors should be installed into the vehicle, research was carried out to identify the main information needed for better accident analysis. After filtering the information and taking into consideration what could be done and what could help the most, the following data were found to be the most important ones needed after an accident: Belt status, Road condition, Brake status, Speed Measurement, Position of the accident, Main Lights status.

II. BLOCK DIAGRAM

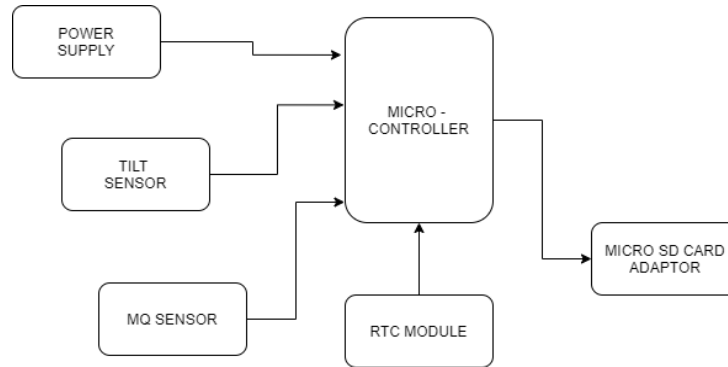


Figure 1: block diagram

III. COMPONENT DETAILS

1. Arduino uno

The **Arduino Uno** is an opensource microcontroller based on microcontroller and developed by Arduino. The board is equipped with sets of digital and analog (I/O) pins that may be interfaced to various (shields) and other circuits. The board has 14 digital I/O pins (six capable of output), 6 analog I/O pins, and is programmable with the (Integrated Development Environment), via a type B It can be powered by the USB cable or by an external though it accepts voltages between 7 and 20 volts. It is similar to and Leonardo. The hardware reference design is distributed under a Attribution Share-Alike 2.5 license and is available on the Arduino website. Layout and production files for some versions of the hardware are also available.



Figure 2: Arduino Uno

2. Tilt sensor module

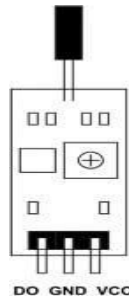


Figure 3: Tilt sensor

Tilt sensor module is a device used for knowing the planar movement. Although they are available in various types their basic function remains the same. Their function is to detect the plane shift from horizontal to vertical and sent of a signal when it happens. There are modules which could sense even small plane shifts but here we are going to discuss about simple contact type TILT SENSOR module. Here we are going to use SW-520D TILT SENSOR MODULE.

3. MQ sensor

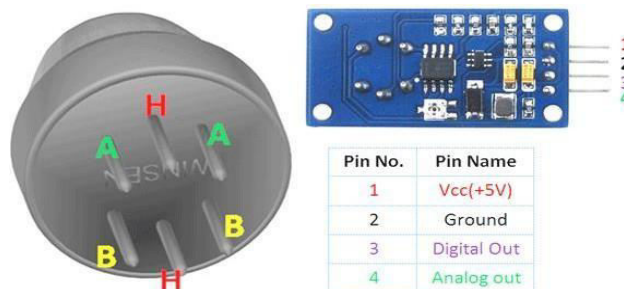


Figure 4: MQ sensor

IV. WORKING

When you start the power supply. Our system goes powered up with 5 voltage 1 ampere. When the alcohol sensor detected the alcohol content or smoke in the vehicle it automatically sense this action as accident or fire in a vehicle also we are using tilt sensor which give the action response over vehicle drop into a For this we are using MQ sensor as analogue port as well as tilt sensor on a digital port. We are using limit switch on active high configuration just for a bumper sensor so if any car got accident or it by the tree or another vehicle then system detect as accident and trigger it on serial monitor

V. RESULT

This system provides better safety rather than no safety. The system uses GPS module to find the location of the accident and GSM module to send an SMS notification to the pre-coded number.

VI. CONCLUSION

A working model of a Black Box with SMS alert vehicles has been developed for vehicle accident detection and reporting. It is a system that uses Arduino UNO, GPS tracking system and GSM module developed for vehicle accident and reporting. It provides crucial information to emergency responders in the earliest possible time. The crucial time



between the accident and getting victim medical attention can often be the difference between life and death.

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SJIF Scientific Journal Impact Factor
Impact Factor: 8.118



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