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System for Automobiles Event Data Recorder

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***Abstract*:- This paper deals with the recent burning topic related to the human being life and the problems regarding road accidents taking place in various cities while investigating the exact reason behind that accident and everything. This project is very helpful for claiming against the accident. With the help of this project we can able to record and generate the report in various formats.**

Key Words: Event, Multiplexer, Retrieve, Investigation, Detect, etc..

1. INTRODUCTION

As we all familiar about the current situation in road accidents, but still we don't know the exact reason behind that accident. So in such conditions this Event Data Recorder (EDR) plays very important role, in such situations this device activates the car's airbags also record and store information of a car's speed whether the driver of car fastened seatbelts or not, and whether driver hit the brake before a collision. This device works like a black box in airplanes. EDR can record the Car's Speed, status of seat belt, brakes and the video recording of that moment. Now days it is very helpful device for insurance companies as well as for police for further procedure. In this project various sensors are interfaced with the microcontroller for recording various parameters of the accident so that it can be used to analyse the accident accordingly.

The four wheeler accident is a major problem in many countries. Despite awareness campaign, accidents are increasing due to rider's poor behaviours such as speed driving, driving with alcohol consuming, riding with insufficient sleep, etc. Deaths and disabilities numbers are very high due to late medical assistance to people who got in accident. This result into huge social and economic burdens to people involved. By considering the importance of the problem, many organisations and automobile industries have developed safety devices to protect peoples from accidental injuries.

In this the device contains two lights for knowing its present status such as a green indicator light means the system is armed and ready to capture an event. And red light represents that when collision of vehicle take place it turns on and start recording the data related to accident during a pre-defined period before and after the impact. This recorded information is stored in the internal memory of the device and we can take this data on our external memory. To save the internal storage of the system and to increase the efficiency, system will get refreshed after every start of the vehicle, unless an accident has taken place.

This paper mainly contains two sections. The first one is how to detect and collect the information from the vehicle. The second is how to present the data to the user in a simplified way. For implementing first section various sensors are used and for second one by writing programming in MATLAB, which helps in two ways first it records the data and second is it retrieves the data from microcontroller memory to display on LCD. Mostly following sensors data that is needed after the accident: Belt status, Break status, Speed Status, Vibration status etc.

2. LITERATURE SURVEY

By author Dheeraj Pawar and Pushpak Poddar "Car Black Box with Speed Control in Desired Areas for Collision Avoidance" [1] the data retrieved as required with great ease. The initial testing was done with connection to a PC instead of an ARM processor for simplicity on trial purposes and later on the actual platform.

By author P. Ajay Kumar Reddy, P.Dileep Kumar "Black box for vehicles" [2] presented in detail each part of the vehicle system also explained how data can be saved in EEPROM and how to analyze recorded data of the vehicle system.

As per the author Ramchandra Patil, Shivaraj Hublikar "Design and Implementation of Car Black Box with Collision Avoidance System using ARM" [3] presented how data can be retrieved by using serial transmission of EEPROM , RS232 and MAX232 for the further investigation of the accident of the user vehicle.

As per the author Varsha Goud, V. Padmaja, "Vehicle Accident Automatic Detection and Remote Alarm Device" [4] we get the idea of how to interface all equipments like MEMS sensors, GPS and GSM tools to get the exact data of the accident that is how and where the accident could take place by using these all sensors in the system.

According to author Priya K. Rathod, Dr. M.M. Khanapurkar "Evidence Collection from Car Black Boxes using Vehicular Digital Video Recorder System" International Journal of Engineering Research and General Science Volume 3, Issue 2, Part 2, March-April, 2015**,** suggests how to prevent data modification and forgery of the system. Also suggested effective data analysis process to avoid data modification and collect data as evidence in the system [5].

3. SYSTEM DESIGN

The complete system block diagram is as drawn in figure 3.1 below, and the blocks used in this system with its applications are as given in table 3.1

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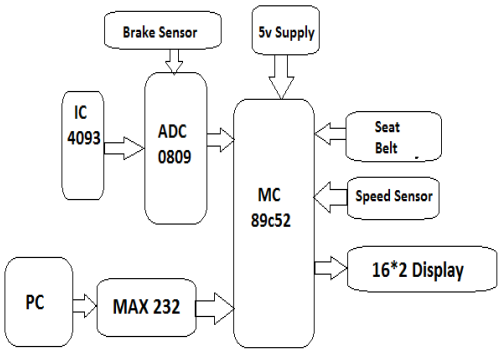

Figure 3.2: System Block Diagram

To complete design the Micro-C program, MATLAB and Eagle software's are used, which allows to develops and deploy complex applications such as,

The micro CPRO for 8051 is a powerful, feature-rich development tool 8051 microcontrollers. Designed to serve programmer with the easiest possible solution to develope applications for embedded systems, without compromising performance or control. The micro CPRO for 8051 is a user-friendly and intuitive environment. The micro CPRO for 8051 is a strictly typed language, which means that every object, function, and expression must have a strictly defined type, known in the time of compilation. To determine the correct memory allocation required initially. The micro-C PRO for 8051 supports many standard (predefined) and user-defined data types, including signed and unsigned integers in various sizes, floating-point numbers with various precisions, arrays, structures, and unions. Also pointers to establish various objects and manipulated in memory.

It determines how much memory is to be allocating to an object and how program will interpret bit patterns found in the object's storage. A given data type can be viewed as a set of values that identifiers of that type can assume, together with a set of operations allowed with these values.

A compile time operator size allows you to determine the size in bytes of any standard or user-defined type. Micro CPRO for 8051 standard libraries and your own program & header files provide unambiguous identifiers and types, so that the micro CPRO for 8051 can consistently access, interpret and change the bit patterns in memory corresponding to each active object in your program.

MATLAB is a system whose basic data element is an array that does not require dimensioning. Matlab could solve many technical computing problems, especially errors with matrix and vector formulations, in a short time it would write a program in a scalar, no interactive language such as C or FORTRAN. Basically MATLAB was developed to provide easy access to matrix software developed by the LINPACK and EISPACK projects, which together represent the state of the art in software for matrix computation. MATLAB has evolved over a period of years with input from many users. In university environments, it is the standard instructional tool and advanced courses in mathematics, engineering, and science In industry, MATLAB is the tool of choice for high-productivity research, development, and analysis. MATLAB features a family of application specific solutions called toolboxes. it is comprehensive collections of MATLAB functions (M-files) that extend the MATLAB environment to solve particular classes of problems.

Table 3.1: components with applications

Component	Application
AT89C52	For controlling and retrieve the data.
ADC0809	It is used for data acquisition.
Max 232	It receive the data parallel and transmit in to the serially.
IC 4093	It is use to provide the clock pulse to ADC.
LM 324	It is use as a voltage comparator.
DC motor	It is use for a speed measurement.
Resistors	It is use to set the break level.
Capacitors	It is use for filter purpose.
Buzzer	It is used for alarming purpose when driver left the hand on starring.
Power supply	It gives 12 volt power supply.
LED	It is using GSM model for ranging purpose.
Micro switch	It is use for reset purpose.
LCD 16*2	It use for display purpose.

Areas in which toolboxes are available include signal processing, control systems, neural networks, fuzzy logic, wavelets, simulation, and many others. Here in this project, image processing toolbox ad image acquisition toolbox is used.

Easily Applicable Graphical Layout Editor (Eagle) is a PCB Design software used to design an electronic schematic and lay out a printed circuit board. Eagle is a PCB design software package consisting of a schematics editor, a PCB editor and an auto router module.

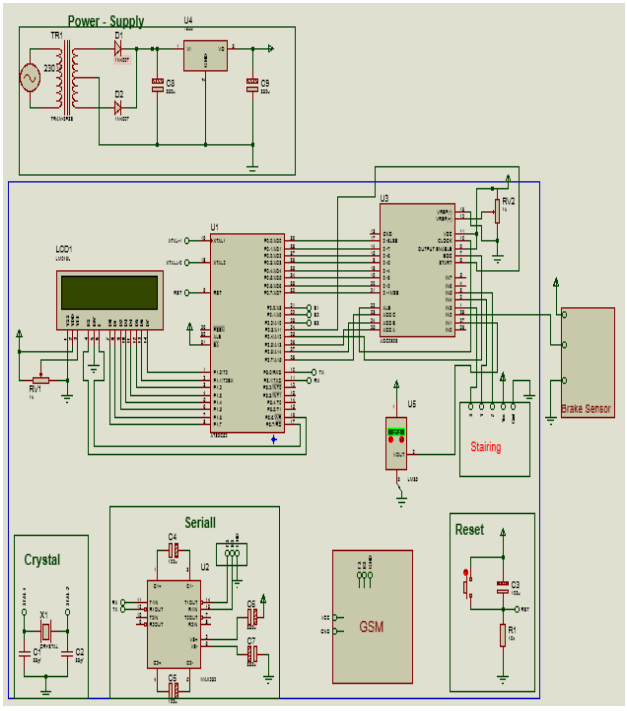

Figure 3.2: Circuit pin diagram

Analog to Digital Converter (ADC 0809): In physical world parameters such as temperature, pressure, humidity, and velocity are analog signals. A physical quantity is converted into electrical signals. We need an analog to digital converter (ADC), which is an electronic circuit that converts continuous signals into discrete form so that the microcontroller can read the data. Analog to digital converters are the used devices for data acquisition.

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The ADC0809 data acquisition component is a monolithic CMOS device with an 8- bit analog-to-digital converter, 8-channel multiplexer and microprocessor compatible control logic. The 8-bit A/D converter uses successive approximation as the conversion technique. The converter features a high impedance chopper stabilized comparator, a 256R voltage divider with analog switch tree and a successive approximation register. The 8-channel multiplexer can directly access any of 8-single-ended analog signals. The design of the ADC0809 has been optimized by incorporating the most desirable aspects of several A/D conversion techniques. The device offers high speed, high accuracy, minimal temperature dependence, excellent long-term accuracy and repeatability, and consumes minimal power. These features make it ideally suited for applications from process and machine control to consumer and automotive applications.

4. SYSTEM OUTPUT

When investigation team wants to retrieve data for analysis need to connect system with computer. After pressing retrieve switch fitted on the board, gathers all stored data, video and displays on the computer screen in numeric and graphical format as given below,

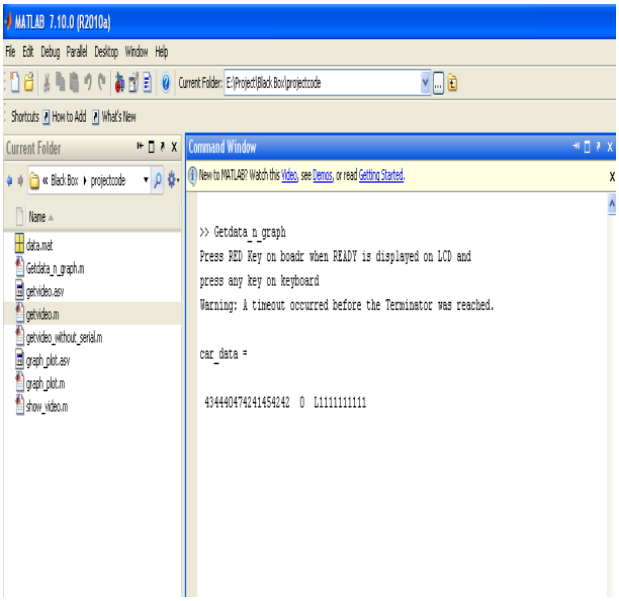

Figure 4.1: Output

5. CONCLUSIONS

We can conclude that, the data recorded by the Event Data Recorder (EVR**)** is used for accident investigation as well as for analyzing air safety issues material degradation matters and engine performance. Due to their importance in investigating accidents, these regulated devices are carefully Engineered and Constructed to withstand the force of a high speed impact and the heat of an intense fire. This system is mainly committed to two sections. The first one is how to detect and collect the information from the vehicle. The second is how to present the data to the user in a simplified way. To implement the first section many components and various types of sensors are used. While the second section was implemented by using the MATLAB Programming .This programming helps in not only recording the data but also retrieving the data from microcontroller memory to an LCD to display it. In order to know which type of sensors to be installed into the vehicle various types of research are done and following ones are considered as the most important data that is needed after the accident: Belt status, Break status, Speed Status, Vibration status etc. When any type of accident occurs due to any reason it provides necessary data to generate the report of accident and about its causes. The recorded data of parameters are easily transferred hyper terminal of laptop/ computer with real date and time thus it provides help to monitor several parameters of car which are responsible for proper movement of car .

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BIOGRAPHIES

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