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STUDY AND LITERATURE SURVEY OF EVIDENCE COLLECTION SYSTEM IN CAR BY EMBEDDED SYSTEM

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Abstract: This demonstration elaborate the collection of the real time data after the detection of collision in an around the vehicle environment and analyze the collected data to have the conclusion regarding the collision while simultaneously transmitting the data over the wireless network. The Evidence Collection System is vehicle based device which collect the data like speed, engine temperature, acceleration, GPS position, wiper movement, date and time. This data can be used to investigate the crime, rescue operation and insurance claims. This data then transmitted to the database server so that web application can be able to access this information at different places like Police station, Insurance Company. In the existing method we can detect the visual information by using sensors and after detecting it rings buzzer to indicate that driver is not paying attention on driving and after buzzer rings driver will come to normal position and he will concentrate on driving. Before driver comes to alert position accident may occur In the existing method the main disadvantage is we are detecting eyes by using sensors but we are not identifying exactly weather the driver paying attention on driving or not.

Keywords: Evidence ,Data, Collision, Black box, Car.

I. INTRODUCTION

The vehicle accident is a major public problem in many countries, particularly India. Despite awareness campaign, this problem is still increasing due to rider's poor behavior such as speed driving, drunk driving, riding without sufficient sleep, etc. The numbers of death and disability are very high because of late assistance to people who got the accident .These causes huge social and economic burdens to people involved. Therefore, several research group and major motorcycle manufacturers have developed safety devices to protect riders from accidental injuries. However, good safety device for vehicles is difficult to implement and very expensive .Like Black Box of airplane, Car Black Box (known as Event Data Recorder) is used to record information related to accidents.
Car black box records driving data, visual data, collision data and position data after the accidents so that it can be used to, analyze the accident easily and to settle many disputes related to car accident such as crash litigation, insurance settlements. It can be used to not only reconstruct what happened before an accident by Insurance Agents and police but improve vehicle design, roadway design and emergency medical service by automakers, government and hospital. The basic functions of a black box should include continuous audio/visual recording for both the front and rear of the vehicle. This will be part of the voice and visual recorder.

In addition to the basic function, the car black box equipped with wireless communication system can send accident location information to central emergency and disaster server in real-time. Therefore drivers who want help can receive service quickly by rack car, police and hospital ambulance. Car Black Box detects a crash and records the motion of the vehicle and driver's actions during a predefined time period after the accident. It consists of data collection devices for collecting the information about car's status and the driver's actions, a non-volatile memory device for recording, a microprocessor for controlling the unit and a wireless modem for communication.

II. METHODOLOGY

Alpha numeric LCD (ALCD) is used to display information about project. The LCD used is 16x2, 2 rows and 16 columns. So in each row we can display 16 characters. The 1 byte data line of lcd is connected to the Port 7.0 to Port 7.7 of the microcontroller. The enable pin of lcd is connected to the Port 0.6 of the microcontroller. The RS pin of the lcd is connected to the Port 0.5 of the microcontroller. Pin 1 of lcd is +5V power supply, pin 2 is GND, pin 3 is for contrast

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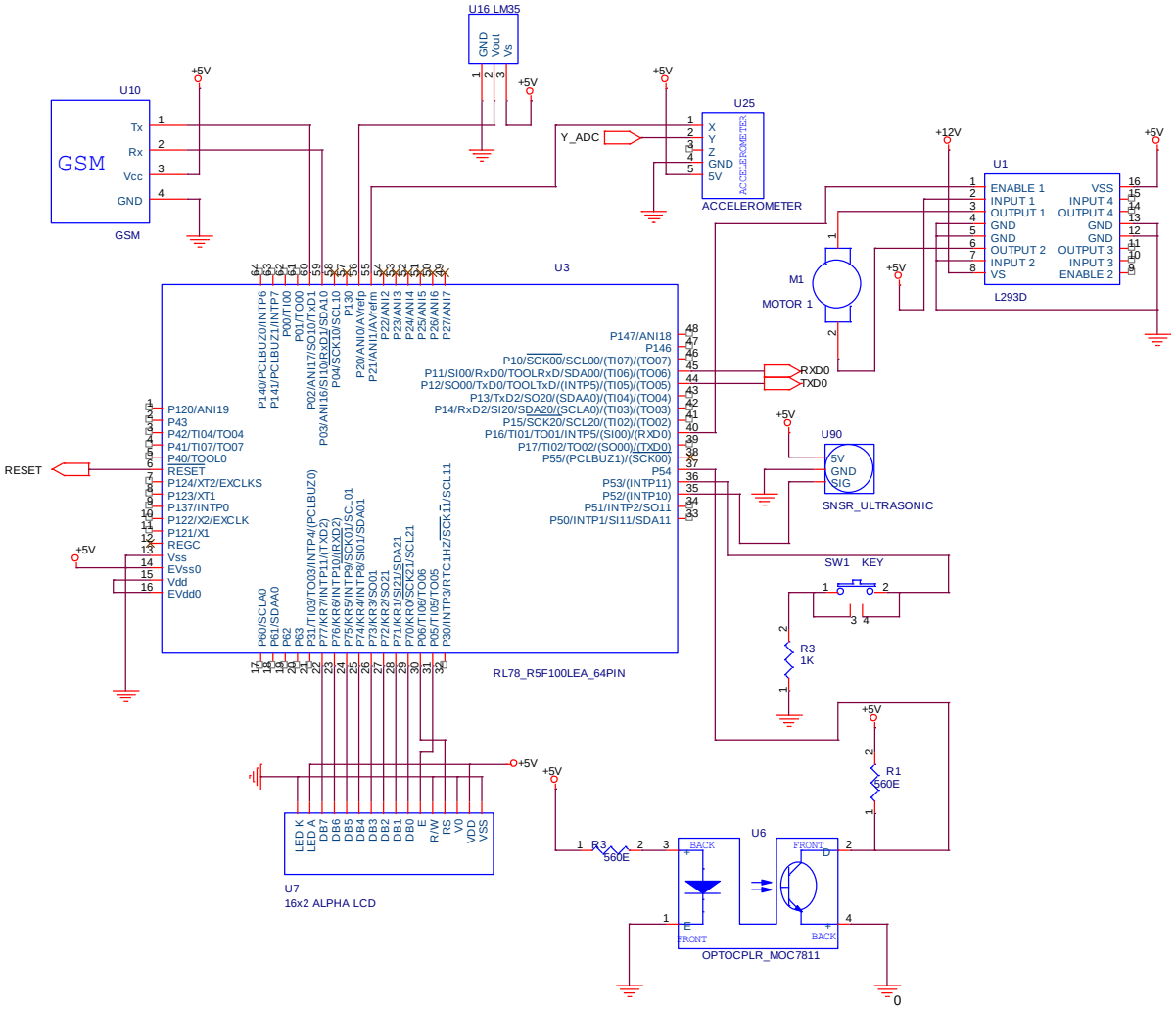
adjustment, pin 5 is for read or write operation. In this project, we are only doing write operation to the lcd. So, pin 5 is GND. Pin 15 is the backlight led anode terminal connected to +5V and pin 16 is backlight led cathode terminal connected to GND.

OVERALL SCHEMATIC



Stage 1: Real time Data collection In first case the data is coming to the input port of the controller which will continuously get the data. When the collision is detected by collision sensor the incoming data to the input port of the controller will be saved to the memory device connected to the system while transmitter connected to the output port of the controller will simultaneously transmit the data to the wireless network.

1) Visual data: The Visual information in front and rear side during driving from camera is taken.

2) Driving data: Driving information such as speed, brake and seat belt status, steering performance is taken.

3) Collision data: Time, speed and shock power when accident occurs is taken from accelerometer.

4) Positioning data: The car positions checked in real time by GPS. These data are saved temporarily in RAM as memory buffer and transfer to the Flash memory like SD card.

Stage 2: Report Generation In this case, at receiving end the collected data after the collision will be received by the antenna. The received is decrypted and the fed to the server machine so as to store the data to the database. Then the web application developed can be deployed on web server which will use this collected information to generate the reports. The conclusion can be generated logically which can be made available on internet with very less time which can be further use by accident investigation, insurance claim and hospitals for handling emergency situations. Analyze the accident easily and to handle many problems related to car accident like crash litigation, insurance settlements etc.

Stage 3: Wireless communication The proto type can be designed to get the actual output. The data can be collected using the different sensors connected. The Web application can be designed on .NET platform which use the SQL server

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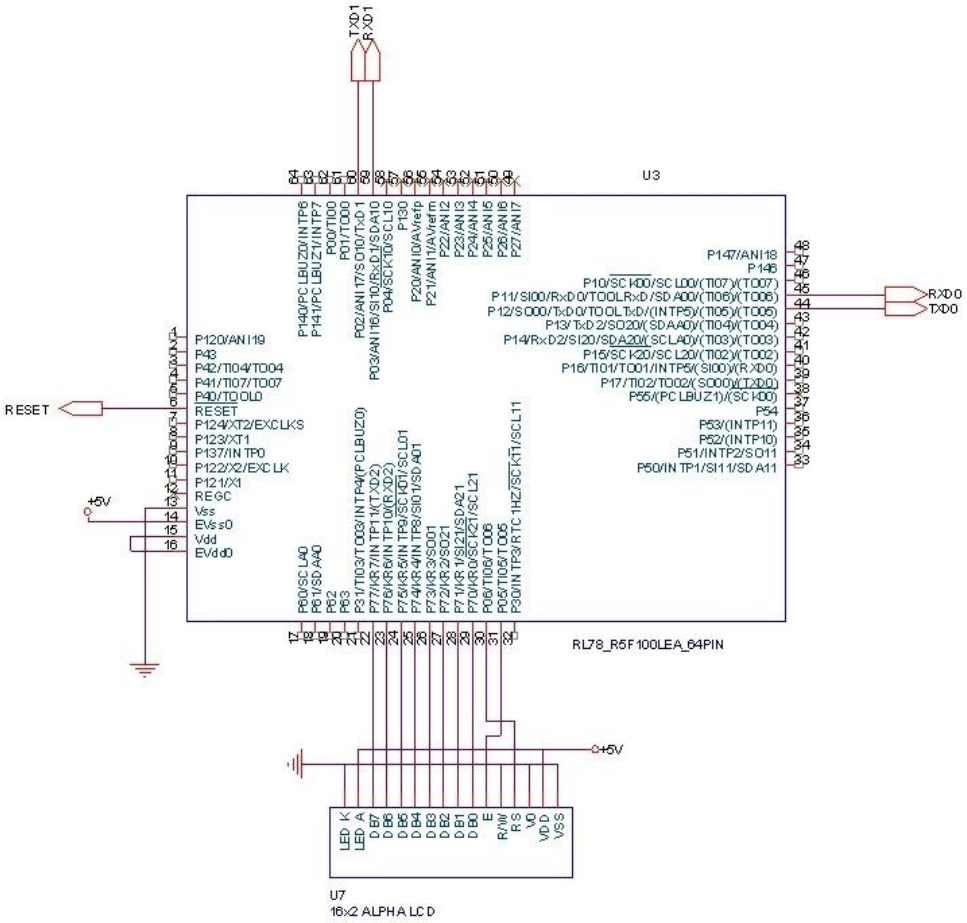
database for database management. The web application can be locally published on the IIS (Internet Information Service) to test the generated reports. Transmitting the all data via Wireless Network, such as CDMA and GSM/GPRS when accident to main control center. Support rapid service for rescue and treatment of accident. the record after a collision. So it should take the most recent data values and store the data and after accident data are transfer to flash memory automatically.



RL78 RENESAS MICROCONTROLLER

III. LITERATURE SURVEY

In this paper, author uses a prototype of Black Box For vehicle diagnosis that can be installed into any vehicle. This prototype can be designed with minimum number of circuits. This can contribute to construct safer vehicles, improving the treatment for crash victims, helping insurance companies with their vehicle crash investigations, and enhancing road status in order to decrease the death rate.[8] This paper presents a low cost system which provides solution to the existing automotive control issues. This system has two main principle components namely Vehicle to Vehicle Collision Avoidance Unit (VVCAU) is used to avoid crashing between vehicles and Black Box (BB) records the relevant details about a vehicle such as Engine Temperature, Distance from obstacle, Speed of vehicle, Brake status, CO2 Content, Alcohol content, Accident Direction, trip Time and Date. The design selects RL78 Renesas microcontroller 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, Real Time Clock, Electrically Erasable Programmable Read Only Memory and GSM module.[9] In this paper, a new framework for conducting controlled driving behavior studies based on multiuser networked 3-D virtual environments. We report on the results of our study from two viewpoints: 1) the reproducibility of the traffic accident situation (i.e., state variables of interest are recreated successfully in 78% of the cases); and 2) the interactive car-following behavior of human subjects embedded in the traffic situation of the virtual environment. [1] In this paper, a process to collect critical video clips from car black boxes using smart phones. Critical video clips in the black box are

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hashed to provide data integrity before being transmitted to the police server. Without VANET infrastructure, smart phones are very useful communication media for car black boxes.[2]

In this paper, the composition and function of an advanced controller system of Car Black Box. The system can not only record the main driving data of the car comprehensively and accurately in real-time, but also reconstruct the accident with data process software, which can help people analyze the accident rapidly and legitimately after a collision. A review of recent researches on Car Black Box is first presented in this paper. The author then analyzes the main problems and development direction of Car Black Box and put forward the necessity of developing Car Black Box with high performance. The author also proposes an integrated design solution for Car Black Box. The design selects the Samsung's S3C2410, which includes CAN controller, pulse counter module, A/D convert module and GPIO interface, audio-out, RS232 interface and USB port. The Car Black Box can receive real-time data including driving speed, rev, light, car door, tire pressure, brake, lay-up and life belt, and also process the data and store it in RAM. Based on the experiment, it is proved that the designed hardware circuit can work accurately and reliably.[3]

In this paper, how to effectively collect and manage information obtained from car black boxes in vehicular networks. The car black box is a vehicle-based CCTV which records video images, sound, GPS position, speed, and time. These data can be used for accurate car accident investigation and some public crimes prevention. However, there are important issues such as user privacy and a data management for a vehicle-based CCTV records. The proposed evidence collection system can reduce driver privacy concerns and communication and management overheads.[4]
In this paper, Embedded controller for Car Black Box using SoC (System on Chip) technique. System on Chip (SoC) is the effective method to implement embedded system like car black box, which consists of processor, memory, I/O peripheral and several interfaces. SoC for Car Black Box system consists of 8051 processor, CAN (Controller Area Network) controller, JPEG compressor, SD controller for dumping the data from memory buffer to SD card, ROM for programming and SRAM acting as memory buffer. Describing the design process in the hardware and software, it was shown in the verification using MFC(Microsoft Foundation Class) program whether the required data such as image, location and other vehicle control status information was recorded and recovered.[5]. In this paper, vehicle safety system which would not only record the video and audio, but also try to prevent a possible collision by limiting the speed of the vehicle in accident-prone areas. In case of an accident, the time and location (co-ordinates) is sent through GSM to a preset number for immediate rescue and treatment. Recorded data can also be used for forensics, revealing the problems that caused the accident and give manufacturer an idea for improvement. So the motto is to develop an embedded integrated system consisting of a microcontroller, a power supply unit, sensors, memory, a motor driver unit and a GPS/GSM modem.[7]

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Stage 2: Report Generation In this case, at receiving end the collected data after the collision will be received by the antenna. The received is decrypted and the fed to the server machine so as to store the data to the database. Then the web application developed can be deployed on web server which will use this collected information to generate the reports. The conclusion can be generated logically which can be made available on internet with very less time which can be further use by accident investigation, insurance claim and hospitals for handling emergency situations. Analyze the accident easily and to handle many problems related to car accident like crash litigation, insurance settlements etc.
Stage 3: Wireless communication The proto type can be designed to get the actual output. The data can be collected using the different sensors connected. The Web application can be designed on .NET platform which use the SQL server database for database management. The web application can be locally published on the IIS (Internet Information Service) to test the generated reports. Transmitting the all data via Wireless Network, such as CDMA and GSM/GPRS when accident to main control center. Support rapid service for rescue and treatment of accident. Here we are going to use XBee module. The car black box contains not only a record of what was happening in the last seconds before the impact of accident but also the record after a collision. So it should take the most recent data values and store them in buffer with a circular sequence (RAM). When the black box senses the accident, buffer refreshing is suspended and the data before and after accident are transfer to flash memory automatically.

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IV. CONCLUSION

In this, I have used RL78 Renesas microcontroller to receive and transmit the collected evidences data over wireless network by using Xbee transmission which indeed is collected at police database server using RL78 renesas microcontroller and receiver. The collected parameters are vehicle id, seatbelt status, speed, engine temperature and steering angle respectively from the prototype designed. The collected data by controller not only transmitted to the server but also is saved to the memory at transmitting end, which in case of wireless transmission failure will be helpful for extraction of data. Web application developed will gives an flexibility to watch the generated reports to the person/institution who has authority for that like Police, Insurance Company, Hospital.

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