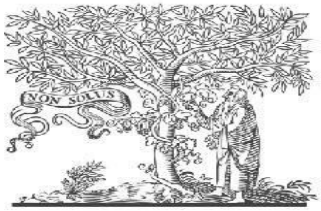
International Journal for Innovative Engineering and Management Research
PEER REVIEWED OPEN ACCESS INTERNATIONAL JOURNAL
www.ijiemr.org

COPY RIGHT



ELSEVIER SSRN

IJIEMR Transactions, online available on 31st Mar 2023. Link :http://www.ijiemr.org/downloads.php?vol=Volume-12&issue=Issue 03

10.48047/IJIEMR/V12/ISSUE 03/73

Title VEHICLE ACCIDENT INFORMATION STORAGE CONTAINER

Volume 12, ISSUE 03, Pages: 521-525

Paper Authors
Prasanth Kumar.K, Veera Venkata Sai Varma. K, Praneetha.R, Sree Kavya.P, Jagadeesh.M

USE THIS BARCODE TO ACCESS YOUR ONLINE PAPER

To Secure Your Paper As Per UGC Guidelines We Are Providing A Electronic Bar Code

International Journal for Innovative Engineering and Management Research
PEER REVIEWED OPEN ACCESS INTERNATIONAL JOURNAL
www.ijiemr.org

Vehicle Accident Information Storage Container

Prasanth Kumar.K[1], Assistant Professor, Department of Information Technology, Dhanekula Institiute of Engineering & Technology, Vijayawada.
Veera Venkata Sai Varma. K[2], Graduation student, Department of Information Technology, Dhanekula Institiute of Engineering & Technology, Vijayawada.
Praneetha.R[3], Graduation student, Department of Information Technology, Dhanekula Institiute of Engineering & Technology, Vijayawada.
Sree Kavya.P[4], Graduation student, Department of Information Technology, ,Dhanekula Institiute of Engineering & Technology, Vijayawada
Jagadeesh.M[5], Graduation student, Department of Information Technology,Dhanekula Institiute of Engineering & Technology, Vijayawada.

Abstract
This paper proposes a method for storing accident data in a vehicle in real-time by using a camera to capture image data during driving. With the rise of vehicle accidents, the need for data to determine accident circumstances and fault has led to the development of vehicle black boxes that record driving data, including vehicle speed. The proposed accident data recording apparatus records external circumstances at the time of an accident as image data using a camera mounted in the vehicle. This data, along with preand post-accident external image data and driving data, helps determine the cause of the accident.
To implement this method, an ARDUINO UNO microcontroller interfaces with sensors and communication devices such as crash, temperature, and gas sensors. The data is stored locally and globally using an SD card module and IOT module. An I2C LCD module connects to the LCD using the ONEWIRE protocol to display the latest sensor and communication information. The GPS device provides the location of the vehicle, while the GSM sends the accident information to the police or respective person care takers.
In summary, this paper proposes a method for storing accident data using a camera mounted in a vehicle and various sensors and communication devices. The proposed system aims to improve accident investigation and fault determination by providing more comprehensive data.

Keywords: Information container, IOT, GPS, ESP-32 CAM.

Introduction

Road accidents involving cars are a common occurrence around the world and often lead to serious injuries or fatalities. According to the World Health Organization[1](WHO), road traffic accidents claim the lives of around 1.35 million people globally each year, with an additional 20-50 million people sustaining non-fatal injuries. There are several factors that contribute to road accidents involving cars, including human error, mechanical failure, and environmental factors. Human error, such as distracted driving, speeding, and drunk driving, is a leading cause of road accidents. Mechanical failure, such as faulty brakes or tires, can also contribute to accidents, as can environmental factors like adverse weather conditions. In addition to causing physical harm and emotional trauma to those involved, road accidents also have significant

economic costs. The cost of medical care, lost productivity, and property damage can be substantial, placing a burden on individuals, families, and communities[2].Overall, road accidents involving cars remain a significant public health and safety concern, and it is essential to continue efforts to reduce their frequency and severity through a range of interventions and prevention measures. With this we also have the problem of insurance claim for our damage due to the amount of insufficient data that is during the time of accident which may sometimes lead to false reports which may cause us the trouble of not getting the insurance money[3]. This paper helps us with this problem we will have an iot system which will record the data during the time of accident and can be used for investigation of the accident to get accurate results during the investigation process.

GSM – GLOBAL SYSTEM FOR MOBILE COMMUNICATION

GSM serves as a medium for remotely controlling and monitoring transformer load, DC motor, stepper motor, temperature sensor, and solid state relay by sending messages through a GSM modem, nature. manual making leveraging its deterministic. This eliminates the need for operation and transportation, it highly efficient for use in industrial controls, automobiles, and appliances that can be controlled remotely. Additionally, it is cost-effective and less expensive, making GSM the preferred mode of communication for controlling such devices. The automatic system is efficient, less expensive, and convenient, making it the preferred mode of communication for controlling purposes.

GPS - GLOBAL POSITIONING SYSTEM

Vehicles use GPS technology for both navigation and tracking purposes. Tracking systems allow a base station to monitor the vehicle's movements without the driver's input, while navigation systems assist the driver in reaching their destination. Although the architecture may differ slightly between tracking and navigation systems, they share many similarities. In the event of an accident, the GPS system can pinpoint the vehicle's location and send that information to the appropriate person via GSM through SMS or a phone call[7]. The GPS module sends real-time data about the tracking position in NMEA format, which includes several sentences. The sentence that begins with $GPGGA and contains the coordinates, time, and other relevant information is crucial. This sentence is referred to as the "Global Positioning System Fix Data" or GPGGA. Further information on NMEA sentences and reading GPS datacan be found here.

A PROBLEM DEFINITION

The system for detecting accidents and messaging vehicles utilizes a GSM modem, which is capable of detecting accidents through the use of a vibration sensor. Piezo elements are used for detecting vibrations or knocks, and their output voltage can be easily read to act as tap or knock sensors. The vibration sensor sends a signal to the Arudino controller, which then sends an alert message containing the location through the GSM modem. In the event of a minor accident, the driver can terminate the message using a switch to avoid wasting the time of medical and police personnel. The GSM modem functions similarly to a mobile phone but lacks a display, keypad, and speakers. It accepts a SIM card and operates through a mobile operator subscription.

We showed the operation scenario and system diagram of the proposed system. When the accident or crime happens it is reported to the police server system and information

request message containing the time and location of the accident is broadcasted to the smart black box system. The smart black box with the recognition and GPS/OBD module matches the request message with the data in DB system.

B METHODOLOGY

The following stages are used by the prototype of this accident detection and information transfer technique:

1. A block diagram is used to represent the Entire Setup.
2. The MCU is informed of the accident's first occurrence via a piezoelectric sensor.
3. The GPS is used to determine the Latitude and Longitude, which are then communicated to the rescue squad through GSM[5].
4. The EEPROM has a pre-stored message receiver number[6].
5. To prevent erroneous messages, an OFF Switch is also available when necessary.

C PROPOSED METHOD

In here, three phase inductive load is used and rated of 80 MW and 60 MVar. The proposed method for an intelligent black box includes several important features that enhance the safety of vehicles on the road. One key aspect is the use of ESP8266 to connect vehicles to the cloud, allowing for real- time tracking and alerts. This feature is

critical in emergency situations, as it enables drivers to receive audio alerts and respond quickly. Another key aspect of this proposed method is the use of ESP32 cam, which is used to live stream accidents that occur in the vehicle[8]. This feature is particularly useful for providing evidence in the event of an accident, as it allows for a clear view of what happened inside the car.

Overall, this proposed method represents an important step forward in the development of intelligent black box technology. By incorporating advanced features like cloud connectivity and live streaming capabilities, it has the potential to significantly improve the safety of drivers on the road. With further research and development, it may be possible to expand on these features and create an even more comprehensive system for collecting and analyzing safety information in vehicles.

System Implementation

• DETECT THE ACCIDENT Detect the accident through the crash sensor and the temperature sensor monitor the engine temperature. The gas sensor is used to detect the driver consuming alcohol or not. Whenever the abnormality in the sensor the microcontroller receives some kind of data. The GPS are used to send the location for that accident.So these of the sensor used to detect the accident.

• COLLECT AND STORE THE INFORMATION The use of the SD card module we can store the collective information from the sensor and ESP32cam and GPS. If accident occurs the use of these data police can easily investigate and found the correct reason for the accident. Kind of information make a investigation easy and effective with the accurate values[9].

• SEND THE INFORMATION Collection of the data from the sensor we want to send the information to the relative persons and police. So we use the GSM and GPS and IOT module for the communication purpose. Black box is made by strongest material so it doesn't break. In case the black box got damaged we can get all the information through the IOT.

Crash sensor

A crash sensor is a device designed to detect sudden impacts or collisions and trigger a response. It is commonly used in automobiles as a safety feature to detect accidents and activate airbags or other safety systems. The sensor works by measuring the acceleration or deceleration of the vehicle and comparing it to a predetermined threshold. If the acceleration or deceleration exceeds this threshold, the sensor triggers an alarm or

activates a safety system. Crash sensors may also be used in other applications, such as in sports equipment to monitor impacts and prevent injury, or in industrial settings to detect collisions and stop machinery to prevent damage or injury.

Temperature Sensor

A temperature sensor is a device that measures the temperature of a particular environment or substance and converts the measurement into an electrical signal. Temperature sensors are used in a wide range of applications, from household appliances to industrial machinery. They work by detecting changes in temperature through changes in electrical resistance, voltage, or current. Common types of temperature sensors include thermocouples, thermistors, resistance temperature detectors (RTDs), and infrared sensors. They are used to monitor and control temperature in various settings, such as in heating and cooling systems, refrigeration units, and industrial processes. Temperature sensors are essential for maintaining safe and efficient operations in many industries, as well as for monitoring and controlling the temperature of various products and materials during production, transport, and storage.

Gas Sensor

A gas sensor is a device designed to detect the presence of various gases in the environment. It works by measuring the concentration of a particular gas and converting it into an electrical signal that can be analyzed and interpreted by a computer or other device. Gas sensors are used in a wide range of applications, including industrial processes, environmental monitoring, and safety systems[10]. They can detect toxic or flammable gases that may pose a risk to human health or safety, as well as gases that may indicate a leak or other problem in a system or process. Common types of gas sensors include electrochemical sensors, infrared sensors, and metal oxide sensors. They are used in a variety of settings, such as in homes, factories, and laboratories, to monitor and control gas levels and ensure safe and efficient operations. Gas sensors play a critical role in many industries and are essential for maintaining safe and healthy environments.

Aurdino

Arduino is an open-source platform used for building electronic projects. It consists of a microcontroller board that can be programmed using a computer and a simple programming language. The Arduino board has various input and output pins that allow it to interact with a wide range of sensors, actuators, and other electronic components. Arduino is widely used by hobbyists, students, and professionals for a variety of projects, such as robotics, home automation, and Internet of Things (IoT) applications. It is designed to be easy to use and flexible, with a large community of users and developers who share ideas, resources, and code. Arduino has become a popular tool for teaching electronics and programming, as it allows users to quickly prototype and test their ideas without requiring extensive knowledge or experience. With its low cost and versatility, Arduino has enabled countless projects and innovations in the field of electronics

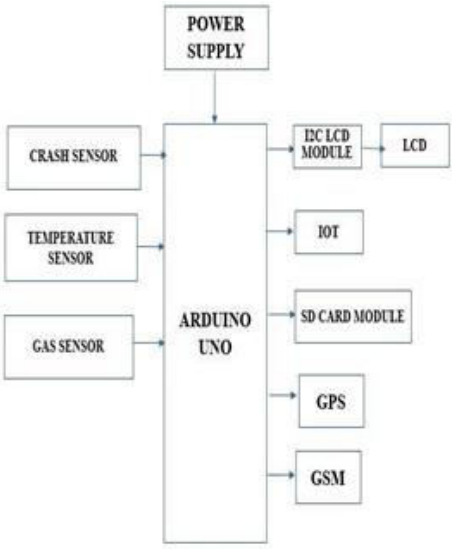


Fig.1.Block diagram

LCD MODULE

A liquid crystal display (LCD) that can be controlled via the Inter-Integrated Circuit

(I2C) communication protocol is known as an I2C LCD module. A single bus may be used by several devices to interact with one another thanks to the serial I2C protocol. A tiny LCD screen and a circuit board with an I2C interface chip make up the I2C LCD module in most cases. The LCD module may connect with other electronics, including microcontrollers or computers, through the I2C bus thanks to the I2C interface chip.

A common option for applications that call for a straightforward display interface is the I2C LCD module. It can show a variety of text and visuals and is readily integrated into applications using a few straightforward instructions. The module may show up to two lines of text with up to 16 characters per line. Moreover, it features an integrated backlight that can be managed via the I2C interface.

Projects like temperature and humidity monitors, alarm systems, and home automation systems frequently employ the I2C LCD module. It is a practical and simple display solution that may be used in a variety of tasks.

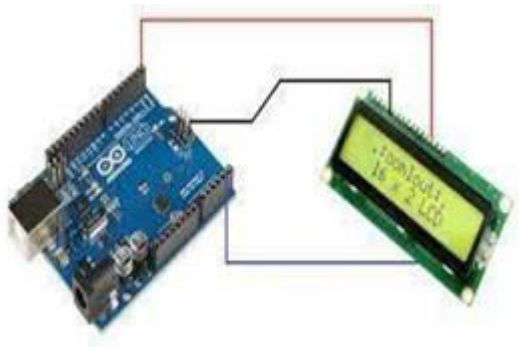


Fig.2.Aurdino board

Conclusion

The focus of our paper is an advanced safety information collection system for cars, which we refer to as an intelligent black box. This system includes enhanced features that go beyond those of a standard car black box, such as the ability to recognize the license plate number and color of nearby vehicles, as well as an IOT function to receive information requests and upload stored information. We provide a detailed account of the simulation and implementation of our proposed system.

References

[1]. D. Zhao et al., “Accelerated evaluation of automated vehicles safety in lane-change scenarios based on importance sampling techniques,” IEEE Trans. Intell. Transp. Syst., vol. 18, no. 3, pp. 595–607, Mar. 2017. [2]. Traffic Safety Facts 2015, NHTSA, Washington, DC, USA, 2015.
[2]. T. Coughlin. The memory of cars. Forbes Jul. 2016.[Online].Available: https://www.forbes.com/sites/tomcoughlin/2016/07/20/the-memoryofcars/#3170f5c41b33 [4]. R. Girshick, “Fast R-CNN,” in Proc. ICCV, 2015, pp. 1440–1448.
[3]. S. Ren, K. He, R. Girshick, and J. Sun, “Faster RCNN: Towards realtime object detection with region proposal networks,” in Proc. Adv. Neural Inf. Process. Syst., 2015, pp. 91–99
[4]. K. He, G. Gkioxari, P. Dollar, and R. Girshick, “Mask R-CNN,” in Proc. ICCV, 2017, pp. 2961–2969. [6]. W. Choi, “Near-online multi-target tracking with aggregated local flow descriptor,” in Proc. ICCV, 2015. [7]. Y. Xiang, A. Alahi, and S. Savarese, “Learning to track: Online multiobject tracking by decision making,” in Proc. ICCV, 2015, pp. 4705–4713. [8].
[5] N. Wojke, A. Bewley, and D. Paulus, "Simple online and real-time tracking with a deep association metric," in Proc. IEEE Int. Conf. Image Process. (ICIP), Sep. 2017, pp. 3645–3649.
[6]. R. Girshick, J. Donahue, T. Darrell, and J. Malik, “Rich feature hierarchies for accurate object detection and semantic segmentation,” in Proc. CVPR, 2014, pp. 580–587.
[7] .J. Long, E. Shelhamer, and T. Darrell, “Fully convolutional networks for semantic segmentation,” in Proc. CVPR, 2015, pp. 3431–3440.
[8]. V. Badrinarayanan, A. Kendall, and R. Cipolla, "SegNet: A deep convolutional encoder-decoder architecture for image segmentation," 2015, arXiv:1511.00561. [Online]. Available: https://arxiv.org/pdf/1511.00561.pdf authorized licensed use limited to Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology. Downloaded on J