WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

The Car Black Box System for Accident Analysis Using IOT

Anand B[1], Mohan Murali K[2], Ankitha C[3], Srinivasa Reddy K[4], Pulla Reddy A[5]

[1,2,3,4] Student, Department of Electronics and Communication Engineering, Chadalawada Ramanamma Engineering college (Autonomous), Tirupati.
[5] Lecturer, Department of Electronics and Communication Engineering, Chadalawada Ramanamma Engineering college (Autonomous), Tirupati.

ABSTRACT:

The Car Black Box System for Accident Analysis is a safety device designed to monitor and record key vehicle data during accidents. In this project it incorporates an MEMS sensor for impact detection, an ultrasonic sensor for obstacle proximity, and an alcohol sensor for driver sobriety. The system uses a GPS module for location tracking and a GSM module to send emergency alerts. A voice module provides safety messages during emergencies, and an LCD screen displays status and location data. The project demonstrates the use of affordable sensors and microcontrollers like Arduino UNO and NodeMCU for practical vehicle safety applications.

1. INTRODUCTION

Road accidents are a major cause of fatalities, making vehicle safety essential. The Car Black Box System records and analyzes accident data to identify causes and improve safety. It uses sensors for impact detection, proximity, and alcohol monitoring, along with GPS and GSM for location tracking and emergency alerts. Additional features include a voice module for safety messages, an LCD screen for updates, and a push-button switch for manual alerts. This affordable system enhances accident response and post-accident analysis, boosting road safety.

2. LITERATURE REVIEW

1. Prof. S. Sabeena and Ms. T. Srinithi "The Vehicle Blackbox Using IoT" | (2024) International Research Journal of Modernization in Engineering Technology and Science. This system is designed to improve vehicle safety by recording and transmitting data related to accidents, vehicle performance, and driver behavior in real-time.

2. Anjali Shrikant Koravi, Harshada Manoj Navale, Shruti Pradip Patil, Sneha Avinash Upadhye, and Bhendawade Pranoti Tanmay "Black Box IoT for Electric Car" |(2024) International Journal of Research Publication and Reviews. This system is designed to enhance the safety, monitoring, and performance of electric cars by continuously recording and transmitting data related to vehicle performance, battery status, driver behavior, and accident detection.

3. PROBLEM STATEMENT

Current vehicle safety systems are fragmented and focus on individual features like collision detection, location tracking, and alcohol detection. These systems lack integration, making it difficult to analyze accidents, monitor driver behavior, and provide real-time emergency alerts. Additionally, network issues and limited data storage reduce their overall effectiveness.

4. PROPOSED METHOD

The Car Black Box System combines several features for safety and accident analysis. It includes collision detection, location tracking, emergency alerts, alcohol monitoring, and obstacle detection to improve safety and help in case of an accident. The system includes a voice module for warnings, an LCD screen for real-time information, and data logging for speed, impact, and location. It also has an emergency button and is powered by a 12V supply. The system helps with safety, driver monitoring, and post-accident analysis.

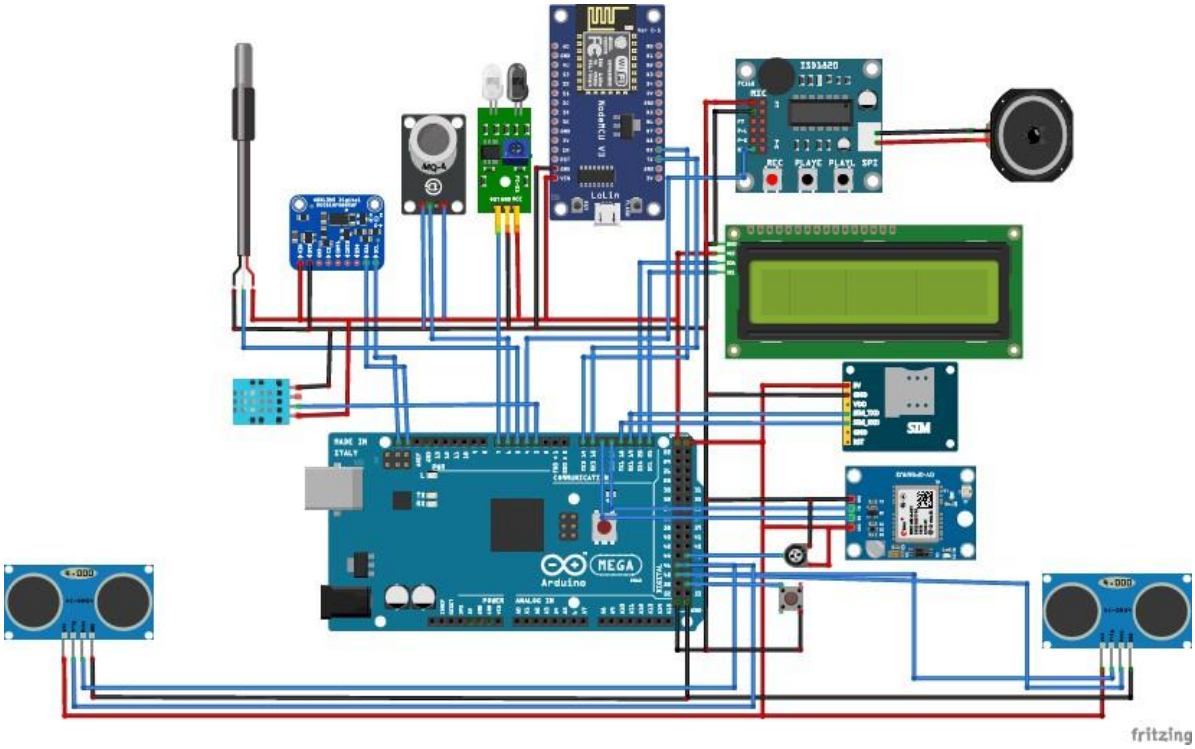

Fig. 1 -Block Diagram of Proposed Method.

5. WORKING PRINCIPLE

The Car Black Box System operates by integrating multiple sensors and communication modules to monitor vehicle conditions, detect accidents, and provide emergency alerts. The MEMS sensor detects impact during an accident, triggering an alert that is displayed on the LCD screen and sent via the GSM module to a registered mobile number along with the vehicle's location from the GPS module. The gas sensor identifies alcohol consumption or fuel leakage, displaying warnings on the LCD display and sending alerts when necessary. The system also allows real-time monitoring of speed and gas sensor values on ThingSpeak, enabling remote tracking and analysis. In case of an emergency, pressing the emergency button activates the voice module, which records the person's voice inside the vehicle and allows playback via a speaker. The system includes ultrasonic sensors to detect obstacles; the front sensor warns if the vehicle is too close to an object, while the rear sensor alerts if a vehicle is approaching from behind. A potentiometer is used to vary the vehicle's speed, and all components are controlled by a NodeMCU Wi-Fi module, with the code running on an Arduino. The combination of these technologies ensures real-time monitoring, remote data access, rapid accident response, and enhanced road safety.

6. RESULTS

All authors are required to complete the Procedia exclusive license transfer agreement before the article can be published, which they can do online. This transfer agreement enables Elsevier to protect the copyrighted material for the authors, but does not relinquish the authors' proprietary rights. The copyright transfer covers the exclusive rights to reproduce and distribute the article, including reprints, photographic reproductions, microfilm or any other reproductions of similar nature and translations. Authors are responsible for obtaining from the copyright holder, the permission to reproduce any figures for which copyright exists.

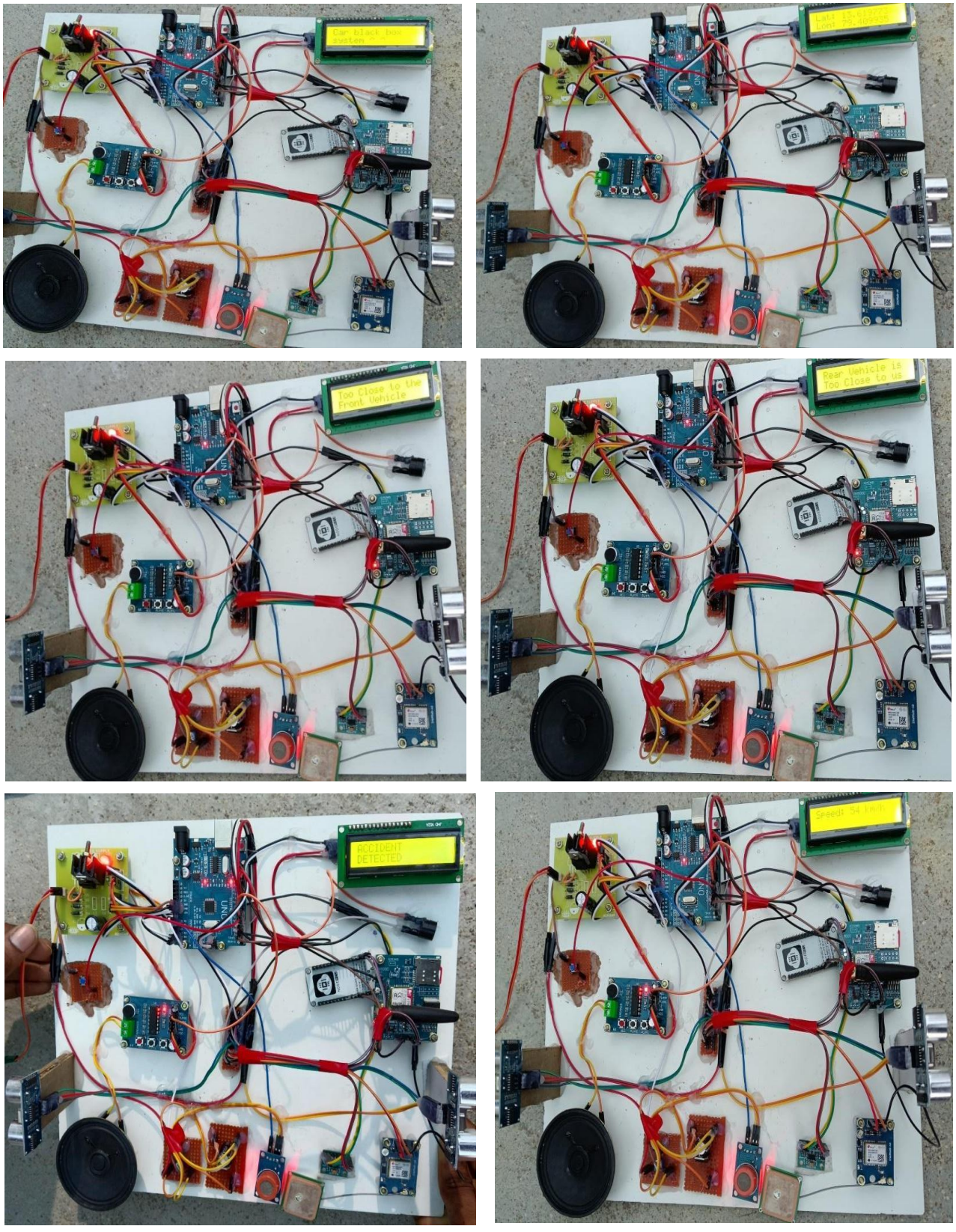

Fig. 2 - Results.

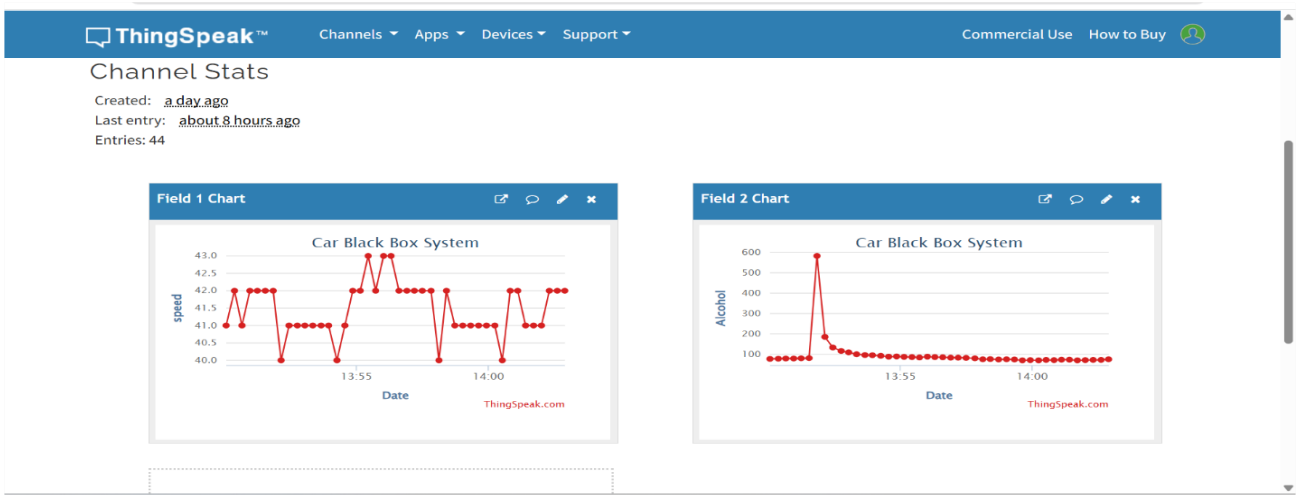

Fig. 3 – Results in Thing Speak.

7. CONCLUSION

This Car Black Box System enhances road safety by detecting accidents, monitoring driver behavior, and providing emergency alerts. The integration of IoT components allows real-time tracking, obstacle detection, and voice recording, ensuring a rapid response in critical situations.

REFERENCES

1. Prof. S. Sabeena and Ms. T. Srinithi "The Vehicle Blackbox Using IoT" | (2024) International Research Journal of Modernization in Engineering Technology and Science. This system is designed to improve vehicle safety by recording and transmitting data related to accidents, vehicle performance, and driver behavior in real time.
2. Anjali Shrikant Koravi, Harshada Manoj Navale, Shruti Pradip Patil, Sneha Avinash Upadhye, and Bhendawade Pranoti Tanmay "Black Box IoT for Electric Car" |(2024) International Journal of Research Publication and Reviews. This system is designed to enhance the safety, monitoring, and performance of electric cars by continuously recording and transmitting data related to vehicle performance, battery status, driver behavior, and accident detection.