BioGecko Vol 12 Issue 02 2023

ISSN NO: 2230-5807

ADVANCED VEHICLE MONITORING AND CONTROLLING SYSTEM USING NRF24L01 MODULE

[1].Mr.J. Hema Sundar, [2].K. Vijay Babu, [3].K. Venkata Siva, [4].K. Manoj Kumar
1 Assistant Professor, Department of EEE, SRGEC, Gudlavalleru,
2 Undergraduate Student, Department of EEE, SRGEC, Gudlavalleru,
3Undergraduate Student, Department of EEE, SRGEC, Gudlavalleru,
4 Undergraduate Student, Department of EEE, SRGEC, Gudlavalleru,
Corresponding Author Email - hemasunder.208@gmail.com
Department of electrical & electronics engineering Seshadri Rao Gudlavalleru Engineering college, Gudlavalleru, AP - 521356

Abstract - With the increasing demand for safer, more efficient, and environmentally friendly vehicles, there is a growing need for advanced vehicle monitoring and controlling systems. In this paper, we propose a wireless vehicle monitoring and controlling system using the nRF24L01 module, which is a low-cost and high-performance wireless transceiver module. This project enables transmission of messages to a receiving vehicle in a sequential manner based on certain conditions. Additionally, it utilizes a buzzer output and an LCD display to convey messages on both the transmitter and receiver sides. The system is also designed to automatically control the brightness of the vehicle's light based on the ambient light levels.

Index terms: Vehicle- Vehicle Communication, NRF24L01 module, Sensors.

1.INTRODUCTION

Road accidents involving vehicles are a major cause of concern worldwide. According to WHO, approximately 1.35 million people die each year due to road accidents, and up to 50 million people are injured or disabled. Some of the most common causes of vehicle road accidents include reckless driving, over speeding, poor road infrastructure etc.. The advancement of wireless communication technologies has paved the way for the development of various monitoring and controlling systems for vehicles. The nRF24L01 module is a low-power wireless transceiver module that operates in the 2.4GHz frequency band. It is capable of providing high-speed data transmission with low power consumption about 100meters. This project is designed to provide real-time monitoring of various parameters like distance from other vehicle, tiltness of vehicle and controlling the brightness of the headlight automatically. The system uses a Arduino UNO as a microcontroller at both ends to control and process the data. The microcontroller at transmitter end side is responsible for collecting of various data form sensors and transmitting wirelessly to the receiver side using nRF24L01 module. The microcontroller at receiver end side will process that data and sends some control signals to the user through alerting equipment and display unit.

2.LITERATURE SURVEY

S.NO	JOURNAL WITH YEAR	TITLE	AUTHOR	LEARNING OUTCOMES
1.	IEEE Transaction(2018)	Proposed framework for V2V communication using Li-Fi technology	Shivaji Kulkarni	In this paper, we employ Light Fidelity (Li-Fi) for data communication among vehicles. Li-Fi falls under the category of Visible Light Communication (VLC). Li-Fi involves the use of

				visible light spectrum as a medium of communication
2.	IEEE Transaction(2017)	Vehicle to vehicle communication for crash avoidance system	N.G. Ghatwai	Aiming at providing reliable wireless communications for vehicular networks the RF communication will serve as an underlying protocol for future inter-vehicular applications worldwide. This paper presents an implementation of a complete vehicle to vehicle communication, designed according to the specification.
3.	IEEE Transaction(2018)	Vehicle-to-Vehicle Communication Technology	Albert Demba	It focuses on countering the challenges of control systems with more emphasis on security. In this context, the technology poses security issues with interference. Thus an enhanced architectural solution is suggested that could help to guarantee system operation without interference and more physical security.
4.	IEEE Transaction(2020)	Vehicle to Vehicle Communication: Dedicated Short Range Communication and Safety Awareness	Yu. A. Vershinin	A new method to improve the security of the DSRC protocol has been developed and presented in this paper. The computer simulation results are included in this paper.

3.PROPOSED WORK

The system consists of two main ends: the transmission side end and receiving end side. The transmission side end consists of a Arduino uno, a set of sensors, and the nRF24l01 module. It is responsible for monitoring the vehicle's performance. The receiving end side consists of Arduino uno, buzzer for alerting system, and a display unit. Which receives data from transmission side and based on the type of data it controls the vehicle parameters. This system is also designed for controlling the brightness of the headlight automatically. The system was implemented using the Arduino

microcontroller platform. The nRF24l01 module was connected to the microcontroller using the SPI interface. The sensors were connected to the microcontroller using the digital input pins. The system was tested and showed good performance. The transmission side was able to accurately measure the various parameters and transmit the data to the receiving end.

TRANSMITTER SIDE

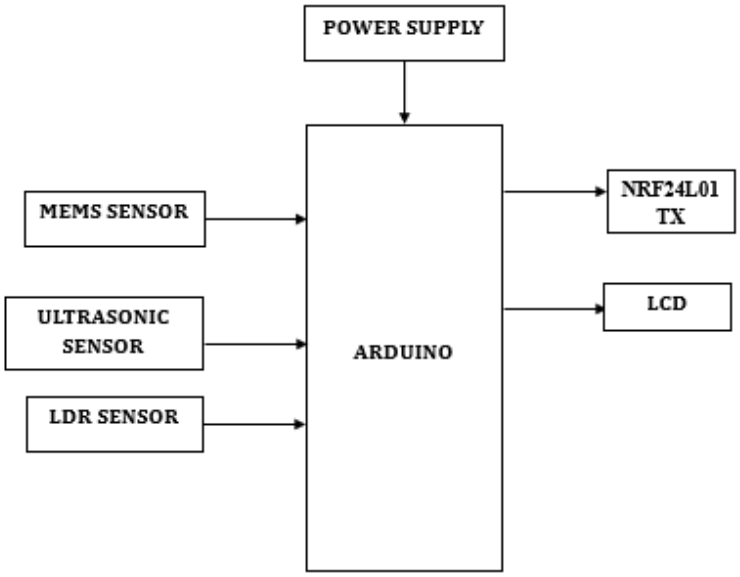

Fig 1:BlockDaigram

RECEIVER

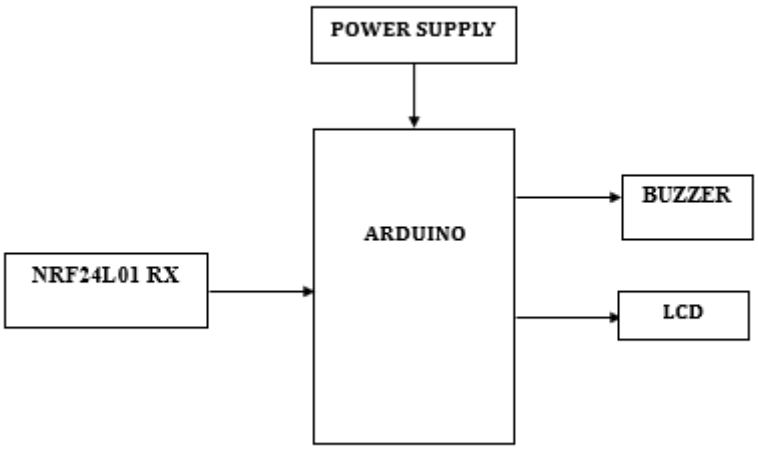

Fig 2:Block Diagram

4.RESULTS AND DISCUSSION

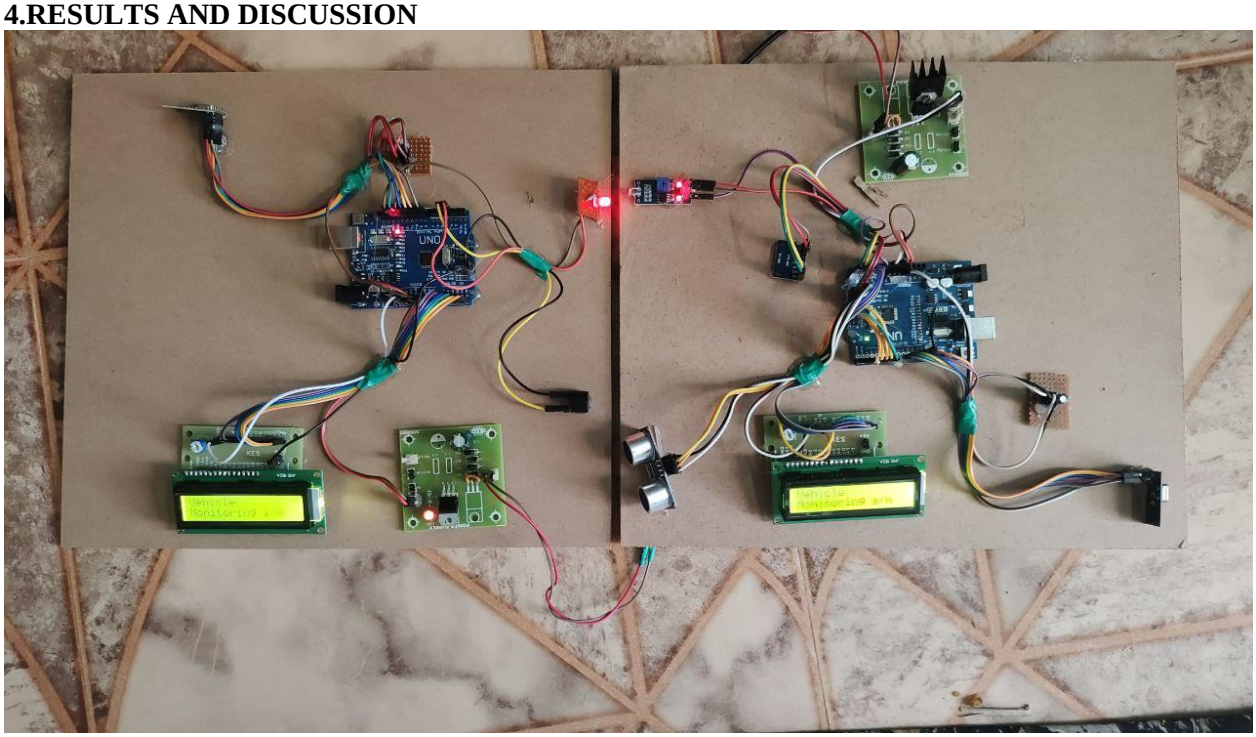

Fig 3:

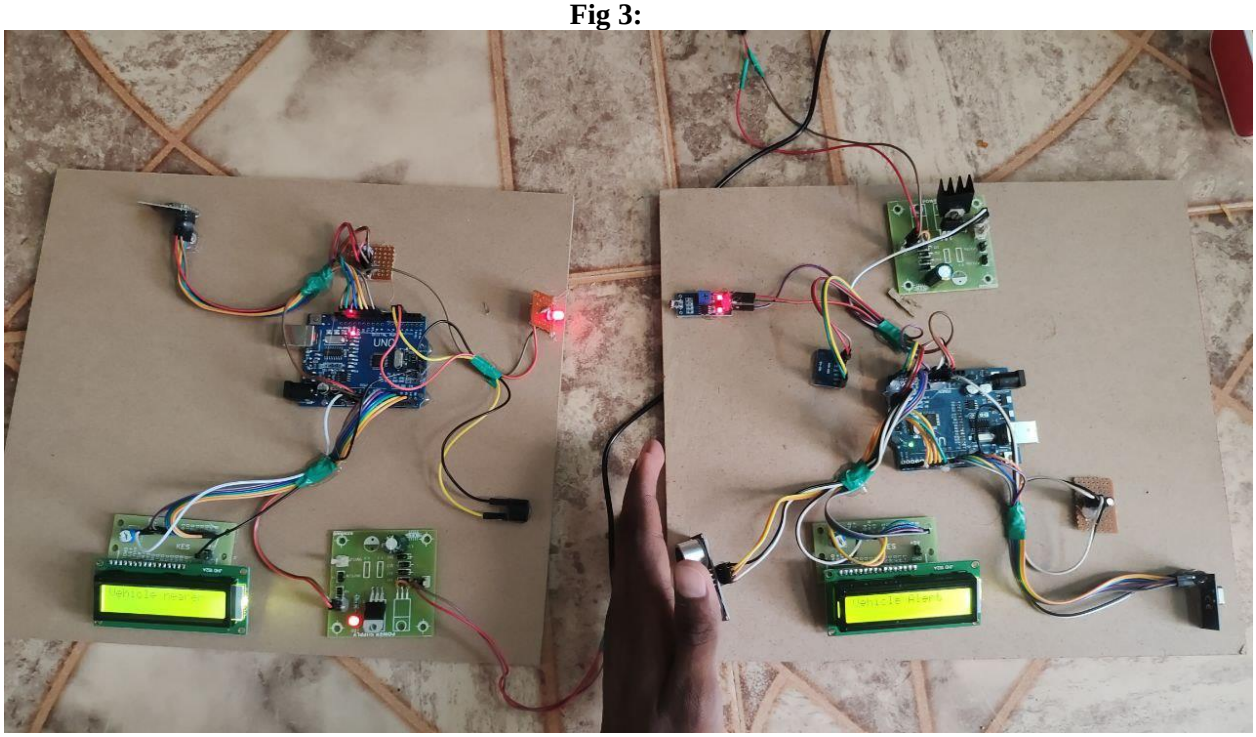

Fig 4:

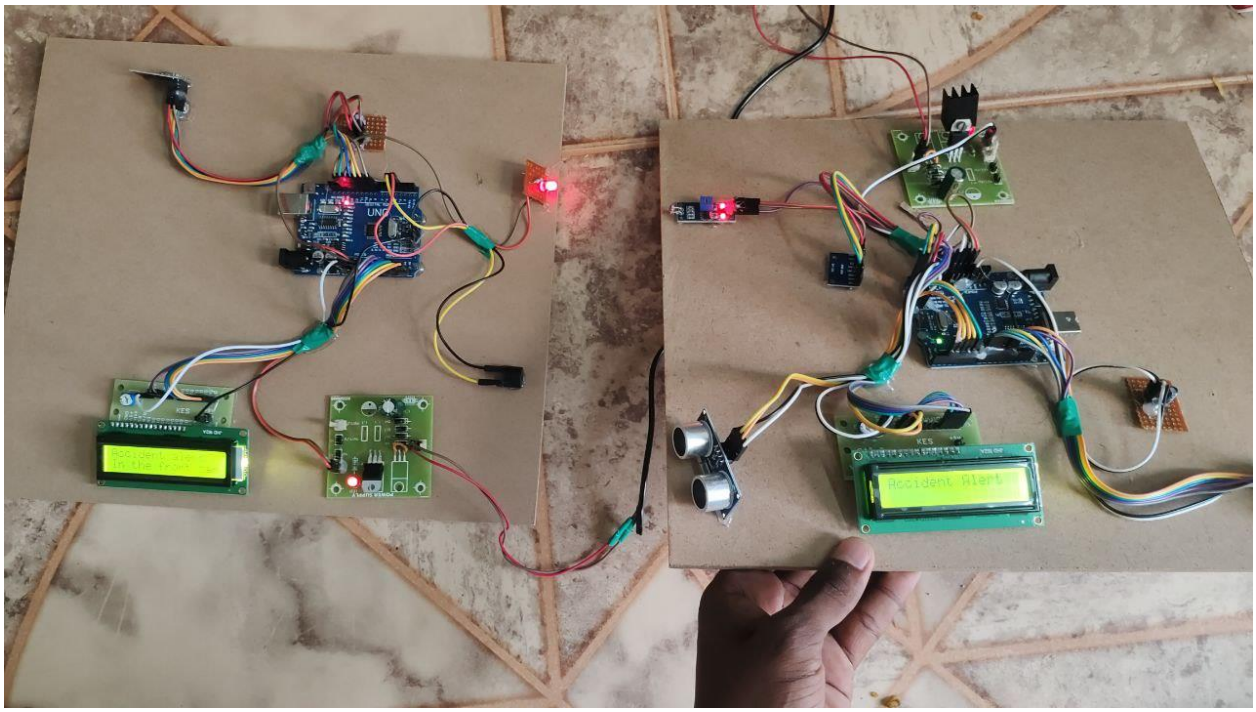

Fig 5:

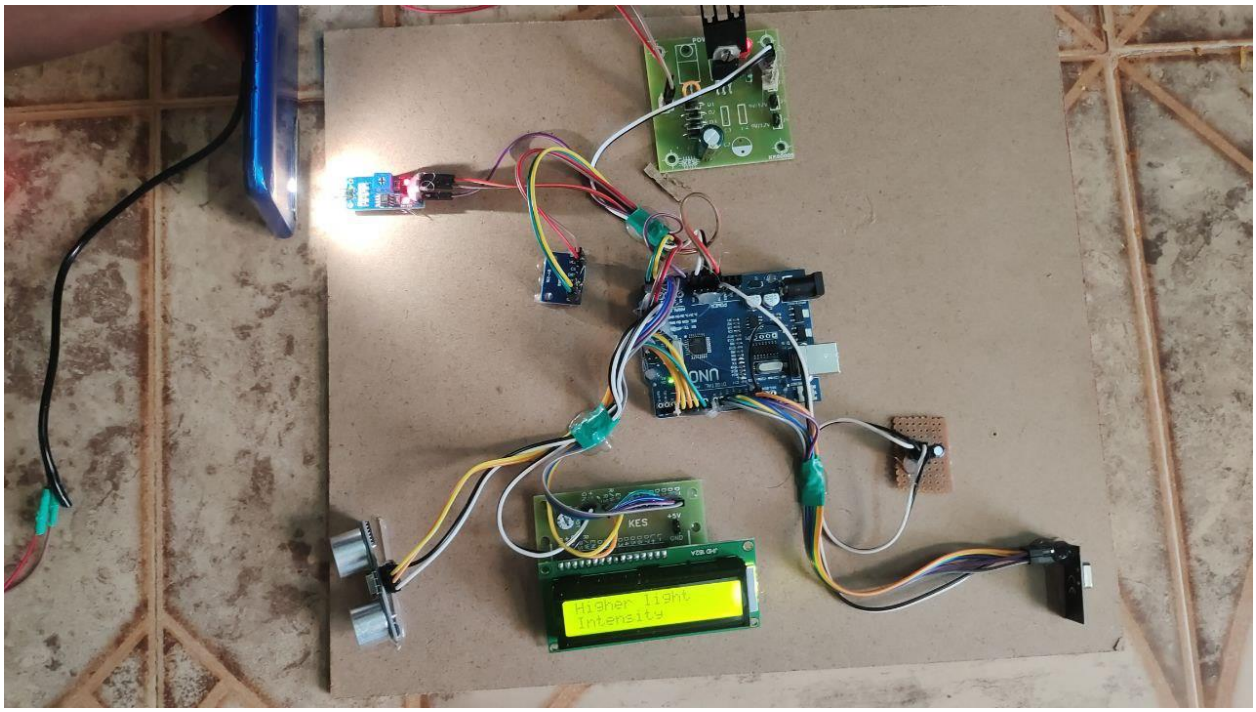

Fig 6:

5.CONCLUSION

The use of vehicle monitoring and controlling system becoming increasingly popular. The use of the nRF24l01 module in such systems has many advantages, including low power consumption, high-speed data transfer, and low cost. The system provides accurate and reliable monitoring of the vehicle's performance, and also ensures that the driver has optimal visibility while driving. The development of such systems is a step towards achieving a safer and more efficient driving

experience. The system can be further enhanced by incorporating additional sensors and functionalities to provide a more comprehensive and holistic monitoring system.

REFERENCES

1) N.G. Ghatwai; V.K. Harpale; Mangesh Kale, "Vehicle to vehicle communication for crash avoidance system," 2016 International Conference on Computing Communication Control and automation (ICCUBEA).
2) Javier Ibanez-Guzman; Stephanie Lefevre; Abdelkader Mokkadem; Sylvain Rodhaim, "Vehicle to vehicle communications applied to road intersection safety, field results," 13th International IEEE Conference on Intelligent Transportation Systems.
3) Shivaji Kulkarni; AmoghDarekar; SuhasShirol, "Proposed framework for V2V communication using Li-Fi technology," 2017 International Conference on Circuits, Controls, and Communications (CCUBE).