IJIRCCE

e-ISSN: 2320-9801 | p-ISSN: 2320-9798

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

Volume 10, Issue 6, June 2022

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

Impact Factor: 8.165

International Journal of Innovative Research in Computer and Communication Engineering

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.165 |

|| Volume 10, Issue 6, June 2022 ||

| DOI: 10.15680/IJIRCCE.2022.1006126 |

Vehicle Pollution Monitoring Using IoT

Dr.Jayashri .M .Rudagi[1], Umera Q Bisti[2] , Abdulrazzaq Allan [2], TriveniTalwar[2], Fatima Bagewadi[2]

Professor/HOD, Dept. of ECE, S.G.B.I.T, India

UG Students, Dept. of ECE., S.G. Balekundri Institute of Technology, Belagavi, India

ABSTRACT: The environment is a major problem these days. Bikes, Cars, buses, and trucks emit air pollutants that can adversely affect human health and cause respiratory problems. Transportation suffers from air pollution that affects more than 50 percent. At present, a vehicle clearance is assessed with the help of pollution control boards. Which are built in some cities only when a Fitness Certificate (FC) is obtained from the RTO office. In private cars, health certificates are valid for 15 years and every 5 years thereafter. In the case of Transport Vehicles, a competency certificate is issued to a new vehicle for 2 years and is extended each year. Under this process, we will not be able to detect carbon emissions caused by the car being serviced up to FC. Using IoT Technology, the project aims to monitor and warn of air pollution on the roads and to track vehicles that cause excessive product emissions by connecting the Global System of Mobile Communications Network to the cloud. This also focuses on avoiding the dangers posed by the carbon monoxide emitted by a car using the MQ7 Gas sensor

KEYWORDS: Carbon monoxide, IoT, RTO Office, Vehicle exhaust, MQ7 gas sensor.

I. INTRODUCTION

Vehicle pollution includes particles of harmful fumes and other substances going into the area by vehicles and any vehicles. These substances are known as pollutants, they have several adverse effects on human health and the ecosystem. [1] Air pollution from urban vehicles, especially in big cities and metropolitan areas, is now a bigger problem than in rural areas. Among the major pollutants released from portable sources are some of the life-threatening emissions of carbon monoxide (CO), hydrocarbons (HC) and other volatile compounds (VOCs), sulphur oxides (SOx), and nitrogen oxides. (NOx), a particle matter that combines dust and smoke, and lead compounds. Contaminants from cars can affect more than just your lungs. Indeed, these pollutants pose a serious health risk to all stages of life, and they can even cause death [2]. However, most air pollution is not natural. It is emitted from the burning of fossil fuels — coal, oil, and natural gas. When fuel is burned to power cars and trucks, it produces carbon monoxide, a colorless, odorless gas. Gas is harmful to high concentrations, or values. City travel produces more concentrated carbon monoxide. Automotive and industry produce some of the most common pollutants, including nitrogen. Incomplete combustion of a car engine results in the release of various gases which contributes to the increase in pollution and has a detrimental effect on the environment.[3,4]

Discovery of these gases is an important task and this is an important factor to control so here we come up with the idea of reducing emissions from cars. As a solution to this, we aim to create an automated control system to control the level of vehicle pollution. A pollution detector is used to extract a percentage of the carbon emitted by a car due to the burning of petrol in it. A smoke detector has been installed at the end of the car exhaust system where smoke is emitted from the surrounding area. The pollution detector detects carbon monoxide and gives it control to check the percentage of carbon content in automotive smoke. The controller, therefore, checks the carbon percentage and when it exceeds the threshold level the system is activated and the engine comes to a neutral state and the information is sent to the RTO office via WI-FI[5.6].

II.RELATED WORK

[1] "Smart sensors for Air Quality Monitoring Applications" gives information about the implementation of a measuring system for air quality monitoring. It provides extended capabilities for air quality monitoring for indoor and outdoor conditions. It also provides good accuracy of a gas concentration measurement by using neural networks to compensate for the temperature and humidity influences. [2] "An Intelligent Networking System for Air Quality Monitoring Apps " contains the concentration of major air pollutant gas using semiconductor sensors. The sensors were calibrated Using the standard static chamber method and hence the instrument can be used in a real environment to

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.165 |

|| Volume 10, Issue 6, June 2022 ||

| DOI: 10.15680/IJIRCCE.2022.1006126 |

measure the ambient air pollution levels. [3]"An Environmental Air Pollution Monitoring System" has information on a wireless distributed air pollution monitoring system and data available on the internet through a Google map interface. The Data shows the pollutant levels and their conformance to local air quality standards. It is worth mentioning that much more work is required to commercialize the system.

III.PROPOSED METHODOLOGY

As shown in the illustrative diagram, below is the system consisting of the development of a Vehicle Pollution Monitoring System using IoT.

1. **Power supply unit:**
- 230V AC Mains
- Transformer
- Bridge rectifier(diodes)
- Capacitor
- Voltage regulator

2. **Pollution Sensor:**

MQ-7 is a pollution sensor and is used to sense the carbon monoxide content from the emission of the vehicle caused due to the combustion of fuel in it.

3. **Relay:**

A relay is an electrically operated switch. We use four relays for ON/OFF, Ignition of the vehicle and another one for the buzzer. SPDT (Single Pole Double Throw) is a common terminal that connects either of two others including two for coil and has five terminals in total.

4. **Relay Driver:**

It is an electromagnetic switch that will be used to drive the relay to make the signal strong. It is used whenever we want to use a low voltage circuit to switch a light bulb on and off and is connected to a 220v mains supply.ULN2003 IC is used as a relay driver.

5. **Light Emitting Diode (LED):**

It is a semiconductor light source. LEDs are used as indicator lamps in many devices. It is highly efficient and has low radiated heat.

6. **PIC Compiler:**

Peripheral Interface Controller is not much different from the C program. PIC compiler is software used where the machine language code is written and complied. After compilation, the machine source code is converted into hex code which is to be dumped into the microcontroller for further processing.PIC compiler also supports C language code.

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.165 |

|| Volume 10, Issue 6, June 2022 ||

| DOI: 10.15680/IJIRCCE.2022.1006126 |

Flow chart of proposed system:

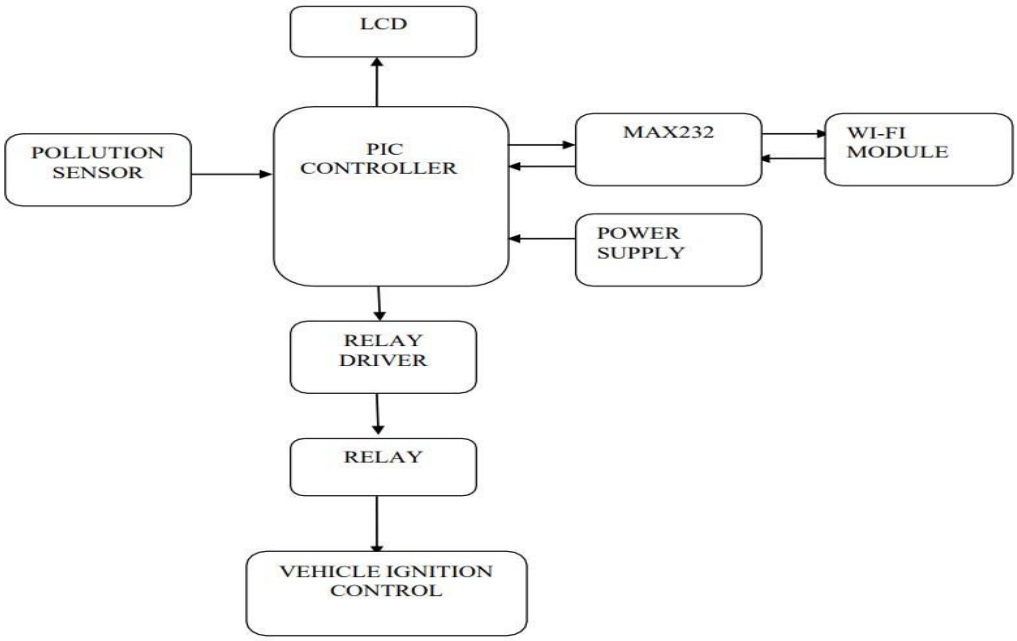


Fig1:Block diagram of proposed methodology

This system is constructed using the PIC controller, WI-FI Modem, and sensors. The PIC controller is programmed to do mainly these functions comparison and triggering. It takes input from the pollution sensors and other pre-defined threshold values. When the output of the pollution sensor is more than the threshold value the PIC controller triggers and informs to the relay to trip. The single pole double throw relay is used. The relay driver ULN 2003 IC is used to drive the relay and to make the signals strong. Similarly, the vehicle number is sent to the respective office. The RTO office gives the notice to the person through a buzzer and relays 1. The WI-FI module is a wireless module that is used for communication purposes, which is interfaced with a controller by MAX 232. The MAX 232 is a dual transmitter/dual receiver that is typically used to convert RX, TX, CTS, and RTS signals. The alert is given to the person though a buzzer and LED is also used for indication purposes. The notice is given 3 times to the person. If the person ignores the notice given by the RTO office then the RTO office makes the vehicle to in the neutral state. The vehicle comes to neutral state by ignition control unit. Then the person should go to the RTO office then he should clear the vehicle issue. Then the RTO will recover the state of the vehicle. **Hardware Required:**

1. Power Supply unit
2. Pollution sensor
3. Relay
4. Relay Driver
5. LED
6. Express PCB
7. Vehicle Ignition unit
8. Buzzer
9. Limit Switch

Software Required:

1. PIC Controller
2. Embedded C programming 3. WI-FI Modem.

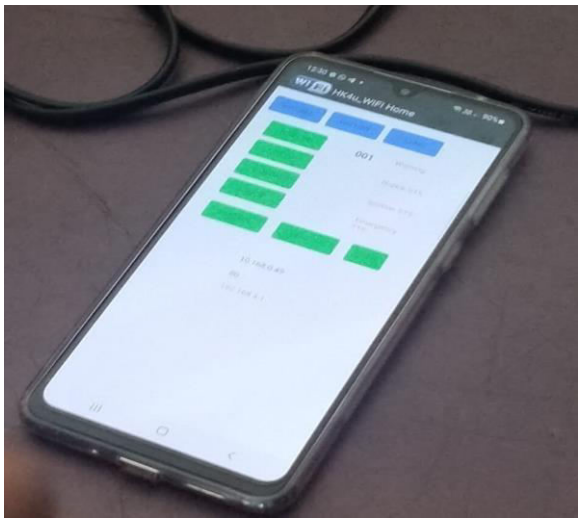
| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.165 |

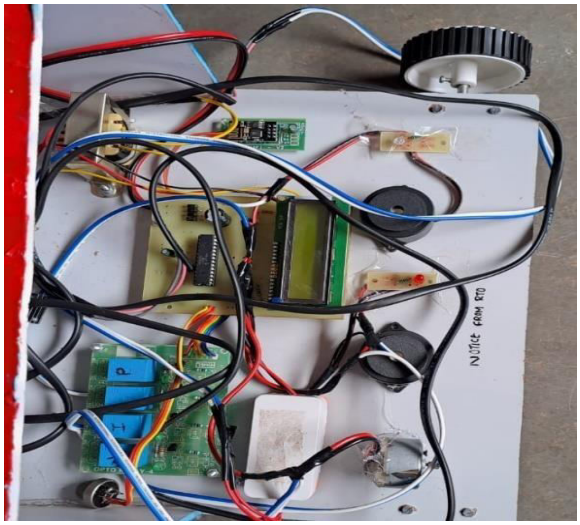
|| Volume 10, Issue 6, June 2022 ||

| DOI: 10.15680/IJIRCCE.2022.1006126 |

IV. RESULTS AND DISCUSSION

Testing has been carried out on a two-wheeler for gas emissions, the target set was 50%, when the emission was above 50%, it will be indicated to the owner by displaying on an LCD display. Then the same thing will be conveyed to the RTO officer using IoT. Once the emission is above 50% and if the owner does not rectify it, then RTO officer will lock the ignition system using IoT, only when the pollution level is below 50%, Then RTO officer unlocks the ignition system.





V. CONCLUSION

Reducing the air pollution in the vehicle is important as it affects human health. So our project aims to identify the level of pollution and sends the information to the vehicle owner and RTO officer. Only after reducing the pollution level, the vehicle can be started, otherwise, it will remain locked, once locked, unlocking will be done only by the RTO officer

REFERENCES

1. Priyadarshini J. Patil, Revathi. M "A Survey on Intelligent System For Vehicle Emission Monitoring ", May 2018 IJETTD(International Journal Of Engineering Trends and Technology).
2. Arunkumar, K. Ajaykanth "Smart Air Pollution Detection and Monitoring Using IoT" , International Journal Of Pure And Applied Mathematics 2014.
3. Prof. Vishal V. Pande, Rupesh A. Kale "Online Vehicle Pollutants Monitoring System using GSM "April 2015, IJAREEIE (International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering). [4] JagadishNayak "Round The Clock Vehicle Emission Monitoring Using IoT for Smart Cities "2018, IJACSA (International Journal Of Advanced Computer Science and Application).
4. Prof.Ghewari M.U, TejaswiniMahamuni "Vehicular Pollution Monitoring Using IoT "Feb 2018, IRJET(International Research Journal Of Engineering and Technology).
5. AbhinayaBalasundaram, AiswaryaUdayakumar "IoT Based Vehicle-emission Monitoring System "March 2017, IJIRST (International Journal For Innovative Research in Science and Technology).

INNO SPACE
SJIF Scientific Journal Impact Factor

Impact Factor: 8.165

doi cross ref

ISSN INTERNATIONAL STANDARD SERIAL NUMBER INDIA

निस्केयर NISCAIR

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

9940 572 462 6381 907 438 ijircce@gmail.com

www.ijircce.com

Scan to save the contact details