

Iot Based Vehicle Pollution Detection

Dr.P.Gnanasundari¹, Metha², Shruthi³, Sethu Madavan⁴

Head of the Department, UG Students, SNS College of Engineering, Department of Electronics and Communication Engineering, Coimbatore, Tamil Nadu, India,

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ABSTRACT— Pollution is an ever-succoring environmental issue in this modern world. Automobile emission plays the vital role as the contributor to pollution, this system can be considered to be controlled. This system focuses on detecting a vehicular gas levels and monitoring system based on the Internet of Things (IoT). The amount of gas which is emitted by the cars can be measured with the help of sensors that are interfaced with the PIC Microcontroller(16f877a). The level of Carbon dioxide more than 10% is considered to be a toxic and if the carbon monoxide reaches 150 to 200ppm is considered to be harmful. If the value of the emitted gas goes beyond the threshold value set in the program then automatically an alert message as a warning will be sent to the vehicle owner two or three times and if they are reluctant to correct it, the message will be forwarded to the authorized person. These data are finally stored in a cloud for future investigation. The main objective is to develop an innovative and pollution free system, thereby proposing a solution for environmental pollution.

Keywords— Global System for Module(GSM), Internet of Things(IOT)

I.INTRODUCTION

Air pollution is singlehandedly accountable for up to 30,000 premature deaths for every year as per earlier report. In 2013, transportation contributed over half of the carbon-monoxide and nitrogen elemental oxides. Pollution from vehicles contribute to over 1.2million death in our country in 2017. As per 2019 report air pollution kills an average of 8.5 out of every 10,000 children in India before they turn five. Every year, more people globally died from air pollution related diseases than from road traffic injuries or health issues. In India, the most polluted region is New Delhi with over 1.5 million air pollution related death. Every year 6,21,138 people died due to air pollution in which approximately 40% people are died due to strop and heart disease. This project is mainly interested in reducing pollution mainly from the vehicles using IOT.

The advent of the IoT and cloud computing brings a new approach, sanctioning to gather, transfer, store and share data on the logistics flow for higher cooperation and ability among devices. Internet of things is an evolution in computer technology and communication that aims to connect objects together via the Internet. Objects mean everything that surrounded by us and can communicate. An Internet of things ecosystem consists of web-enabled smart devices that use embedded systems, like processors, sensors and communication hardware, to collect the data, send and act on information that they acquire from their environments.

II. LITERATURE SURVEY

The major source of air pollution in urban is due to vehicles. Transportation is main source for generating carbon monoxide that contributes 72% of total pollution in the urban places like Calcutta, Mumbai and Delhi. In the above project "Development of IOT based vehicular pollution Monitoring System" they have used MQ-2 gas sensor which is suitable for detecting carbon dioxide and Sulphur oxides concentration in air. They have used RFID technology which increases the project cost. IOT Based Air Pollution Monitoring System. As earlier mentioned, carbon monoxide contributes 72% of total pollution in metropolitan cities. In above project "IOT Based Air Pollution Monitoring System" they have used MQ-135 gas sensor which is suitable for detecting other gases rather than Carbon-Monoxide-gas. In our project, we have used MQ-7 Carbon-monoxide gas sensor which gives very high precise gas value in detecting Carbon Monoxide gas. It also detect other harmful gases which gives additional advantage to our project.

We have found a basic idea with the literature from the paper "IOT based smart system for Controlling Carbon-di-oxide Emission". They observe and watch the vehicle pollution, forest fire and industrial pollution level. As they have used raspberry pi for better efficiency, we use Microcontroller for cost efficient.

In this paper “IoT Enabled Carbon-dioxide and Carbon-monoxide Monitoring and Control for Vehicles to Reduce the emission” they are monitoring both carbon-dioxide and carbon-monoxide for every 15 to 20 day using an Arduino. In this project we are monitoring the value carbon-dioxide emission only from the vehicle. It is enough to reduce the pollution level by servicing the vehicle.

In this paper “A monitoring system detecting emission of gas from the vehicles and tracking using GPS & GSM” they are monitor the emission level and alert the user by buzzer. The alerting sound will distract the vehicle user. So that we try to send notification via message to vehicle users by using GSM.

In this paper “IoT Based Vehicle Emission Monitoring and Alerting System” they have used Pic microcontroller to detect the pollution level. The drawback while we are using Pic microcontroller, we have to use pic kit for connecting to pc this may increase the components and cost .

In this paper “IoT Based Vehicle Emission Monitoring System” they are using Node MCU to control the entire circuit and it displays the present values in the LCD. By displaying the present value of gas is one of the basic ideas. So that we are implementing the this idea in our project.

III. EXISTING SYSTEM

As we know that the pollution an ever-sustaining environmental issue in this modern world, there are many measures to control the pollution. One among those in the existing projects, they have used the gas sensors to detect the pollution or the smoke from the vehicles. Such gas sensor generally detects the smoke and brings the notification to the user.

IV. PROPOSED SYSTEM

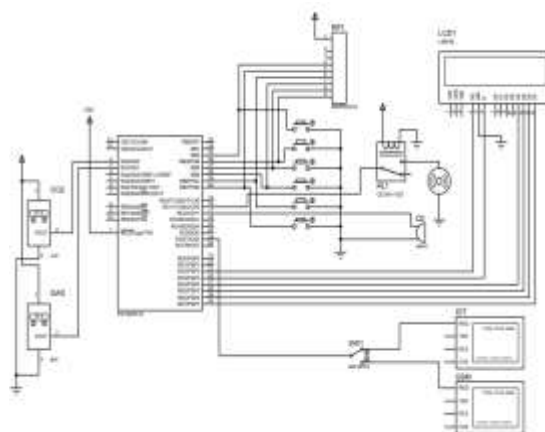
In this project, we have used both the carbon-dioxide sensor ant the gas sensor to detect the amount of smoke from the vehicle. The usage of PIC(16f877a) and the transformer plays the major role in this project, in which we have implemented. The carbon-dioxide sensor is used to measure the amount of carbon-dioxide which is considered to be more toxic. When the carbon-dioxide reaches the at most toxic level (more than 10%), it brings alerting notification. The gas sensor is used to detect other gases such as carbon-monoxide (150 to 200 ppm) which is considered to be as a toxic. If the sensed value goes beyond the

threshold value set in the program, then automatically an alerting message as a warning will be sent to the vehicle owner two or three times to the user and if they did not take any measures regarding high release of the gas from the particular vehicle, the message will be forwarded to the authorities. The third party can notify this through the blynk app and the message by using GSM. These data will be stored in a cloud for future analysis.

V. WORKING

In this system mq7 sensors placed at the vehicle exhaust, monitor the hydrocarbon, carbon monoxide and nitrogen oxide value emitted from the exhaust. The analog value received from the sensors is processed by the controller with Wi-Fi connection to the internet. The value obtained from the sensors is continuously updated to Blynk app. When the value obtained from the sensor reaches the threshold limit, the controller will alert to the user by notification(SMS). IOT helps the system to update the value to the Blynk app. The PIC Microcontroller connected to the sensors helps to update the value obtained from the sensors to Blynk app when Wi-Fi is connected to the internet. The percentage of the gas emission is keep on updated to vehicle owners and also the cloud storage. when the value reaches the threshold limit set in the Blynk app, it will indicate it to the vehicle owner by sending alert message.

VI. SCHEMATIC DIAGRAM

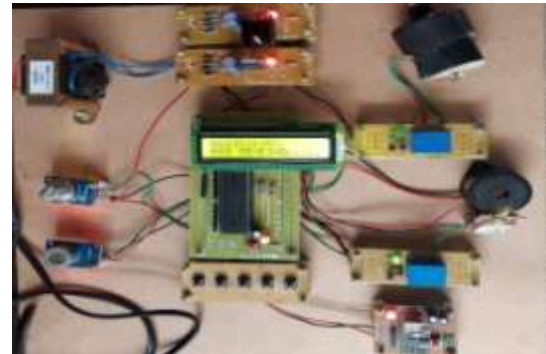


VII. SOFTWARE

[1] MATLAB:Used to analyze the air pollution detection data collected by Blynk app.
[2]BLYNK APP: The data received is analyzed and employed on data visualization for the end-users to receive information updates of the air quality condition based on the notification alerts.

VIII.HARDWARE

- [1]PowerSupplyUnit-32 V 1amps step down transformer to convert ac to dc
- [2]PICMicrocontroller(Pic16f877a)- It has wide operating voltage range:2.5V to 5.5 V. It has operating speed of 20 MHZ. It has Brown-out detection circuitry for Brown-out Reset(BOR).
- [3]LCD Display- It displays the level of Carbon-di-oxide and toxic gases measured by sensors.
- [4]Gas Sensor-The sensor MQ135 is used here to detect or measure the toxic gases emitted by the vehicle.
- [5]Co2 Sensor- The sensor MG811 is used here to sense the value of carbon-di-oxide level in the atmosphere released by the vehicles.
- [6]Relay- The relay of DC 24V 5amps is used in the number of two for operating motor and to activate GSM and ESP8266 Wi-Fi module.
- [7]Motor – The DC motor is used here to replace the vehicle’s motor
- [8]GSM Module – The GSM used here is to detect the location of the vehicle and also helps in sending the message to the owner of the vehicle.
- [9]Keypad- The keypad is used to enter the number of the user and also to initiate the operation of the circuit,
- [10]Alarm- Here alarm is used for the reason to give an alert to the user by an sound of an buzzer.

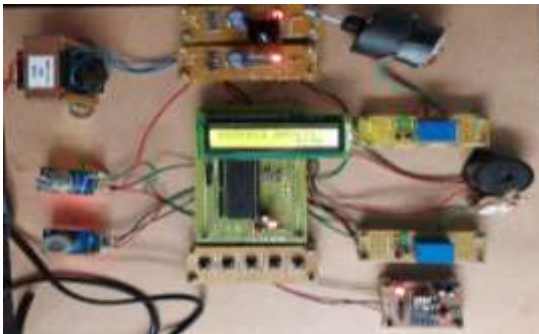


This figure represents the notification message sending to the user

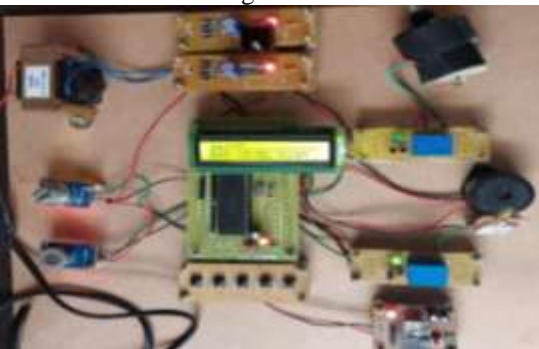


This figure shows data represented in Blynk app

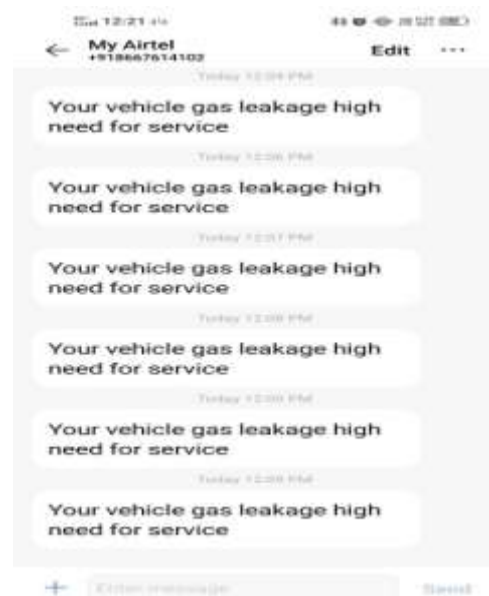
IX.EXPIREMENTAL RESULTS



This results indicates the level of carbon-di-oxide and carbon-momoxide gas



This figure indicates the initializing high gas level



This figure represents the notification top the user

X.CONCLUSION

By referring to many journals and analyzing many projects based on vehicle pollution detection, Pollution is an ever-sustaining environmental issue in today's world. Automobile emission being the key contributor to air pollution, this method will be considered as a bearing measure. This majorly focusses on detecting a vehicular pollution and monitoring the system based on the Internet of Things (IoT). The level of gas pollution emitted by the vehicles can be measured with the help of carbon-di-oxide and carbon-monoxide sensor interfaced to Node MCU. If the gas value goes beyond the threshold level set in the program then automatically an alerting message as a warning will be sent to the vehicle user for two or three times and if there is no measures taken in order to reduce or correct it, the message will be directed to the authorities. These data are finally collected and stored in a cloud (Blynk app) for future analysis. The main objective is to develop an innovative and time-saving system, thereby suggesting a resolution for environmental problems.

XI.FUTURE SCOPE

The suggested model accounts for carbon dioxide outflow. In any event, dangerous gases such as carbon monoxide, CO₂, methane, NO, and the others pollute the atmosphere. The model will be used to monitor the gases that are causing harm to our precious climate. This MQ2 sensor is now being used to detect CO₂ outflow. This sensor can resist temperatures of up to 70 degrees Fahrenheit. The total structure may be inserted into the vehicle's exhaust. The model may be utilized not only in automobiles, but also in a variety of industries to assess hazardous chemicals and reduce air pollution produced by these gases.

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