

Standardizing and Monitoring Pollution with Iot

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Date of Submission: 25-09-2020

Date of Acceptance: 05-10-2020

ABSTRACT - Pollution is one of the most significant threats in the world today. The consequences in various states in India are already noticeable in the form of various natural calamities. Technical development to control emissions is therefore strongly required. Contamination can be monitored and recorded using sensors, microcontrollers and communications. Our mission is the emission free society solution through the application of IoT and Embedded Technology. Vehicles commonly emit emissions. But when it is released outside limits it poses very severe health risks. In 2013, more than half of the carbon monoxide and nitrogen oxide added to the atmosphere through transportation. The toxins in the air and the poor air quality improves illnesses such as asthma and bronchitis. The dangerous contaminants have also been related to birth defects, cancer and other serious diseases according to the World Health Organization (WHO). Research estimates that the emissions from vehicle tailpipe are related to about 3,61,000 premature deaths. This clearly showed that the consequences of the emissions produced by vehicles are a matter of no laughing. Our paper is not only about pollution control but about covering it as well. We have a sensing device to monitor and track the emissions with the aid of a carbon sensor and an immediate action device. We use both Embedded and IoT technologies to have a coverage around the world. **Key Words:** IoT (Internet Of Things), WHO(World Health Organization), Dangerous Contaminants, Birth Defects, Immediate Action.

I. INTRODUCTION

India is a country which has an unprecedented rate of population growth. Nearly every person in a family has their own car, which has resulted in rise in number of vehicles in the country leading to air pollution. The vehicle's primary emissions are carbon monoxide and hydrocarbon. Such pollutants along with certain microscopic particles lead to problems with breathing and heart along with an elevated cancer risk.

In environmental matters, pollution is easily visible, in addition to safety issues. Air pollution is one of the biggest problems affecting the climate. The greenhouse gases are supplied by air pollution which affects the ozone layer. Air pollution is harmful not only to the atmosphere but to all other living things on earth. Inhaled air contaminants have significant impacts on the health of living beings affecting the lungs and respiratory system. The main sources of air pollution are the cars and factories. Every vehicle would certainly have emissions but the issue arises because of inadequate vehicle maintenance.

1.1 Objectives

The main objectives of our project is to reduce pollution and illegal usage of vehicles and to impose equal penalty to everyone in the country without any discrimination.

1.2 Solution of the Problem

If excess pollution is detected the vehicle stops by itself and this report is sent to RTO. Now if RTO sees the same vehicle generating heavy pollution and updating complaint means they need to take some action. This may be in the form of cancelation of the license or the warrant. Yet they don't know who uses the car and they won't be able to revoke the license for a few months. So they'll come to the RTO office and pay fine to unlock the car. Then another explanation is that if vehicle is stolen, or used for any illegal work such as terrorism, kidnapping so owner will complain to RTO and RTO Can LOCK THE ENGINE. So police do not have to search and capture the vehicle.

II. LITERATURE SURVEY

[1] K. S. E. Phala et al. proposed an air quality monitoring system (AQMS) based on IEEE/ISO/IEC 21451 standards. In the development of AQMS, they have used the GSM wireless communication module. Their developed system is capable of real-time measurement of air polluted gases like CO₂, CO, NO₂

and SO₂. The AQMS uses many sensors to take measurements of the ambient air surrounding it and wirelessly transmits the data to the base station. A graphical user interface (GUI), which makes it easy for end users to interact with the system.

[2] Mahesh A. Rakhonde et al. proposed a system to detect accidents in real time and minimize the response time of medical help. Tire pressure is assessed for accident avoidance while node MCU is used to detect accidents. MQ7 is used in order to monitor the pollution. The proposed system is useful in reducing the vehicular accidents and pollution monitoring will help to know the environmental status.

[3] V. K. Mittal et al. proposed the design of a Pollution Monitoring Mobile System (PMMS) that can monitor vehicular pollution in real-time along with the information about the area being monitored. The pollution monitor uses an Arduino micro-controller board and a combination of different sensors and a Wi-Fi module. The combined data from the primary unit and the secondary unit is sent to the local server. The data from the local server can then be logged/stored on a cloud service for detailed analysis of the data. The initial performance evaluation results are encouraging. This system is a robust, flexible, easily deployable and an eco-friendly solution, in the domain of Internet of Things (IoT), to the ever concerning problem of pollution.

III. WORKING

The Vehicle is turned on and the silencer produces pollution as in all the vehicles. The vehicle works normally when the pollution rate is normal. Once when the vehicle starts to produce pollution more than the permissible limit, it is then sensed by a carbon sensor (MQ-5) which is a viscous sensor. Then the vehicle uses its IOT (Internet Of Things) device ESP8266 and uploads a message that is set as per our program, like “Vehicle No. PY 01 SM 1009’s Pollution Level has crossed the Threshold level! Take Immediate Action!” and then uploads it to the RTO/ Pollution Control Department. In turn they can turn off their engine after giving a warning note. When the engine is made off, the LCD display that is fit in the vehicle near the speedometer displays a message to the user like, “Vehicle is Not in proper Condition, kindly Service it! Engine will off in 2mins” and then turns the vehicle off. Even when the vehicle is made to start, this process is repeated and the engine is made off again. This switching off of engines will make the owners of the vehicles to service their mean of transport regularly. This in turn reduces the pollution amount in the air.

IV. COMPONENTS USED

- Arduino UNO
- ATmega 328P PU Microcontroller
- ESP8266
- MQ7 Sensor
- LCD Display
- Engine Ignitor
- Relay
- Voltage Regulator

V. BLOCK DIAGRAM

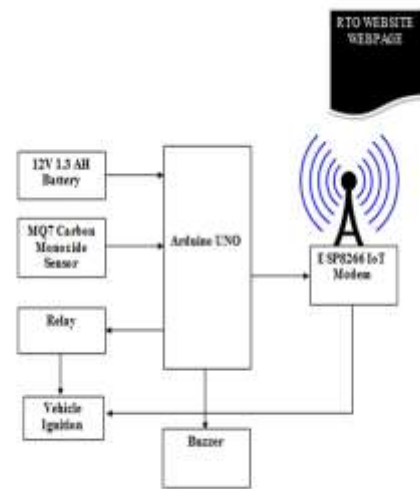


Fig 1- BLOCK DIAGRAM OF SYSTEM

VI. CIRCUIT DIAGRAMS

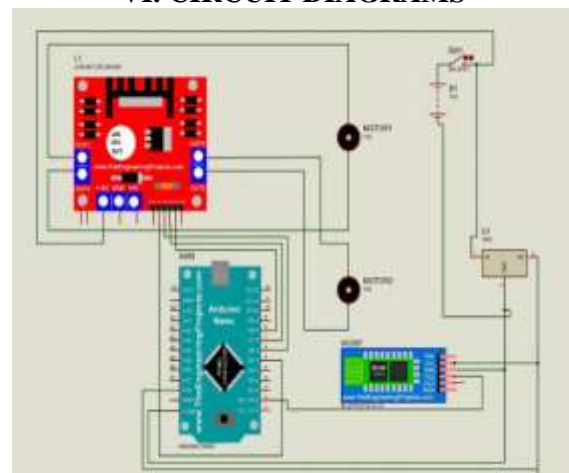


Fig 2- CIRCUIT DIAGRAM OF SENSING UNIT

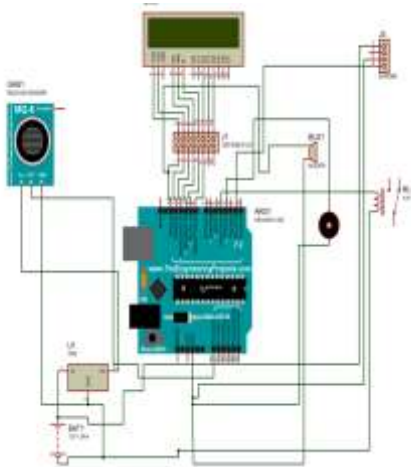


Fig 3- CIRCUIT DIAGRAM OF COMMUNICATION UNIT

The above circuit diagrams indicate the sensing and communication units of the system that are used to sense the pollution and report it respectively.

VII. SOFTWARES USED

- Arduino IDE
- Proteus



Fig 4- ARDUINO IDE

An Arduino IDE is the programming tool that is used in the system. It connects to Arduino hardware to communicate with them by uploading the program

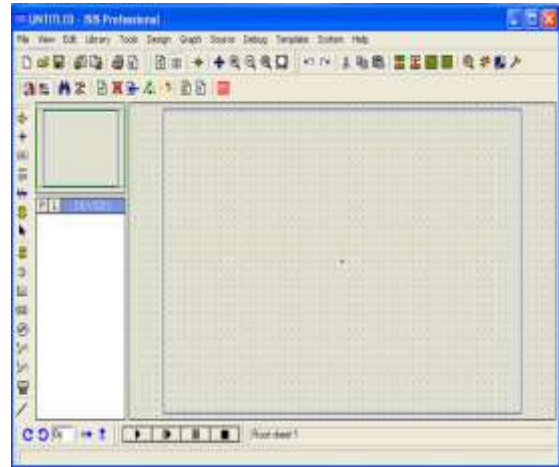


Fig 5- PROTEUS

A Proteus is a simulation tool with which the circuit diagrams are built and executed in PC itself.

VIII. WORKING MODEL



Fig 6- WORKING MODEL OF THE SYSTEM

IX. CONCLUSION

Thus the system is developed which mainly focuses on two operations. An embedded system is developed to detect and control pollution from the vehicles. Atmega 328 P micro controller, CO MQ7 sensor are used for detecting the pollutants. The system is tested in diverse environmental condition. So,

embedded system will be highly beneficial in curbing this problem. The second reason is that this system will be one of the greatest improvements in technology to keep the Environment free from vehicular emission and bring it to a halt if the Pollution level is more than the Standards mentioned by the Government. The system will not change the configuration of the engine by any means, and it is employed in the existing vehicles. As the system is designed with low cost and low power, yielding high accuracy, this can be extended to home, transport and industrial applications.

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