Inspecting pollution emit from vehicle & controlling speed of vehicle using IOT

D. Murugeswari [1] *, R. Malathi [1], D. Narmadha [1], K. Sireesha [1]

[1] *UG Student, Department of Information Technology, Panimalar Institute of Technology*
Corresponding author E-mail: deswari01@gmail.com

Abstract

At present the number of people using the vehicle is increased tremendously. Therefore the pollution such as air & noise emitted by the vehicle is also increases proportionally. 1] Air is polluted with hazardous gases emitted by motor vehicles. This polluted air is adversely affects the health of humans, animals, birds and the growth of trees. 2] Sometimes horn sound raised by the vehicles, near to the hospital, school and college zones makes unpleasure to the folks over there. 3] The drivers drive vehicles at high speed even in speed restricted areas without considering the safety of the public. To overcome the above stated problems this paper presents the way for controlling the air & noise pollution emitted by the vehicle by using the sensor & IoT Technologies and speed of the vehicle is also controlled in school, hospital and college zones to avoid accidents for some extent.

Keywords: *Air Pollution; Noise Pollution; Speed Limit; Sensor*

1. Introduction

Air pollution is one of the major environmental concerns of the urban Asian cities including Republic of India, where majority of the population exposed to poor air quality. Pollution has a vital role in damaging our earth. The fast industrialization, rapid urbanization, fast growth in population, tremendous increase in vehicles on roads and other activities of human beings. The main source of pollution in cities is due to motor vehicles. The raise in use of motor vehicles in cities results in increase in the emission of various toxins into air. In addition to human activities also affect the environment directly or indirectly. Common gaseous pollutants such as carbon monoxide, hydrocarbons and some other harmful gases produced by motor vehicle. It is necessary to watch air quality and it should be brought under control for a better future and healthy living for everyone. Here we propose a system to control an air pollution as well as noise pollution that emit from the motor vehicles. Most of the accidents are caused due to the over speed and speed crossing of the motor vehicles. Here To control and watch the speed of vehicle on public roads the respective government departments has to take necessary step. But it is impossible to watch the violation of vehicles on the public roads. So therefore we using RFID to control the speed of the vehicle automatically.

2. Proposed system

2.1. Controlling air pollution

When the Engine of the vehicle starts, the Driver Mechanism activates the smoke sensor. The purpose of the smoke sensor is used to measure the smoke coming out of the vehicle. When the vehicle emits smoke, the sensor measures amount of smoke released by the vehicle. The information about the amount of smoke emitted by each vehicle is sent to the RTO office server. when level of smoke crosses the threshold level, the alert message is automatically sent to the vehicle owner mobile for three times at the fixed interval of time. And for an instant notification buzzer connected to the vehicle starts alarming. If the vehicle continuously emits smoke after that three warnings, then the vehicle is stopped for a while. An IOT module is used to remotely access the status of the vehicle.

Methodology Behind Stopping The Vehicle

How A Engine Works:

Engine of the vehicle starts after the following four operations such as

1) Intake:

In the process of intake, intake valve opens, and the piston moves down. Due to this, it brings air and gas to engine.

Fig. 1: Intake Operation of Engine.

2) Compression

In this cycle the piston moves up and pushes the air and gas into upwards.
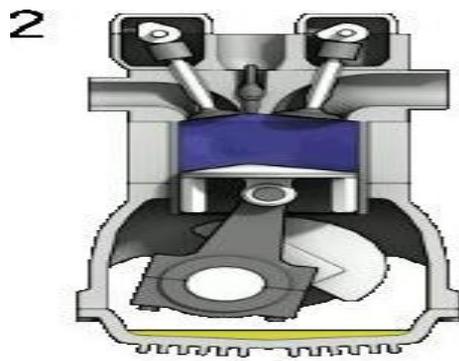
Fig. 2: Compression Operation of Engine.

3) Combustion

The spark plug creates a spark that ignites and explodes the gas . Due to large power of the explosion forces the piston to down.
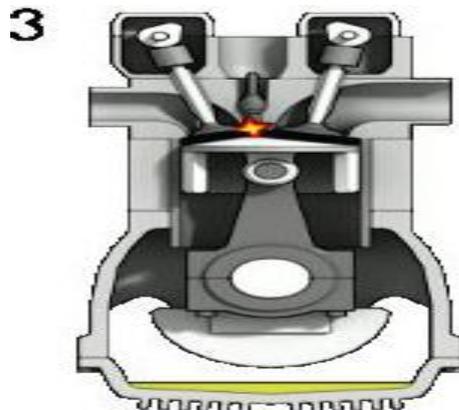

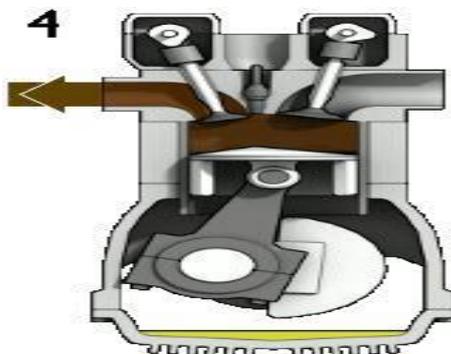**Fig. 3:** Combustion Operation of Engine.

4) Exhaust

Fig. 4: Exhaust Operation of Engine.

The exhaust valve opens to release waste gas created due to explosion

By this way the start of vehicle is done .To stop the vehicle temporary we are going to provide the delay in the beginning of step3 for a while(2 minutes) .
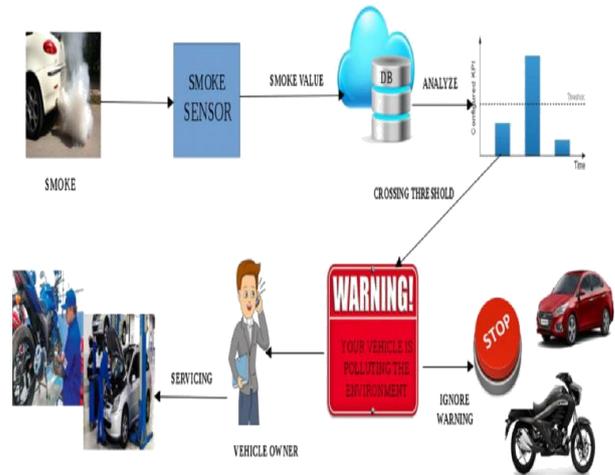
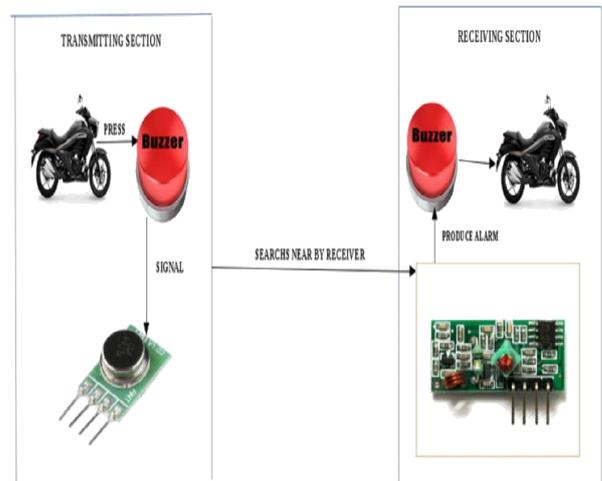**Fig. 5:** Architecture Diagram.

Fig. 6: Architecture Diagram.

For controlling air pollution for controlling noise pollution

2.2. Controlling noise pollution

When the engine of the vehicle starts ,as soon as the Driver Mechanism activates the components such as RF Transmitter and RF Receiver. The people who were waiting in the long traffic horn continuously which makes harm to other people near to them and the people horn in the places near to the hospital, school and college zone causes harm to patients and students. To avoid noise pollution instead of pressing the horn we makes use of buzzer. When we press the buzzer, RF transmitter fixed in the vehicle send a signal to the nearby RF Receiver of the other vehicles. The RF receiver which is placed in the nearby vehicles will sound the buzzer, when they receive the transmitted signal. Now the device which receives the signal starts sounding the buzzer. The sound only hear to that vehicle owner not to everybody.This results reduction of the noise pollution to some extent.

2.3. Controlling the speed of the vehicle

When the engine of the vehicle starts, the Driver Mechanism activates the RFID Reader of the vehicle. RFID tags are kept at the fixed interval of distance in speed limit zones. RFID emits a Electro Magnetic waves. When a vehicle enters the speed restricted zone the RFID reader installed in the vehicle observes the electromagnetic waves , which is emitted by the RFID. Electromagnetic waves simulates the code signal to the RFID reader. Now the reader has code which is transferred by the tag. This code indi-

cates the speed limit which is to maintained in that region. This code indicates the regulation that is to maintained therein region. Once the reader gets this code ,it is transferred to the management unit for process. once the microcontroller gets this signal it compares this with the information of the microcontroller. If the code matches with anybody of the code within the information. Then the microcontroller reduces the speed that is feasible therein zone. till therein zone we tend to cannot increase the speed of the vehicle.After crossing the zone vehicle ,moves with constant speed and if we'd like to extend the speed is feasible.

3. Methodology

The speed of the DC motor is directly proportional to the voltage applied to its terminals. If the voltage across motor terminal is varied then the speed of motor can be varied even. This project carries the above principle to control the speed of the motor by varying the duty cycle of the pulse applied to it .An RF transmitter acts as a remote control that has the plus point with capable range of 200 meters with antenna. The receiver decodes the command instructions before feed it into microcontroller to drive a DC motor via ICmotor driver.PWM (Pulse Width Modulation) is created at the output by the microcontroller .The average voltage flows through the motor will change depends on the duty cycle (ON pulses and OFF pulses), so the speed of the motor vehicle will change accordingly. The motor driver IC is linked to the microcontroller for receiving PWM signals and delivering desired output for speed control of the DC motor.
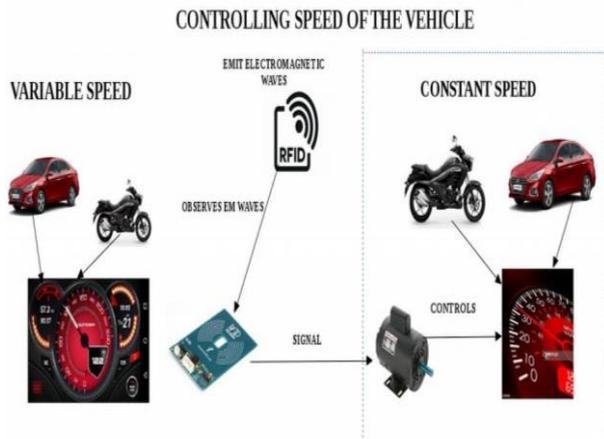

Fig. 7: Architecture Diagram for Speed Control.

4. Implementation

We have implemented a prototype for the proposed system. The prototype consists of Login, Updation and Analyze.
   a)   Login:
To allow only authorized user to access the data. We makes use of username and password. When the username and password matches with already stored information in the databse then user can access the informations.
   b)   Updation:
The vehicle which are crossing is the threshold limit , the details such as owner name, vehicle number, amount of pollution emitted by the vehicle is updated in the server,concentration of each gaseous emitted by the vehicle.. The warning message is sent to the vehicle owner mobile.
   c)   Analyze
The Vehicle which emits smoke continuously for three times is marked and stored separately in the database. This list will be sent to the appropriate areas and further actions are taken manually.

5. Monitoring section

Fig. 8: Personal Computer.

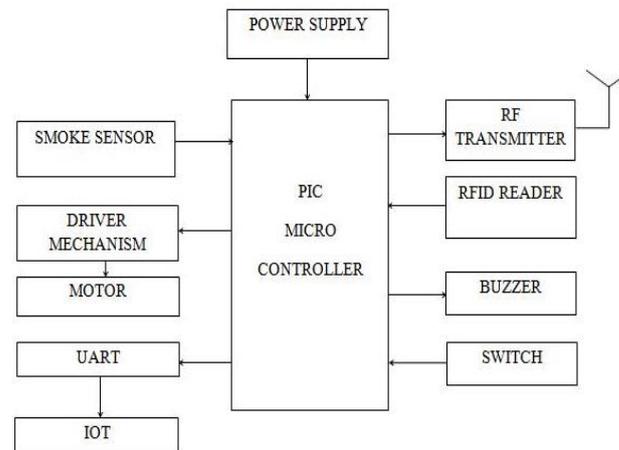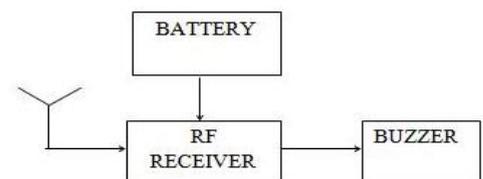**Fig. 9:** Block Diagram.

6. Block diagram

7. Conclusion

It is very much necessary to aware the people about the Pollution emitted by their own vehicle. It is possible by IoT applications. By using these Pollution Monitoring IoT applications people can lead a green environmental life. These applications not only give the pollution information but also make the people to think about the pollution reduction made by their own

Acknowledgement

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