Smart Pollution Monitoring In Automobiles Using IOT

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ABSTRACT :

The main idea of the project is to intimate the driver or the vehicle owner that the vehicle emits excessive CO content from the outlet. Our system does this in a smart manner by sending a notification to the mobile application using IOT .For detection of the CO content we have deployed a CO sensor and the entire system is attached to the vehicle such that the CO sensor evaluates the emissions from the outlet and processes the real time data .

1. INTRODUCTION:

The growth of the Industrial Revolution and technology also resulted in the increase in the pollutions levels in various forms such as Air, Water, Land etc.[1]

Out of all these Air Pollution is probably the most dangerous problem that is prevailing in the society and preventive measures are to be taken in order to control it so that we can pass on a brighter and a safer future to the next generation.[2]

Automobile industry has shown a very rapid growth over the years , yet at times it becomes the responsibility of the individuals to take care of the small things that contribute and affect people and environment on a larger scale.[3]

Transportation can be responsible for more than 50 percent of carbon monoxide in the air. On taking into account all these things we have come up with a system that monitors the release of the CO content from the vehicle and does process real time data using IOT.[4]

2. EXISTING SYSTEM:

Currently there is no definite system that could track the pollution levels of all the vehicles at a dynamic rate.

So this leads us to the conclusion that it does not enforce , checking of the pollution levels of the vehicles, it is completely left to the interest of the individual to take care of it or leave it carelessly.

Above all ,the existing system does not deal with the use of cloud servers or IOT platforms, making them less flexible to the advent of developments of the current trend.

As the monitoring standards are low , no laws can be enforced on the vehicle owners for their act of negligence.

3. PROPOSED SYSTEM:

3.1. COMPONENTS:

3.1.1. NodeMCU:

This is a Wi-Fi module that is used to transmit data over the internet connection. It is a open source IOT Platform which runs on a ESP8266 firmware.

3.1.2. CO Sensor:

This Sensor is used to detect the amount of the carbon mono oxide that is released from the vehicle.

3.1.3. Voltage Regulator: (LM7805)

This is used to regulate the voltage from 9v(Battery) to the required levels .

3.1.4. 9v Battery:

This is used to power up the sensor and the Node MCU.

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3.1.5. Breadboard:

It used to make connections across various firmware.

3.2. HARDWARE DESIGN:

The system module is placed near the exhaust outlet of the vehicle. The automobile unit consist of MQ-7 Sensor, Voltage Regulator, 9v Battery and Node-MCU. The CO Sensor senses the carbon mono oxide content that is released into the atmosphere and sends the data to the cloud server using Node MCU via IOT. Thus processing the real time data helps us to identify if the release of CO content and is supposed to be above the safe level of the predefined standards. Every time its limit exceeds an warning intimation is sent to the owners registered number via mobile application. The vehicle owner has to take corrective measures as soon as possible, otherwise necessary action is

taken accordingly. The System set-up is shown in the figure(i) as follows.
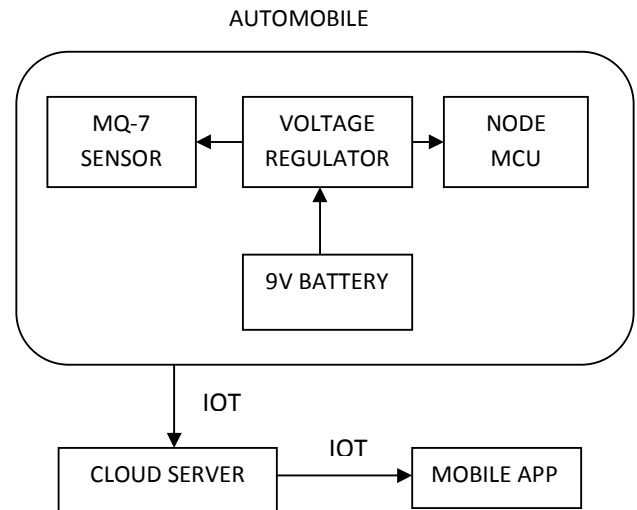
Fig(i) transmission of data from vehicle to cloud server .

3.3. SOFTWARE DESIGN:

3.3.1. CODE FOR NODE-MCU:

```
#include "UbidotsMicroESP8266.h"

#define    TOKEN    "A1E-0YdxMxtuxNWMxl1F4Xg58ZA4tNgcyo"  /* Put here your Ubidots TOKEN */

#define  WIFISSID  "Virus_Uploading"  /* Put here your Wi-Fi SSID */

#define  PASSWORD "saikisaaa"  /* Put here your Wi-Fi password */



Ubidots client(TOKEN);



void setup(){

  Serial.begin(115200);

  delay(10);
```
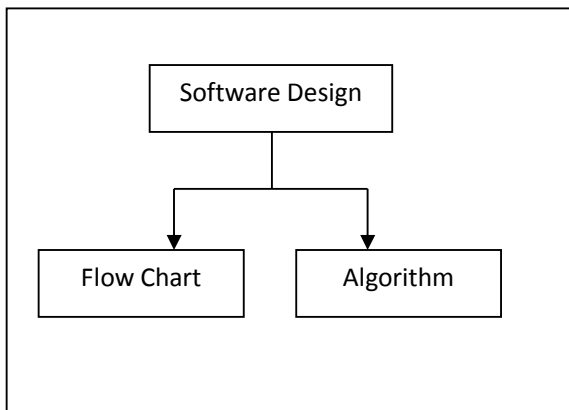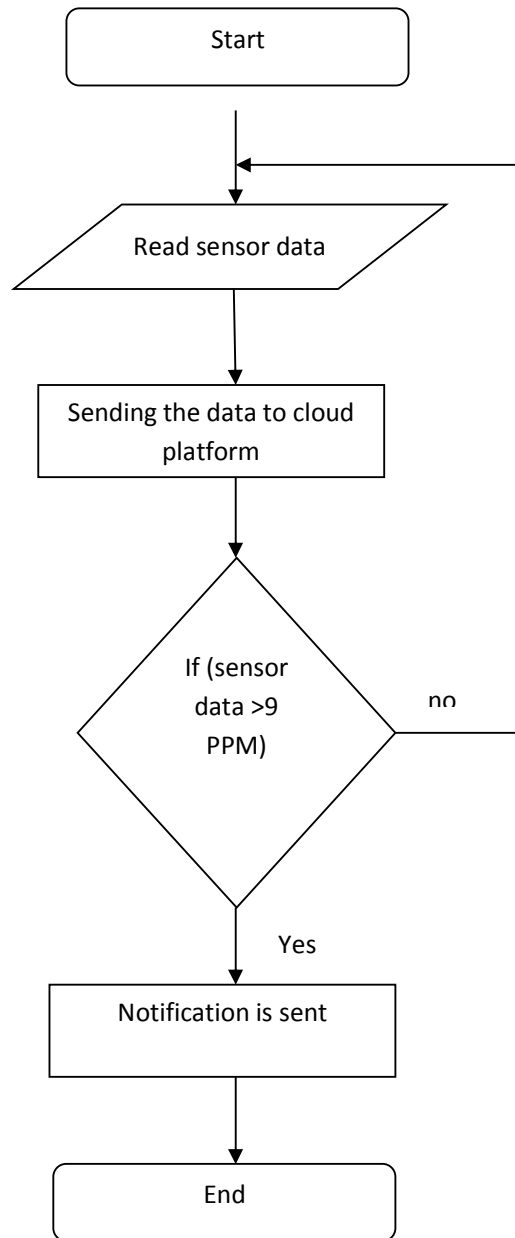
```
    client.wifiConnection(WIFISSID,
PASSWORD);

}

void loop(){

    int val = analogRead(A0);

  val = map(val, 0, 1023, 0, 100);

    /* float value2 = digitalRead(D1) */

    client.add("co", val);


    Serial.println(val);

    /* client.add("switch", value2); */

    client.sendAll(true);

    delay(5000);

}
```


Fig(ii) Various Modes of Design

3.3.2. FLOW CHART:

Fig(iii) Flow Chart

3.3.3 ALGORITHM:

STEP:1 Start the process.

STEP:2 Read Sensor Data.

STEP:3   Sending the data to the cloud platform.

STEP:4 If the Sensor Data is greater than 9PPM Notification is sent to the Mobile Application else go to Step 2.

STEP:5 Stop the Process.

3.3.4. UBIDOTS:

Ubidots offers a Automatic IOT platform for developers that enables them to easily capture sensor data and turn it into useful information. Thus it is used to send data to the cloud from any Internet-enabled device. It is necessary to declare the required device and variable names in order to interface with the internet enabled firmware .

3.3.5. SIMULATION:
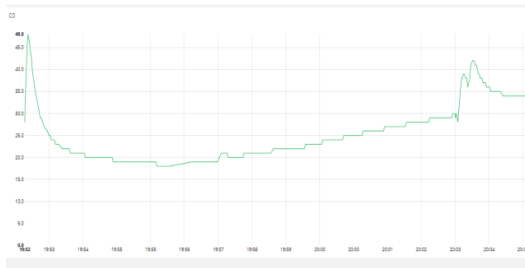
Fig(iv) Plot for CO vs Time.

4.CONCLUSION:

This system is designed and a sensor is calibrated in such a way that it senses the CO content released from the exhaust and the data is recorded in the cloud server using IOT. The data recorded in the real time is plotted in a graph taking Time along the x-axis and CO along y-axis. It can be used to take necessary action on the individual if no corrective measures are taken, despite repeated notification through the mobile application.

5. REFERENCE:

[1]http://rajamani.dreamerindia.com/IEEE/IEEE2014/vehicle%20Pollution.pdf

[2]http://www.arresearchpublication.com/images/shortpdf/1489495010_S2031ijeee.pdf

[3]https://www.researchgate.net/publication/292137925_Development_of_IoT_based_Vehicular_Pollution_Monitoring_System

[4]http://ieeexplore.ieee.org/document/6909157/

[5]https://www.researchgate.net/publication/286840430_Vehicular_pollution_monitoring_using_IoT