Traffic Controlling system using RFID as Ambulance detector in Machine Learning

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*ABSTRACT-*Vehicles have become an indispensable part of today's life. In this fast paced urban life situations and circumstances demand the usage of vehicles. Cars and trucks contribute to air pollution by releasing a variety of emissions into the atmosphere by the process of burning gasoline. Due to the presence of large number of vehicles, the quality of air all over the word is degrading. The emission from vehicles which form the primary source of pollution causes diseases and trigger asthma attacks, cancer etc. A number of measures are being taken by the government authorities in order to control this air pollution. Even the Delhi government has introduced even and odd number plate scheme but it is not efficient. Fitness Certificate is used to check the emission values of vehicles. The major disadvantage of this method is that the regular checking is done only for heavy vehicles but not for two wheelers. It is difficult task for the officials to constantly ask the vehicle owners for checking out their vehicles on a regular basis so as to keep a track of the emissions caused due to their vehicles. All the above mentioned issues are addressed in this proposed system using Internet of things. A smoke sensor is used to detect the values of emission from the vehicle and alert the owner to service the vehicle if the emission value crosses the threshold level. A secured cloud is used to prevent any Eaves dropping or tampering and to increase security. The data stored at the Cloud can be retrieved anytime and the scenarios can be analyzed in a better way leading to the solution for controlling air pollution to some extent. SMS gateway is used to send messages

I. INTRODUCTION

To minimize emissions from road transport which causes high level of air pollution from urban areas, implementation of continuous and accurate monitoring techniques is very much essential. In India, transportation sector is the primary cause to one-fifth of the total emissions of toxic gases CO, COx and NOx in the atmosphere. To prevent pollution in cities observing the emission and implementing long and short term mitigation measures is required. Asthma, eye irritation, lung disorders, consequences of fertility and other adverse health effects are the acute and chronic

outcomes of air pollution. The people living in growing urban areas are experiencing high risks of health outcomes. To prevent, control and abate air pollution, the Indian government has enacted the Air Prevention and Control of Pollution Act in 1981 and amended in 1987. Currently new emission norms for monitoring the air pollution have been regulated by the government and the resulting data provides an opportunity to minimize the dreadful effects on the environment. In the metro cities both light and heavy vehicles are responsible for 72% of CO and NOx release.

Due to the increasing pollution the Central Pollution Control Board made Fitness Certificate renewal compulsory for Heavy Transport Vehicles every year and 5 years once for Light Motor Vehicles. Every vehicle has to undergo assessment to obtain Pollution under Control certificate for every 3 months as per the regulations. The smoke sensor senses the emission values from vehicles and the data transmission and their communication are done using new techniques which paved the way to get real time and more reliable information. The most alarming condition occurs when the vehicle emission exceeds the threshold value. The emission laws are foisted as a serious condition and many awareness campaigns are conducted. The cost of elevating the new technology into the market is important even though the revenue effects of e-vehicles are insignificant in the long run.

On the other hand in developing countries like Brazil, South Africa and India are mostly depending on fossil fuels for transportation and domestic applications. While purchasing the vehicles emission certificate is provided to all citizens but the renewal of it is ignored by most people. The proposed system comprises of micro-controller and the sensor to sense the vehicle emissions and update to the cloud. Warning message is sent with the help of SMS gateway to alert the concerned person regarding the service of the vehicle.

II. LITERATURE SURVEY

In the previous study of S. Nocera, F. Cavallaro, "The Ancillary Role of CO2 Reduction in Urban Transport Plans", [1] the study regarding the RFID tag is placed with embedded controller at Toll Gates, Parking areas and also in traffic signal areas. In [2] the architecture consists of sensors and MQ135 analog sensors are used for measuring Carbon monoxide and carbon dioxide but the capacitive proximity sensor are not so accurate compared to inductive sensor type. The supporting architectures that facilitates the resource and computational requirement of IoT architecture is Cloud computing [5]. The main reason for using cloud computing is its ability to configure and its services such as Software as a Service (SaaS), Platform as a Service (PaaS) and Infrastructure

as a Service (IaaS) [5][6]. Security is one of crucial issues that need to be addressed to provide an efficient and reliable communication of data in IoT environment.

OpenIoT [12] architecture is a SaaS based open source architecture. In this architecture sensors communicate directly with the M2M devices and cloud contains databases only. Web portal is used to make the cloud and sensors communicate. Vehicle pollution monitoring and controlling using IoT [13], this paper gives us, a novel solution is presented to monitor and control the pollution at the traffic signalling lights. A simple wireless embedded chip is inserted in the personal vehicles to control the ignition on and off remotely. The operator will send command to the wireless traffic pollution control system, depending upon the pollution level measured from sensors at the traffic signaling. Controlling the ignition of vehicles remotely, is done by inserting a simple radio frequency based embedded chip in the personal vehicles. The control system at the traffic lights communicates with the chip and helps to control the ignition. It is the best way to reduce the air pollution.

Vehicle Pollution Monitoring Using IoT [14], in this paper ,according to recent technology development in this miniaturization of electronics and wireless communication technology have led to the emergence of environmental pollution sensor network wireless air pollution monitoring system analyses the level of air pollution and provides real-time information. In this region, as well as provides alerts in case of drastic change in quality of air. Prompt actions such as evacuating people or sending emergency response team can be taken by the authorities based on this information. To categorize the various levels of air pollution Air Quality Index is used. To evaluate the level of health concern for a specific area, the system uses the AQI.

Development of IoT based vehicular pollution monitoring system [15], this paper gives us, Wireless sensors are used in most of the in real time applications for collecting physical information. Using the wireless technology, the impossible measurements in typical ways have currently become attainable. One of the difficult areas for the researchers is the measurement of air quality. Vehicles are the main causes of atmospheric pollution. Due to the high inflow of vehicles in urban areas decreasing air quality and increased air pollution that leads to severe health diseases. The data measured is also sent to the vehicle owner, traffic department and national environment agencies. The advantages of these systems are low cost, helps in controlling the air pollution mainly in the urban areas.

III.   PROPOSED SYSTEM

Carbon emission is the main problem in India as it accounts to 7% to the world. There are many other reasons due to which the emission of carbon occurs.
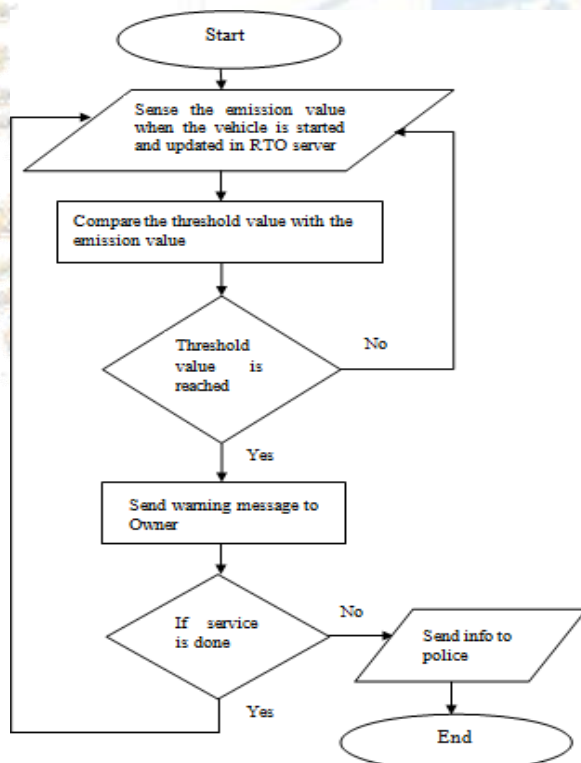

Fig.1. Flowchart of Vehicle CO2 Emission

But transportation plays a major role in this

emission. In the traditional method, the Fitness Certificate was used to analyze

emission values. The main problem with this method is that regular checking is done only for heavy vehicles but not of two wheelers. The solution to this problem is given in the proposed system, which is to monitor vehicle pollution, by using IOT. If threshold value is reached then the warning message is sent to the owner of the vehicle regarding the service which should be given to the vehicles within 10 days be given to the vehicle within 10 days from which the message is sent. As soon as the vehicle is started, the amount of carbon emitted is measured by using the MQ2 sensor and values are automatically sent to the server in the RTO office and comparison is done with the threshold range. If the service is not done then the record is sent to the police and the necessary actions will be taken. The server in the RTO office maintains the name, registered number of the vehicle, value of carbon emitted, and the company of the vehicle. The complete connection between the sensor and the server is done using the wireless medium with the internet connection. The warning message is sent directly from the office to the owner of the vehicle using SMS gateway. The flow diagram of the proposed system is given in Fig.1. Compared to traditional method, the proposed system is more user friendly. The high polluting engine model is also detected in this system. Global warming is reduced. It helps to control respiratory problems and climate change.

The proposed system is divided is into 3 modules:

A. Hardware

B. DB Connections & Processing

C. SMS Gateway

A. HARDWARE

This research is proposed for designing Emission Gas Detector (EGD). Polluting vehicles are identified in order to take appropriate steps to control the emission cause. A Large number of outputs collected from individual sensors can be compared for a more accurate analysis. In the existing systems, various other methods have been used to detect the emission values. RFID tag is one such method. A RFID tag is placed with an embedded controller at Toll plazas, vehicle Parking areas and also in traffic signals. This framework also causes the pollution level to increase and is not cost effective. Another method to detect the emission values is the usage of Fitness Certificate (FC).

Using the gathered data from the FC, actions are taken accordingly by the authorities. The main problem with this method is that the regular checking is done only for heavy vehicles but not for two wheelers. But the two wheelers are also the major cause for the emission. In some methods the sensors, MQ9 and MQ135 analog sensors are used for measuring Carbon monoxide and carbon dioxide but the capacitive proximity sensor are not so accurate compared to inductive sensor type. In our proposed work, in order to overcome all the disadvantages a new architecture is used to connect the sensors and all the hardware components. The architecture of the proposed system is given in Fig.2. This method consists of a gas sensor interfacing with a pic microcontroller is used to detect the presence of smoke and gas in surroundings. They provide accurate data and also give best performances. The Smoke sensor is useful for sensing gases from the vehicles, it highly sensitive and it gives very fast response. In case of harsh environments the sensor can be protected with the help of GALVI and is placed on the exhaust of the vehicle. In real time, a sensor is located on the exhaust line, senses the high pressure and temperature exhaust gas leaving the engine cylinder during the exhaust stroke, then

travels through the exhaust manifold and comes in contact with the smoke detector placed in the exhaust line. The sensed emission value is sent to the server maintained in the RTO. The sensor is also protected from heat dissipation by placing it in the GALV

Thermal Isolation Clip from the vehicle exhaust which causes the sensor to malfunction. The System is equipped with requirements to help officials to detect the polluting vehicle.

The prototype consists of a regulator which regulates the 120 volt transformer and then supplies power to the whole setup. The transformer is interfaced with the Microcontroller. The collected data is stored in a PIC micro controller on a real-time basis and is analyzed in the server. With the help of Bluetooth technology the connection with the server is done and it will handle the wireless part of communication they transmit and receive data wirelessly between one device to another. The emission value is compared with the threshold level which is predefined. The system interfaced with the vehicle at normal condition, continuously senses the gas from the exhaust. The time period remains at zero value while the vehicle is running in usual condition. The abnormal condition detected in the emission value sends the warning message to the appropriate person to check the emission state within time. The Fitness certificate expiry of the vehicle is most important to prevent emissions. Hence the proposed system has special commands for sending alert messages from the RTO to the owner with the help of SMS Gateway.

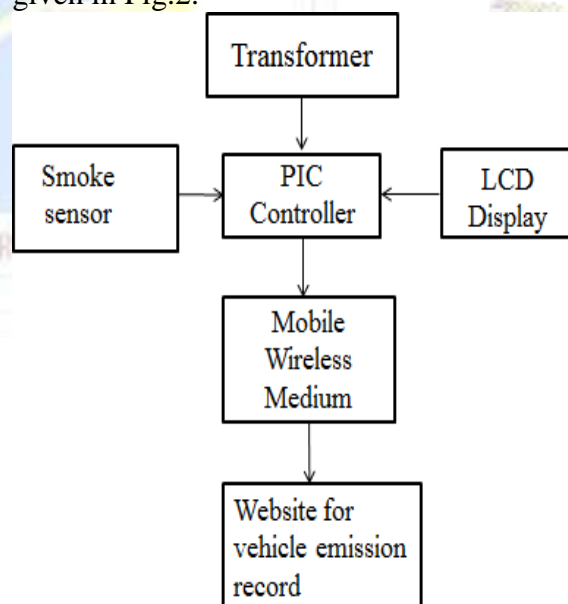The architecture of the proposed system is given in Fig.2.

Fig.2.Block Diagram of the Hardware Connections

B. DB CONNECTIONS AND PROCESSING

The Bluetooth application is paired with the module to update all the emission values to the server. The server receives the values and compares with the threshold value. The threshold value is initialized based on the BS VI norms which will be implemented from April 2020.

According to BS VI the applicable limits are:

- CO - 0.50 g/km
- HC - 0.35g/km
- NOx - 0.15g/km

Based on the above mentioned norms the threshold values are fixed. This is done in order to make sure that the pollution contributed by the transportational sector is reduced to a great extent. If the value shoots above the threshold value then the warning

essage is sent to the owner of the vehicle regarding the vehicle service. If the value is below the threshold value then no actions are taken. When the vehicle crosses a kilometer then the emission value is updated to the RTO server. In the server, two sections are available. In the Home Section, all the emission will be displayed along with the name of the owner, date & time of emission. In the Company Section, the emission values which have crossed the threshold level along with the company of that vehicle will also be displayed. This in turn will help the officials to identify the company which emits large amount of emission. By this, the notice can be sent to the concerned company regarding the emission problem in their vehicles and steps can be taken accordingly.

C. SMS GATEWAY

This module deals with the software utility that enables you to easily send and receive text "Short Messages & quot; over GSM telephone networks from your local PC or the network. In the existing system, they have used

the GSM module which is a mobile communication modem. It stands for the global system for the mobile communication (GSM). The GSM will digitizes and also reduces the data, then it sends down through the channel with two different types of client data in it , with each of its own time slot. Perhaps the greatest disadvantage of GSM is that multiple users can share the same bandwidth. With enough users, the transmission can encounter an interference. Therefore, the faster technologies, such as 3G, have been developed on the different types of networks than GSM, such as CDMA, in order to prevent such a bandwidth limitations. To overcome this above issues, in this proposed system we are using the SMS API which is a well-defined software interface which enables code to send short messages in it. These are used to allows the web applications to easily sends and receives the text messages through a logic written for the standard web frameworks in it. The web server sends the HTTP request via SMS Gateway through the SMS protocol. The process of sending, receiving and controlling the messages can be done with the base station controller. In this process, if the emission level of CO2 from the vehicle crosses the threshold value then the alert messages will be sent to the person from the RTO office regarding the service of the vehicle.
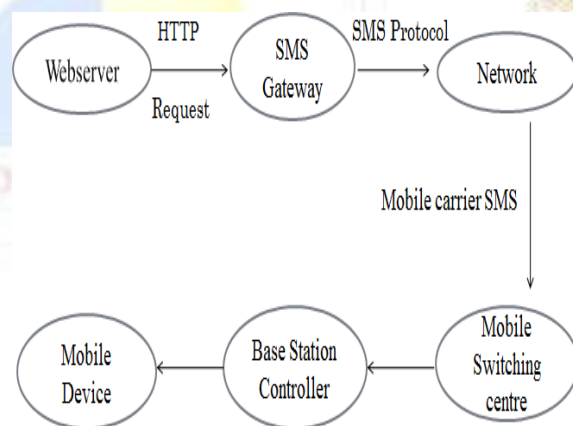
Fig.3. SMS Gateway Architecture

IV. IMPLEMENTATION

The implementation of Vehicular Emission Monitoring System using IoT is given in Fig.4. The process involves a Transformer, PIC Controller, LCD Display, Smoke sensor, Bluetooth, Website for vehicle emission record. The 3 relay switches are assumed as vehicles. When the relay

switch is pressed then the power supply from the transformer regulates with the help of capacitor, diode and regulator then supplies 12 volt to the PIC-microcontroller. The Gas Sensor PCB, Bluetooth module and LCD display are all connected with the micro controller. Then the gas sensor senses and detects the emission values and are updated to the server.
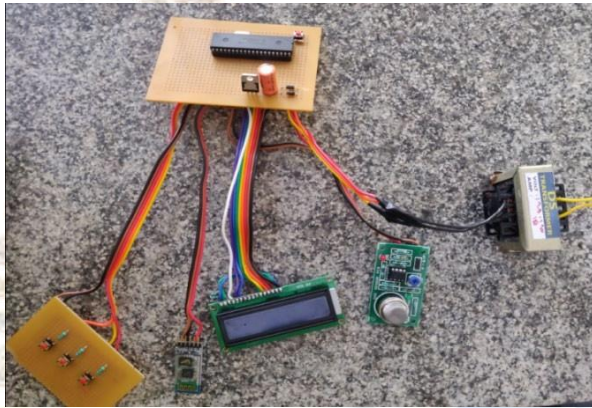

Fig.4. Hardware Connections of Vehicular Emission Monitoring System

Fig.5. Display of Vehicle EmissionMonitor

Fig.6. Selecting the Vehicle

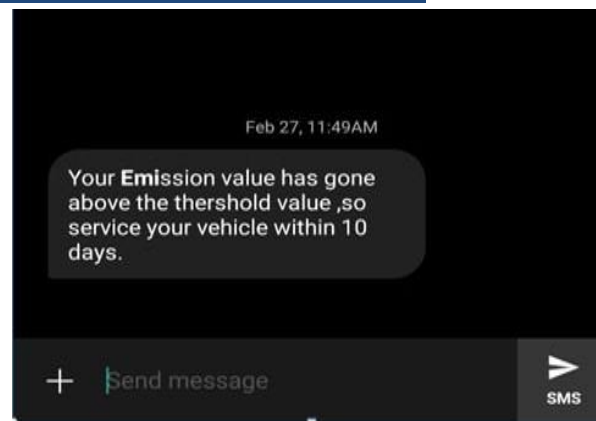
Fig.7. Vehicle Emission Value

The emission values are all updated in the server maintained in the RTO. In the Home section, all the emission values along with the name, date & time are all updated and can be viewed easily. In the Company Section, the vehicle which crosses threshold level will be displayed along with its company name.

Vehicle CO2 Emission Control System Using IOT

HOME   COMPANY

Vehicle	Emission	EmissionDate
A	12.21	24-02-2020 14:22:51
A	11.73	24-02-2020 14:22:52
A	11.73	24-02-2020 14:22:53
A	11.24	24-02-2020 14:22:54
A	10.75	24-02-2020 14:22:57
A	10.75	24-02-2020 14:22:58
A	10.75	24-02-2020 14:22:59
A	10.26	24-02-2020 14:23:01
A	10.26	24-02-2020 14:23:02
A	10.26	24-02-2020 14:23:03
A	10.26	24-02-2020 14:23:05
A	9.77	24-02-2020 14:23:06
A	9.77	24-02-2020 14:23:07
A	9.77	24-02-2020 14:23:09
A	10.26	24-02-2020 14:23:10
A	10.26	24-02-2020 14:23:11
A	9.77	24-02-2020 14:23:13
A	9.77	24-02-2020 14:23:15
A	10.26	24-02-2020 14:23:22

Fig.8 Display of emission values

Vehicle CO2 Emission Control System Using IOT

HOME   COMPANY

VehicleCompany	Emission
Hero	9.77

Fig.9 Display of company name

Feb 27, 11:49AM

Your Emission value has gone above the thershold value ,so service your vehicle within 10 days.

Send message   SMS

Pollution indication SMS

V. CONCLUSION

In this paper, the problem of air pollution is minimized to an extent by monitoring and controlling the emission values from the vehicles using the IoT technology. Vehicular Pollution Monitoring System is used to sense the emission values from the sensor and update to the cloud. If the values are beyond the threshold level then the warning message is sent regarding the serviceof the vehicle to the owner.

VI. FUTURE WORK

For establishing the connection between the sensor and the server instead of Wi-Fi, alternative technologies like SIM Cloud connections can also be used to publish data to the cloud. Along with the emission detection, accident detection, over speed detection can be integrated in order to make this system more efficient. Using VLSI technology, the entire system should be designed compactly. Secured Hybrid Cloud can be used to prevent illegal actions.

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