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Vehicle Smog Identification System

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Abstract - The objective is the system is to identify the various harmful gasses which are emitted by the vehicles and Check these gases according to the Indian ministry of environment regulation and saves their data on our system application database and share these data with Regional Transport Office (RTO) websites so that they fine according to their rules and regulations. If the proportion is greater than the stated limit of the government norms, our application sends a text warning message to the vehicle holder and if they do not take any action to modify their vehicle then the system application sends their data to the RTO office so that they can fine her/him according to their rule and regulation. Apart from industries, the biggest contributors to pollution are the vehicles. Vehicles generate the oxides of nitrogen and carbon, which are harmful for living beings, environment. Air pollutants can cause serious health issues such as affecting the respiratory system.

Index Terms – Regional Transport Office (RTO), Internet of Things (IOT), Carbon Monoxide Sensor (CO).

I. INTRODUCTION

In the Starting of the 21st century, we see the harmful effect of air pollution on our Earth as a result of global warming as well as our human body. There are many reasons for the increase of air pollution but the main reason is those toxic gasses which are generated by our vehicles which include carbon dioxide, carbon monoxide etc. In recent years our Gov. of India introduced various bills to reduce pollution which are generated by vehicles.

Apart from industries, the biggest contributors to pollution are the vehicles. Air pollutants affect the sea life, they are deposited in soil, plants etc. They also affect the lungs of the living beings as they are taken and pumped into the blood by human exposure and also affect sea life. By implementing various technologies. It has become very easy to automatically monitor the vehicles in recent year.

The main purpose of this system is to check the various harmful gasses which are emitted by the vehicles according to the Indian ministry of environment regulation and saves their data (car details) on our system application database

and share these data with the Regional Transport Office (RTO) websites so that they fine according to their rules and regulations.

If the value is greater than the given limit as per the government norms, our application sent a text warning message to the vehicle holder and if they do not take any action to modifies their vehicle then system application sends the pollution data to the RTO office so that the fines her/him according to their rule and regulation.

In our system we use different Internet of Things (IOTs) sensors such as carbon monoxide sensor to detection of carbon monoxide level, MQ9 gas sensor, Arduino board, GSM board.

II. PROPOSED METHODOLOGY

This system is to identify the various harmful gasses which are emitted by the vehicles according to the Indian ministry of environment regulation and the data which are generated by Arduino Board saves on our system application database if proportion of toxic gasses is greater than the given limit as per the government norms. If proportion of toxic gasses are greater than given limit as per defined by the government rules then our proposed system sent text message as warning to the vehicle holder for two days if they ignore the warning then out system application automatically shares their data with Regional Transport Office (RTO) websites and then they fine him/her according to their rules and regulations.

Our system is divided into two parts which include the hardware part and the second is the software part.

A. Hardware Part (CS)

In hardware part we detect the various gasses and calculate their amount of emission from the vehicle such as carbon monoxide sensor, carbon dioxide sensor, MQ9 gas sensor, Arduino Board, and Internet of Things (IoT) [1].

i. **Carbon Monoxide Sensor:** A Carbon monoxide sensor is a device that is used to detect carbon monoxide

(CO) gas. It contains sub-blocks whose names are transducer, ADC, and smoke sensor. A smoke sensor is one of the main components which are planted into the vehicle exhaust.

In vehicle, the smoke sensor detects the senses of smoke discharged and delivers this information to the micro-controller. A transducer is an electronic device that is used to change sensor result into an electronic signal then this electronic signal is future transform a binary signal with the help of ADC [2].

CO concentration can be measured using MQ9, ranging from 10 to 10000 parts per million. Carbon monoxide concentration can be sensed using this sensor from the exhaust of vehicles.

ii. **MQ9 Gas Sensor:** This is help to detect carbon monoxide and flammable gases. It has three sub-parts that are transducer, ADC, and smoke sensor.

A smoke sensor is one of the main components out of three sub-parts that are used to sense the amount of smoke discharged from the vehicles. A smoke sensor is embedded in the exhaust of the vehicle and gives this data to the micro-controller. A transducer is an electronic device which convert the result of the sensor into an electronic signal then this electronic signal is future placed into a digital signal with the help of ADC CO concentrations can be measured using the MQ9, ranging from 10 to 10000 parts per million.



Fig.1: MQ-9 Gas Sensor

iii. **GSM Board:** Global System for Mobile Communications (GSM), shown in the Fig-2. We call this with another name i.e 2G (second-generation cellular network). Arduino GSM board is used to connect Arduino board to the internet, make receive and send voice calls and receive and send text messages.



Fig.2: GSM Board

iv. **Arduino Board:** It is an open-source platform that is used to build Internet of things projects (IOTs). It consists of an ATMEGA microcontroller that processes the data. For the target processor, the compiler converts the program in binary machine code. C++ and C programming languages are support by Arduino IDE. Arduino IDE itself is written in a java programming language. Arduino IDE supports various operating systems like Windows 7 or newer OS [3].

With the help of the above sensors, we measure the emission level of toxic gasses which are harmful to nature and human beings. In the hardware part of our system, we first check the emission level of gasses if their emission level is greater than the limit as per the government norms then with the help of our Arduino Board; we share these data with our system application.

B. Software Part

In the software part if the data computing by the Arduino board larger than the given limit as per the government rules then firstly the proposed system sent a warning text message with the help of GSM to the vehicle holder for two times for two days after this if vehicle holder cannot modify our vehicle, then Arduino send the data to the system application.

Firstly, for network connectivity we will connect our Wireless-Fidelity module to the Wireless-Fidelity router. Then construct the local server, after this data is provided by the local server to Web and lastly connection is closed. Module is autonomous SOC with integrated TCP/IP protocol. When ESP8266 hosts the application and this application processor is only the device it boot up directly from an external flash.



Fig.3: Software Part

III. PROPOSED SYSTEM AND IMPLEMENTATION

The functions are programmed in the micro-controller, they are doing comparison, triggering circuit and timer, and pollution related issues. When the engine is turned on, the sensors are turned on and the system is activated. When the sensors detect the input and the operation is started. The input is taken into the smoke sensor's output and a default number or value is given to the micro-controller that is set as per the norms. If the number or value is greater than that of the default value, then all the

sensors, modules and circuits are triggered and the user is informed about the situation and it will also tell the user to get to a safe zone, the GSM modules sends the message to the applicant about the exceeding value. The sensor also tells us about the exceeding value of the vehicle.

In the previous technologies, in certain distance the vehicle has to be stopped and towed at nearby station. This is also overcome in this technology by sending a message to the RTO including the full detail of the vehicle. Thus by implement it detect the over booths and pollution reduced. It has the in over polluting vehicle than any other. As it doesn't require any accuracy rates are high.

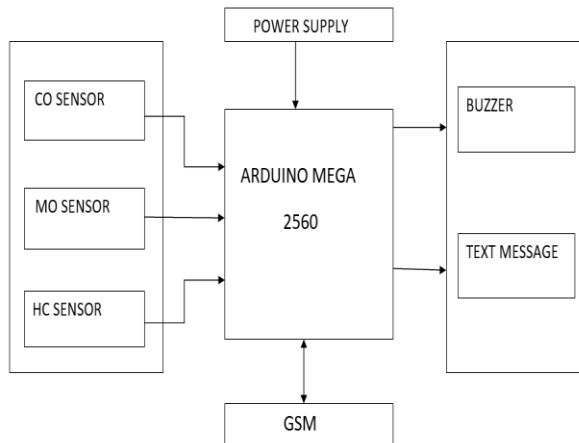


Fig.4: Proposed System

IV. RESULT AND DISCUSSION

With the help of this technology, we can find those vehicles that produce harmful gases as per govt. norms easily. As we know this is an automated process, so the system doesn't require any type of manpower to operate.

The precision rate of this technology is very high. Since global warming is occurring very fast because of over usage of vehicles, industrialization and as a result the depletion in the ozone layer, which is a protective shield from the harmful ultraviolet rays. Reducing emissions can help the environment; therefore the pollution will be lower than usual. It can detect over-polluting vehicles, to stop the pollution rate.

V. CONCLUSION

The gasses emitted from vehicles needed to be reduced so, the environment became ecofriendly. This system gives the best solution to check the gasses emitted from the vehicles. It is easy to maintain and is low cost. In the future, we can use GPS for sending the details to the regional transport office and to evaluate the number of gasses which are leak from vehicles in a particular region.

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