

Cloud and IoT Enabled Smart Vehicle Monitoring System

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Abstract –In today's life standard, vehicles became an integral partner of each one's life. In this modern era, situations and circumstances demands the usage of vehicles as a need of fast paced urban life. When any technology used for benefits, its uncontrolled use creates the serious problems for the human being. The vehicles also creates the very serious problem of pollution by emitting the hazardous gases, if it is beyond the standard values. Again due to the over speeding, drunk driving, drowsiness the accident occurs which destroys many life. The environment badly affected by the pollution which causes increase in the heat, acid rain, breathing problems etc. So to reduce the hazardous effect of vehicle, the smart vehicle monitoring system has been designed and developed using different IoT sensors and the Cloud computing concepts. With the help of our system vehicle owner can be alerted for the vehicle servicing if the emission of the gases from the vehicle is above the threshold. Also with the help of the image processing and IoT the buzzer can be raised against the drowsiness or fatigue by continuously monitoring the face of the driver. So, that it can reduce the pollution and the road accidents happens in day today life.

Keywords –IoT, Air pollution, Road accidents, Cloud computing, sensors, standard emission level.

I. INTRODUCTION

The Air pollution and the road accidents are the most critical problems in the human's life. Since the number of vehicles are increasing day by day, these problems are also increasing including mild allergic reactions such as irritation of the throat, eyes and nose as well as some serious problems like bronchitis, heart diseases, pneumonia, lung and aggravated asthma. About more than 1.26 million premature adult deaths occurs due to pollution and 151000 death count occurs due to road accidents annually. In many cities like Delhi the air quality index is in dangerous level. The transportation is the most rapidly growing source of the CO₂ emission with the different gases like carbon monoxide gas, oxide, and sulfur dioxide etc.

So, to supervise air quality to keep it under control for our healthy and superior future living and for controlling road accidents, Internet of Things technology (IoT) and cloud computing plays a key roll.

Our system includes design and implementation of the smart mechanism for monitoring and informing the vehicle owner about the pollution and also against drowsiness, drunk, smoke levels of the driver. Monitoring gives measurements of air pollutant concentrations, which can be used to resolve health problems. By making analysis of monitored data the system is able to know the level of the different gases emitted through the vehicle. If

it is above the threshold value then send the alert to the owner for taking necessary measures such as servicing etc. so that it is below the threshold level. Another aim of our system is to build a real-time application using

Image Processing which can be used to detect the fatigue or drowsiness in driving conditions and alert the driver whenever drowsiness is detected. This will help to minimize road accidents.

II. LITERATURE REVIEW

Over the period of time, Government made several BSI standards to control the vehicle pollution. But due to the old vehicles and the number of the vehicles increasing day by day the pollution is increasing. The different researchers propose the different systems for monitoring and controlling the pollutions.

The vehicle pollution monitoring and controlling system using IoT has been proposed by the author [2]. The threshold values of different gases is referred as given in [3]. The different gases are sensed using the different sensors to check bit level. In the paper [4], the quality of air in the car cabin was analyzed using semiconductor (MOS) gas sensors. In the paper [11] the semiconductor sensors have been used to detect the pollutant level of the vehicles. It concentrates mainly on three blocks; smoke detector, microcontroller and fuel injector. The smoke detector detects the pollutants (CO, NO_x, etc.) continuously. The microcontroller compares the level of

pollutants with the stipulated level allowed by the government. When the pollutant level exceeds the standardized limit, it sends a signal to the fuel injector. On receiving a signal from the controller, the fuel injector stops the fuel supply to the engine after a particular period of time.

In our work we want to monitor the pollution level using different sensors and store the data over the cloud. Also we want to detect the drowsiness of the driver using the image processing so that it will alert the driver and avoid the number of road accidents.

III. PROBLEM STATEMENT

To monitor the vehicle condition to avoid pollution and to detect the drowsiness of driver using IoT and Image processing.

IV. OBJECTIVES

1. To provide a platform that monitors the parameters and help to create better and pollution free future life.
2. To build real time application which can be used to detect the drowsiness in driving conditions and alert the driver whenever drowsiness is detected.
3. To provide SMS notification when pollution exceeds the threshold.
4. To detect the smoke by smoke detector Sensor.
5. To track the vehicle location using GPS.

V. PROPOSED SYSTEM ARCHITECTURE METHODOLOGY

Our proposed system contain Arduino Uno, MQ-135 sensor and cloud server as shown in Fig. 1

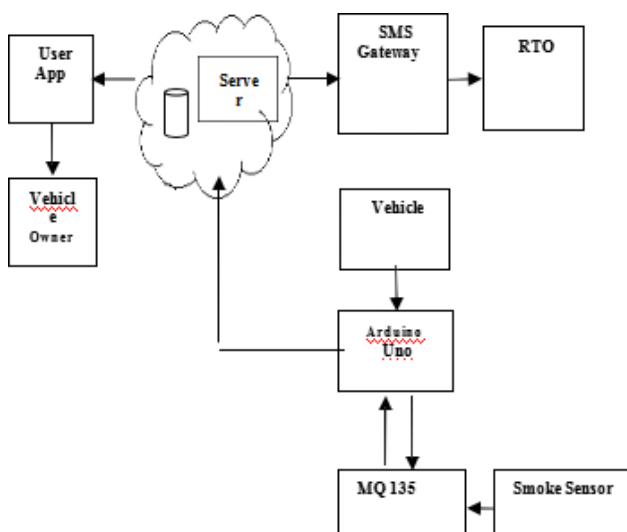


Fig. 1. Proposed system Architecture.

When the vehicle gets the start, the actuator will power ON Arduino Uno. Arduino Uno will initialize all sensors and convert the analog data. Each car will have one unique ID related to it. We have set threshold time as 20minutes. After every threshold time, Arduino Uno will send information sensed by the sensor to the traffic department through Android application and agencies of national environment. All information sensed by the sensor is stored in a cloud server.

Our system will use mobile internet to send the data. The Sensors are very sensitive that it can sense the gas emitted from other vehicles while stuck in Traffic which can disturb the integrity of the system. It will send the message to car owner. Car owner get notification of pollution rate of his car which are sensed by sensors. This can be overcome by reading the samples over a period of time and then based on the average value the system will take an action. We believe that implementation of our proposed system on a larger scale would benefit a large number of people.

And we also inform to traffic controller system to track those vehicles whose polluted air level of vehicles is higher than given threshold.

Traffic server send message to vehicle owner and RTO user. RTO user track vehicle using latitude and longitude to pay fine from vehicle owner.

Also Android application To build a real-time face and eye tracking application which can detect the driver fatigue or drowsiness in driving conditions. The application is embedded and contactless to the driver for the comfort while driving. It is able to detect the drowsiness and alert the user with in a threshold time.

VI. REQUIREMENTS

Different softwares and hardware componets are used for development of the system as-

1. Hardware : It includes Arduino UNO connected with MQ-135sensor. MQ-135 sensor will help to detect harmful gases and showing the status of pollution rate of vehicle. GPS for navigation. It also uses Buzzer as a voice alert.
2. Software: An integrated android application which will provides navigation in both the cases. RTO user well as Vehicle owner user.

VII. IMPLEMENTATION

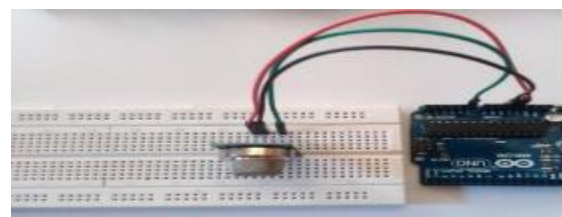


Fig. 2. Air Pollution circuit.

The circuit for detection of the gases using different sensors are shown in fig 2. It includes MQ-135 sensor for harmful gases detection, Arduino UNO, power supply. Fig. 3 shows the pollution level.



Fig .3. Pollution Level.

It gives notification of pollution rate of each vehicle and also other mandatory information.

VIII. CONCLUSION

The system has been designed and developed for two things as first includes detecting the level of Pollution and second includes detecting and alerting the drowsiness of the driver to the driver. It is used to detect and analyze the gases level responsible for pollution increase and to notify the user to take measure to reduce it. The real-time

application has been designed and developed for drowsiness detection and alarm generation using Image Processing technique. It also detects the smoke within the vehicle by using smoke detector sensors. In the future, we can add more sensors for accident detection, alcohol detection also in built this system to upcoming vehicles.

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