

IOT Based Pollution Monitoring System with Auto Detection of Traffic Rules Violation And Intimation

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Abstract- In the recent times we have seen that the level of pollution is increasing rapidly at a faster rate due to urbanization, industries, and increase in the number of vehicles and population which has affected human health to a greater extent. With the increase in the number of vehicles there is a steep increase in traffic rule violations resulting in accidents. It is estimated that over 2 million deaths occur prematurely in India due to pollution accounting for 25% of global deaths due to air pollution. It is also seen that about 464674 accidents which caused 148707 traffic related deaths in India. IoT based air pollution monitoring system is used to monitor the air quality over a web server using internet and multiple sensors. The other aspect is to intelligently detect accidents and upload information to the cloud which could be accessed by authorized people as the situation be, so that necessary fines could be levied using sensors and GPS.

Keywords- Air pollution, web server, cloud, sensors, GPS.

I. INTRODUCTION

Air pollution is the biggest problem of every nation, whether it is developed or developing. Health problems have been growing at faster rate especially in urban areas of developing countries where industrialization and growing number of vehicles leads to release of lot of gaseous pollutants. Harmful effects of pollution include 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. To reduce air pollution, car manufacturers consider today various alternatives: manufacturing of electrical cars, the creation of new environmentally friendly fuels. Unfortunately, today the reality is that cars do pollute. Even though manufacturers try to reduce this problem, people behind the wheel are also responsible for creating a better future for themselves and their children. The solution to environmental degradation involves unselfish and compassionate behaviour, a scarce commodity.

Violations in traffic laws are very common in a highly populated country like India. The conditions are even worse in metro cities like Delhi, Mumbai Bangalore and Chennai. The accidents associated with these violations cause a huge loss to life and property. Excess speed is defined as exceeding the speed limit. Inappropriate speed is defined as

driving at a speed unsuitable for the prevailing road and traffic conditions. In high-income countries, speed contributes to about 30% of deaths on the road, while in some low-income and middle income countries, speed is estimated to be the main contributory factor in about half of all road crashes. Controlling vehicle speed can prevent crashes happening and can reduce the impact when they do occur, lessening the severity of injuries sustained by the victims.

In this, we design an automatic alert system which enables the continuous emission monitoring, speed monitoring and application of Odd Even rule in vehicles which prevents cars with odd number registration to be driven on an even numbered date and its converse

II. RELATED WORK

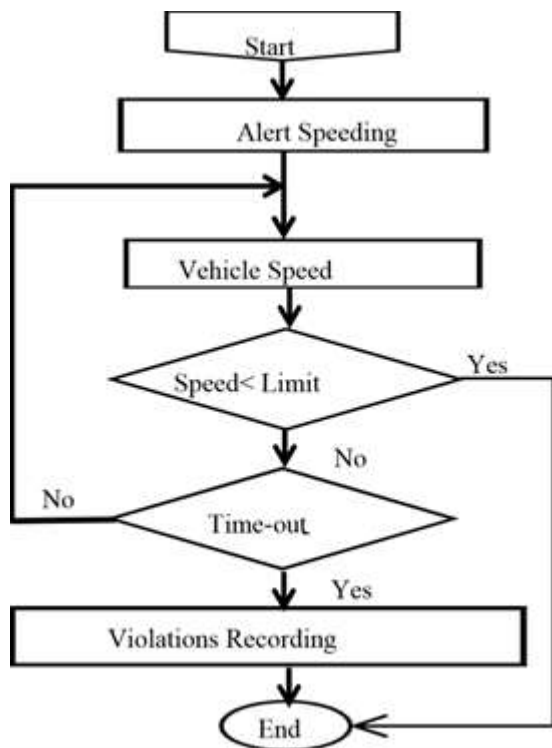
Riteeka nayak, Malaya Ranjan, Vivek kumar rai, T appa rao [1] This system uses MQ135 gas sensor to sense smoke, benzene and alcohol and LCD. The MQ135 gas sensor will the output in the form of voltage level and it will be converted into PPM. When the values exceed 1000 PPM the buzzer starts beeping and the LCD will display "POOR AIR". When the values are below 1000 PPM the LCD displays "FRESH AIR".

Ch.v.saikumar, M.reji, P.C.kishoreraja [2] The Air Excellence Guide (AQI) is calculated on air pollutants like CO and NO₂. The arduino UNO, CO, NO₂ sensors are been used. The arduino board is programmed using arduino coding. Gas sensors are developed and installed on AQMS circuit. The circuit is provided with power supply. The values of sensors are sent to the mobile using the server. All the sensors start to collect the values depending upon the parameters and it will update according to the threshold values when there are any huge variations in the values it will update to the industrial management.

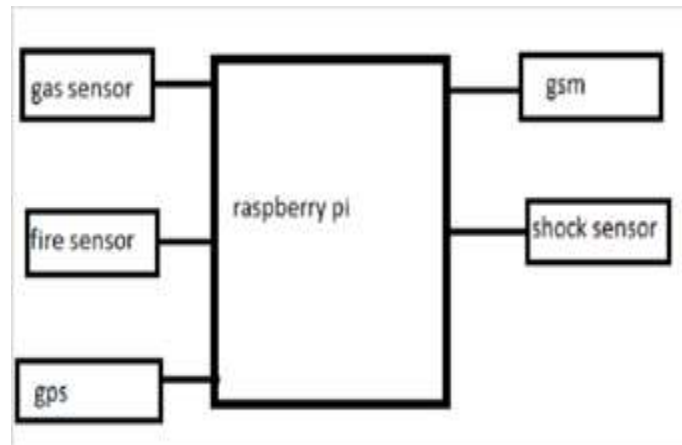
Raja vara Prasad, Mirza sami, Rahul k, P rajalakshmi, U.B.desai[3] the real time wireless air pollution monitoring system was designed and developed to obtain the fine grain population data of the gases like CO₂, O₂,NO₂,CO along with other parameters like temperature, humidity and pressure.it involves calibration of gas sensors, configuring

wireless sensor nodes for air pollution monitoring, development of middleware, and field deployment.

Nordine Aliana, Javier Fernandez, Mario Mata, serigo Bemposta [4] two systems are presented firstly Traffic sign Detection and Recognition and secondly traffic violation recording unit. TSDR module is used to detect vertical signs on the road in certain dangerous situations like speeding, no passing zone, intersections, stop signs ,dangerous turns. The TVR module depends on TSDR module, EDR unit .it basically focuses on speed limit, stop sign and forbidden turning. When a traffic violation is committed its corresponding scenario is recorded. The collected data is organised in the database and the drivers are provided with their traffic violation record making a self-diagnosis of their driving behaviour.



Manasi patil, Aanchal rawat, Prateek singh, Srishtie dixit [5].This paper focuses on detecting vehicles when accident occurs. The vehicle has a raspberry pi controller fixed in it which is interfaced with sensors like gas sensor, temperature sensor and shock sensor. These sensors are fixed at a predetermined value before accident. But when the accident occurs the value of one of the sensors changes and a message to a predetermined number is sent through gsm. The gps module which is interfaced with the controller also sends the location of the vehicle.



M.R.T hossian, M.M.K bhuiya, J.U ahamed, S bhowmik [6]. This paper provides a traffic violation processing system. This system involves detection of the violation and identification of the vehicle involved. The IR transmitter and IR receiver cover the violation detection unit, while for identifying the vehicles, microcontroller triggered mobile communication system is used. The sensors used for the detection of the violation are inductive loop detectors, micro loop detectors.

III. RESEARCH GAP

From the above papers we could find a few research gap on the basis of which our project is carried out. Some of these include:

- 1- To convert the output in PPM it is necessary to use a different library for MQ135 gas sensor.
- 2- It is limited to sensing few gases and lack of accuracy and reliability.
- 3- Calibration at periodic intervals is necessary but it is difficult to do for large number of sensors in field.
- 4- As only drivers are alerted no strict or legal action is taken on repeated violations.
- 5- The use of raspberry pi is not compatible with operating systems and more over it cannot be used for bigger businesses.
- 6- The methods used are traditional and cumbersome with lack of much technology and reliability.

IV. PROPOSED WORK

In this system we are making use of Technology can be subdivided into three parts: UID of cars, Emission control and Over Speeding of vehicles.

Part A: UID of cars each car should be registered with means of a vehicle registration number fed into the system during vehicle registration at the RTO office. For existing cars, the system should be installed in the car with the details fed manually by an authorized person. This will ensure that each car has an UID with future scope evolving on the fields of Smart Card DL, RFID tags..

Part B: Emission control. Since the system will be synchronized with date and time, the cars can be validated easily on the basis of their vehicle numbers.

The various smoke detectors and vehicle emissions sensors should detect the gaseous emissions and compare with the threshold values. We propose a policy wherein the driver of the cars will be alerted in case of emission law violation and be given a warning to get the vehicle duly tested.

Part C: Over-speeding and Accident Detection Presence of Speed sensors and intelligent cloud based system will track the vehicle in the speed zone Accident detection sensors will help to detect types of accident. The information will be fetched to the cloud. The GPS co-ordinates will be collaborated. Hospital nearest to the location of collision will be intimated. Various traffic signs are also detected and informed accordingly.

V. CONCLUSION

IoT is an emerging networking concept within the pervasive or ambient things or objects are connected to provide a smart or intelligent service to make human life easier and happier. Using the Iot we have proposed a system which monitors the vehicular pollution. By monitoring the emissions data, the engine health can be easily inspected and examined. The vehicle owner also becomes aware of his vehicle's condition and makes the engine tune-up. Apart from this the system also proposes the detection of traffic rule violation and important traffic signs. The proposed system along with the comparative analysis of previously proposed system it shows that the proposed system is effective and reliable for vehicle emissions inspection. As we all know that global warming is taking place due to environmental pollution. Vehicular pollution is the main cause for the environmental pollution. By using the proposed system, the global warming can be reduced to some extent.

REFERENCES

- [1] A.N.Madur, Sham Nayse, "Automationa in Rationing system using ARM 7", International Journal of Innovative Research in Electrical, Electronics, Instrumentation and Control Engineering, Vol.1, Issue 4, July 2003, pp 168-171
- [2] Dr.Sreeramareddy G M, Deepak C, Raghuvveeran S, Thyagaraja M S, "Secure ration Dispensere for Corruption Dispenser using RedTacton", International conference on computer science, Electronics & Electrical Engineering – 2015, pp 20-23
- [3] Cordeiro, C. et al. "Body Area Networking: Technology and Applications", Selected Areas in Communications, IEEE Journal on 27.1 (2009): 1-4. ©2009 Institute of Electrical and Electronics Engineers
- [4] Akshay Shinde¹, Ajit Gole², Akshay Jadhav³ Mrs. Trupti Harhare, " HUMAN INTERFACING NETWORK USING RED TACTON TECHNOLOGY", International Journal of Technical Research and Applications, e-ISSN: 2320-8163, Special Issue 39 (KCCEMSR), March 2016, PP. 63-63
- [5] Ryoji Nagai, Taku Kobase, Tatsuya Kusunoki, Hitoshi Shimasaki, and Yuichi Kado, Department of Electronics, Kyoto Institute of Technology, Matsugasaki Sakyo-ku, Kyoto, Japan.and Mitsuru Shinagawa Faculty of Science and Engineering, Hosei University Koganei-shi, Tokyo, Japan, "NearFieldCoupling Communication Technology For Human-Area Networking"
- [6] Aburva Poongundran, Jeevabharathi - Vehicular Monitoring and Tracking Using Raspberry pi
- [7] Radhi, Hassan. "Evaluating the potential impact of global warming on the UAE residential buildings—a contribution to reduce the CO₂ emissions." Building and Environment 44.12 (2009): 2451-2462.
- [8] Trading Economics, "CO₂ emissions (metric tons per capita) in the United Arab Emirates", <http://www.tradingeconomics.com/unitedarabemirat/es/co2-emissions-metric-tons-per-capitawb-data.html>, 2015.
- [9] Devarakonda, Srinivas, et al. "Real-time air quality monitoring through mobile sensing in metropolitan areas." Proceedings of the 2nd ACM SIGKDD International Workshop on Urban Computing. ACM, 2013.
- [10] Ignaccolo, R., S. Ghigo, and E. Giovenali. "Analysis of air quality monitoring networks by functional clustering." Environmetrics 19.7 (2008): 672-686.
- [11] Aritro Mukherjee, Smoke Detection using MQ-2 Gas Sensor, <https://create.arduino.cc/projecthub/Aritro/smokedet>

ection-using-mq-2gas-sensor-79c54a, 2016, visited on
November 18,2017.