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Intelligent Traffic System for Auto Detection of Traffic Rules Violation and Intimation with Pollution Monitoring

S Bhargavi
Professor & HOD, Dept of TCE, S.J.C.I.T, Chickballapur, India.
bhargavisunil@gmail.com

Niranjan S, Rakshita Bhat, Sameera L R, Sneha Shaw
Undergraduate student, Dept of TCE, S.J.C.I.T, Chickballapur, India. niranjan2097@gmail.com

Abstract - This paper is to develop a compact system to detect the pollutants in the vehicle which could be assembled in the vehicle itself. Tremendous innovations have been made in the technology and manufacturing of cars as well as in the pollution control department but still nothing significant achieved of it. This idea employs an MQ-7 sensor and temperature and humidity sensor which is economical and capable of detecting Carbon Monoxide gas and temperature and humidity emitted from the exhaust gases of the vehicle. An initial warning is given to the driver regarding the amount of CO gas with the help of LCD display and later the same information is transferred to the Police Control Room in case of negligence. This is done with the help of Arduino Controller that is incorporated in the vehicle. The Arduino Controller is used to transfer the information to the different applications from the MQ7 sensor.

Keywords— MQ-7 sensor; DHT-11 sensor; LCD display

I. INTRODUCTION

To reduce air pollution car manufacturers, consider today various alternatives: manufacturing of electrical cars, the creation of new environmentally friendly fuels (Sovacool 2010). 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 degradations involves unselfish and compassionate behavior, a scarce commodity.

In this, we design an automatic alert system which enables the continuous emission monitoring, speed monitoring. The other aspect of this paper is to intelligently detect accidents and upload information to the cloud which could be accessed by authorized people as the situations be, so that necessary help could be dispatched.

Traffic congestion is a critical problem which happens on roads which make traffic busy because roads full of cars and buses. Traffic congestion challenges traffic flow in urban area and is prevented smooth traffic. A growing urban area creates complex problems in daily life with traffic. Congestion phenomena cannot be terminated only by applying physical constructing such as: build bridge, motorways and increasing road capacity. It is necessary to build technology system for transportation management which is used for control of the traffic phenomenon.

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.

The advent of technology has also increased the traffic hazards and the road accidents take place frequently which causes huge loss of life and property because of the poor emergency facilities. This paper will provide an optimum solution to this draw back. An accelerometer can be used in a car alarm application so that dangerous driving can be detected. It can be used as a crash or rollover detector of the vehicle during and after a crash. With signals from an accelerometer, a severe accident can be recognized. According to this project when a vehicle meets with an accident immediately Vibration sensor will detect the signal or if a car rolls over, and Micro electro mechanical system (MEMS) sensor will detects the signal and sends it to ARM controller.

II. LITERATURE REVIEW

A generic solution to reducing air-pollution using vehicular networks was previously presented in [1]. The authors propose an adaptive traffic light system that uses wireless communication with vehicles to improve traffic fluency. [2] proposed a traffic flow prediction mechanism based on a fuzzy neural network model in chaotic traffic flow time series. [3] applied agent-based fuzzy logic technology for traffic control situations involving

multiple approaches and vehicle movements. In [4] the authors developed strategies to integrate different dynamic data into intelligent traffic system.

Recent news has been flooding the media about foreign investments in cloud-based technologies to aid Indian economy and develop intelligent traffic systems to curb city pollution and improve living standards.

The proposed system deals with an automatic accident detection system involving vehicles which sends information about the accident including the location, the time and angle of the accident to a rescue team like a first aid center and the police station. This information is sent in the form of an alert message. But in the cases where there are no casualties a switch is provided which can be turned off by the driver to terminate sending the alert message. A GSM module is used to send the alert message and a GPS module is used to detect the location of the accident. The GPS and GSM module are interfaced to the control unit using serial communication. The accident itself is detected using two sensors- Micro Electro Mechanical System (MEMS) sensor and vibration sensor. MEMS sensor also helps in measuring the angle of rollover of the car.

III. BLOCK DIAGRAM

The block diagram of an Intelligent Traffic System for Auto Detection of Traffic Rules Violation and intimation with Pollution Monitoring is shown in Figure 1.

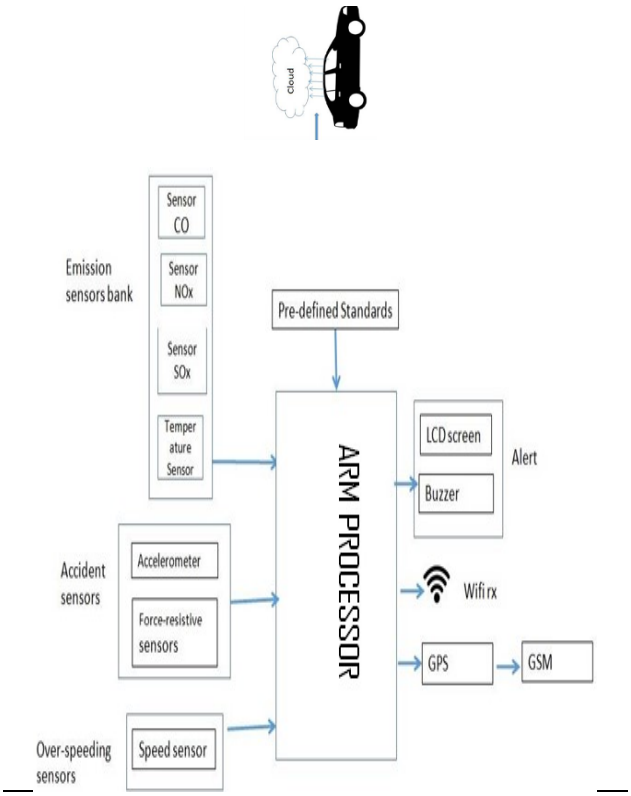

Fig 1. Block diagram of an Intelligent Traffic System for Auto Detection of Traffic Rules Violation and intimation with Pollution Monitoring

IV. IMPLEMENTATION

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.
- Since each car will be a potential Wifi Hub and with latest proposal of government to install wifi hotsopts over the cities, the car can be easily tracked by concerned authorities.

Part B: Emission control

- To curb pollution, odd-even policy as implemented in Delhi, could be implemented in cities such as Bangalore.
- 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.
- If the driver chooses to ignore the warnings, the controller will detect a violation and will intimate the pollution control office by means of a cloud.

Part C: Over-speeding and Accident Detection

- Presence of Speed sensors and intelligent cloud based system will track the vehicle in the speed zone.
- Speed restrictions if violated can be fed into the cloud, and necessary fines be levied.
- 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.
- So that, medical aids could be delivered on time.

V. ADVANTAGES

- Requires lesser cables and investment cost.

- High power transformers are not needed.
- Least losses in transmission lines.
- Easy to Implement.
- Independent of Weather Conditions.
- It won't disturb the traffic.
- Efficient method.
- Less Consumption of electrical energy.
- Less maintenance.
- Cheap and economical.
- Infra red technology uses simple and extremely cheap senders and receivers which are integrated into nearly all mobile devices.

VI. APPLICATIONS

- Traffic management in metropolitan cities
- In highly populated areas to control over speeding of traffic and avoid collisions.
- In automobiles for monitoring the condition of the vehicle.

VII. 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. Experimental results show 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.

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