

Automobile Speed Sensing and Smoke Detecting System

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Abstract

Automatic monitoring of vehicle has become a very essential scenario in the recent years and it can become possible by implementing the following technology. The beginning of the 21st century was the time when importance for Environmental awareness was instigated. One of the major concerns regarding the environment is air pollution. The main pollutants from the vehicles are the oxides of carbon and nitrogen, which can be easily detected these days with the help of semiconductor gas sensors. The system consists of a global positioning system, an IoT module and a GSM board. The gas sensor detects the gas produced due to over pollution and the micro-controller board determines the proportion and if it is higher than the stated limit as per the Bharat Stage 6 norms, the GPS system sends the co-ordinates to the nearby RTO. The warnings received will be saved and if the warnings exceed more than three times or if the pollution level raises drastically the vehicle automatically provides navigation to a nearby safe zone. The safe zones are detected automatically with the help of IoT and GPS technologies. A vehicle speed monitoring sensor is used and is coupled with the IoT so as to reduce the speed of the vehicle at specific places, say school zones, hospitals, accident prone zones etc.,. If this technology is employed the parameter of safety and reduction in pollution levels as well as prevention of accidents can be achieved.

Keyword- Automobile Speed Sensing, Smoke Detecting System, IoT Module, GPS Technologies, GSM Board

I. INTRODUCTION

The beginning of the 21st century was the time when importance for Environmental awareness was instigated. One of the major concerns regarding the environment is air pollution. Air pollution contributes to the green houses gases, which causes the greenhouse effect, whose side effects are now well known to all of us after the findings about the hole in the ozone layer. Air pollution is not only harmful to the environment but, also to all other living beings on earth. Air pollutants that are inhaled have serious impact on human health affecting the lungs and the respiratory system; they are also taken up by the blood and pumped all around the body. These pollutants are also deposited on soil, plants, and in the water, further contributing to human exposure and also affecting the sea life. Vehicles are one of the major contributors to air pollution apart from industries. The main pollutants from vehicles are the oxides of carbon and nitrogen, which can be easily detected these days with the help of semiconductor gas sensors. Therefore, in this paper an idea is suggested, which would be very helpful in reducing the amount of pollution from vehicles. Over the years, there have been several accidents occurring due to over speed, carelessness in driving, drunk and drive etc in places like school zones etc where many people cross roads frequently. Hence some technology has to 12.

II. EXISTING TECHNOLOGY

The main pollutants from the vehicles are the oxides of carbon and sulphur, which can be easily detected these days with the help of semiconductor gas sensors. The existing system has air pollution detection and indicates the vehicle using GPS, hence as a result the traffic authority can detect the vehicle and seizes. The existing technology provides alarm if rest.

III. PROPOSED SYSTEM

The overall block diagram of the proposed system is given in figure 1. The block diagram mainly consists of the following elements:



Fig. 1: Basic Block Diagram

The system consists of a GPS positioning system, an IoT module and a GSM board. The gas sensor detects the gas produced due to over pollution and the microprocessor board determines the proportion and if it is higher than the stated limit as per the Bharat Stage 6 norms, the GPS system gets activated and the co-ordinates of the vehicle's location are noted and is transmitted to the nearby traffic control division and a warning signal will be received to the vehicle. The warnings received will be saved and if the warnings exceed more than three times or if the pollution level raises drastically the vehicle automatically provides navigation to a nearby safe zone. The safe zones are detected automatically with the help of IoT technology. In addition a speed monitoring sensor, which measures the engine speed and sends signals to the micro-controller board. Whenever any over populated zone is detected by the GPS and IoT the speed of the vehicle is reduced to the safe limit as prescribed.

IV. CONCEPT OF THE PROJECT

Nowadays emission of gases from vehicle has become a major crisis and hence controlling and harnessing of emission is mandatory. Hence by implementing this system, which checks the flue gas outlet of the vehicle for CO emission frequently, and when a vehicle's rate of emission of gases is higher than the mentioned levels as per the Bharat Stage 6 norms, it makes an alarm and hence the over polluting vehicle could be identified easily. Thus pollution rates can be reduced due to vehicle smokes. The speed of the vehicle is monitored by the speed sensor and the speed is automatically reduced as soon as entering the accident prone and densely populated zones.

V. WORKING

When the vehicle's engine is ignited, the MQ-9 CO gas sensor and Microcontroller system are activated. The microcontroller is programmed to do three functions namely comparison, timer and triggering circuit. The microcontroller takes in two another being the predefined another being the pre-defined threshold value specified by the government as per the Bharat Stage 6 norms. When the smoke sensor output is more than the threshold value, the microcontroller triggers the timer circuit, IoT and GPS modules and an alarm is set off to inform the driver that his vehicle has some pollution related issues and also indicate that the vehicle will come to a halt as soon as the IoT detects a safe zone. Apart from the timer being triggered, a trigger is also given to the GPS, which helps in locating the nearest service station. Once the timer runs out, a trigger pulse is generated by the microcontroller which is fed to the engine control module of the vehicle, so as to control the fuel injector, which in turn reduces the flow of fuel to the engine, as a result of which, the speed of the vehicle is lowered down. The main function of the fuel injector is to minimize the supply of fuel to the engine, when the pollution limit is breached. When the pollution level reaches the maximum limit, a trigger pulse is given to GPS by the microcontroller. The GPS transmitting system is programmed in such a way that, when it receives a trigger pulse, it shows the nearest service stations where the vehicle can be taken for maintenance. The MQ-9 gas sensor will calculate the smoke emission values. The emission values are compared with the pre-defined values. Alert message will be displayed and alarmed that the vehicle will stop as soon as reaching a safe zone. If vehicle is stopped by itself then the fuel control unit turns off the fuel inlet to the engine. If the vehicle does not stop in the safe zone, fuel control unit off the fuel inlet to the engine. GPS coordinates are tracked and SMS will be sent to the nearby RTO and owner of the vehicle. GSM module will send the SMS to the RTO when the smoke value excides the pre-defined value. This SMS is an alerting message for the RTO to control the pollution. The speed of the vehicle is monitored by the speed sensor and the speed is automatically reduced as soon as entering the accident prone and densely

populated zones. Whenever any over populated zone is detected by the GPS and IoT the speed of the vehicle is reduced to the safe limit as prescribed by the government. The previous technologies had a major drawback.

VI. CONCLUSION

Thus by implementing this technology, we can detect the over polluting vehicles easily at the toll booths and pollution levels due to vehicles can be reduced. It has the immense potential to detect the over polluting vehicles at a rate comparably faster than any other. As it is an automized technology accuracy rates are high. Our present scenario is a situation where global warming is occurring very rapidly due to industrialization and over usage of vehicles and as a result the ozone layer, which is a protective shield from the harmful ultra-violet rays has been depleted. Hence it is mandatory to reduce the emission which causes global warming. The main motive of this project is to detect the over polluting vehicles at a rate faster than any other.

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