

Avoidance And Control Of Vehicular Pollution

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Abstract—The proposed system is aimed to build an automated control system for the pollution caused by vehicles at the emission level. It is used to monitor as well as control the pollutants from the vehicles. We have many strategies to monitor the pollution which are coming from the vehicle. The controlling of pollution is done by cutting the injection of fuel into the engine using solenoid valve. The pollution control circuit includes Smoke Sensor, GSM and Engine which are interfaced with a Controller. A unique feature of three level intimation system is established based on the threshold level of pollution: thrice SMS alert sent to user upon proper time intervals from a predefined number (RTO) and this intimation is displayed on LCD DISPLAY. In case of emergency situation, emergency stop button is used. At that time OTP is sent to the user for activation of engine for ONE hour.

IndexTerms—:PIC microcontroller, GSM module, smoke sensor, driver circuit, emergency control, LCD display

I. INTRODUCTION

The incomplete combustion of fuel in the engine of a vehicle leads to emission of different gases contributing increased level of pollution and adversely affecting the environment. Detection and control of these gases is an important area to work to save the environment. The pollutant emission from vehicles cannot be completely avoided but definitely can be controlled. Since they are the critical things to be controlled, a concept to reduce pollution, detect the location of vehicle using GPS and intimate the user with a three levels of intimation strategy along with a unique emergency recovery mechanism is proposed. As a solution to the above problems it is aimed to build an automated control system for the pollution caused by vehicles at the emission level. Smoke detector is used to detect the percentage of carbon in the smoke released by the vehicle due to incomplete combustion of fuel in it. Smoke detector is fixed at the end of the exhaust of vehicle from where smoke is released into the environment. The smoke detector detects carbon level and gives it to the Microcontroller to check the maximum percentage of carbon content in the smoke released by vehicles. Now, the controller checks the percentage of carbon and compares it with a threshold value. If it exceeds the threshold level, the system gets triggered and the engine comes to halt state and SMS is sent about this to the user and a nearby pollution control office through GSM.

II. LITERATURE SURVEY

Over the years, there have been several regulations made by the Government to control the emission from vehicles; most of them being unsuccessful at the same. The standards and the timeline for implementation are set by the Central Pollution Control Board under the Ministry of Environment & Forests. Bharat stage emission standards are emission standards instituted by the Government of India to regulate the output of air Pollutants from internal combustion engine equipment, including motor vehicles. The first emission norms were introduced in India in 1991 for petrol and 1992 for diesel vehicles. These were followed by making the Catalytic converter mandatory for petrol vehicles and the introduction of unleaded petrol in the market. On April 29, 1999 the Supreme Court of India ruled that all vehicles in India have to meet Euro I or India 2000 norms by June 1, 1999 and Euro II will be mandatory in the NCR by April 2000. Car makers were not prepared for this transition and in a subsequent judgment the implementation date for Euro II was not enforced. The standards, based on European regulations were first introduced in 2000. Progressively stringent norms have been rolled out since then. All new vehicles manufactured after the implementation of the norms have to be compliant with the regulations. Since October 2010, Bharat stage

III. NORMS HAVE BEEN ENFORCED ACROSS THE COUNTRY. IN 13 MAJOR CITIES, BHARAT STAGE
IV EMISSION NORMS ARE IN PLACE SINCE APRIL 2010.

TITLE	TECHNIQUE	MERITS	DEMERITS
Automated System for Air Pollution Detection and Control in Vehicles	GSM. GPS. Pollution control unit. Engine stopping circuit. Smoke/ temperature sensor.	Checks the pollution level of vehicle and stops it when pollution crosses the threshold value.	Stops the engine abruptly without any intimation. No facility for emergency cases.
VehNode: Wireless Sensor Network platform for automobile	A WSN based Vehicular pollution monitoring platform. Wireless sensor network. Web of things	Measures different types of pollutant concentrations contained in smoke produced by	It is used only to monitor and intimate the authority but does not stop or avoid the pollution caused by

pollution control	GPRS GPS	the vehicle and report the status automatically to the concerned agency.	the source.
An air pollutant vehicle tracker system using gas sensor and GPS	Gas sensor. GPS. MQ-7 CO sensor. TCP/IP.	Tracks the pollution level using MQ-7 and the data from GPS is sent to server using TCP/IP.	Used mainly for cars and cannot be implemented to all the vehicles. TCP/IP is used to send data which consumes more power and internet.
Industrial pollution monitoring GUI system using internet, Lab VIEW AND GSM	Lab VIEW GSM ph, CO, humidity, temperature sensor.	Find the amount of pH present in the industry, level of smoke released, machineries temperature and humidity in the industrial environment during industrial process. These parameters can be monitor through internet by using Lab VIEW software.	Finds only these parameters which are present in the industry and also these are monitored using Lab VIEW software which is hard to install and monitor on moving vehicles.
Smart industry pollution monitoring and controlling using Lab VIEW based IoT	Arduino IOT LabVIEW Xamps	Use of AT-mega 2560 Arduino board to collect the temperature and humidity parameter from the DHT -11 sensor, carbon dioxide concentration using MG-811 and update it into the online database using MYSQL. For monitoring and controlling, a website is designed and hosted which will give a real essence of IoT.	Monitors and updates the information in the cloud which is not necessary for monitoring day-to-day pollution level of millions of vehicles. Consumes more power and cloud space.
Optimal WSN Deployment Models for Air Pollution Monitoring	Design integer linear programming models that compute sensor deployments capturing both the coverage of pollution under time-varying weather conditions and the connectivity of the infrastructure.	Alternative or complementary approach, with a network of low cost and autonomous wireless sensors, aiming at a finer spatiotemporal granularity of sensing	This monitors only the air quality and give optimization models ensuring pollution coverage and network connectivity with minimum cost. But does not give a solution to control and avoid the pollution.

IV. PROPOSED WORK

The microcontroller is programmed to do mainly three functions namely: Comparison, emergency alert and stoppage of fuel. It takes two inputs, one from the smoke sensor and the other being the pre-defined threshold value specified by the government and are compared continuously. When the smoke sensor output is more than the threshold value, the microcontroller sends an alert message from predefined number [GSM] to user and thus the vehicle comes to the halt state. The message will be sent to the user and a time limit of ONE Week is provided for the user to give the vehicle for service. If suppose the timing is exceeded and still the pollution level is maintained, the pollution control department continuously monitor the status of pollution exhausted by vehicle and stop the usage of it by slowly cutting down the injection of fuel using the solenoid valve. This alert is given ONE HOUR before the stoppage, so that user can search for the nearby service center through GSM module. Every vehicle has

unique ID to locate and trace it for security purpose. In case of emergency, the message is sent to the predefined number(RTO) so that OTP is send to the user and the engine is activated for ONE hour alone. And this OTP is entered in emergency keypad input. This OTP is sent only to the owner of the vehicle. The pollution rate is displayed in LCD display.



Fig1. Process Diagram

V. FEATURES

- Periodically checks the amount of smoke expelled.
- Interfacing the microcontroller and engine.
- Comparing the threshold level with smoke exhausted continuously.
- Interfacing GSM module.
- Sending SMS alert.
- Sending warning SMS before one hour of fuel stoppage.
- Slow stopping of fuel.
- OTP is send in case of emergency for activation of engine for 1 hour.

VI. FUEL INJECTOR MODULE

The main function of the fuel injector is to supply the fuel to the engine. When the pollution limit is breached, the fuel must be cut. Fuel injector system work as a discontinuous control model (ON and OFF position) for fuel pump. Fuel injector system input is connected to the microcontroller and its output is connected to the Engine. The ignition switch is in the ON state when the pollutants are within limits. When the pollutants cross the threshold values the ignition switch get turned OFF. When the ignition switch gets ON the engine control unit starts i.e. the engine will start there by the Fuel pump relay gets excited and hence the petrol pump run continuously without any disturbance. While the pollution increases beyond the pre-defined value, the fuel injection will be stopped. In this proposed model, the engine control unit is programmed in such a way that, when the microcontroller receives the SMS from predefine number (RTO) then, that the fuel is cut off, hence the switch is turned off. In case of an emergency situation, the user presses emergency stop button. Hence an SMS alert is sent to RTO to release the lock and hence the fuel supply from the pump will be activated in solenoid valve for an hour.

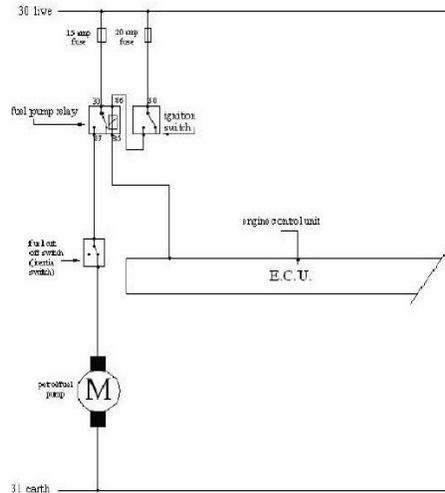


Fig.2 Fuel injector module

6.1 Hardware Component

1. Micro Controller
2. Engine
3. Emergency Keypad Input
4. Gsm Module
5. Power Supply
6. Smoke Sensor
7. Solenoid Valve

6.2 Software Requirement

1. Embedded C
2. Software Ide

VII. CONCLUSION

As the major pollution is caused by the vehicle, the gas exhausted by the vehicle should be reduced. In the former system, the pollution was monitored but not been controlled. This PROPOSED system is used for both monitoring and controlling the air pollution. The system is easy to implement and this may be helpful to save our environment. The way for intimation is also simple which is given by a systematically timed SMS to the user so which user can able to service the vehicle on or before time of service and so pollution rate is controlled.

VIII. FUTURE SCOPE

Every user is requested to service the vehicle before the service period is completed in order to reduce the emission rate and thus the environment is saved. The greenhouse effect will be reduced and so the depletion of ozone will be also be reduced. The life time of engine as well as for human is also increased and thus this system is beneficial in all such cause.

IX. REFERENCES

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