



Economic Human Safety for Co-Emission and Vehicle Fitness Constraints with Self Alert

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Abstract

Vehicles have become an integral part of every one's life. Situations and circumstances demand the usage of vehicles in this fast paced urban life. As a coin has two sides, this has its own effects, one of the main side effects being air pollution. Every vehicle will have emission but the problem occurs when it is beyond the standardized values. The primary reason for this breach of emission level being the incomplete combustion of fuel supplied to engine, which is due to the improper maintenance of vehicles. This emission from vehicles cannot be completely avoided but, it definitely can be controlled with the evolvement of semi-conductor sensors for detecting the various gases. The aim of the project is to monitor and control the pollutants in the vehicle by using the pollution control circuit. This pollution control circuit consists of various sensors like CO sensor, accident sensor, IoT module GPS and IoT module and all of them are integrated and connected to a PIC microcontroller. This paper demonstrates an effective utilization of technology by which we save our environment by controlling the pollution of vehicles. FC date is monitored with help of a memory. If in-case of FC period exit the IoT module will update the current vehicle location to the RTO office. This paper, when augmented as a real time project, will benefit the society and help in reducing the air pollution. The accident information system will alert vehicle owner relative or nearby hospital through

IoT with the accident location using GPS. It is also very useful for women safety. If women's are attacked by anyone, this system sends the GPS location by using switch. An RF transmitter is placed near the accident zone, which transmits a signal at a specific frequency. An RF receiver is installed in the vehicle and tuned to that frequency to detect the signal. Once the receiver detects the signal, it alerts the driver through an audible or visual warning, such as a flashing light or message on the dashboard display. This system can improve road safety by providing real-time alerts to drivers, helping to prevent accidents.

Keywords: Combustion of Fuel, Semi-conductor Sensors, Women Safety, RF Transmitter, Dashboard Display, Road Safety.

1. Introduction

Day by day the number of vehicles is increasing very fast. The incomplete combustion in the engine of a vehicle leads to emission of different gases contributing to increase in the pollution [1], [2] and adversely affecting the environment. Detection and control of these gases is an important area of work. This emission from vehicles cannot be completely avoided but, it definitely can be controlled. Now a day's accidents are common reason for deaths. These are critical things to control so here we come up with a concept to reduce pollution and detect the location of accident using GPS. As a solution to the above problems we aim to build an automated control system for emission level control of vehicle and accident place detection. Smoke detector is used to detect the carbon percentage in the smoke released by the vehicle due to 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 and gives it to the Microcontroller to check the maximum percentage of carbon content in the smoke released by vehicles. Temperature sensor can be used to sense the temperature in the vehicle. So the controller checks the percentage of carbon and temperature, if it exceeds the threshold level the system gets triggered and the engine comes

to halt state and then it sends SMS about this to the nearby pollution control office through IoT[3],[4]. Air excellence monitoring in addition management has gained abundant attention latterly as the impact of air quality [5] on several aspects of life. Besides the detrimental effects of toxic emissions on the environment and health, work productivity and energy efficiency are affected by air quality [6]. Many researches have shown that, in a work place, the rise of CO₂ levels ends up in an increase within the amount of unstable carbon-based mixtures (VOCs), odours, and microorganisms in the air. Moreover, nearly revisions have revealed that CO₂-based air controls can result in up to 50% energy savings (CO₂-based ventilation control can typically reduce HVAC cost in most buildings by 5% to 20%). Recently, Wireless Sensor Networks (WSNs)[have attained an excessive latent for an extensive applicability in the arenas of monitoring, observation, information gathering, and medical telemetry. This potential can be attributed to their attractive characteristics: WSNs can perform self-configuration and reconfiguration in the instance of any changes (for example a network topology change). WSNs can be monitored remotely. WSNs adapt well to mobility. Potentials of WSNs in air quality monitoring [8] have not been exploited to their fullest. Some WSN-based air quality monitoring systems have been introduced recently but they are not appealing enough to industry. Most of these are too difficult to implement, require specific instrumentation that is not open-hardware or open software, and are application and location dependent. They do not study excellence of package metrics of the networks like delay, accuracy, liableness.

The high demand of automobiles has also increased the traffic hazards and the road accidents. Life of the people is under high risk. This is because of the lack of best emergency facilities available in our country. An automatic alarm device for vehicle accidents is introduced in this paper. This design is a system which can detect accidents in significantly less time and sends the basic information to first aid centre within a few seconds covering

geographical coordinates, the time and angle in which a vehicle accident had occurred. This alert message is sent to the rescue team in a short time, which will help in saving the valuable lives. A Switch is also provided in order to terminate the sending of a message in rare case where there is no casualty, this can save the precious time of the medical rescue team. When the accident occurs the alert message is sent automatically to the rescue team and to the police station. The message is sent through the IoT [9] module and the location of the accident is detected with the help of the GPS module. The accident can be detected precisely with the help of both Micro electro mechanical system (MEMS) sensor and vibration sensor. The Angle of the rolls over of the car can also be known by the message through the MEMS sensor. This application provides the optimum solution to poor emergency facilities provided to the roads accidents in the most feasible way. Road accidents are a major cause of fatalities and injuries worldwide. In many cases, accidents occur due to a lack of information or awareness of dangerous road conditions ahead. To address this issue, we propose a system that uses RF technology [10], [11] to alert drivers of an accident zone ahead. The system provides advanced warning to drivers, enabling them to take necessary precautions and avoid a potential collision.

2. Proposed Methodology

Our paper aims at using those semi-conductor CO sensors at the emission outlets of vehicles which detects the level of pollutants and also indicates this level with a meter.

When the pollution/ emission level shoots beyond the already set threshold level, there will be indicate that the limit has been reached and the vehicle will stop after a certain period of time , a cushion time given for the driver to park his/her vehicle. After the timer runs out, the fuel supplied to the engine will be cut-off and the vehicle has to be towed to the mechanic

or to the nearest service station. The synchronization and execution of the entire process is monitored and controlled by a micro controller and the vehicle lock system is enabled automatically and also GPS location send it to the pollution control department. FC date is monitored with help of a memory. If incase of FC period exit the IoT send it to the RTO office with vehicle location. The vehicle lock mechanism can be controlled by user to our system through IoT module. The accident information system will alert relative of the vehicle owner relative or nearby hospital through IoT module with the accident location using GPS module. And also the emergency switch information system will alert relative of the vehicle owner relative or nearby police station through IoT module with the location using GPS module.

3.1. Block Diagram

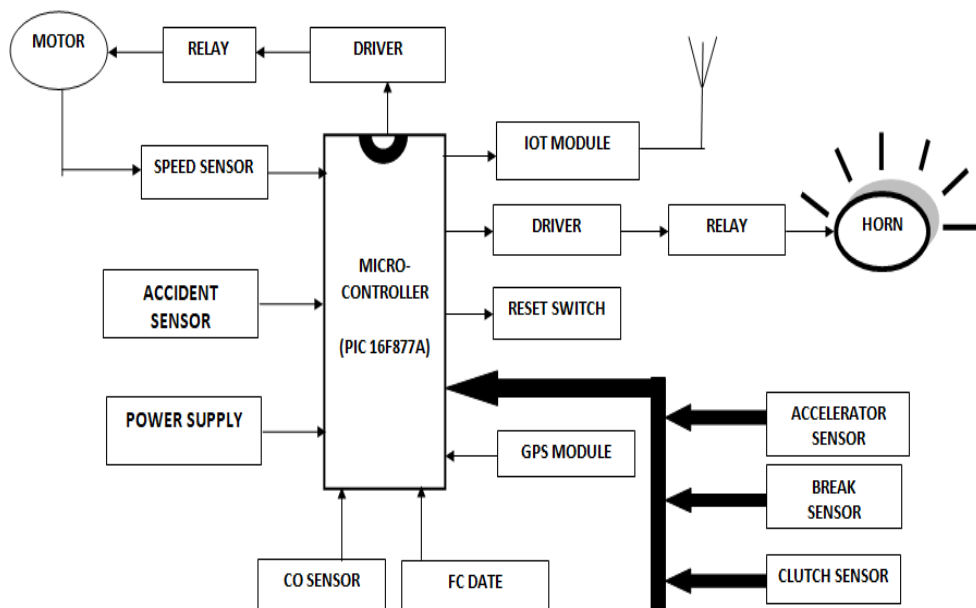


Figure.1. Block Diagram

3.2. Working Principle

This project is designed with Microcontroller, CO sensor, Level sensor, IoT (Internet of things), GPS (global positioning system), and LCD display, indicator panel. The CO sensor is

used to measure the CO level of the smoke from the vehicle. The CO sensor can obtain the level of the carbon and gives output to the signal conditioning unit in the form of physical quantity, then the transducer converts the physical quantity to analog voltage which is presented in the signal conditioning unit. so that we can get analog voltage from CO sensor as an analog voltage (0 to 5V). This analog output is directly connected to the PIC microcontroller at pin no: RA0. In PIC16F877A have in-built ADC (analog to digital converter), so that it can convert the analog voltage to digital output. We can easily compare the output of the CO level to the threshold level. This threshold level can be set by programming the PIC microcontroller. So whenever the CO level exceeds the threshold level, microcontroller indicates with led panel. If the CO level decreased before reaching the threshold level, then the vehicle run as usual. If the CO level exceeds the threshold level, PIC will turn off the vehicle engine. At same time, this system will sends the information to the pollution control department with GPS location of the vehicle with the help of IoT module. Then the vehicle can be turned on by receiving the information from pollution control department through cloud communication. Second part of this project is based on the FC (Fitness Certificate) of the vehicle. FC is the only identity to know the fitness of the vehicle, so it should be renewed periodically. In present scenario we are renew owner vehicle FC once a year. But everybody doesn't renew their FC. By using our system in real time we can easily overcome this problem. This project can be display the validity, so we can remind the owner to renew his FC. If the owner doesn't renew his FC, the vehicle will be turned off by the relay driver. Then the RTO can track the polluted vehicle easily by using IoT module. The accident information system will alert relative of the vehicle owner relative or nearby hospital through IoT module with the accident location using GPS module. Accelerator, brake clutch and steering position sensor indicate the position of accelerator, brake and clutch respectively. The entire process is monitored in Cloud.

4. Result and Discussion

This proposed system is designed with Microcontroller, CO sensor, IOT (Internet of things), GPS (global positioning system), and LCD display. The CO sensor is used to measure the CO level of the smoke from the vehicle. The CO sensor can obtain the level of the carbon and gives output to the signal conditioning unit in the form of physical quantity, then the transducer converts the physical quantity to analog voltage which is presented in the signal conditioning unit. so that we can get analog voltage from CO sensor as an analog voltage (0 to 5V). This analog output is directly connected to the PIC microcontroller at pin no: RA0. In PIC16F877A have in-built ADC (analog to digital converter), so that it can convert the analog voltage to digital output. We can easily compare the output of the CO level to the threshold level. This threshold level can be set by programming the PIC microcontroller. So whenever the CO level exceeds the threshold level. If the CO level decreased before reaching the threshold level, then the vehicle run as usual. If the CO level exceeds the threshold level, PIC will turn off the vehicle engine. At same time it will send the message to the RTO mobile number with GPS location of the vehicle with the help of IOT. Then the vehicle can be turned on by receiving the message from RTO. Second part of this project is based on the FC (Fitness Certificate) of the vehicle. FC is the only identity to know the fitness of the vehicle, so it should be renewed periodically. In present scenario we are renew owner vehicle FC once a year. But everybody doesn't renew their FC. By using our system in real time we can easily overcome this problem. This project can be display the validity, so we can remind the owner to renew his FC. If the owner doesn't renew his FC, the vehicle will be turned off by the relay driver. Then the RTO can track the polluted vehicle easily by using the message which is received from the IoT module.

5. Conclusion

Vehicle pollution is a significant environmental and public health issue that results from the release of harmful pollutants into the air from motor vehicles. The emissions from vehicles contribute to a range of environmental and health problems, including respiratory diseases, heart disease, cancer, and climate change. To reduce vehicle pollution, there are various measures that can be taken. The concept of detecting the level of Pollution and indicating it to the driver is implemented. There is an increase in the level of Pollution over the last couple of decades, leading to several Environmental problems. There will be a huge population, who do not take care of the pollution from their vehicles seriously, which has already resulted in several environmental problems such as Ozone layer depletion and so on. Hence this system will be highly beneficial in curbing this problem. The concept of detecting the level of Pollution and indicating it to the driver (vehicle owner through message) is implemented. There is an increase in the level of Pollution over the last couple of decades, leading to several severe Environmental problems and health issues. Due to busy life an automated system is needed to take the action against pollution control.

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