ENGINE SELF AUTOMATED SYSTEM FOR AIR POLLUTION DETECTION IN VEHICLES

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ABSTRACT: One of the major concerns regarding the environment is air pollution. Air pollution is addition of any harmful gaseous to the atmosphere, which causes the damaging of the environment, human health on quality of life in urban area that can endanger the health of human beings, plants, animals, or damage materials reduce visibility or release undesirable odors. By this one of the great problems faced in urban areas throughout the world is the increase in vehicles due to imbalance between the public transport and the increase in population, mobility and last mile connectivity. This increase in the number of vehicles has lead to increase in congestion and the increase in pollution by the private vehicles. this paper aims at using those semi-conductor 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 a buzz in the vehicle to indicate that the limit has been breached and the vehicle will stop after a certain period of time, a cushion time given for the driver to park his/her vehicle. During this time period, the GPS starts locating the nearest service stations. 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. This paper, when augmented as a real time project, will benefit the society and help in reducing the air pollution.

Keywords: Microcontroller, Gsm, Co, Temperature Sensor,GSM.

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 green house 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 round 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 semi conductor gas sensors. Therefore, in this paper an idea is suggested, which would be very helpful in reducing the amount of pollution from vehicles. The rest of the paper is organized as follows. Section II gives the background information and a brief note about the various research activities, on gas sensors and monitoring systems discusses about the various blocks of the proposed system. Section concludes the paper with an idea to implement the same as a real time project. II. The Hardware System Micro controller: This section forms the control unit of the whole project. This section basically consists of a Microcontroller with its associated circuitry like Crystal with capacitors, Reset circuitry, Pull up resistors (if

needed) and so on. The Microcontroller forms the heart of the project because it controls the devices being interfaced and communicates with the devices according to the program being written. **ARM7TDMI**: ARM is the abbreviation of Advanced RISC Machines, it is the name of a class of processors, and is the name of a kind technology too. The RISC instruction set, and related decode mechanism are much simpler than those of Complex Instruction Set Computer (CISC) designs. Liquid-crystal display (LCD) is a flat panel display, electronic visual display that uses the light modulation properties of liquid crystals. Liquid crystals do not emit light directly. LCDs are available to display arbitrary images or fixed images which can be displayed or hidden, such as preset words, digits, and 7-segment displays as in a digital clock. They use the same basic technology, except that arbitrary images are made up of a large number of small pixels, while other displays have larger elements.
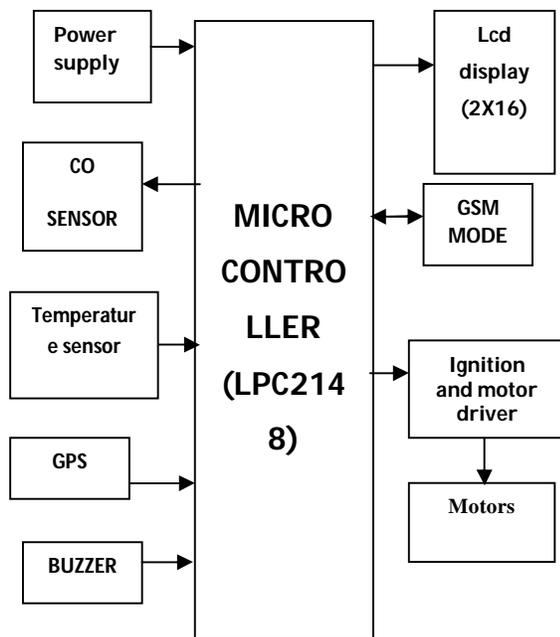
I. Design of Proposed Hardware System

Fig.1.Block diagram

The process of working of this project is explained as follows. The total equipment of this project is placed inside a vehicle. Here we have GPS (Global Positioning System) module by which we can get the location of the vehicle, the location values are displayed on the LCD (Liquid Crystal Display). In this project we have two sensors which are interfaced to the micro controller. Those are temperature sensor and CO sensor through which we can measure the temperature and amount of CO released from the vehicle. These values are also displayed on LCD. Here ADC (Analog to Digital Converter) is used to convert the analog data from the sensors to digital form. Whenever these values exceed the threshold then intimation is given to the RTA including vehicle's exact position

IV.Board Hardware Resources Features

Co Sensor: They are used in gas leakage detecting equipments in family and industry, are suitable for detecting of LPG, i-butane, propane, methane, alcohol, Hydrogen, smoke.

Specifications:

- Semiconductor Type Gas Sensor.

- Target gas/Typical detection ranges:

- MQ-4: Methane, Natural gas, 500 to 10000ppm.

- MQ-5: town gases, hydrogen, 100 to 3000ppm.

- MQ-6: propane, butane, liquefied petroleum gas,300 to 10000ppm. Standard circuit conditions:Heater voltage: 5V DC/AC

- Circuit voltage: 3~15V DC

- Heater power consumption: 750 Mw

- Temperature range: -20deg. C to +40 deg. C Size:Diameter19mm×High17mmorDiameter17mm×High10mm

Temperature Sensor: The LM35 is an integrated circuit sensor that can be used to measure temperature with an electrical output proportional to the temperature (in oC) The LM35 - An Integrated Circuit Temperature Sensor You can measure temperature more accurately than a using a thermistor. The sensor circuitry is sealed and not subject to oxidation, etc.

 The LM35 generates a higher output voltage than thermocouples and may not require that the output voltage be amplified. It has an output voltage that is proportional to the Celsius temperature. The scale factor is .01V/oC The LM35 does not require any external calibration or trimming and maintains an accuracy of +/-0.4 oC at room temperature and +/-0.8 oC over a range of 0 oC to +100 oC. Another important characteristic of the LM35DZ is that it draws only 60 micro amps from its supply and possesses a low self heating capability. The sensor self-heating causes less than 0.1 oC temperature rise in still air.

GSM

An embedded system is a special-purpose system in which the computer is completely encapsulated by or dedicated to the device or system it controls. Unlike a general-purpose computer, such as a personal computer, an embedded system performs one or a few pre-defined tasks, usually with very specific requirements. Since the system is dedicated to specific tasks, design engineers can optimize it, reducing the size and cost of the product. Embedded systems are often mass-produced,

benefiting from economies of scale. Global System for Mobile Communication (GSM) is a set of ETSI standards specifying the infrastructure for a digital cellular service. The standard is used in approx. 85 countries in the world including such locations as Europe, Japan and Australia1.

In this project we are using SIM 900 module as a Gsm. The modem will communicate with microcontroller using serial communication. The modem is interfaced to microcontroller using MAX 232, a serial driver.

CONCLUSION

This whole paper mainly focuses on two things. The First thing is the concept of detecting the level of Pollution and indicating it to the driver. 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 the pollution from their vehicles seriously, which has already resulted in several environmental problems such Ozone layer depletion and so on. So, this system will be highly beneficial is curbing this problem. The second reason is that this system will be one of the greatest improvements in technology to keep the Environment free from vehicular emission and bring it to a halt if the Pollution level is more than the Standards mentioned by the Government. The fact that this system is just an add-on, as it does

not change the configuration of the engine by any means, will make it easier to employ this system in the existing vehicles. The same concept can also be extended to industries.

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