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SMART REAL TIME MONITORING AND CONTROLLING OF HAZARDOUS GASES FROM A VEHICLE

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***Abstract*— Every vehicle has its own emission of gases, but the problem occurs when the emission is beyond the standardized values. The primary reason for such emission level is due to the the incomplete combustion of fuel supplied to the engine which is due to the improper maintenance of vehicles.the emission of hazardous gases can not be completely removed but it can be controlled.**

This paper designs present a initial experience in developing and monitoring and controlling of hazardous gasses from vehicle.it not only measures the pollution exhausted by vehicle but also it can be controled by using this digital gadget.The gas sensor senses the amount of exhausted smoke through exhausted pipe or silencer and displays on the LCD screen.if the level of exhausted harmfull gases increses the certain level then an alarm is ON even there will not control on exhaust of hazardous gases then a message will send to owner of vehical or any authorized person whose number is stored in memory of gsm modem.it is mainly made for detecting ,monitoring and controlling some amount of pollution from vehicle.

***Keywords*— sensors,arduino uno,gsm modem,alarm.**

INTRODUCTION

Smart real time pollution control system is a digital gadgets which helps to make a digital world. Though there is increase in the development of technology but we have been failed to take care about the surroundings in which we live in. CO detectors can be placed near the ceiling or near the floor because CO is very close to the same density as air.emission gasses defining the gas concentration limits are continuously falling aiminresults hazardous for human health. Since CO is colorless, tasteless and odorless (unlike smoke from a fire), detection in a home environment is impossible without such a warning device. It is a highly toxic inhalant and attaches to the hemoglobin (in the blood stream) with an affinity 200x stronger than oxygen, producing inadequate amounts of oxygen traveling through the body Motor vehicle emissions contribute to air pollution and are a major ingredient in the creation of smog in some large cities. A 2013 study by MIT indicates that 53,000 early deaths occur per year in the United States alone because of vehicle emissions. According to another study from the same university, traffic fumes alone cause the death of 5,000 people every year just in the United Kingdom.From this kinds of gases there are various problems for human beings such as headche, ashthma ,cancer etc. recently it is found that the gases are more toxic for seniour citizen and also it is avoiding from patients this paper designs not only measures the pollution exhausted by a vehicle but also it can be controlled by using this digital gadgets,which can be under control by R.T.O. . the gas sensor senses the or measures the amount of exhausted smoke throgh exhausted pipe or silencer and display on the LCD screen which is present on that

system. if the level of exhausted harmfull gases increses the normal level.then an alarm is generated even there will not control on exhaust of hazardous gases then a message will send to R.T.O. and also owner of vehical or authorized user via GSM module.

RELATED WORK: A **carbon monoxide detector** or **CO detector** is a device that detects the presence of the carbon monoxide (CO) gas in order to prevent carbon monoxide poisoning. In the late 1990s Underwriters Laboratories (UL) changed their definition of a single station CO detector with a sound device in it to a carbon monoxide (CO) alarm. This applies to all CO safety alarms that meet UL 2034; however for passive indicators and system devices that meet UL 2075, UL refers to these as carbon monoxide detectors. CO is a colorless, tasteless and odorless compound produced by incomplete combustion of carbon-containing materials. It is often referred to as the "silent killer" because it is virtually undetectable without using detection technology and, in a study by Underwriters Laboratories, "Sixty percent of Americans could not identify any potential signs of a CO leak in the home".[1] Elevated levels of CO can be dangerous to humans depending on the amount present and length of exposure. Smaller concentrations can be harmful over longer periods of time while increasing concentrations require diminishing exposure times to be harmful. According to the 2005 edition of the carbon monoxide guidelines, NFPA 720,[12] published by the National Fire Protection Association, all CO detectors "shall be centrally located outside of each separate sleeping area in the immediate vicinity of the bedrooms," and each detector "shall be located on the wall, ceiling or other location as specified in the installation instructions that accompany the unit."

According to the 2009 edition of the IRC,[13] published by the International Code Council, section R315.1, "For new construction, an approved carbon monoxide alarm shall be installed outside of each separate sleeping area in the immediate vicinity of the bedrooms in dwelling units within which fuel-fired appliances are installed and in dwelling units that have attached garages", and section 315.2, "Where work requiring a permit occurs in existing dwellings that have attached garages or in existing dwellings within which fuel-fired appliances exist

In this paper, the semiconductor sensors have been used to detect the pollutant level of the vehicles. This Paper concentrates mainly on three blocks; sensors, microcontroller and gsm modem. The smoke detector detects the pollutants (CO, NOx, etc.) continuously. The microcontroller compares the level of pollutants with the stipulated level allowed by the government. When the pollutant level exceeds the standardized limit, it sends a signal to the authorized user or any number which is stored in the memory On receiving a signal from the controller.

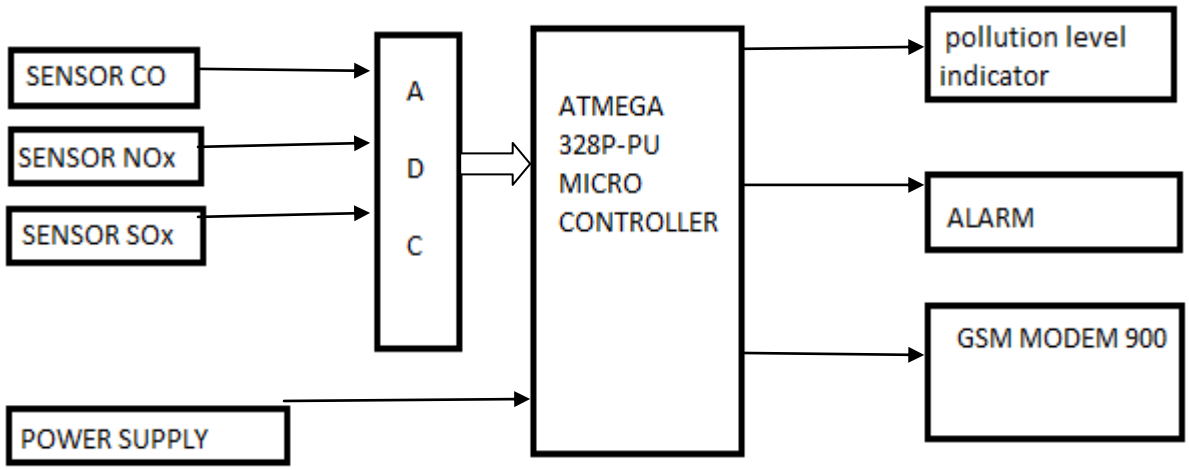
HARDWARE DESCRIPTION:

ATMEGA 328P-PU microcontroller: The Atmel picoPower ATmega328/P is a low-power CMOS 8-bit microcontroller based on the AVR enhanced RISC architecture. By executing powerful instructions in a single clock cycle, the ATmega328/P achieves throughputs close to 1MIPS per MHz. This empowers system designer to optimize the device for power consumption versus processing speed The Atmel 8-bit AVR RISC-based microcontroller combines 32 kB ISP flash memory with read-while-write capabilities, 1 kB EEPROM, 2 kB SRAM, 23 general purpose I/O lines, 32 general purpose working registers, three flexible timer/counters with compare modes, internal and external interrupts, serial programmable USART, a byte-oriented 2-wire serial interface, SPI serial port, 6-channel 10-bit A/D converter (8-channels in TQFP and QFN/MLF packages), programmable watchdog timer with

internal oscillator, and five software selectable power saving modes. The device operates between 1.8-5.5 volts. The device achieves throughput approaching 1 MIPS per MHz.

FEATURES: High Performance, Low Power Atmel®AVR® 8-Bit Microcontroller Family • Advanced RISC Architecture – 131 Powerful Instructions – Most Single Clock Cycle Execution – 32 x 8 General Purpose Working Registers – Fully Static Operation – Up to 20 MIPS Throughput at 20MHz. 32KBytes of In-System Self-Programmable Flash program Memory – 1KBytes EEPROM – 2KBytes Internal SRAM. 32KBytes of In-System Self-Programmable Flash program Memory – 1KBytes EEPROM – 2KBytes Internal SRAM. I/O and Packages – 23 Programmable I/O Lines – 28-pin PDIP, 32-lead TQFP, 28-pad QFN/MLF and 32-pad QFN/MLF • Operating Voltage: – 1.8 - 5.5V • Temperature Range: – -40°C to 105°C • Speed Grade: – 0 - 4MHz @ 1.8 - 5.5V – 0 - 10MHz @ 2.7 - 5.5V – 0 - 20MHz @ 4.5 - 5.5V • Power Consumption at 1MHz, 1.8V, 25°.

BLOCK DIAGRAM AND DESCRIPTION:



Carbon Monoxide (CO) sensors: A CO sensor is a device that detects the presence of the CO gas in order to prevent the CO poisoning. Figure 2.shows the MQ-7 Carbon Monoxide sensor. It ranges the output in the range of 20-20000 pp

Features:

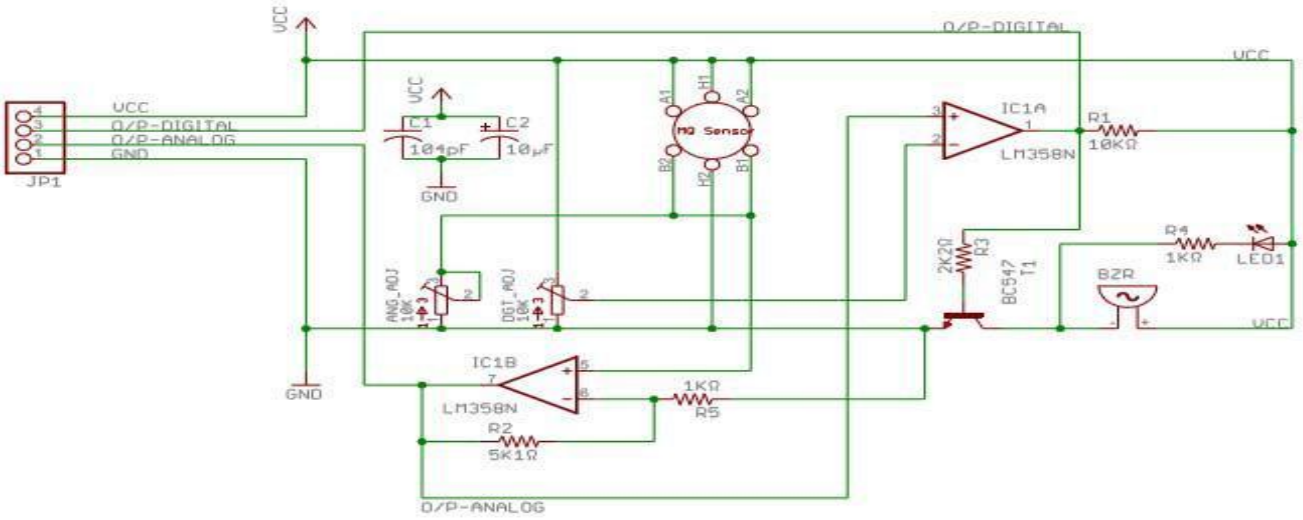
• High sensitivity

• Detection Range: 10-1000 ppm of CO

• Response time :< 150s

• Heater voltage: 5.0V

Sensitive material of MQ-7 gas sensor is SnO2, with lower conductivity in clean air. It make detection by the method of cycle high and low temperature, and detects CO when low temperature (heated by 1.5V) and the sensor's conductivity is higher along with the gas concentration rising. When high temperature (heated by 5.0V), it cleans the other gases adsorbed under low temperature. The specifications of the MQ-7 sensor are shown below. Figure 3 A simple electronic circuit is used which converts the change of conductivity to its corresponding output signal of gas concentration. MQ-7 gas sensor has high sensitivity to Carbon Monoxide. The sensor could be used to detect different gases contains CO and is a low cost and suitable for different applications.



LCD DISPLAY:

Liquid Crystal Displays (LCD) have materials, which combine the properties of both liquids and crystals. LCD is a flat electronic visual display. Light modulating properties of liquid crystals are being used for the video display in the LCD. An LCD consists of two glass panels, with the liquid crystal materials sand witched between them LCD are more reliable and energy efficient. Its low power energy consumption makes it to be used in battery powered electronic devices. LCD consists of array of small pixels. Each pixel of an LCD consists of a layer of molecules aligned between two transparent electrodes, and two polarizing filters, the axis of transmission is perpendicular to each other.

GSM : GSM (Global System for Mobile Communications: originally from Group Special Mobile) is the most popular standard for mobile telephony systems in the world. The GSM association has its promoting industry trade organization of mobile phone carriers and manufactures, estimate that 80% of the global mobile market uses this standard. A GSM modem is wireless modem that works with a GSM wireless network. GSM modem requires a SIM card from a wireless carrier in order to operate. A GSM available service like SMS (Short Message Service) represents alternative modalities to make remote measurements and control. SMS service is suited for remote control applications that requires small amount of data and rare activation, like sending alarms, or emergency commands. The system can be interconnected with the car alarm system and alert the owner, on his mobile phone. The system is composed by a microcontroller and a GSM phone A GSM modem is a specialized type of modem which accepts a SIM card, and operates over a subscription to a mobile operator, just like a mobile phone.

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IMPLEMENTATION: The level of the toxic gas CO is continuously sensed by the sensor MQ-7. The level is displayed in the LCD continuously for each and every second. When the level of the toxic gas CO exceeds the normal level then the microcontroller proceeds with an alarm. The GSM modem inside the vehicle sends a message to the authorized user about the alarming situation inside the cabin with the levels of the gases monitored by the sensors. Then ventilation is provided, so that the level of the toxic gases can be lowered as early as possible. This provides an immediate response to the situation which is an added advantage of the system.

Conclusion: This embeded system is designed and tested using arduino uno328p-p microcontroller.djkthis toxic gasses is insensible for human health and invisible like air.when co level exceeds the normal level then designed system provides an alarm and also message to authorized user.

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