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A Real Time Monitoring Of Gas Emission Vehicle Using Cognitive Iot

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Abstract *- With rise in the amount of heat trapping gases the earth is getting warmer day by day, leading to global warming. CO2 is the major contributor of the greenhouse gases. The main aim of this research is to reduce the greenhouse effect by real time monitoring and controlling of CO2 emission caused due to vehicles and industries using cognitive IOT. The Internet of Things (IOT) extends internet connectivity to a diverse range of devices and everyday things that utilize embedded technology to communicate and interact with the external environment, all via the Internet. In this proposal we have tried to make the CO2 detector intelligent by saving the CO2 levels in different regions. This model adheres to cognitive IOT and provides information for utilization of vehicular features based on the CO2 levels. The model is cost effective and also can be easily produced and integrated with vehicles and also in industries.*

Keywords: Cognitive IOT, CO2 detector, Internet centric.

Introduction

Any activity involving burning things/fuels and mixing substances that cause chemical reactions may release toxic gases in the process and some activities like construction, mining, transportation, etc. produce large amounts of dust which has the potential to cause air pollution. As generation of toxic gases from industries, vehicles and other sources is tremendously increasing day by day, it becomes difficult to control the hazardous gases from polluting the pure air pollution not only brings serious damage to human health but also causes negative effects to natural environments. The air pollution occurs due to contamination of air with Carbon monoxide (CO), Carbon dioxide (CO2), Nitrogen dioxide (NO2), Sulfur dioxide (SO2) and many other harmful pollutants. This pollutant causes serious damage to environment. It also has hazardous effects on human health. Carbon monoxide reduces oxygen carrying capacity of the body's organs and tissues which may lead to cardiovascular disease. Carbon monoxide causes visual impairment, reduced manual dexterity, reduced work capacity, poor learning ability.

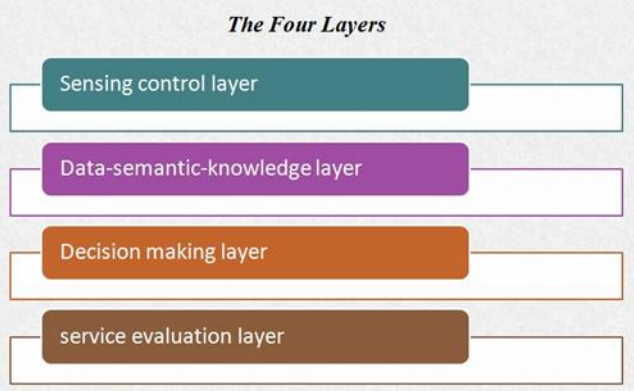
So it becomes more and more important to monitor and control air pollution. It will become easy to control it by monitoring the concentration air pollutant parameters in air. Using laboratory analysis, conventional air automatic monitoring system has relatively complex equipment technology, large bulk, unstable operation and high cost. This system can only be installed in key monitoring locations of some key enterprises, thus system data is unavailable to predict overall pollution situation. Using empirical analysis,

conventional air automatic monitoring system has high precision, but large bulk, high cost make it impossible for large-scale installation. Now a days, air pollution is monitored by static air quality measurement stations which are highly reliable and can measure the pollutants in air to a high level of accuracy and precision using analytical instruments, such as mass spectrometers, operated by official authorities. However, extensive cost of acquiring and operating such stations limits the number of installations. To monitor air quality, wireless sensor networks (WSNs) might be a great tool, because they can automatically collect air quality data. It will also help us to keep a working staff away from danger and a high security can be achieve and it will also help the Government authorities to monitor the air pollution.

The proposed system will focus on the monitoring of air pollutants concentration with the help of combination of Internet of things with wireless sensor networks. The analysis of air quality can be done by calculating air quality index. This information will be displayed on the webpage via internet in real time. By the combination of internet of things and wireless sensor networks for purpose of air pollution monitoring it becomes easy to keep the air quality data updated in real time. Also the system is cost effective which make its installation possible in various areas. The system existing before was based on microcontroller based toxic gas detecting and alerting system and the developing system will have a complete monitoring system which is IOT based. Also the information will be directly sent to the internet from system; no need of computer for transmission purpose which reduces the cost further.

Methodology

The proposed system will not only detect the concentration of pollutants in the air but also gives the information about quality of air. This information will be stored on a webpage with the help of internet. The user with access key of webpage can view the information and monitor it while sitting at far distance from the system. The proposed design falls in the CIOT (cognitive internet of things).The framework CIOT, serves as a transparent bridge between physical world like object, and social world together with itself to form an intelligent system. The cognitive proces of the our system where gases in the vehicle exhaust is monitored & consist of 4 major layer i.e.



Observation:

This paper presents the development of a cyber-physical system that monitors the environmental conditions or the ambient conditions in indoor spaces at remote locations

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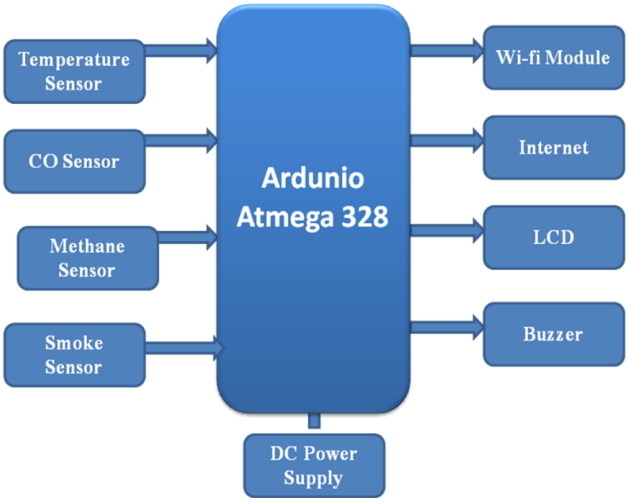
Block Diagram



Fig(a): Block Diagram of An integrated air pollution monitoring system with IOT platform

WORKING

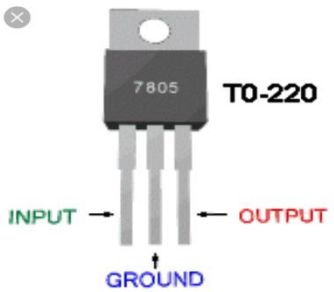
The block diagram of proposed system is shown in fig . It consists of Ardunio Board module in the center of system. The various sensors for detection of pollutants and other parameters are connected to ardunio board. Here Smoke, CO, Temperature and methane sensors will detect respective gas concentration and other parameters in the air of particular area. The concentration of particular parameter will be sensed by sensor and that values will collected by Ardunio module. Some analysis will be done on these values to find the air quality of that area. The information will also be displayed on the LCD display at system side. This information in analysis form will be send to the internet cloud using IOT module. This information is uploaded on the website from cloud. The user having key and password can access to the website to android cell phone. In case of emergency and high pollution condition the alarm can be generated at site by giving alarm command from the webpage itself.

Aurdino uno:

Arduino Uno is a microcontroller board based on the ATmega328P (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. The Arduino Uno board is a microcontroller based on the ATmega328. It has 14 digital input/output pins in which 6 can be used as PWM outputs, a 16 MHz ceramic resonator, an ICSP header, a USB connection, 6 analog inputs, a power jack and a reset button. This contains all the required support needed for microcontroller.

Fig(a):aurdino uno R3

A. ***IC 7805:*** Voltage source in a circuit may have fluctuations regulating in not providing fixed voltage output. A voltage regulator IC maintain the output voltage at a constant value. 7805 IC, a member of 78xxx series of fixed linear voltage regulator used to maintain such fluctuations, is a popular voltage regulator integrated circuit. The xx in 78xx indicate the output voltage its provides. 7805 IC provides +5v regulated power pply with provision to add a heat.



Fig(b):IC 7805

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B. ***smoke sensor:*** *Smoke sensor is a device that senses smoke, typically as an indicator of fire . Commercial security devices issues a signal to a fire alarm control panel as a part of a fire alarm systems, while household smoke detector, also known as smoke alarm, generally issues a local audible or visual alarm from the detector iitself* . Smoke detector are housing plastic inclosures, typically shape like a disk about 150mm in diameter& 25mm thick, but shape & size vary. Smoke cab be detector either optically or by physical process.

FIG.3.8 MQ-2 SENSOR

Fig(c):Smoke Sensor

C. ***Temperature sensor*:** Temperature sensor is a device that senses temperature. On most vehicle the coolant temperature sensor can be found somewhere nera the engine thermostats, which allow it to function optically. The Sensor work by measuring the temperature that being given of by the thermostat & coolant itself. The temperature is then sent to the on bord control system.

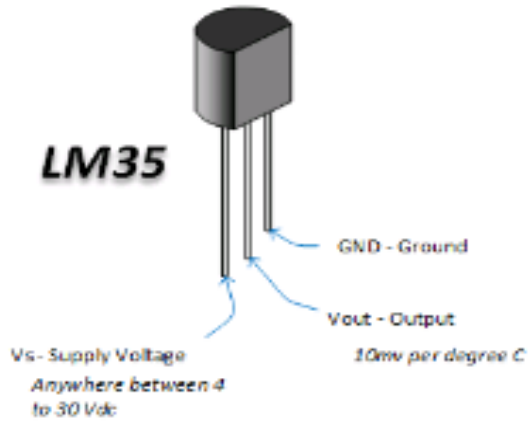

FIG.3.10 TEMPERATURE SENSOR

I

E. ***Methane sensor***: Methane sensor is a device that senses the methane gas. One of the most common uses for semiconductor sensor is in co sensor. They are also use in breath analyzers. Because the sensor must come in contact it the gas to detect it, semiconductor sensor work over a smaller distance than infrared point or ultrasonic detector.

FIG.3.14 MQ-4 SENSOR

Fig(e):Methane Sensor

Carbon monoxide: Carbon monoxide detector or co detector is a device that detects the presence of the carbon monoxide gas in order to prevent carbon monoxide poisoning. CO is a colourless testless and odourless compound produce by incomplete combustion of carbon containing material. CO detector are design to measure CO level over time & sound an alarm before dangerous level of CO accumulate in an environment, giving people adequate warning to safely ventilate the area. of a large number of small pixels, while other displays have larger

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elements. Since LCD screens do not use phosphors.

D. ***Buzzer*:** A Buzzer is an audio signaling device which may be mechanical, electromechanical or piezoelectric. Typical uses of buzzer or beapers include alarm devices, timer & conformation of user input such as mouse click or key stoke.

G. Lcd:

A liquid-crystal display (**LCD**) is a **flat**-panel display or other electronically modulated optical device that uses the light-modulating properties of **l**iquid crystals. Liquid crystals do not emit light directly, instead using a backlight or reflector to produce images in colour or monochrome. LCDs are available to display arbitrary images (as in a general-purpose computer display) or fixed images with low information content, 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 they do not suffer image burn-in when a static image is displayed on a screen for a long time (e.g., the table frame for an aircraft schedule on an indoor sign). LCDs are, however, susceptible to image persistence. The LCD screen is more energy-efficient and can be disposed of more safely than a CRT can its low electrical power consumption enables it to be used in batterypowered electronic equipment more efficiently than CRTs can be. By 2008, annual sales of televisions with LCD screens exceeded sales of CRT units worldwide, and the CRT became obsolete for most purposes.

Fig(*d*):Liquid crystal display

Advantages

1. The designed smart intelligent environmental system monitors the pollutants produced by the vehicles.

2. Warm the vehicle owners to control the pollution.

3. The air pollution agencies can able to analyze the data and also detect the vehicle registration number that causes more pollution in the atmosphere.

4. Low cost, simple to operate and is easily inserted in any location.

Application

1. Environmental monitoring

2. Fire detection

3. Weather Report monitoring

4. Detection of harmful gases in mines

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5. Home safety

Result

In our proposed system, the MQ-7 sensor is used to sense the CO gas concentration in the gas emitted from the vehicle. The DHT11 sensor is used to sense the temperature and humidity of the released gas. Both the sensors are placed facing the exhaust pipe. The arduino controller is inbuilt in the vehicle and the LCD display is placed in front of the driver near the steering. Both the sensors continuously sense the values and the values are sent to the arduino controller. The arduino controller then compares the CO concentration level with the threshold value set in the arduino. If the sensed value is greater than the threshold value then a message is sent to the owner of the vehicle and at the same time the vehicle id, threshold crossed sensor values along with date and time is sent to the database server maintained in the police control room. The owner is allowed to tune up the engine. Every day a warning message is sent to the vehicle owner and the database entry is made in the police control room until the owner tunes up his vehicle's engine. So, the corrective action can be taken on the vehicle's owner if he delays to tune up the engine. In the below figure we can see the temperature and humidity value and the CO sensor value displayed on the LCD display.

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Fig: Output display on LCD display

Fig. Output displayed on LCD display In the fig. 9.1 we can see the picture of the LCD display. Here, T represents the temperature of the released gases, H represents the humidity of the released gases relative to temperature and CO represents the CO concentration in the released gases from the particular vehicle.

Conclusion

Pollution Check has to be done every 6 months and hardly people get it done. Our model has to be installed one time and goes on for 10 years. Also the model adheres to real time monitoring of CO2 which can reduce the greenhouse gas in the environment as compared to the existing system of pollution check. This Product can cut down and control the emission considerably. It will gradually reduce Global Warming, if implemented on global scale.

Acknowledgement

It is indeed our great pleasure and proud privilege to complete the project entitled **A REAL TIME MONITORING OF GAS EMISSIONS VEHICLE USING COGNITIVE IOT** as a combined effort of all involved in our project. In the midst of this pleasure and satisfaction we express our deep sense of gratitude and whole

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