AN IOT BASED VEHICLE COMMISING AND CONTROL SYSTEM FOR AIR POLLUTION

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ABSTRACT

The level of air pollution has increased with times by lot of factors like the increase in population, increased by vehicle use, industrialization and urbanization which results in harmful effects of human wellbeing by directly affecting health of population exposed to it. In order to monitor in this project we are going to make an IOT based vehicle commising and control system for air pollution the air quality in the engine using vehicle by IOT and it will trigger alarm ,when the air quality goes down beyond a certain level, it means when there are sufficient amount of harmful gases are present in the air like CO2, It will show the air quality in PPM on the LCD, so that we can monitor very easily, MICROCONTROLLER is passes information with the help of WI-FI module to the RTO and they send the warning message to the vehicle user through the TCP/IP client app, In this IOT project you can monitor and control the pollution level from anywhere using your mobile through TCP application.

OBJECTIVE:

An IOT based vehicle commising and control system for air pollution is reduce the air pollution released by the use of vehicles.

MICROCONTROLLER UNIT

A microcontroller unit is a true computer on a chip. The design incorporates all the features found in a microprocessor such as CPU, ALU, PC, SP and registers. It also has added features needed to make a complete computer ROM, RAM, parallel I/O, serial I/O, counters and clock circuit.
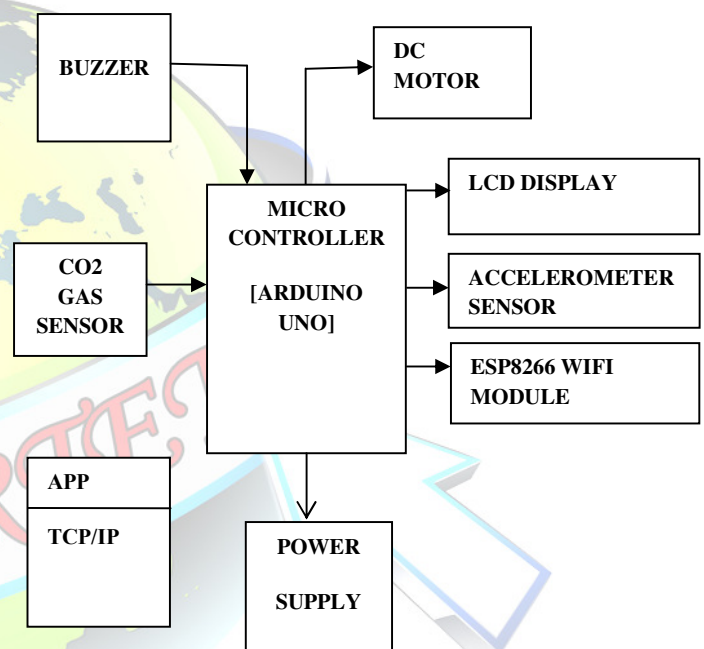
ARDUINO MICROCONTROLLER

PIN DIAGRAM

The clock speed is 16 MHZ, which translates to about executing about 300,000 lines of C source code per second. The board has 14 digital I/O pins and 6 analog input pins. There is a USB connector for talking to the host computer.

SYSTEM ARCHITECTURE

BLOCK DIAGRAM

MICROCONTROLLER:

A microcontroller is a complete microprocessor system built on a single IC . Microcontrollers were developed to meet a need for microprocessors to be put into low cost products. Building a complete microprocessor system on a single chip substantially reduces the cost of building simple products, which use the microprocessor's power to implement their function, because the microprocessor is a natural way to implement many products. This means the idea of using a microprocessor for low cost products comes up often.

MEMORY

The ATMEGA 328 has 32KB of flash memory storing code (of which is used for the bootloader); It has also 2KB of SRAM and 1 KB of EEPROM (which can be read and written with the EEPROM library).

INPUT AND OUTPUT

Each of the 14 digital pins on the Uno can be used as an input or output, using pinMode(), digitalWrite(), and digitalRead() functions. They operate at 5 volts. Each pin can provide or receive a maximum of 40 mA and has an internal pull-up resistor (disconnected by default) of 20-50 kOhms.

ARDUINO UNO ATMEGA328 DATA SHEET

"Uno" means one in Italian and is named to mark the upcoming release of Arduino 1.0. The Uno and version1.0 will be the reference versions of Arduino, moving forward. The Uno is the latest in a series of USBArduino boards, and the reference model for the Arduino platform;

PIN EXPLANATION:

The Arduino Uno is a microcontroller board based on the ATmega328 (datasheet). It has 14 digitalinput/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, aUSB connection, a power jack, an ICSP header, and a reset button. It contains everything needed tosupport the microcontroller;
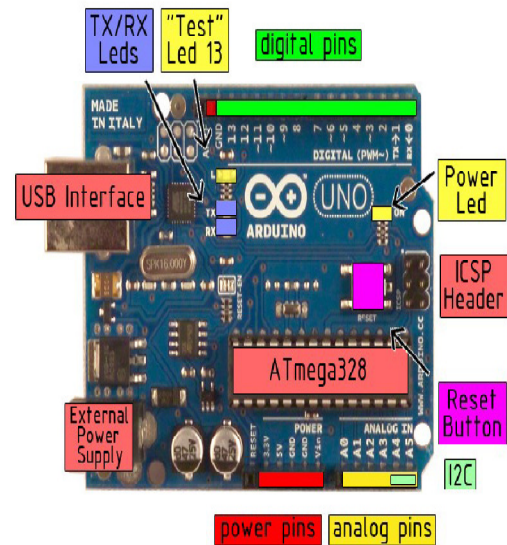
POWER SUPPLY

The Arduino Uno can be powered via the USB connection or with an external power supply. The powersource is selected automatically. External (non-USB) power can come either from an AC-to-DC adapter (wall-wart) or battery. The adaptercan be connected by plugging a 2.1mm center-positive plug into the board's power jack

IC VOLTAGE REGULATORS:

Voltage regulators comprise a class of widely used ICs. Regulator IC units contain the circuitry for reference source, comparator amplifier , control device , and overload protection all in a single IC. IC units provide regulation of either a fixed positive voltage, a fixed negative voltage, or an adjustable set voltage.

BUZZER

A buzzer or beeper is a signaling device, usually electronic, typically used in automobiles, household appliances such as a micro**wave oven, or game shows.**

DC MOTOR

A DC motor is any of a class of rotary electrical machines that converts direct current electrical energy into mechanical energy. The most common types rely on the forces produced by magnetic fields. change the direction of current flow in part of the motor

CO2 GAS SENSOR

The CO2 Gas Sensor measures gaseous carbon dioxide in two ranges–0 to 10,000 ppm and 0 to 100,000 ppm with this sensor, you can easily monitor changes in CO2 levels occurring in respiration of organisms ranging from peas to humans on the high range, you can explore human respiratory changes in CO2 levels based on exercise.

WIFI MODULE ESP8266
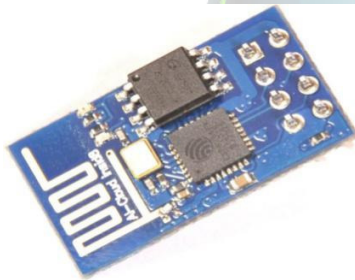
The ESP8266 is a low-cost Wi-Fi microchip with full TCP/IP stack and microcontroller capability produced by Shanghai-based Chinese manufacturer, Espressif Systems. This small module allows microcontrollers to connect to a Wi-Fi network and make simple TCP/IP connections using Hayes-style commands.

ACCELEROMETER SENSOR

One of the most common inertial sensors is the accelarometer, a dynamic sensor capable of a vast range of sensing. Accelerometers are available that can measure acceleration in one, two, or three orthogonal axes.

TCP/IP CLIENT APP

TCP/IP Framework (TCP/IP CF) is a library that wraps the .NET Socket class and defines several classes for developing communication applications that use TCP/IP. TCP/IP CF defines asynchronous operations and is designed to be used in small applications that communicate with a few devices or server applications that maintain communication with a large number of devices.

LCD

LCD is used to display the results of the system operation such as sensed values, motor status etc….A liquid-crystal display (LCD) is a flat panel display, electronic visual display, or video display that uses the light modulating properties of liquid crystals. Liquid crystals do not emit light directly. The LCD standard requires 3 control lines and 8 I/O lines for the data bus. The most commonly used Character based LCDs are based on Hitachi's HD44780 controller or other which are compatible with HD44580. In this tutorial, we will discuss about character based LCDs, their interfacing with various microcontrollers, various interfaces (8-bit/4-bit), programming, special stuff and tricks you can do with these simple looking LCDs which can give a new look to your application.

SOFTWARE REQUIREMENT

EMBEDDED C

Embedded C Programming is the soul of the arduino uno processor functioning inside each and every embedded system we come across in our daily life, such as mobile phone, washing machine, and digital camera.

EMBEDDED C PROGRAMMING

Earlier, many embedded applications were developed using assembly level programming. However, they did not provide portability. This disadvantage was overcome by the advent of various high level languages like C, Pascal, and COBOL. However, it was the C language that got extensive acceptance for embedded systems, and it continues

to do so. The C code written is more reliable, scalable, and portable; and in fact, much easier to understand
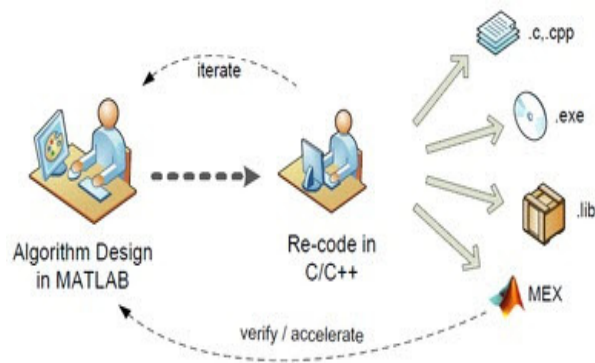
CONCLUSION

The system is monitor and control the air pollution through the IOT based vehicle commising and control system using Arduino uno microcontroller using ATMEGA 328, This IOT technology is proposed to improve the quality of air and control the air pollution with the use of IOT technology to enhances the process of monitoring various aspects of vehicle air quality, here CO_2 gas sensor is used to sense the CO_2 type dangerous gas and arduino uno is the heart of this project which controls the entire process ,WIFI module ESPRESSIF connects the whole process to the internet and LCD display is used for the visual output ,Buzzer is used for trigger a alarm when the air quality is goes down beyond the certain level then the message can be sends to the higher authority person with the help of wifi module they sends the warning message to the user, the user is receiving the message with help of TCP/IP client application, in this project through we can monitor the air pollution level from anywhere

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