IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

AIR QUALITY PREDICTION

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ABSTRACT

Because air pollution has a range of negative repercussions for human health, ecosystems, and climate change, it is both an environmental and a social concern. One of Europe's most important environmental health issues today is air pollution. Air quality is the most significant factor that directly increases the prevalence of diseases and reduces the quality of life in cities and metropolitan areas. The capacity to make appropriate decisions in a timely way is based on air quality data collection and interpretation, necessitating the development of real-time air quality monitoring. A full level investigation of key contaminants and their sources is possible using multi-parameter air quality monitoring devices.These monitoring devices are used in many smart city efforts to monitor air quality and minimise main pollutant concentrations in urban areas. As air pollution levels rise in both wealthy and developing nations, a more portable and cost-effective solution is required. A concept for detecting air pollution and creating public awareness is included in the proposed system. The purpose of this research is to leverage IoT and the cloud to make services more real-time and faster. The proposed gadget will be installed in a place with severe air pollution. The level of each hazardous pollutant is tested at regular intervals..To determine the Air Quality Index (AQI) for the observed pollutants and create public awareness, an android app that displays the amount of each detected pollutant as well as the air quality index in that specific location is employed.

INTRODUCTION

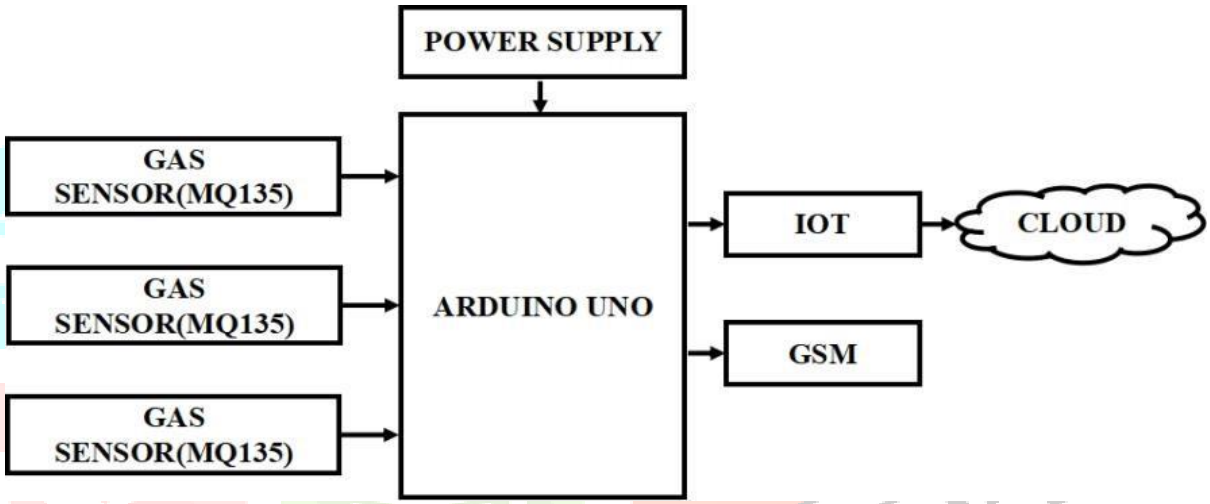
Air pollution is the most serious environmental issue, with several negative consequences for human health, water bodies, and climate. Vehicles are the primary cause of air pollution in all large cities, with industry being the secondary source. Vehicle usage has resulted in a significant rise in pollutants in the atmosphere. This is the source of environmental pollution that has a negative impact on human health. Other respiratory issues, such as asthma episodes and skin rashes, have also been reported. The Central Pollution Control Board has established a norm at these levels, but the public is hesitant to comply. Because the contaminants that pollute the air are unseen, people have become negligent. As a result, today's primary requirement is public recognition. As a result, the suggested approach addresses this significant problem. The air pollution monitoring system is put at a specific location where there are evidence of acute air pollution in order to identify the constituent gases of air that might impair human health and other living things. This system predicts the levels of numerous dangerous gases such as CO, NH3, particulate matter, and smoke using Arduino and multiple gas sensors. Carbon monoxide is given first priority since it is a greenhouse gas and a major pollutant that contributes to global warming. Previous products did not have the benefit of keeping pollution rates current.

PROPOSED SYSTEM

This project is an IoT-enabled air tainting metre that monitors air quality on your phone using the Server and an Arduino board. The server stage of the Internet of Things (IoT) is often used to operate Arduino boards. On your phone, the server delivers a computerised dashboard that shows continuous air quality data for your immediate area. The IOT server was not created with a certain board or shield in mind. Whether you connect the Arduino or Raspberry Pi to the Internet by Wi-Fi, Ethernet, or an ESP8266 chip, you'll be ready for the web and the Internet of Things. The analogue and digital pins on the Arduino are used to connect the sensors. The microcontroller has an ADC built in. An ADC is a data processing technique that converts analogue impulses into digital codes, allowing originality and digital circuitry to coexist. Analogue signal levels are continually changing. Analog signals change in value over time and are gathered by a range of sensors that track a number of variables. Many digital devices connect with their surroundings through analogue signals. Through the transmitter and receiver, the data from the analogue to digital converter is sent to the Wi-Fi chip (Tx and Rx). The data is then stored on a secure cloud platform. The cloud values may be monitored using the open source mobile application. Warnings and frequent alerts are given when the values for Hardware Setup exceed the threshold value.

A. Block Diagram

This is the general depiction of the Air Quality Prediction Process, and in this function, we have several diagrams that show the Power Supply, the Arduino Uno Board, and the Gas sensors that are attached to the function. The devices are subsequently connected to the IoT, and then the system is connected to GSM.

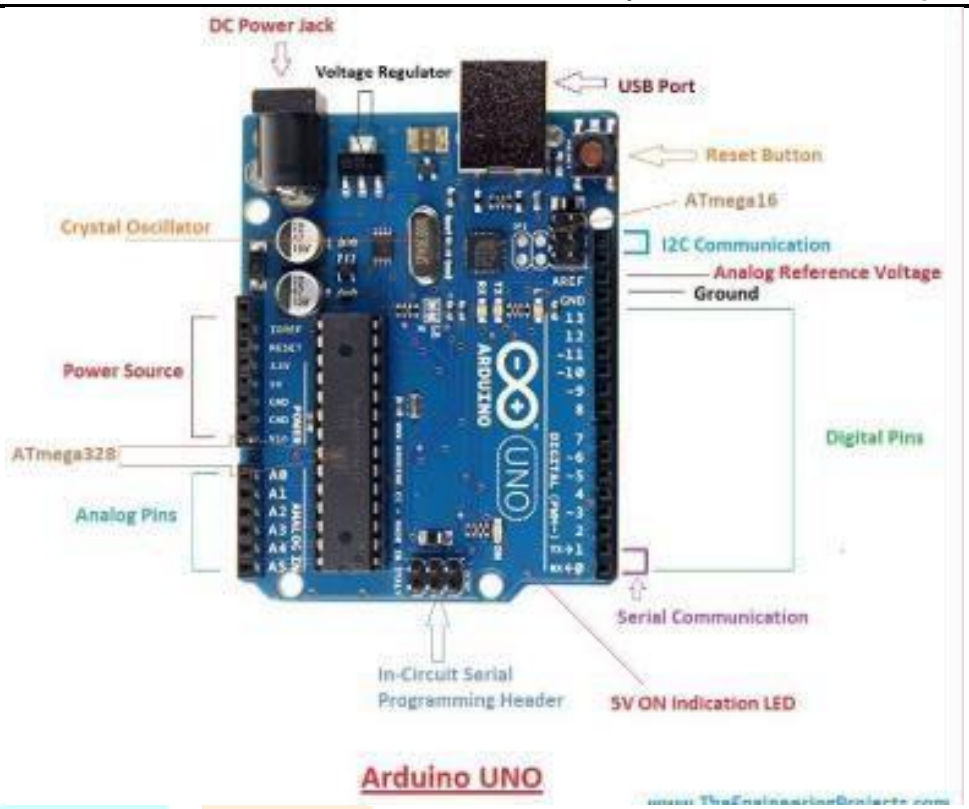


B. WORK FLOW DIAGRAM

Work flow diagram is a function that shows how the function works and then the start will execute and then get the data from the sensor and then the threshold values are fixed based on the data from the user and then based on the function and then the Torn on the ventilation motor and the datas are uploaded in the cloud and then we see these function and get the datas in the webpage.

Arduino Uno

The Arduino Uno is an ATmega328-based microcontroller board (datasheet). It features 14 digital input/output pins (six of which may be used as PWM outputs), six analogue inputs, a 16 MHz ceramic resonator, a USB port, a power connector, an ICSP header, and a reset button. It comes with everything you need to get started with the microcontroller; simply connect it to a computer by USB or power it with an AC-to-DC converter or battery. The Uno is unique in that it does not employ the FTDI USB-to-serial driver chip seen on previous boards. Instead, it uses a USB-to-serial converter based on the Atmega16U2 (Atmega8U2 up to version R2). A resistor pulls the 8U2 HWB line to ground on revision 2 of the Uno board, making it easy to put into DFU mode.



Pinout

SDA and SCL pins were added near the AREF pin, as well as two additional pins near the RESET pin, the IOREF, which allow the shields to adjust to the voltage supplied by the board. Shields will be compatible in the future with both the AVRbased boards that run on 5V and the 3.3V-based Arduino Due boards. The second is an unconnected pin that will be used in the future.

Gas Sensors

A gas detector is a device that detects the presence of gases in a space, and is frequently used as part of a safety system. This sort of technology detects gas leaks or other pollution and may communicate with a control system to shut down a process automatically. Operators in the area where the leak is occurring can be alerted by a gas detector, giving them the chance to flee. Because many gases may be detrimental to biological life, such as people or animals, this sort of equipment is essential. Combustible, flammable, and poisonous gases, as well as oxygen deficiency, may all be detected with gas detectors. This sort of equipment is commonly utilised in industry, and it may be found in places like oil rigs to monitor manufacturing processes and developing technologies like photovoltaics. They might be used to combat fires.

Catalytic bead (Pellister)

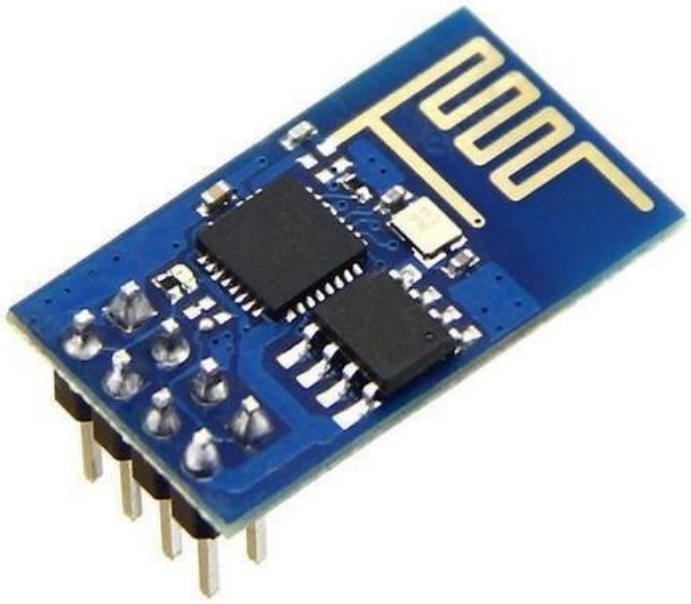
When concentrations are between the lower explosion limit (LEL) and the upper explosion limit (UEL), catalytic bead sensors are widely employed to assess flammable gases that pose an explosive threat (UEL). On opposing arms of a Wheatstone bridge circuit, active and reference beads with platinum wire coils are electrically heated to a few hundred degrees C. The catalyst in the active bead causes combustible chemicals to oxidise, causing the bead to heat up even more and change its electrical resistance. The voltage differential between the active and passive beads is related to the amount of flammable gases and vapours present. When the instrument is taken into an atmosphere containing flammable gases, the sampled gas reaches the sensor through a sintered metal frit, which acts as a barrier to avoid an explosion. Pellistors can detect almost all flammable gases, although they are more sensitive to tiny molecules that diffuse more quickly through the sinter. The detectable concentration varies from a few hundred parts per million to a few percentage points.

GSM

For communication purposes, the GSM system was built as a digital system employing the time division multiple access (TDMA) approach. A GSM digitises and compresses data before sending it along a channel with two separate streams of client data, each in its own time slot. The digital system can handle data speeds ranging from 64 kbps to 120 Mbps.

ESP8266 MODULE

With Hayes-style instructions, microcontrollers may connect to a Wi-Fi network and establish rudimentary TCP/IP communications. Many hackers were drawn to investigate the module, chip, and software on it, as well as translate the Chinese documentation, because it appeared to be relatively cheap in bulk.

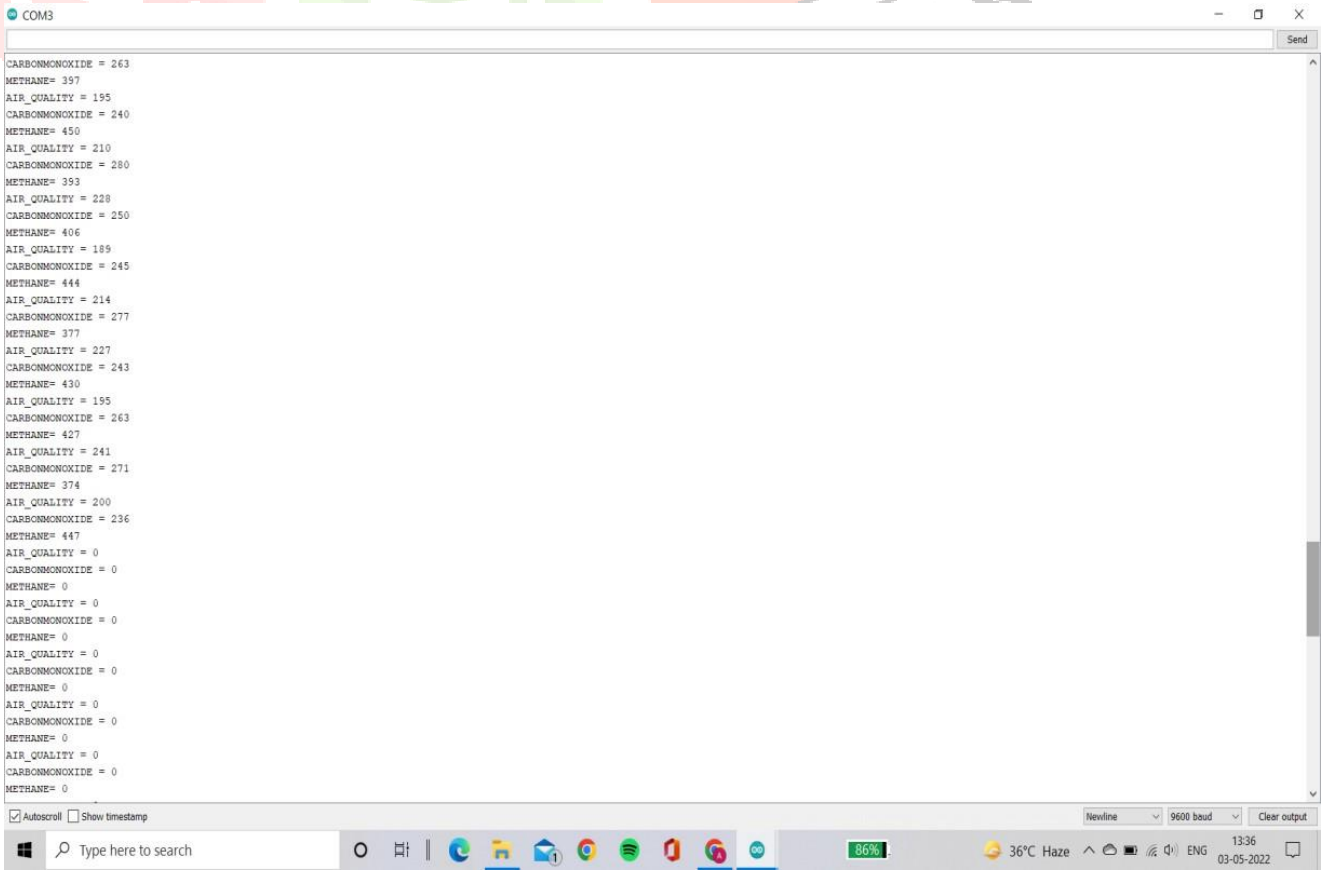


Embedded c

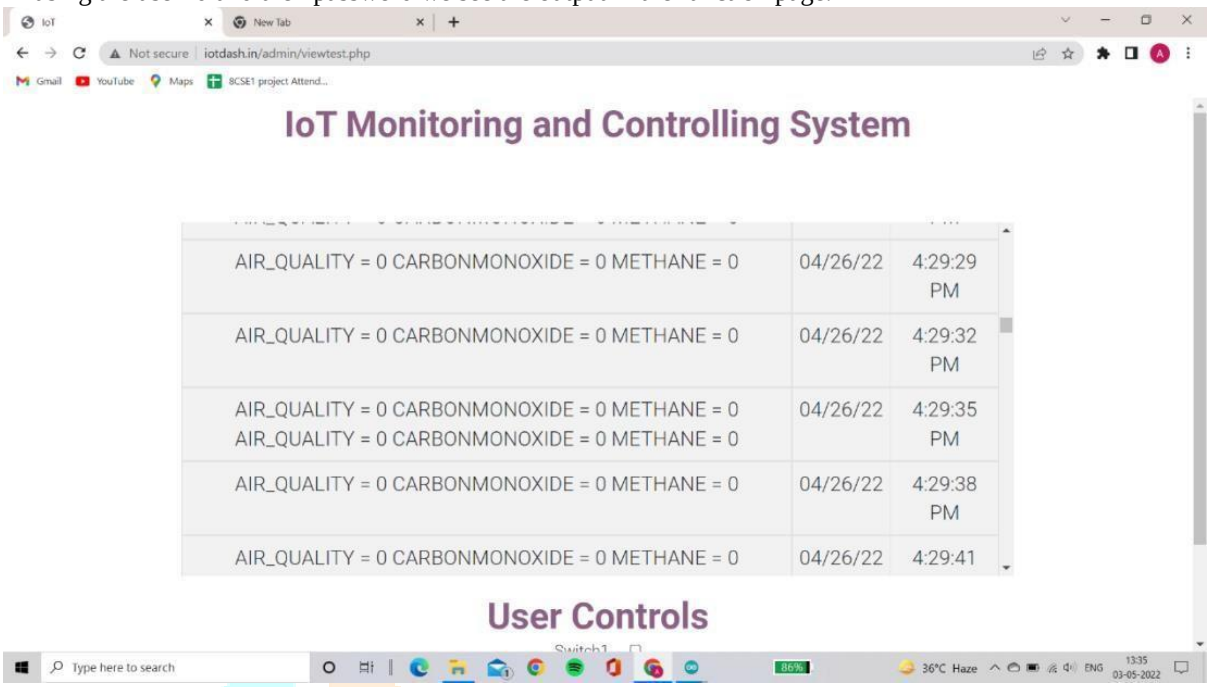
Embedded C is the most widely used programming language in the software industry for creating electrical devices. Embedded software is coupled with each processor in an electronic system. Embedded C programming is essential for the CPU to accomplish specified tasks. We utilise various technological equipment in our daily lives, such as cell phones, washing machines, digital cameras, and so on. The microcontrollers that power these devices are programmed in embedded C.

RESULTS

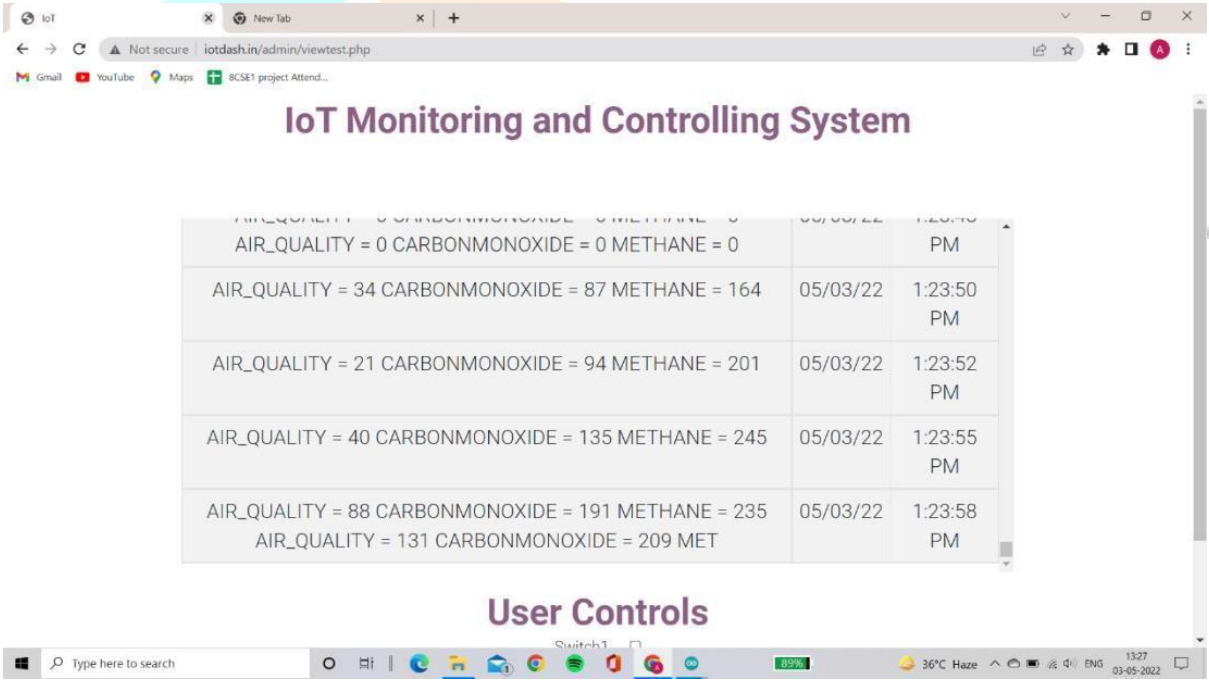
They illustrate the functions that the Gas sensors are linked to the Arduino uno board and then they gathered data from the environment and then they contain the function that collects and delivers data to the function and then it detect the function depending on the value.



In the next page, the system shows the function and we see the output in the next page through the node mcu and we enter using the user id and then password we see the output in the function page.



The below page the value in the IOT and then it has shows the disease based on the values in the function.



I.CONCLUSION AND FUTURE WORK

Within the framework of the study, the construction of the electronic tracking system "Calculation of the Average Life Time of an Average Person Based on the Indoor Oxygen Content" assessed the quantity of oxygen and gas in the environment. These actions are read using MQ135, MQ7, and MQ4 sensors attached to Arduino, and the readings are sent to desktop and online apps through serial port, as well as a mobile app via Wi-Fi module. The goal of this technology is for those who are imprisoned in tight locations to see their life span and realise that they have more time than they thought.

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