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AIR PURITY DETECTION USING IOT

V.K.G.Kalaiselvi[1], Pushgara Rani D[2], Hariharan Shanmugasundaram[3]
Bhanu Prasad A[4], Pavithra P[5], Sneka L[6]

[1]*Assistant Professor, Department of Information Technology, Sri Sairam Engineering College Chennai, India*
[2]*Assistant Professor, Department of ECE, Sri Sairam Institute of Technology, Chennai*
[3]*Professor, Department of Computer Science and Engineering, Vardhaman College of Engineering, Hyderabad, India*
[4]*Associate Professor, Department of Computer Science and Engineering, Vardhaman College of Engineering, Hyderabad, India*
[5]*Student, Department of Information Technology, Sri Sairam Engineering College, Chennai, India*

[6]*Student, Department of Information Technology, Sri Sairam Engineering College, Chennai, India*

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ABSTRACT

Increased levels of air pollution have come from technological advancements during the industrial and urban eras, as well as an increase in the number of vehicles on the road. Excessive pollution in the air has a negative impact on both economic growth and the environment. The foundations of this project are the representation and implementation of an Air Quality Analysis System. It is critical to evaluate air quality in the future in order to raise awareness about the need of guaranteeing a healthy future. The sensors analyze dust particles, carbon dioxide, carbon monoxide, nitrogen dioxide, and sulphur dioxide levels in the air using wireless sensors. These measurements are transmitted to a gateway, which delivers them to a cloud database via cellular or Wi-Fi connection. To give data on air quality, the information is examined in the cloud. We will utilize the Blynk iot stage to make an air quality checking framework for this undertaking.

I. INTRODUCTION

Continued exposure to poor air quality surroundings is a serious public health risk in both industrialized and developing countries. Pollutants responsible for poor air quality are estimated to cause almost 2.5 million premature deaths worldwide each year. Because of its connection to industrialisation, public health issues connected with poor air quality disproportionately affect industrialized and developing countries. When airborne contaminants are found, it is frequently simple to take corrective measures to enhance air quality. The Air Excellence Guide (AEG) is a possible common indicator of air quality. The Air Quality Indicator (AQI) is computed and supported on air pollutants such as CO and NO2 compounds that consume opposing properties that happen to the environment and human health. The

Air Quality Indicator is a range that reflects the best meditation of a certain air unused matter at a specified moment. I propose an air quality and air pollution monitoring system that uses the Internet of Things to monitor and check live air quality and air pollution in a given location (IoT). It employs air sensors (Gas Sensor MQ135) to detect the presence of hazardous gases/compounds in the air and continuously transmits this information. Furthermore, the system continuously measures and reports the air level. This study requires people to determine which components of the air are contaminated. Because nodemcu esp12E has Wi-Fi, we can remotely monitor air pollution with module node mcu esp12E.

II. LITERATURE REVIEW

[1] The semiconductor gas sensors could be used to track the target gas concentrations. Using semiconductor sensors, a device has several advantages such as low cost, rapid response, low maintenance, continuous measuring capacity, and so on. A compact scale is one of the system's main advantages.WLAN, network server, and site server Gateway Node are all included in a single lightweight edition. That's a great size for the device. This gadget also aids in the incorporation of various hardware components into the controller as a credit scale microcomputer. The

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network can be modified by including more sensor nodes. Because of its extensive nature and calculation testing, this device is really useful. The technology can be used to track emissions as a smart portable tool.

[2] To enhance air quality, a system to monitor the environment's air utilizing Arduino microcontroller and IOT Technology is presented. The use of Internet of Things (IoT) technology improves the process of monitoring many parts of the environment, such as the air quality monitoring issue discussed in this study. The MQ135 and MQ6 gas sensors are used to detect several types of harmful gases, and the Arduino is at the core of this project. Which is in charge of the entire procedure. The Wi-Fi module connects the entire process to the internet, and the visual output is provided by an LCD.

[3] This platform's cloud computing- based web server analyses real-time data and provides visual effects to represent the interior air quality conditions. In addition, the web server was built to send out alerts to mobile app users or facility management when air quality was moderate or poor, allowing responsible parties to take quick action. A platform for enhancing indoor air quality is created via real-time monitoring and a quick alarm system.

[4] Using the Internet of Things, develop a monitoring system for Indoor Air Quality. Sensors, protocols, and the Internet of Things were employed in the monitoring system discussion material to combat IAQ. MQ gas sensors, DHT, and SHT are examples of inexpensive sensors that may be utilized in an IAQ monitoring system. To develop IAQ monitoring and control systems that are capable of working autonomously. The Internet of Things allows users to monitor their surroundings from anywhere via a Wi-Fi or ethernet connection. Pollutants most commonly used in observations are temperature, humidity, and CO2. Developments in information systems make it easy to conduct and build an integrated monitoring system and produce accurate and efficient data.

[5] The system employs sensors to detect hazardous gases that are more dangerous to human life. By using the sensor inputs and sending them to the screen. When the parameter concentration of smoke exceeds the normal range after the code is run, analogue values are generated. The sensor will update the numbers every 30 seconds by feeling the air. The generated values are saved in a database so that the authorized user can view the information from any location.

[6] A system which might observe the run of toxicant gases and hence the amount of pollution exploitation Raspberry-Pi and IoT is planned which might stop deadly accidents. By the utilization of MQ135/6/7 gas sensors the toxic gases will be perceived or sensed and warning will be given to save the lifetime of individuals. Raspberry-Pi is the centre of this module that controls the whole method. The Wi-Fi module connects the total method to the web and an LCD is employed for the visual Output. The air condition observing system will facilitate the innovation of recent practices to overcome the issues of the highly-polluted areas, which may be a major issue. It efficiently fosters the construction of a healthy life by supporting modern technology.

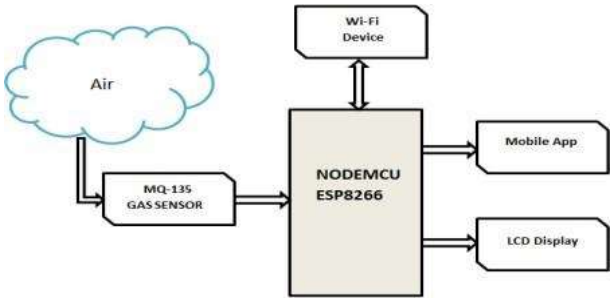
III. EXISTING SYSTEM

The existing project is done using Arduino UNO which connects with ThinkSpeak platform. This device connects with the Wi-Fi to send the data. They used a MQ-135 gas sensor to monitor and they also provided a character LCD to display the sensor data. In this project the Arduino is powered and some initial data is shown in the LCD then work goes to the MQ-135 sensor. The Arduino sketch manages the sensing and sending of data to ThinkSpeak. This Arduino is loaded to board by Arduino IDE. Using IoT in smart homes, an air quality monitoring system was constructed and installed indoors to see how people can live in a place with a rich and good atmosphere. The condition indoors was analyzed by MATLAB simulation, the data of fine particulate matter and CO2 in the indoor environment was analyzed using fuzzy control, and a logic base was established based on the AQI data for better air quality in homes.

IV. PROPOSED SYSTEM

This research aims to develop an air pollution monitoring system that can be installed in a specified locality and to improve the system from previously developed systems by creating an android app that can be used by the public easily. In this new proposed system of the Air monitoring System , The ARDUINO IDE plays a key role in controlling the entire system. MQ135 sensor is used for identifying dissimilar ecological factors like alcohol, NOx, CO2, benzene, ammonia, smoke, sulphide steam and moisture. Major sensors are linked with a NODE MCU board and also an LCD unit is connected to the output of the NODE MCU. The connection between hardware components is then established using the ARDUINO IDE software tool. The programming of sensing devices to the NODE MCU is done according to the user's needs. The data from the sensors is displayed on the LCD, and then information is continuously communicated, and the user receives an air quality notification or warning via the BLYNK App.

V. ARCHITECTURE DIAGRAM



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VI. REQUIREMENTS

HARDWARE REQUIREMENT

- NODEMCU ESP8266:

Description: NodeMCU is an open source platform based on the ESP8266 that allows things to be connected and data to be transferred over the Wi-Fi protocol. Some of the most significant features of a microcontroller are GPIO, PWM, ADC, and so on; by supplying them, it may solve the needs of many projects on its own. For NodeMCU, an open-source firmware, there are open-source prototype board designs available. The term "NodeMCU" is derived from the terms "node" and "microcontroller" (micro-controller unit).The word "NodeMCU" refers to the firmware, not the development kits that go with it. The designs for the firmware and prototyping board are both open source. The Nodemcu ESP8266 is becoming increasingly popular, with nearly half of all IoT projects now using it.
Function: NodeMCU is used in this project to fetch the data that is being detected and transport it to a site where other procedures can be performed.

- MQ-135 GAS SENSOR

Description: The MQ-135 gas sensor is extremely sensitive to ammonia, sulfide, and benzene series steam, as well as smoke and other dangerous gases. It is a low-cost sensor for applications that can detect any type of harmful gas. This module consumes 5V and outputs digital logic outputs such as 0 and 1, which may be used to identify whether or not a dangerous gas has been identified. The output is 0 (LOW) when no gas is detected and 1 when gas is detected (HIGH).

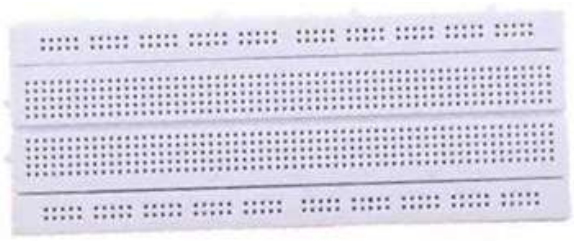
Function: The gas sensor is important in this project since it is used to detect dangerous substances in the air and relay them to the nodemcu.

- 16x2 LCD

Description: LCD - Liquid Crystal Display - is a type of flat panel display that operates primarily using liquid crystals. LCDs represented a significant advancement over the technology that they superseded, which included light-emitting diodes (LED) and gas-plasma displays.
LCDs employed far thinner screens than cathode ray tube (CRT) technology. LCD displays require substantially less electricity than LED and gas-display screens because they function on the idea of blocking light rather than emitting it. An LCD's liquid crystals generate a picture with the help of a backlight, which emits light from an LED.

Function: The LCD is used to display the output, which indicates whether or not the air is contaminated.

- BREADBOARD



Description: A breadboard is a basic gadget that allows you to build circuits without the need of solder. It is a building foundation for electronic prototyping. Because we can reuse them, they are ideal for constructing temporary prototypes and experimenting with circuit design. The lead pitch (the distance between the clips) is generally 0.1 inch (2.54 mm). Integrated circuits (ICs) in dual in-line packages (DIPs) can be placed to span the block's centerline. To complete the circuit, interconnecting wires and discrete component leads can be placed into the remaining open slots.

Function: The breadboard was useful for repairing the components without the requirement for soldering. It made it easier to insert our components and connect them.

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- JUMPER WIRE

Description: A jumper wire is an electrical wire or a group of them. They are also known as jumper, jump wire, and DuPont wire. There are different types of jumper like male to male, female to female, and male to female etc., where female specifies connectors and male to pins.

Function: Here we have used jumper wires like male to male, female to male and female to female to connect different components. These were used as a bridge that connected various parts.

A. SOFTWARE REQUIREMENT

- ARDUINO IDE

In addition to a code editor, this open-source software provides a message area, a text console, a toolbar, and a menu system. The Arduino IDE is used to upload code to Arduino boards.

- BLYNK IOT PLATFORM

BLYNK is an IOT platform that is used to control Arduino, NodeMCU, and Raspberry Pi via the internet. This is a bridge that communicates between the smartphone and the hardware. It allows us to create awesome interfaces using various widgets which are provided by the platform itself.

VII. CONCLUSION

This system is very simple as compared to the existing air quality monitoring systems. As we can see in the output the quality of the air is detected and the values are shown in ppm. This project is also used for pollution monitoring purposes in cites. In future, this prototype can be extended in real time implementations of urban cities and also can be implemented in Google Maps for live map view of pollution level. The semiconductor gas sensors may be used to track the gas concentrations of the target gas and it has numerous advantages like low-cost, rapid response and low maintenance. This device also helps one to incorporate certain hardware components into the controller as a microcomputer of credit scale. Through incorporating further sensing nodes, the network can be updated.

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