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AIR QUALITY MONITORING SYSTEM

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ABSTRACT

Measuring air quality is a crucial step in raising awareness among the public about the need to ensure the health of future generations. Even after receiving a good night's sleep, we frequently feel incredibly weak when getting out of bed. This occasionally occurs as a result of the nighttime enclosed room's poor air quality. This inexpensive air quality monitor uses a MQ135 air quality sensor to keep track of the air quality in a given space. Using a DHT11 sensor, it also measures the humidity and temperature of the room and displays the results on an OLED screen. This initiative is really helpful.

KEYWORDS

→MQ-3 ALCOHOL GAS SENSOR, MQ-4 CNG, MQ-6 LPG, MQ-7 CARBON MONOXIDE, HC-05 BLUETOOTH MODULE, and PIEZO SPEAKER

1.INTRODUCTION

The production of hazardous gases by companies, automobile emissions, and an increase in the amount of harmful chemicals and particulate matter in the atmosphere are all contributing factors to air pollution. Due to elements that can harm human health, such as industries, urbanisation, population growth, and automobile use, the level of pollution is rising quickly. Particulate matters are one of the most prominent factors contributing significantly to the rise in air pollution. This necessitates the measurement and analysis of real-time air quality monitoring in order to enable prompt decision-making. An independent real-time air quality monitoring system is presented in this paper. The Internet of Things is currently being used extensively in every industry and is essential to our system for monitoring air quality. The configuration will display the air quality in PPM on a website

So that we may simply monitor it. With this IoT project, you may use a PC or a mobile device to check the pollution level from anywhere. The configuration will display the air quality on a webpage so that we can easily monitor it. With this IoT project, you may use a computer or

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mobile device to check the pollution level from anywhere. There is a lot of air pollution. Automobile emissions, industrial chemicals, smoke, and dust have become commonplace in recent years. Because of this, air conditioning is currently very dirty. The effects of air pollution are particularly detrimental to human health, especially in areas where our bodies draw air for breathing.

In our some ailments, like asthma, coughing, and lung abnormalities, may be caused by the lungs. Human emotions are unable to sense air pollution. Numerous hazardous compounds, including LPG gas, carbon monoxide, and methane, may be present in the air pollution. The pollutants in the air are quite harmful. For instance, if the carbon monoxide level is greater than 100 ppm, people may feel lightheaded and queasy and may even pass away within minutes. This study helps people identify the pollutants in the air. Due to the Wi-Fi built inside the module node mcu esp8266, we are able to remotely monitor the air quality. This enables the air conditioning to be constantly checked.

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2.LITERATURE SURVEY

Numerous reasons like population growth, increased automobile use, industrialization, and urbanisation have all contributed to an increase in pollution levels throughout time, which has a negative impact on people's health and wellbeing. To keep an eye on In this project, we'll build an IOT-based air pollution monitoring system that will track the air quality via an internet-connected web server and sound an alarm when it drops below a certain threshold, which occurs when harmful gases like CO2, smoke, alcohol, benzene, and NH3 are present in sufficient quantities. The LCD and website will both display the air quality in PPM.That it is very simple for us to monitor. The Air Pollution Monitoring System in this IOT project will monitor the Air Quality over a web server using the internet and will sound an alarm when the air quality drops below a certain level, which is defined as when there are enough harmful gases, such as CO2, smoke, alcohol, benzene, and NH3, present in the air. You can monitor the pollution level from anywhere using your computer or mobile device. On the LCD and on the website, the air quality will be presented in PPM for easy monitoring. Since the MQ135 sensor can correctly measure gas concentrations and can detect the majority of dangerous gases, it is the best option for air quality monitoring. With this IOT project, you may use a PC or a mobile device to check the pollution level from anywhere. This research made a grave error in supposing that Delhi, the city with the highest levels of air pollution, recorded 350PPM whereas the output was 997PPM, indicating that the air was fresh. It is obvious that neither the sensor nor the raw sensor data were converted into PPM using our methods of derivation. They have been using Local Host, which has the restriction that they can only view the output on the laptop that is linked to the experimental configuration. However, we have utilised open source, premium IoT platforms that are highly secure.

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3.IMPLEMENTATION

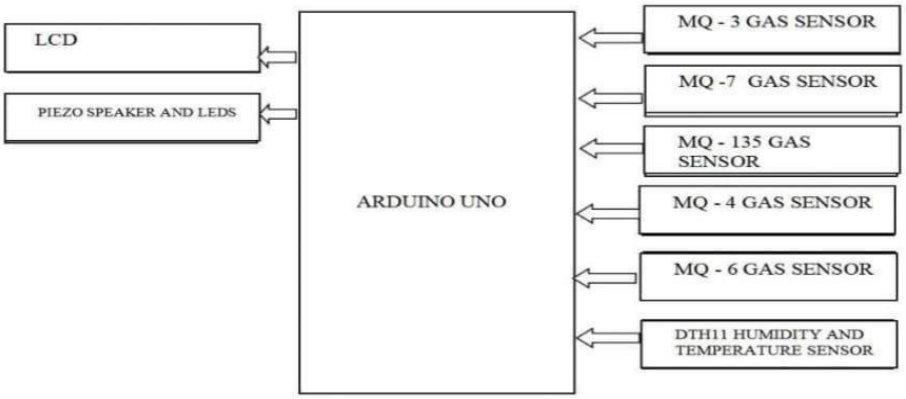

Fig 3.1. Block diagram of Air quality monitoring system

The block diagram serves as the basis for the Air Pollution Monitoring System. MQ135 gas sensor and MQ6 LPG gas sensor both recognise air data.The NH3, NOx, alcohol, Benzene, smoke, and CO2 can all be detected by the MQ135 sensor. As a result, our method for monitoring air pollution uses dynamic gas sensors. It will sense all gases when it is linked to an Arduino and provide the pollution level in PPMs (parts per million). The output from the MQ135 gas sensor will be in the form of voltage levels, which we must translate into PPM. Therefore, we used a library for the MQ135 gas sensor and the MQ6 sensor to transform the output in PPM. When there is no gas nearby, the sensor gives us a value of 90, and The safe limit for air quality is 350 PPM, and it shouldn't go over 1000 PPM. When it gets over the 1000 PPM limit, it causes in headaches, tiredness, and stuffy, stagnant air.It will increase heart rate and lead to a number of ailments if it exceeds 2000 PPM. The LCD and website will display "Fresh Air" when the number is less than 1000 PPM. The LCD and webpage will display "Poor Air, Open Windows" and the buzzer will begin to beep when the value exceeds 1000 PPM. And after it reaches 2000, the buzzer will continue to beep and send an alert message over GSM to a smartphone. "Danger! " will be shown on the LCD and website. Get some fresh air. It will measure the temperature and humidity, therefore it might display the air's current temperature and humidity. We used an LM35 temperature sensor and a SY-HS-220 humidity sensor.

An air quality gas sensor is a device that is used to detect, measure, or monitor gases like ammonia, benzene, sulphur, carbon dioxide, smoke, and other dangerous gases.

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The MQ135 air quality sensor, which is a member of the MQ gas sensor family, is frequently used to identify dangerous gases and smoke in outdoor air. This article provides a quick explanation of how to use a MQ135 air quality sensor to measure and detect gases. MQ-2 (methane, LPG, butane, and smoke), MQ-3 (alcohol, smoke, and ethanol), MQ-4 (CNG gas and methane), MQ-5 (natural gas, and LPG), MQ-6 (butane and LPG), MQ-7 (CO), MQ-8 (hydrogen), MQ-9 (CO, and combustible gases), MQ131 (ozone), and MQ136 are some alternatives to the MQ135 air quality(hydrogen sulphide gas), MQ137 (ammonia), MQ138 (benzene, alcohol, propane, toluene, formaldehyde gas, and hydrogen), MQ214 (methane and natural gas), MQ303A (alcohol, smoke, ethanol), MQ306A (LPG and butane), and MQ307A (coal tar).

Fig 3.2. *MQ135 Air Quality Sensor*

It is a semiconductor air quality sensor that can be used for quality control applications. It is extremely sensitive to harmful atmospheres such as NH3, NOx, CO2, benzene, and smoke.For applications involving the detection and monitoring of hazardous gases, it is reasonably priced. When the air's gas concentration exceeds the threshold limit, the digital output pin goes high. The sensor's potentiometer can be used to adjust the threshold value. The analogue output voltage acquired from the sensor's analogue pin provides an approximation of the gas level in the atmosphere. Use analogue or digital pins to measure or detect the gases. You can see that the module's power LED goes ON (glows) after only providing 5V to it.When the module detects no gas, the output LED turns OFF.

This indicates that the digital pin's output is 0V. Keep in mind that the sensor needs to warm for 20 seconds (as specified in the specs) before being used.

Now, when the MQ135 sensor is activated to detect, the LED output and the digital output pin both go high. Use the potentiometer in any other case until the output rises.

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The digital pin swings high (5V) if the sensor detects a specific gas concentration; otherwise, it remains low.

20°C is the temperature, 65% is the relative humidity, 21% is the oxygen content, and 20 kilo ohms is the load resistance.

Here, Ro is the sensor's resistance value at 100 ppm of NH3 in pure or fresh air. R stands for the sensor's resistance at various gas concentrations.

By using the formula below to determine the Rs value, we can calibrate the MQ135 sensor. Sensor resistance Vc/VRL-1/RL is equal to Rs.

The ratio is determined after computing the Ro and Rs values. Using the graph above, we can then get the PPM value of the specific gas that needs to be tested.

4.RESULTS

Observed outcome of project:

The study's goal is to demonstrate how wearable technology will significantly impact both people's daily lives and how organisations operate in the future. In this paper, it is suggested that wearable technologies will improve the lives of people with disabilities, help businesses interact with other businesspeople more easily, conduct market research more effectively, and apply sales and service strategies more successfully. They will also help law enforcement, fire departments, and military personnel provide public and personal safety, improve virtual reality in games, and allow doctors to keep track of patients' health indicators. In conclusion, wearable technologies will make the future safer, simpler, healthier, quicker, and more fun.

Figure 4.1:Head mounted Display

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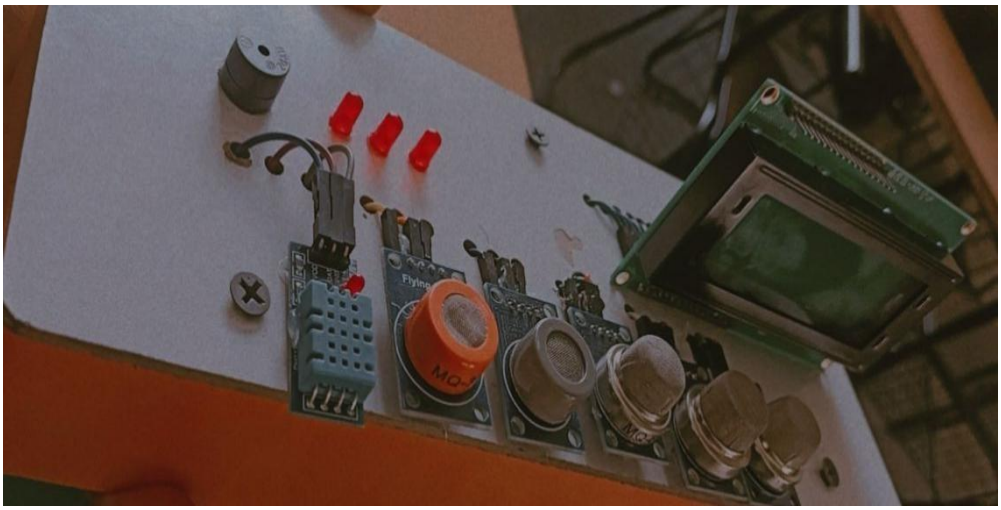

Figure 4.2: Air quality monitoring device

Figure 4.2:Stimulation of the device

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5. CONCLUSION

In earlier works, air quality monitoring systems were created employing various sensors for both indoor and outdoor air quality monitoring using Bluetooth, GPS, and GPRS wireless technologies. Previously, the pricey WASP module was employed. Different sensors can be used in place of it. The suggested method was created for remotely monitoring indoor air quality. Along with a combination of address- and data-centric protocols, request and response is a cost- and energy-efficient protocol. The paper provides a summary of the main air quality monitoring methodologies. In the study, these methods are thoroughly explained. One of the most popular techniques in the suggested system is a cloud-based air quality monitoring system. A website is hosted and data is stored using the same cloud data shown on the webpage.

Future scope:

When it comes to wearable computers, we're in an interesting time where both small startups and well-known companies are working on experiments to tap new markets and persuade consumers to acquire the new technology that could be incredibly helpful to them.

There is a vast market in a major country like India in today's fast-paced, technologically-driven world. Several wearable technologies, such as Apple's iWatch, iRing, S6 Golf Watch, Wrist Gear, Sony Smart Band, 3 High-Tech Eye Glasses, Google Glass, Bluetooth Ring, iPhone-Connected Jewellery with wireless security alerts, Smart Contact Lenses for Medical Purposes, Smart Eyelashes and Fingernails, have been introduced to the market etc.

The majority of significant electronic firms today are concentrating on wearable technology; some have already released the early iterations of their wearable goods, while others are still developing prototypes. For both public and commercial application, wearable technology is currently in the "early adopter" stage (Taylorwessing.com, 2014). Future smart glasses with augmented reality capabilities will likely be the most potent and widely used wearable technology.

Wearable technologies will have several advantages and applications in the near future. Based on the area of use, wearable technology use and applications can be categorised.

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