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Pollution Monitoring Using IOT and GSM Notification System

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Abstract –

In this paper, we'll build an IOT-based air pollution monitoring system that will use the internet to monitor the air quality. An alarm will go off when the air quality drops below a certain point, which happens when there are enough dangerous gases like CO2, smoke, alcohol, benzene, and NH3 in the air. On the LCD and on the website, the air quality will be shown in PPM for easy monitoring. Previously, we constructed an LPG detector using a MQ6 sensor and a smoke detector with a MQ2 sensor. This time, however, we utilised the MQ135 sensor, which is the greatest option for monitoring the Air Quality Index as, it is capable of correctly measuring the level of most dangerous gases and can detect them. With this IOT project, you may use a PC or a mobile device to check the pollution level from anywhere. This system may be installed anywhere, and it can also activate a device to inform the user when pollution levels exceed a certain threshold, such as turning on an exhaust fan or activating a buzzer.

Key Words: ESP8266, MQ6 sensor, MIC sensor, GSM, DHT11 sensor, soil & moisture sensor.

1. INTRODUCTION

Carbon dioxide gas, carbon monoxide gas, pollutant, particulate matter, and ground level gas are the pollutants that are measured. The internet of things makes it possible to detect or control items. The term "things" in the Internet of Things refers to manufactured products, such as cars with built-in sensors. The creation of a pollution observation system will make it easier to manage and track pollution-related factors. There are many different approaches to regulate pollutant factors. We frequently gauge whether pollution levels are high or low as a result of vehicle fuel burning before implementing pollution detecting systems. With the aid of Node MCU and other components, we usually gauge how far we've come in developing and putting it into practise. This approach is becoming increasingly crucial for pollution detection in vehicles. Carbon dioxide (CO2) and carbon monoxide (CO) are produced by the vehicles. We often use the Electronic Text Transfer Protocol (HTTP) for acting, sending data, and providing assurances. Our goal is to create an IOT-based air pollution monitoring system that will use the internet to monitor the air quality. An alarm will go off when the air quality drops below a certain point, which occurs when harmful gases like CO2, smoke, alcohol, benzene, and NH3 are present in sufficient amounts. On the LCD and on the website, the air quality will be shown in PPM for easy monitoring. When dangerous things, such as biological molecules and particles, are added to the Earth's atmosphere, air pollution results. A LCD display panel that continually presents the real-time output values of the temperature, humidity, and gas sensors will help us determine the quality of the air by displaying the levels of gases and temperature.

2. LITERATURE SURVEY

In this task, we will create an IOT-based air pollution monitoring system. We will use the web to monitor the air quality, and when it drops below a certain level—i.e., when enough harmful gases, such as CO2, smoke, alcohol, benzene, and NH3—are present in the atmosphere—we will sound an alarm. In order for us to monitor the air quality without any issues, it will be displayed on the LCD and on the site page in PPM. Since the MQ135 sensor can accurately measure gas 16 concentrations and can detect the majority of harmful gases, it is the best option for air quality monitoring. With this IOT project, you can use a computer or a mobile device to check the pollution level from anywhere. This system can be installed anywhere, and it can also activate a device—for example, turning on the exhaust fan or notifying the user via SMS or mail—when pollution levels exceed a certain threshold.[1]

These issues, various health problems are arising for the faculties and students because of improper exposure in class. Moreover, the students and faculties are residing inside in this environment for nearly eight hours which leads physical cognitive hazards. In this work, IOT based Wi-Fi module (ESP8266) is integrated with air quality monitoring Unit. Sensors are allocated to monitor the changes over the environment which in result provides the contamination level of the environment. The results are observed in a real time application which ensures the safety and also maintain the carbon dioxide (CO2) level for the students [2].

Internet of Things (IoT) is an increasingly popular technology that enables physical devices, vehicles, home appliances, etc. to communicate and even interoperate with one another. Air pollution in India is estimated to kill about 1.5 million people every year; it is the fifth largest killer in India. Existing monitoring systems have inferior precision, low responsively, and require laboratory analysis, are the limitations of existing systems. Therefore, improved monitoring systems are needed. To overcome these problems, we propose a three phase air pollution monitoring system. An IoT kit using gas sensors, Arduino IDE (Integrated Development Environment), and a Wi-Fi module was developed. This kit can be physically placed in various cities to monitoring air quality. The sensors gather data from surroundings and forward the data to the Arduino IDE. The

Arduino IDE transmits the data to the cloud through the Wi-Fi module. We also developed an Android application that 17 users can access air quality data from the cloud. If a user is traveling to a particular destination, the pollution level of the entire route is predicted, and a message is sent to user, if the pollution level is too high [3].

The pollution of air and sound is increasing abruptly. To bring it under control its monitoring is majorly recommended. To overcome this issue, we are introducing a system through which the level of sound and the existence of the harmful gases in the surroundings can be detected. The growing pollution at such an alarming rate has started creating trouble for the living beings, may it be high decibels or toxic gases present in the environment leaves a harmful effect on human's health and thus needs a special attention. This monitored data can be obtained from remote location without actually visiting it due to the access of internet. The framework of this monitoring system is based on combination or collaboration of affective distributed sensing units and information system for data composition. The role of IoT is the new concept used in air and sound pollution measurement, which allows data access from remote locations [4].

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3. PROPOSED SYSTEM

Air traps harmful gases such as CO, smoke, and LPG, which harm the environment and human health, such as asthma. Different moisture levels exist in soil, which might harm crops, thus we need to figure out what dampness level is best for farming. Various types of environmental contamination pose severe problems for humanity. In horticulture, the amount of moisture in the soil plays an important role. 9 Air traps harmful gases that are harmful to human health. The aforementioned difficulties compelled us to carry out this project. We use convolution Neural Network and Deep Learning For Real time Detection and Monitoring of Pollution. Plans for ESP32 boards employ a variety of chips and regulators. The sheets come with sets of sophisticated and basic information/output (I/O) sticks that can interact with other development sheets, breadboards (safeguards), and various circuits. The sheets highlight interfaces for sequential correspondence, including on some models, Universal Serial Bus (USB), which is also used for stacking programs from PCs. The microcontrollers are frequently modified using a language made up of C programming language elements. The ESP32 project offers a coordinated development environment (IDE) based on the Processing language project in addition to using conventional compiler tool chains.

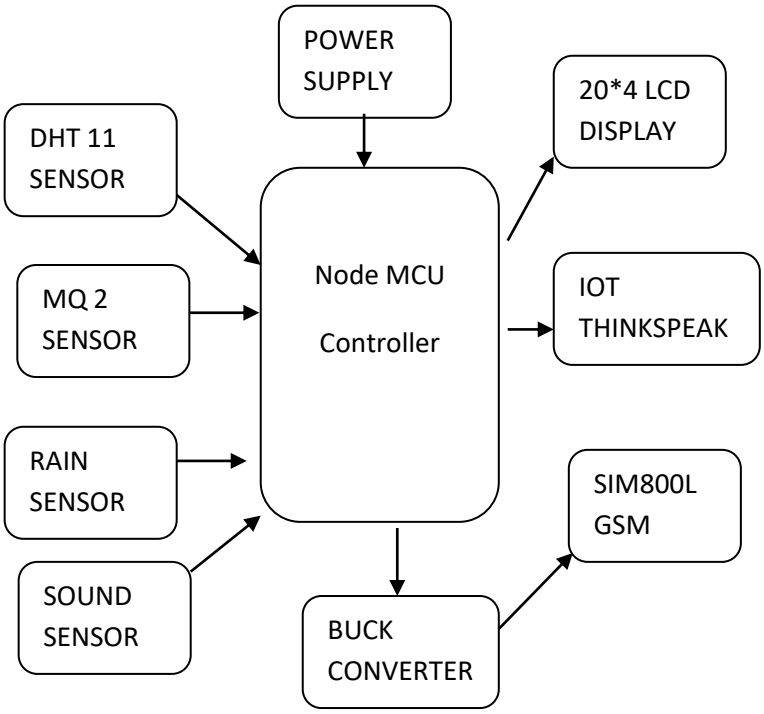

Fig1: Block Diagram

4. SYSTEM DESIGN

1. Install Arduino IDE Software 1. Once Arduino programming has been introduced, test the setup by connecting a functioning Arduino Uno to a Blink sketch. Every framework works as it should.

2. After installation, install the following libraries: • DHT sensor library • Spark fun BMP280 library

3. After that, we type the code for the transmitter hub and the collector hub and transfer it to the various ESP 32 devices. Module Temperature and Humidity: The DHT11 gathers the boundary values (humidity and temperature sensor) Air pollution: The parameters to detect air pollution are smoke, CO and LPG The gas sensor collects the boundary values. Soil pollution.

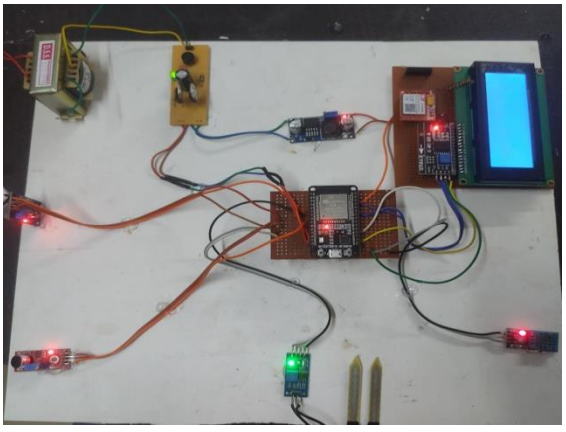

Fig 2: Hardware of the system

The threshold for identifying soil contamination is the level of soil moisture

The soil dampness sensor collects the boundary values. Sound pollution: Sound levels serve as the thresholds for identifying sound contamination. The sound sensor collects the boundary values.

Through a message to the user The GSM module functions as a doorway for data communication between the ESP32 and the cell phone. SMS via GSM module to mobile. Through Cloud

• The data obtained from all of the sensors in a cell phone through an application will be displayed through the Cloud Thing speak online interface.

• When the measured qualities are high and threaten to harm the climate in a particularly dirty area, with added heavy rain, the contamination boundary values are sent via message.

• Thing speak is an iot platform which is used to monitor the data wirelessly generated by the sensor in these project. we use MQTT protocol and read write API keys in order to establish communication between Node MCU and thing speak server.

• At the thing speak server i have created field tabs for the sensor which I used in the project and configured them as well.

• The data at the thing speak server is updated by every 30 seconds.

• In these project we use AC-to-AC transformer which steps down 230v peak to peak voltage to 12 v peak to peak AC voltage.

• These voltage which consist of ripple fed to 7805 voltage regulator along with filter capacitor which gives ripple free 5v dc output and it is supply to circuitry.

• In these project we use Node MCU as computing device in order to process the data from sensor. Here we use four sensor DHT11, soil and moisture sensor, sound, MQ6 sensor.

5. RESULTS

We monitor a few gases and focused energy perturbations that could affect air quality. Furthermore, the amount of disturbance caused by combustible gases including smoke, LPG, isobutene, and propane additionally, this allows for real-time monitoring of carbon dioxide. Framework. Thanks to constant monitoring, we can use IoT to take the best possible action to avert any significant calamities. If the air and noise pollution exceeds the stated maximum amount, the gadget will send out the alert. (Chosen by the author). Every IoT device is distinct. By the associated channel ID this programmed, which can be used to learn more about air and sound pollution, shows the computed value of the air. Another example is noise pollution. The method for monitoring sound and air resolves the problem of the severely filthy places is a critical one that requires attention.

5.1. IOT LAYOUT

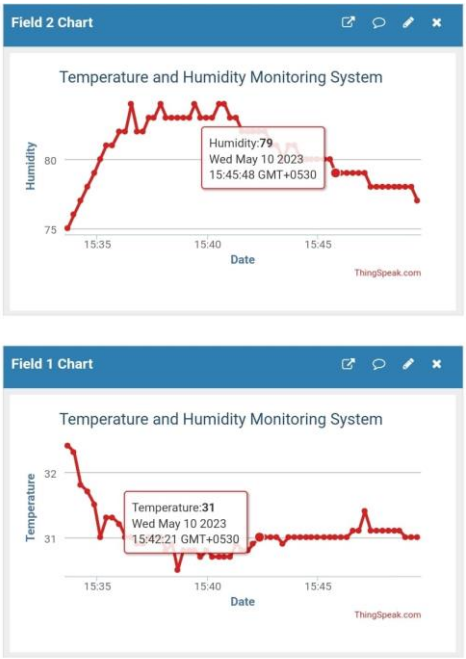

Fig 3: shows the humidity and temperatur

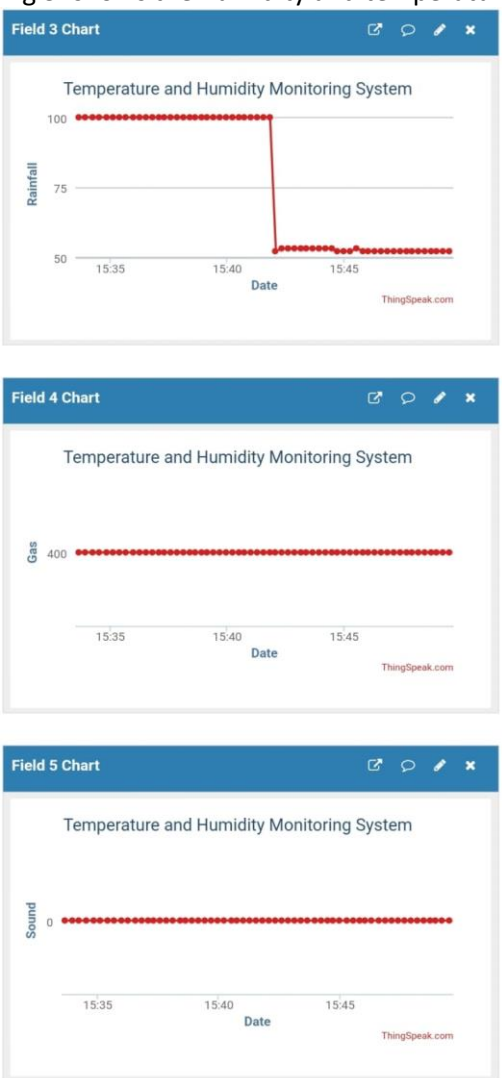

Fig 4:shows the Gas and Noise and water content

6. CONCLUSIONS

It is suggested that the framework to screen various climatic boundaries using ESP 32, CLOUD, and GSM Technology work on air nature. The most common method of monitoring various aspects of climate, such as the air quality checking issue proposed in this paper, has been made possible by technological advancements like cloud and GSM upgrades. Identification and observation of hazardous gases are taken seriously, and associated safety precautions are seen as a potential key step Given that it is a unified framework with comprehensive checking capabilities, it is predicted that this framework will enjoy extraordinary market recognition. This paper provides several models for the shrewd method for assessing the climate and an effective, low-cost implanted framework. Different modules' design capabilities were discussed in the proposed design. The framework for measuring noise and air quality using the Internet of Things concept was tested inconclusively for observing two boundaries.

A low-cost Node MCU network architecture for measuring soil moisture. This work tested and put into practice the sensor hub and handset hub's ability to integrate with other types of sensors. The distinctive bend showed how precisely the sensor determined the amount of moisture in the dirt. It also demonstrated how volumetric water content could be used to monitor and schedule the water system in 65 Farming nurseries. Checking the sensor's temperature and humidity with a new benefit and the current GSM system. The framework is very flexible. This framework can be used to detect quality boundaries by simply changing the relevant programming programs and the comparing sensors. The task is simple. The framework can be expanded to screen for things like hydrology, air pollution, modern creation, and horticulture. It has extensive applications and increases value.

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