IOT BASED AIR QUALITY INDEX MONITORING SYSTEM

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ABSTRACT

Internet of Things (IoT) may be a worldwide system of "smart devices" which will sense and connect with their surroundings and interact with users and other systems. Global air pollution is one of the major concerns of our era. The level of pollution has increased with times by lot of things like the increase in population, increased vehicle use, industrialization and urbanization which ends up in harmful effects on human wellbeing by directly affecting health of population exposed to it. Air quality goes down when enough amount of harmful gases present in the air like carbon dioxide, smoke, alcohol, benzene, NH3, and NO2. In order to analyses we are developing an IOT Based pollution Monitoring System which we'll monitor the Air Quality over an internet server. Existing monitoring systems have inferior precision, low sensitivity, and need laboratory analysis. Therefore, improved monitoring systems are needed. To overcome the issues of existing systems, we propose a threephase pollution monitoring system. It will show the air quality in PPM on the LCD and also as on webpage in order that we will monitor it very easily. In this IOT project, you can monitor the pollution level from anywhere using your computer or mobile device. The system uses MQ2 and MQ7 sensor for monitoring Air Quality. It measures their amount exactly and finds out harmful gases.

INTRODUCTION

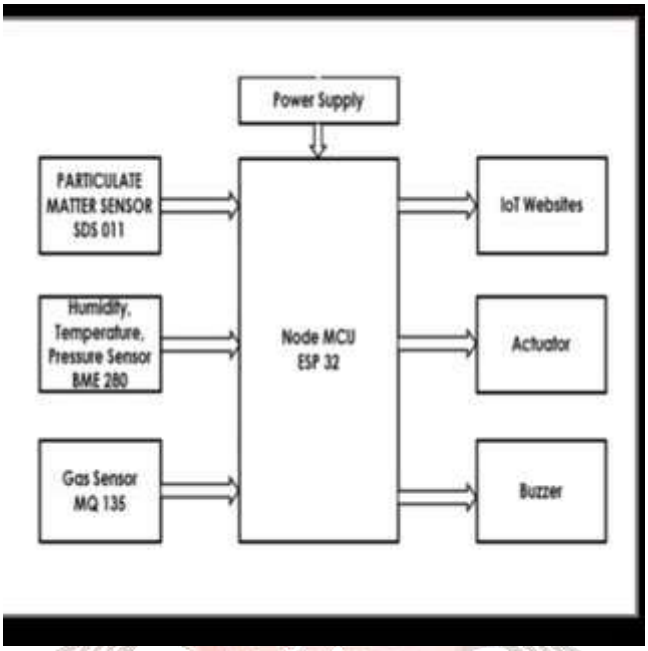
Air pollution is the biggest problem of every nation, whether it is developed or developing. Health problems have been growing at faster rate especially in urban areas of developing countries where industrialization and growing number of vehicles leads to release of lot of gaseous pollutants. Harmful effects of pollution include mild allergic reactions such as irritation of the throat, eyes and nose as well as some serious problems Air Quality Monitoring System 3 like bronchitis, heart diseases, pneumonia, lung and aggravated asthma. As winter sets in, the air hanging over us thickens with smoke and gaseous emissions from burning fields, industrial factories, and vehicular traffic, blocking out the sun and making it hard to breathe. Experts say that the high levels of air pollution and COVID-19 pandemic can be a dangerous mix that can have serious consequences. The necessity for real-time monitoring of Air Quality is very glaring. So in this project, we are going to build an ESP32 Air Quality Monitoring System using Nova PM SDS011 sensor, MQ-7 sensor, and DHT11 sensor. We will also be using an OLED Display module to display Air Quality Values. The Air Quality Index (AQI) in India is based on eight pollutants, PM10, PM2.5, SO2 and NO2, CO, Ozone, NH3, and Pb. However, it is not necessary to measure all of the pollutants. So we are going to measure the concentration of PM2.5, PM10, and Carbon Monoxide to calculate the Air Quality Index. The AQI values will be published on Adafruit IO so that we can monitor it from anywhere. Previously we have also measured the concentration of LPG, Smoke, and Ammonia gas using Arduino.

LITERATURE SURVEY

The drawbacks of the conventional monitoring instruments are their large size, heavy weight and extraordinary expensiveness. These lead to sparse deployment of the monitoring stations. In order to be effective, the locations of the monitoring stations need careful placement because the air pollution situation in urban areas is highly related to human activities (e.g. construction activities) and location-dependent (e.g., the traffic choke-points have much

worse air quality than average). IOT Based Air Pollution Monitoring System monitors the Air Quality over a webserver using internet and will trigger an alarm when the air quality goes down beyond a certain level, means when there are amount of harmful gases present in the air like CO2, smoke, alcohol NOx The system will show the air quality in PPM on the LCD and as well as on webpage so that it can be monitored very easily. Temperature and Humidity is detected and monitored in the system.

IMPLEMENTATION



Block diagram

From the above block diagram we can make out the circuitry involved in the design of an IOT BASED AIR QULITY INTEX MONITORING SYSTEM SDS011 Sensor, DHT11, and MQ-7 sensor are powered with +5V while the OLED Display module is powered with 3.3V. The transmitter and Receiver pins of SDS011 are connected to GPIO16 & 17 of ESP32. The Analog Out pin of the MQ-7 sensor is connected to GPIO 25 and the data pin of the DHT11 sensor is connected to the GPIO27 sensor. Since the OLED Display module uses SPI communication, we have established an SPI communication between the OLED module and ESP32

METHODOLOGY

3.1 WORK FLOW PHASE - 1: Detection of Air Pollutant Level It indicates the early phase of the project. An IoT based air pollution detection kit is developed. It deals with the collection of data from gas sensors connected to Raspberry Pi and the information is sent to the cloud platform that stores it. PHASE - 2: Creating the interface This stage involves the clarification of the various components for optional performance. MCP3008 is a 10 bit converter which is calibrated to convert analog data to digital with on-board sample and hold circuitry.The data collected is stored, processed and can be monitored using the Mobile Application. Users can review the stored data through the application. PHASE - 3: Execution and Testing The various components are interfaced together and the project deliverables are built with the help of different circuit designs. The testing, debugging and troubleshooting of the design is performed to test the performance of the design under various conditions. If a circuit design fails to pass the tests, then a newer circuit design should be completed, implemented and tested.

RESULT & CONCLUSION:

The system to monitor the air of environment using ESP32. IOT Technology is proposed to improve quality of air. With the use of IOT technology enhances the process of monitoring various aspects of environment such as air quality monitoring issue proposed in this project. Here, using the MQ-7 sensor gives the sense of different type of dangerous gas and ESP 32 is the heart of this project. Which control the entire process. Footstep arrangement is used to generate the electric power. As the power demand is increasing, this arrangement is used to generate the electrical power in order to meet the large energy demand. In this arrangement the mechanical energy is converted into electrical energy.

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