IoT Webserver to Analyze the Quality of Air, Temperature, Humidity and noise in Our Environment

R Mohana Priya¹, Dr. L.K. Hema², G. Harishankari³, G. Pavithra³, T. Suva Lakshmi³

¹Assistant Professor (Gr-II), ECE, Aarupadai Veedu Institute of Technology, Vinayaka Mission’s Research Foundation, Chennai, India
²Professor & HoD ECE, Aarupadai Veedu Institute of Technology, Vinayaka Mission’s Research Foundation, Chennai, India
³UG Scholars, ECE, Aarupadai Veedu Institute of Technology, Vinayaka Mission’s Research Foundation, Chennai, India

E-mail: mohanapriya@avit.ac.in

Abstract. The proposed system is for the weather parameter and quality of air temperature coverage over the web. It permits the individuals to directly check the surrounding environmental condition on-line while not the necessity of a prognostication agency. System uses temperature, humidness as also as rain sensing element to watch weather and supply live coverage of the weather statistics. The system perpetually monitors temperature victimization temperature sensing element, humidness victimization humidness sensing element and additionally for rain. The system will transmit this information to the microcontroller that currently processes this information and keeps on transmitting it to the net web server over a Wi-Fi association. This information will be live updated on the net server system. Additionally system permits user to line alerts for specific instances, the system provides alerts to user if the weather parameters cross those values.

Keywords: IOT, Wi-Fi, Temperature, Humidity

1. Introduction

At present, Pollution of air and sound is increasing dead. To bring it in restraint its observance is majorly suggested to beat this issue, we tend to area unit introducing a system through that the amount of sound and also the existence of the harmful gases, temperature within the surroundings are often detected. The growing pollution at such AN baleful rate has started making hassle for the living beings, might or not it’s high decibels or harmful gases gift within the surroundings leaves a harmful result on human’s health and so desires a special attention. The objective of System is that the Air, sound, temperature is obtaining higher recently. To measure air quality which is harmful to human being so the authorities to check pollution in various areas and take action against it. Thus officers will analyse on the over sound which is close to colleges, hospitals and areas wherever noise isn’t allowed, and if system detects air quality and noise problems it alerts officer so they will take immediate measures to reduce the difficulty.

The objective of the system is to perpetually transmit this information to the microcontroller that currently processes this information and keeps on transmitting it to the net web server over a Wi-Fi association. This information is live updated to be viewed on the net server system. Additionally system permits user to line alerts for specific instances, the system provides alerts to user if the weather parameters cross those values.
2. Literature Review

The paper deals with IoT application in real time world things into intelligent practical things to unite everything in our world under same infrastructure, giving us not only control of objects around us, but also keeping condition about that objects [1]. The paper deals with smart sensor networks which is recent trends in research now a days. The paper deals with monitoring of noise and air pollution levels in region of interest. The hardware prototype uses Arduino UNO board, sensor devices and it is tested for two or three parameters like noise, CO₂ etc [2]. This paper deals with vehicular pollution. The developed model consists of transmitter and receiver with GPRS Modems and GPS-module for transmitting the information [3]. The prototype developed is air pollution monitoring system which will gather the air value in ppm as well as sound value in decibel over a web page using internet. It will trigger an alarm when the air quality goes beyond certain level [4]. The aim of this paper is by using different types of sensors, GSM/GPRS module and cloud/server to design an efficient and remote system to monitor the levels of various pollutants and minimize these parameters [5]. In this model raspberry pi 3 is used and it is embedded with sensing and storing devices. Raspberry pi connects the embedded device to internet and sensors are connected. The digital data will be further evaluated [6]. The main aim of the paper is to monitor air pollution in different areas and we can keep a watch on noise pollution. It uses air sensors to sense the harmful gases like NH₃, Benzene, smoke and CO₂. Also system keeps measuring sound level and reports it to the online server over IoT [7]. This system has heterogeneous devices to sense different pollution in air. Also solve the queries raised by mobile user [8]. In this paper the author is concern about temperature monitor, vehicle parking and waste management [9]. The main focus of author to develop a wireless community networks. The Clean WiFi network constantly checks the air quality and uses the same data for public WiFi service, displaying information about the quality of the air to the user [10].

3. Proposed Design

3.1 Arduino Uno

The arduino input/output pins which will be interfaced to various growth boards (shields) and different circuits [5]. The board has fourteen digital I/O pins (six capable of PWM o/p), half-dozen analog I/O pins, and is programmable with the Arduino IDE (Integrated Development Environment), with a form B USB cable. It is powered by the USB cable or by with external 9-volt battery, though it accepts voltages between 7 v and 20 volts. it's similar to the Arduino Nano and da Vinci architect.

3.2 Wi-Fi Module

The ESP8266 is also an inexpensive Wi-Fi conductor, with a full TCP/IP stack and microcontroller capability, created by categorical if Systems in Shanghai, China. The chip initial came to the attention of Western makers in August 2014 with the ESP-01 module, created by a third-party manufacturer Ai-Thinker, this tiny module permits microcontroller to connect to a Wi-Fi N/W and build simple TCP/IP connections exploitation Hayes-style commands. However, at first there was nearly no English-language documentation on the chip and so the commands it accepted as shown in figure 1.
3.3 DHT 11 Sensor
The DHT11 could be wetness and Temperature sensing element, that generates tag digital output. DHT11 is interface with any microcontroller like Arduino, Raspberry Pi, etc. DHT11 could be a low price wetness and temperature sensing element that provides high dependableness and future stability. It uses as a electrical wetness sensing element and a semiconductor live the encircling air, and outputs a digital signal on the information pin (no analogue input pins needed) [3]. It’s terribly straightforward to use, and libraries and sample codes area unit out there for Arduino and Raspberry Pi. This module makes is straightforward to attach the DHT11 sensing element to associate Arduino or microcontroller as includes the pull up electrical device needed to use the sensing element. Solely 3 connections area unit needed to be created to use the sensing element - Vcc, Gnd and Output as shown figure 2.

3.4. LCD display
A liquid-crystal display (LCD) could be an electronically device that uses the light-modulating properties of liquid crystals combined with polarisers as shown in figure 3. The Liquid crystals is not going to emit lightweight directly, instead a backlight is to provide pictures in colour or monochrome. LCDs area unit out there to show pictures (as in a very general pc display) or fastened pictures with minimum data content, which may be displayed or hidden, like predetermined words, digits, and 7-segment displays, as in the digital clock [5]. The LCD will either be on (positive) or off (negative), looking on the polarizer arrangement. As an example, a personality positive digital display with a backlight can have black inscription on a background that’s the colour of the backlight, and a personality negative digital display can have a black background with the letters being of identical colour because the backlight. Optical filters area unit superimposed to white on blue LCDs to present them their characteristic look.
3.5 MQ-135 Sensors

The MQ 135 sensor is the Air quality sensing element to find harmful gases such as NH₃, NO, alcohol, benzene, smoke and CO₂. These Sensors has high sensitivity to Ammonia, sulphide and Benzes, steam, additionally sensitive to smoke it’s with low price and notably appropriate for Air quality observance application. This sensor operates on .3V to 5V dc. The output of this sensor is digital format it is shown in figure 4 the display screen.

3.6 Sound Detection Sensor

It detects sound from the atmosphere and output digital trigger signal. It's a sound point modify, to regulate the brink worth. Thus if the reading goes on the far side the brink worth authority can able to understand the noise pollution is at a high level of that specific place. LM39 Sound Detection sensing device to detects whether or not sound has exceed a minimum range as shown in figure 5. The sound is detected through the electro-acoustic transducer associated fed into the operational amp.

4. Results and discussion

The information from different devices, which are placed specially square measure of interest. The perceived information will be sent to the online server, once a correct connection is established with sever device the online page provides the information regarding the intensity of sound and also the Carbon di-oxide level variations in this specific region, wherever the monitoring system is placed. To implement this to deploy the devices within the surroundings for recording the information and analysis. If air quality is less than 500 ppm then it is fresh air and if it is between 1000 ppm to 2000 ppm then it is poor air quality we should open the windows of the room and at last if it is greater than 2000 ppm then it is danger the area is very much polluted. As when we start sensing air and noise pollution the area where we placed our air and sound come under the range where air quality is in between 200ppm to 750 ppm it
comes under fresh air quality region. Some of the observations and hardware implementation is given below in figure 6.

![Prototype of Hardware module](image)

**Figure 6: Prototype of Hardware module**

Ready to supply the required results. It is with success enforced as a true Time system with bound modifications. Science is discovering or making major breakthrough in varied fields, and thus technology keeps dynamic from time to time. Going more, most of the units is fictional on one in conjunction with microcontroller so creating the system compact thereby creating the present system simpler. To make the system applicable for real time functions parts with larger vary must be enforced. This system is to observe the developing cities and industrial zones for pollution monitoring. To safeguard the public health from harmful things, this module as shown in figure 6 provides economical and minimum price for continuous analysis of environment. If air quality is less than 500 ppm then it is fresh air and if it is between 1000 ppm to 2000 ppm then it is poor air quality we should open the windows of the room and at last if it is greater than 2000 ppm then it is danger the area is very much polluted. When we start sensing air and noise pollution the area where we placed our air and sound come under the range where air quality is in between 200ppm to 750 ppm it comes under fresh air quality region. Some of the observations and hardware implementation is given below figure 7, figure 8 and figure9.

![Air Quality 347.92 PPM](image)

**Figure 7 Air Quality 347.92 PPM**
Figure 8 Air Quality 490.26 PPM

Figure 9 Sound Pollution in decibel (dB)
5. Conclusion

The Proposed System proposes an effective implementation for Internet of Things is used for monitoring atmospheric conditions of environment like quality of air temperature, humidity and sound as shown in figure 7, figure 8 and figure 9. This project presents a conceptual architecture for a versatile, flexible and cost efficient for monitoring the air and sound quality of a particular site. This system used to analyse the harmful gases, high temperature and noise in the environment.

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