IoT Based Weather Monitoring System

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Abstract:- The IoT Technology provided in this paper is a good option for surveillance the weather data at a particular region and make the data visible anywhere in the world. The idea behind this is Electronic sensors connected to the Public Internet by using IoT technology. The data fetched from the embedded system can be accessible over the Internet from anywhere in the world. In some area, it will be challenging to check and monitor the vital weather parameter through wires and analogue devices during some weather hazards. To resolve this problem here, electronic sensors are used to review and monitor the weather parameters.

Keywords: IoT Technology; Weather Monitoring System; Embedded System, Microcontroller, Environment data study.

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1. Introduction

A weather station is a technology that collects data related to the weather & environment using different electronics sensors. There are two types of weather station, one who is having their sensors and the second type of weather station is where we pull data from the weather station servers. In this project, we are designed by our weather station. We all know that a weather station is not a single device, but it is a combination of many small tools to form a larger system. It contains various sensors and gadgets that work together but in specific ways to transmit proper and accurate data of the weather parameters.

It is quite tricky to uses of WEB server based weather station to non-technical peoples, so we are providing web server-based user interface as well as Android application. We are well known today most mobile units running on Android OS, and many peoples are well known to use the android phone. So, our application is beneficial for such purpose.

This device is all about IoT based Live Weather data Monitoring Using NodemCU ESP8266. We will interface DHT11 Humidity & Temperature Sensor, BMP180 Barometric Pressure Sensor and FC37 Rain Sensor with NodeMCU ESP8266-12E wi-fi Module.
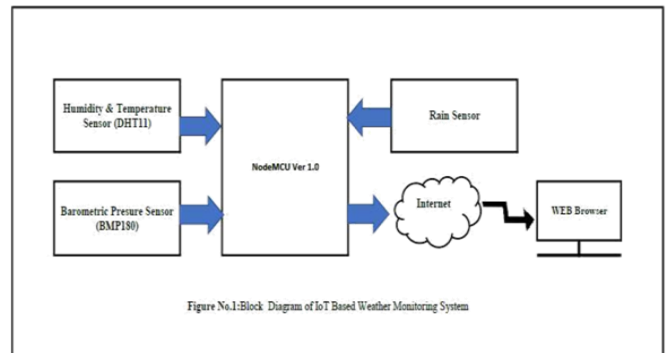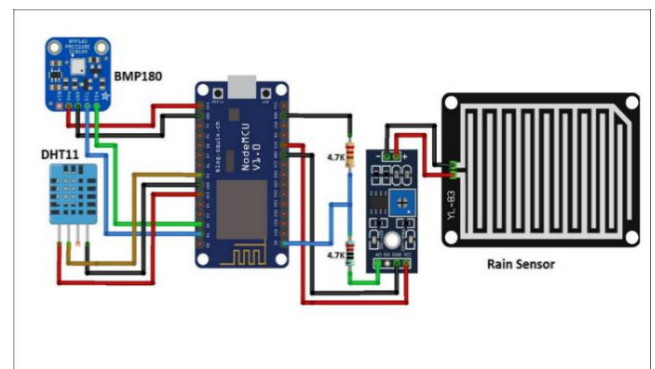

Fig. 1 Block Diagram

Fig. 2 Circuit Diagram

2. Literature Surveys

There are possible to make the user-friendly live weather monitoring system using IoT technology. IoT is an Internet of things which capable of transferring data over a network without requiring human interaction [1]

With the development of a cloud-based system, the cloud platform can give better weather availability of data anywhere and anytime. The weather needs easy ways and new techniques for surveillance and management. Monitoring the weather parameter is required to assess the live condition of the weather to takes the right life action according to fetched data from the device. [2]

It is an embedded system which consists of web-enabled smart such as processors, sensors and communication hardware, to fetch, transmit and work on available data they obtained from their weather. The IoT devices sent this processed data to the network gateway, and from there, it will be available to within network. But by designing such a system which also available on public Internet also is make more advantage to human life. [3]

Previously many of IoT based weather monitoring system design used third parties IoT platform such as Thing Speak. But we have designed our cloud-based server because of that anyone can easily access our web-based service or through android app [4].

3. Working

Assemble all system as per circuit diagram. Program the NodeMCU using Arduino IDE. You will get confirmation on your screen once

The NodeMCU is a programable controller which has inbuilt wi-fi module We connect three sensors 1) BMP180 2) DHT11 and 3) Rain Sensor to NodeMCU. By using these three sensors, we can collect the required weather data for monitoring purpose. This pooled data is stream over the Internet to display it or read it from anywhere. After the successfully programmed hardware, the NodeMCU get one IP address. We can browse this IP address from any of WEB browser like Chrome, Firefox, Internet Explorer etc.so we display the required live data which fetched by sensors in beautiful Graphical User Interface format. The weather parameters that we monitor are Temperature, Pressure, Humidity and Rain.

Also, you can check whether data through anywhere using Internet as we hosted this server publicly. We developed an android application for easy access to our weather monitoring system.
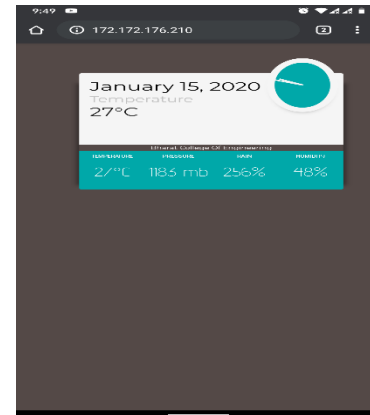

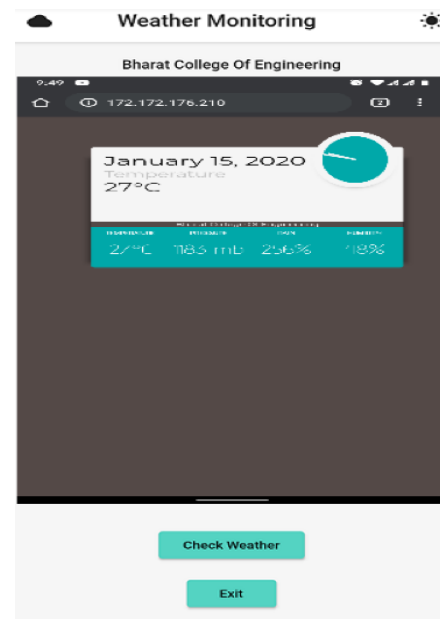Fig. 3 WEBPAGE interface Of Weather Monitoring System

Fig. 4 Android Application interface Of Weather Monitoring System

4. Hardware and Software Requirements

IoT Based Weather Monitoring System is required hardware as well as the software needed to implement. The details are given follow.

Hardware Components:

The things needed for this project are given below.
1. Nodemcu ESP8266 12E Board
2.BMP180 Pressure Sensor
3.DHT11 Humidity Temperature Sensor
4.Rain Sensor FC37
5.4.7K Resistors - 2
6.PCB
Software Requirement:
1.HTML File Library.
2.Arduino IDE
3.Pressure Sensor BMP180 Library
4.Humidity Temperature Sensor DHT11 ESP Library.

5. Applications Details

1) Data are available on the android app.
2) Prior weather alert or weather data can be possible.
3) Useful for the agriculture sector as a system is very cheaper, it can be affordable to Farmer.
4)By making an extensive network of this device, we can fetch real-time data of weather from a different location that can be available for free help purpose.

6. Conclusion

To make this idea, genuine need to take help of electronic sensor devices which are needed to place in the environment. By using this sensor, we can stream real-time data over the web server using ESP8266. We also required one dedicated public IP to available this server over the open Internet. The excellent and low-cost weather are monitoring real-time system presented in this paper.

6. Acknowledgement

A great deal of work goes into the stage I of final year project that every dedicated engineering student aspires for. However, nothing can compare with the satisfaction one experiences when the expectations and dreams of a student are actually realized in the form of a physical working model. We have several people to thank for having embarked on this beautiful, exciting and arduous journey with us.

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