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European Journal of Advances in Engineering and Technology, 2022, 9(4s):398-401
International Conference on Tech Trends in Science & Engineering (ICTTSE) 2022
Suryodaya College of Engineering & Technology, Suryodaya Polytechnic, Nagpur, Maharashtra, India

Research Article ISSN: 2394 - 658X

Weather Monitoring System by using Internet of Things

Shital Yende[1], Priyanka Gaurkhede[2], Shubham Balbhadre[3], Vaibhav Ladekar[4]

[1,2]Asst. Prof. SCET, [3,4]Student SCET

ABSTRACT

The system proposed in this paper is an advanced solution for monitoring the weather conditions at a particular place and makes the information visible anywhere in the world. The technology behind this is Internet of Things (IoT), which is an advanced and efficient solution for connecting the things to the internet and to connect the entire world of things in a network. The data updated from the implemented system can be accessible in the internet from anywhere in the world. In agriculture zone it will be very difficult to check and monitor the weather parameter through wires and analog devices during some weather hazards. To overcome this problem here the wireless sensors are used to check and monitor the weather parameters. The other idea is Vertical farming system. It is implemented for cultivating different crops in small area.

Key words: IoT, monitor

INTRODUCTION

Existing technology mainly focus on controlling and monitoring of different activities. These are increasingly emerging to reach the human needs. An efficient environmental monitoring system is required to monitor and assess the conditions in case of exceeding the prescribed level of parameters. Sensors are placed at different locations to collect the data to predict the behavior of a particular area of interest. The main aim of this paper is to design and implement an efficient monitoring system through which the required parameters are monitored remotely using internet and the data gathered from the sensors are stored in the cloud and to project the estimated trend on the web browser. The values from the cloud are updated at each and every moment. The crops are cultivated and the soil are tested mainly the moisture is measured. Thus we can cultivate different crops at a particular area. Vertical farming is nothing but it is a vertically stacked farming and it is upcoming methodology for farming.

RELATED WORKS

Due to weather disasters and uneven environmental changes, life style of humans will be changed. It is very difficult to monitor different weather parameters through wired system architect and analog devices in an agriculture zone during certain hazardous envy and critical situations. It is very important to measure the weather parameters in agriculture zone for the farmers which help to plan their farms according to the weather conditions. To overcome the problem of monitoring the weather parameters using wired devices, the wireless sensors network devices may take certain steps and issues even in worst case for monitoring the weatherparameters.

SYSTEM ARCHITECTURE

The implemented system consistsof a main block NODEMCU and sensors are connected to the NODEMCU. NODEMCU collects the information from different sensor, then its send a data to WebServer.

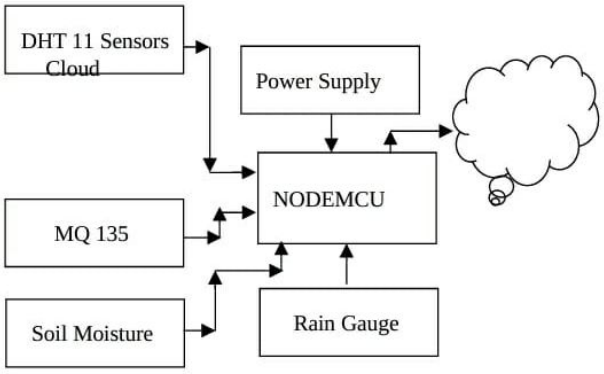

Fig. 1 Block Diagram of IoT Based Weather Monitoring system

IMPLEMENTATION SETUP

A. Components required: Hardware

1) NODEMCU
2) DHT11Sensor
3) Soil Moisture Sensor
4) Raingauge

B. Components required: Software

1) ARDUINO IDE
2) XAMPP Server
3) PHP Language

1) NodeMCU

It is the heart of the device. It provides the platform for IOT. It's a WIFI module having esp8266 firmware within. All the other sensors are connected to this micro- controller. They send the measured values to it and it uploads all the values to the cloud where the values are analyzed. The developer of this board is ESP8266 Open source Community. It has an operating system called XTOS. The CPU is ESP8266 (LX106). It has an in-built memory of 128 Kbytes and a storage capacity of4Mbytes.

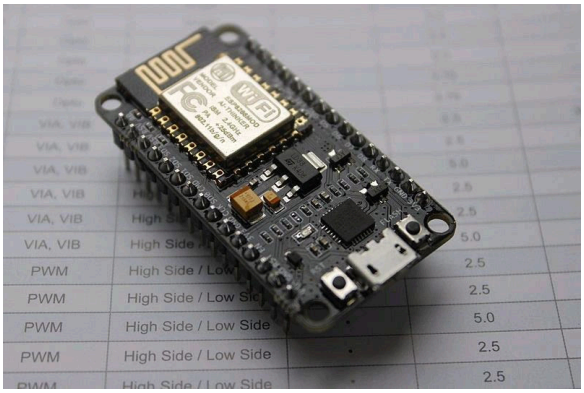

Fig. 2

2) DHT11 Sensor

It senses the temperature of the surrounding. It's a 4-pin device. We should connect a10k resistor between pin 1 and pin 2. Pin 1 is connected to the 3.3V. Pin 4 isconnectedtoGND. Pin 2 is the output pin which gives input to the NODEMCUpin D4. Pin 3 is left empty. It consists of a humidity sensing component, a NTC temperature sensor and a IC on a backsideof thesensor.

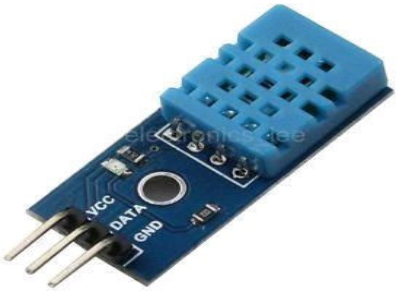

Fig. 3

3) Soil Moisture Sensor

It has two probes and it allow current to pass through soil when it gets the resistance value to measure the moisture content in the soil. If the water is more it conducts higher electricity and lesser resistance and the moisture level ishigher

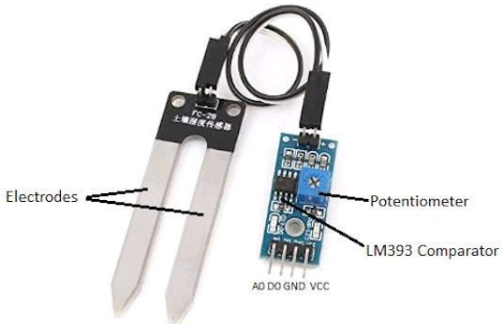

Fig. 4

4) Rain Gaugemodule

It is used for the detection of rain. It can also be used for measuring the intensity of the rain. It has both digital output as well as analog output. This module measures the moisture through analog output pin and when the threshold of moisture exceeds too much it provides a digital output. The more water or the lower resistance means lower output voltage. Whereas, the less water means higher resistance, i.e., high output Voltage on the analog pin. For example a completely dry board will cause the module to output five volts. The analog output of the module is connected to the A0 pin of the nodmc.

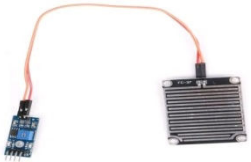

Fig.5

5) XAMPP Server

XAMPP is a completely free, easy to install Apache distribution containing Maria DB, PHP, and Perl. The XAMPP open source package has been setup to be incredibly easy to install and to use. XAMPP is a compilation of free software (comparable to a Linux distribution), it's free of charge and it's free to copy under the terms of the GNU General Public License.But it is only the compilation of XAMPP that is published under GPL. Please check every single license of the contained products to get an overview of what is, and what isn't, allowed. In the case of commercial use please take a look at the product licenses (especially MySQL), from the XAMPP point of view commercial use is alsofree.

EXPECTED RESULT

After sensing the data from different sensor devices, which are placed in particular area of interest. The sensed data will be automatically sent to the web server, when a proper connection is established with sever device.

CONCLUSION

As per the study the existing systems are time consuming as well as uneconomical. The proposed system is not only overcome these problems but also improve accuracy and crack detection in rails. It is the most economical solution provided in order to achieve good results of railways of our country in order to minimize the stats of accidents caused. There by possible to save precious lives of passengers and loss of economy. It also saves the time and money for identification of crack. It is possible to save precious lives of passengers and loss of economy. It also saves the time and money for identification of crack.

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