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IoT Based Weather Monitoring System

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Abstract- The system proposed in this paper is an advanced solution for monitoring the weather conditions at a particular place and make 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.

Index Terms- IoT,vertical Farming,Esp8266

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 the 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 is 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 a upcoming methodology for farming.

II. 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 weather parameters.

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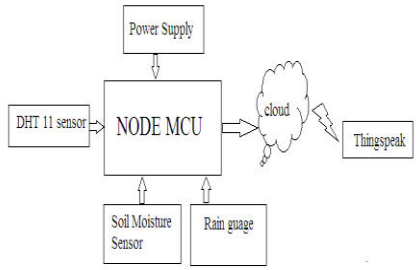
III. SYSTEM ARCHITECTURE

The implemented system consists of a main block NodeMCU and sensors are connected to the nodemcu.Nodemcu collects the information from different sensor , then its send a data to thingspeak.



Block Diagram of IoT Based Weather Monitoring system.

IV. I MPLEMENTATION SETUP

A. Components required: Hardware
1)NodeMCU
2)DHT11 Sensor
3)Soil Moisture
4)Rain gauge

B. Components required: Software
1) Arduino IDE[11]

1. Node MCU

It is the heart of the device. It provides the platform for IOT. Its 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 Opensource Community. It has an operatingsystem called XTOS. The CPU is ESP8266(LX106). It has an in-built memory of 128 KBytes and a storage capacity of 4MBytes.

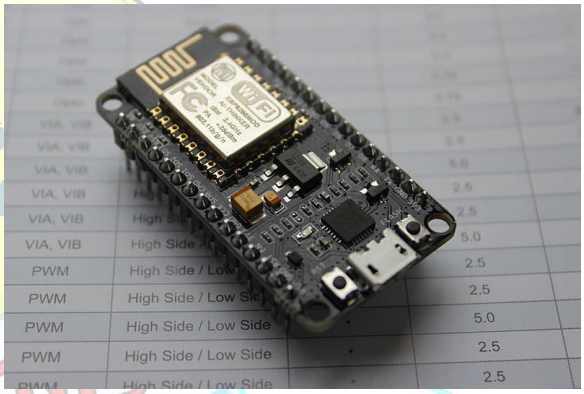


Fig a

2. DHT11 Sensor

It senses the temperature of the surrounding. Its a 4-pin device. We should connect a 10k resistor between pin 1 and pin 2. Pin 1 is connected to the 3.3V. Pin 4 is connected to GND. Pin 2 is the output pin which gives input to the nodemcu pin D4. Pin 3 is left empty.It consits of a humidity sensing component,a NTC temperature sensor and a IC on a backside of the sensor.

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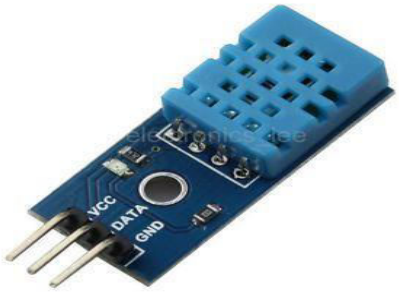
Fig b



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 moisure content in the soil.If the water is more it conductes higher electricity and lesser resistance and the moistue level is higher

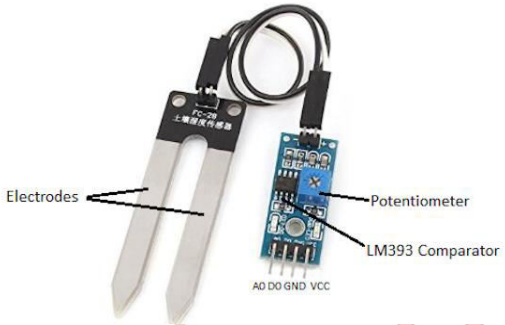


Fig c

4. Rain Guage module

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. Where as, 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 nodemcu.

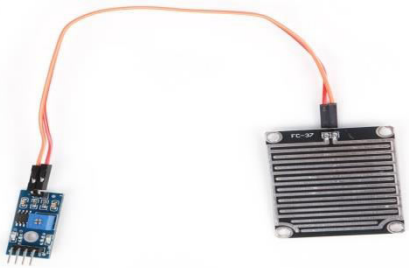


Fig d

5. Thingspeak

According to its developers, “Thing Speak” is an open source Internet of Things (IOT) application and API to store and retrieve data from things using the HTTP protocol over the Internet or via a Local Area Network.Thing Speak enables the creation of sensor logging applications, location tracking applications, and a social network of things with status updates".Thing Speak has integrated support from the numericalcomputing software MATLAB from MathWorks allowing Thing Speak users to analyze and visualize uploaded data using Matlab without requiring the purchase of a Matlab license from Mathworks.

V. SIMULATION 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.

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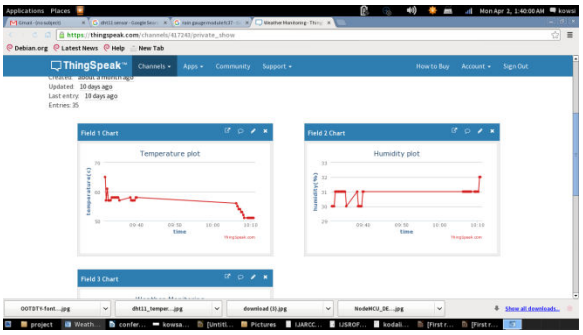

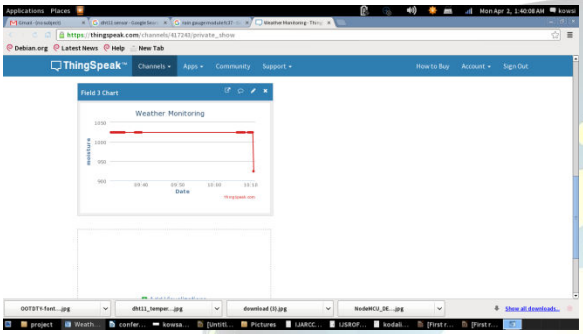

Fig e

Fig f

The two graphs fige and fig f illustrates the temperatore and humidity of the area that are measured for different crops and the moisture of the soil isalso measured for different crops on implementing the idea of vertical farmng.

VI. CONCLUSION

By keeping the embedded devices in the environment for monitoring enables self protection (i.e., smart environment) to the environment. To implement this need to deploy the sensor devices in the environment for collecting the data and analysis. By deploying sensor devices in the environment, we can bring the environment into real life i.e. it can interact with other objects through the network. Then the collected data and analysis results will be available to the end user through the Wi-Fi. The smart way to monitor environment and an efficient, low cost embedded system is presented with different models in this paper.It can also be modified such that whenever a message or email is sent from a particular phone number or email id to the server, all the environmental parameters of the device along with its location will be delivered to that phone or email id. This device can also be used to monitor a particular room or place whose environmental parameters are required to be monitored continuously.The vertical farming helps to cultivate more crops on the basis of stack formation and it occupy less acres for such impementation.It uses hydroponics or aquaponics process for growing the crops under any conditions.

REFERENCES

[1] Y. Zhou, Q. Zhou, Q. Kong, and W. Cai, “Wireless temperature
amp; humidity monitor and control system,” in 2012 2nd International
Conference on Consumer Electronics, Communications and Networks
(CECNet), April 2012, pp. 2246–2250.

[2] International Journal of Engineering Research & Technology (IJERT)ISSN: 2278-018IJERTV3IS090619 Vol. 3 Issue 9, September- 2014’Modular Weather and Environment Monitoring Systems using Raspberry Pi’ Kuruvadi Praveen ,AnkhitBala Venkata Department of Telecommunications BMS College of Engineering Bangalore, India

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ISSN2394-3785 (Online)
Available online atwww.ijartet.com

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[3] The International Journal of Engineering and Science (IJES) Volume 4 2015 ISSN (e): 2319 – 1813 'Zigbee based weather monitoring system' .

[4] T. Thaker, "Esp8266 based implementation of wireless sensor networkwith linux based web-server," March 2016.[5] International Journal of Engineering Trends and Technology (IJETT) –Volume33-March2016'AnAutomatedThingSpeak Weather Monitoring System using Raspberry PI'M. Ramesh1, Dr. S.A.K. Jilani2, Mr.S.Arun3 Department ofElectronics&Communication Engineering, MITS, Madanapalle, India

[6] "Arduino." [Online]. Available: http://www.arduino.cc/download/