

A Mini-Project Report on
ARDUINO BASED WEATHER STATION

Submitted in partial fulfillment of the requirements For the degree of
BACHELOR OF ENGINEERING

in
Information Technology Engineering by

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Under the guidance of

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University Of Mumbai 2019-2020**

Certificate

This is to certify that Ms.Yashashree Gore Moodle Id.17204009, Mr.Amol Beldar Moodle Id.16104070 and Mr.Sanjog Mhasde Moodle Id.15204006 Semester 8th has completed the mini project entitled "**Arduino Based Weather Station**" in the subject IOT as laid down by University of Mumbai in satisfactory manner within the premises of Institute during the academic year 2019 - 2020.

Date:

External

Subject-In-Charge

Head of Department

Principal

ABSTRACT

Weather is the state of the atmosphere, to the degree that it is hot or cold, wet or dry, calm or stormy, clear or cloudy. Weather generally refers to day-to-day temperature and precipitation activity, whereas climate is the term for the average atmospheric conditions over longer periods of time. When used without qualification, “weather”, is understood to mean the weather of earth. Monitoring the weather conditions manually is difficult. The present work is to develop an automated system which monitors the weather condition.

The weather condition is driven by air pressure (temperature and moisture) differences between one place and another. These pressure and temperature differences can occur due to the sun angle at any particular spot. Through this system we can automatically collect the information about humidity and temperature. The details are stored in a database and according to current and previous data we can produce the results in graphical manner in the system. The objective of this paper is to formulate the weather and be able to forecast the weather without human error.

INTRODUCTION

Weather forecasting is the application of science and technology to predict the state of the atmosphere for a given location. Human beings have attempted to predict the weather informally for millennium and formally since the nineteenth century. Weather forecasts are made by collecting quantitative data about the current state of the atmosphere on a given place and using scientific understanding of atmospheric processes to project how the atmosphere will evolve on that place. Using Internet of Things (IOT), we can control any electronic equipment in homes and industries. Moreover, you can read a data from any sensor and analyse it graphically from anywhere in the world. Here, we can read temperature and humidity data from DHT11 sensor and upload it to a ThingSpeak cloud using Arduino Uno and ESP8266-02 module. Arduino Uno is MCU, it fetch a data of humidity and temperature from DHT11 sensor and Process it and give it to a ESP8266 Module.ESP8266 is a WiFi module, it is one of the leading platform for Internet of Things. It can transfer a data to IOT cloud.

LITERATURE SURVEY

With reference to www.codeprojects.com in one of the articles @dimirea, he suggested to use a DHT11 sensor for temperature and humidity detection, but we found that DHT22 is more accurate and supports negative temperatures as well. So we are suggested to use 'DHT22' instead of 'DHT11'. But we are not going to measure negative temperature so we are using 'DHT11' only. Also we found that our project needs only 1A of current so we can use a powerbank instead of a wall adaptor for more portability. We also found that Arduino has more ADC connectors where as in NODEMCU there is only single analog connector. NODEMCU is relatively on expensive side than Arduino UNO and since Arduino UNO is sufficient for our project so we prefer Arduino over NODEMCU.

PROBLEM STATEMENT

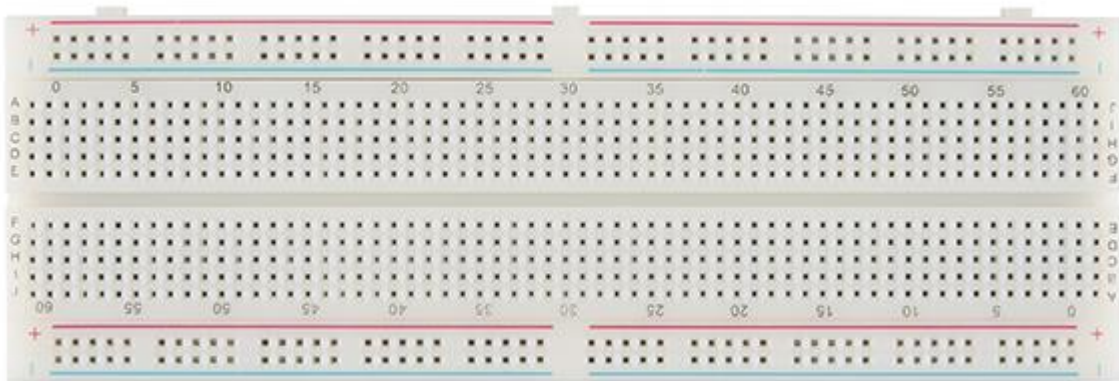
To design a weather station using Arduino Uno which shows humidity and temperature on thingspeak screen.

OBJECTIVE

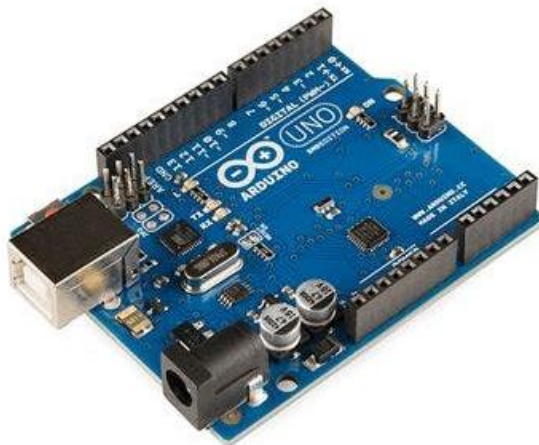
Using the DHT11 sensor temperature & humidity of environment is detected and this received data will be sent to an android app via ESP8266-02 wifi module.

Hardware Requirements :-

1) Breadboard



2) Arduino Uno



3) Humidity and Temperature Sensor (DHT11)

| DHT22 pins | |
|------------|------|
| 1 | VCC |
| 2 | DATA |
| 3 | NC |
| 4 | GND |

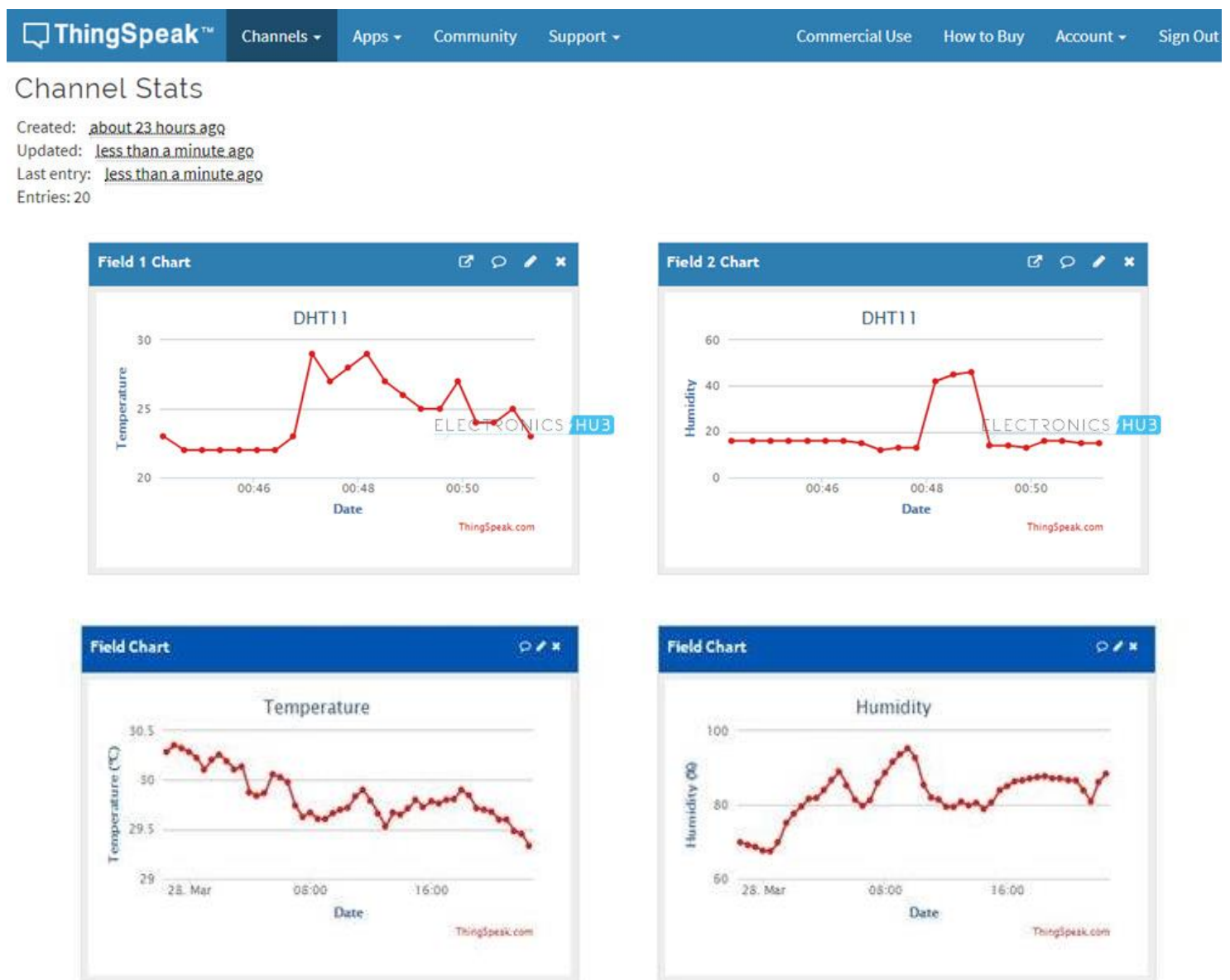


Software Requirements :-

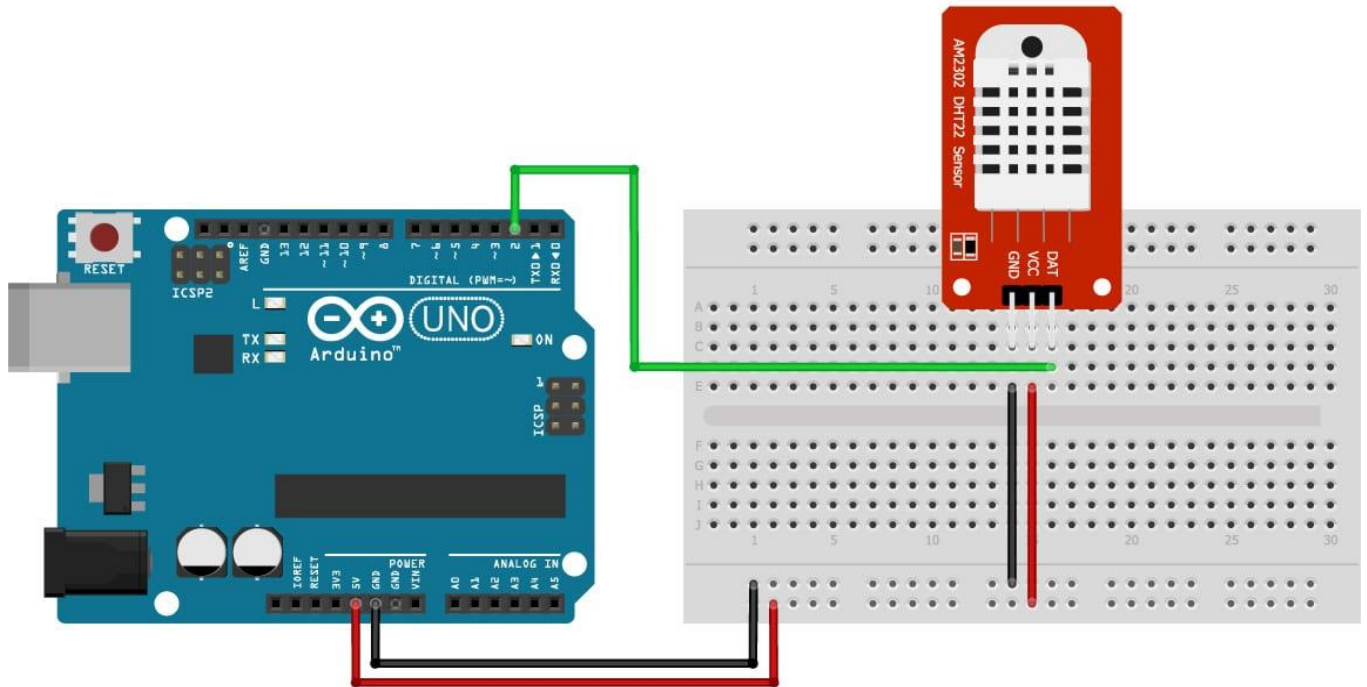
1) Arduino IDE



Working :-



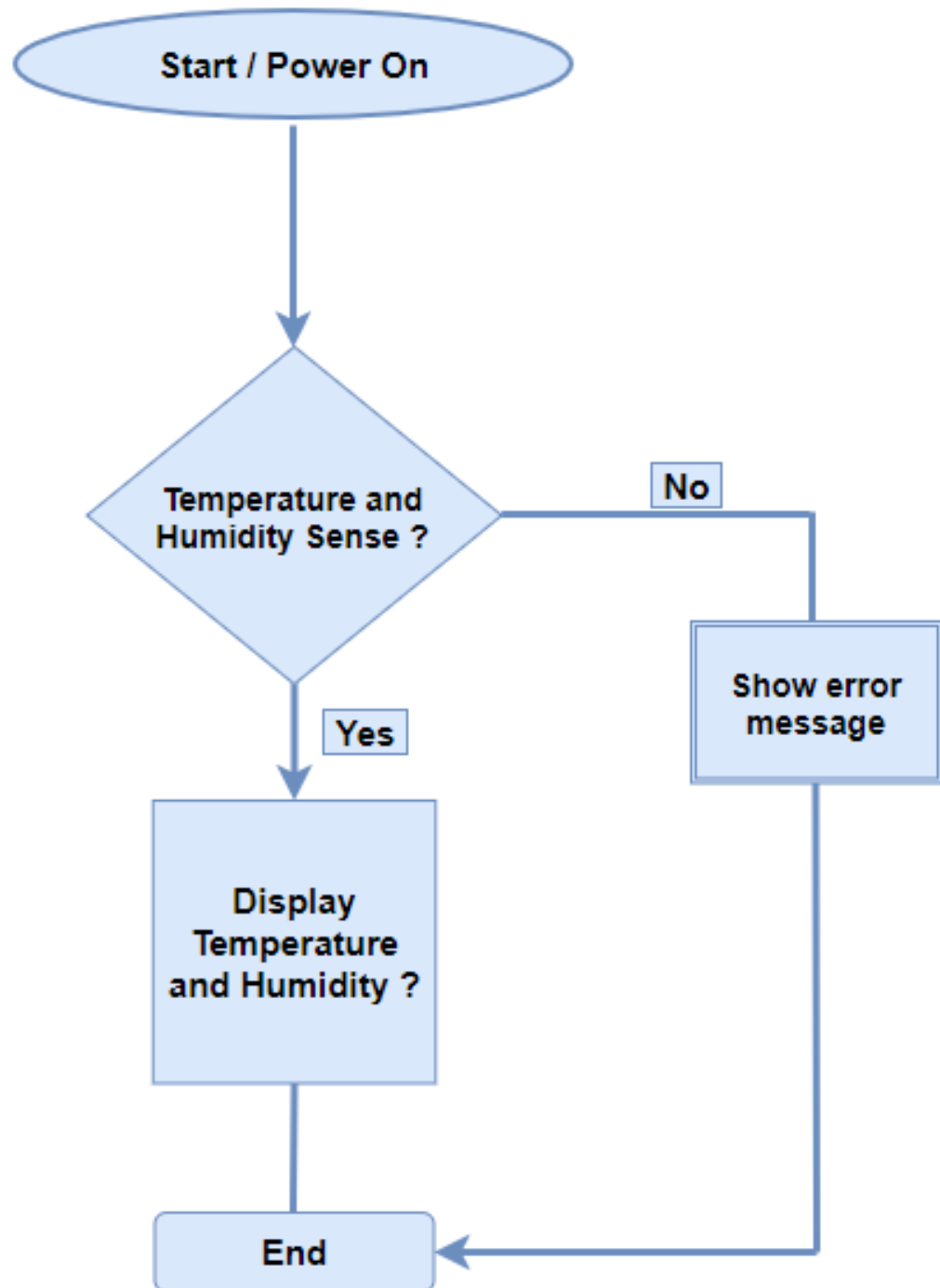
CIRCUIT DIAGRAM



BLOCK DIAGRAM



FLOWCHART



CODE SNIPPETS

```
1 #include <dht.h>
2
3
4 #define dht_apin A0 // Analog Pin sensor is connected to
5
6 dht DHT;
7
8 void setup(){
9
10  Serial.begin(9600);
11  delay(500); //Delay to let system boot
12  Serial.println("DHT11 Humidity & temperature Sensor\n\n");
13  delay(1000); //Wait before accessing Sensor
14
15 } //end "setup()"
16
17 void loop(){
18  //Start of Program
19
20  DHT.read11(dht_apin);
21
22  Serial.print("Current humidity = ");
23  Serial.print(DHT.humidity);
24  Serial.print("% ");
25  Serial.print("temperature = ");
26  Serial.print(DHT.temperature);
27  Serial.println("C ");
28
29  delay(5000); //Wait 5 seconds before accessing sensor again.
30
31  //Fastest should be once every two seconds.
32
33 } // end loop()
```

CONCLUSION

This concludes that the present work was a success and it will provide a competent method for recording real time weather readings and help farmers whose livelihood depends on the weather in a country like India to produce better quality crops. It can be used to gather information about the requirements for each area over the years. The gathered information is used to determine the optimal conditions for plants to grow and the farmer can modify the environment suitable for the growth of the plant. This, in turn will have a huge impact on agriculture and also on farmers throughout the world. In future, sensors to analyze air quality using gas detectors could be included and a web interface or service to feed the data directly to Internet could also be built.

REFERENCES

- 1.Satoh. F, Itakura. M, “Cloud-based Infrastructure for Managing and Analyzing Environmental Resources”, SRII Global Conference, pp.325- 334, 201.
- 2.Kurschl. W, Beer W, “Combining cloud computing and wireless sensor networks”, International Conference on Information Integration and Web-based Applications and Services, pp.512-518, 2009.
- 3.Zhengtong. Y, Wenfeng. Z, “The research of environmental pollution examination system based on the Cloud Computing”, International Conference on Communication Software and Networks, pp.514516, 2011.
- 4.Montgomery. K, Chiang. K, “A New Paradigm for Integrated Environmental Monitoring”, ACM International Conference Proceeding Series, 2010.
- 5.Wei. Q, Jin. N, Lou X, Ma. R, Xu. J, “Software design for water environment remote monitoring system based on mobile devices”, Applied Mechanics and Materials, pp. 2027-2032, 2011.

LINKS

1. <https://electronicsforu.com/electronicprojects/humidity-temperature-monitoring-usingarduino-esp8266>
2. <https://www.pantechsolutions.net/iotprojects/iot-based-humidity-and-temperaturemonitoring-using-arduino-uno>.
3. IEEE Link : <https://ieeexplore.ieee.org/document/1279115/>