

# IOT Based Weather Monitoring System

## **IOT based weather monitoring system**

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GitHub link: <https://github.com/Tinkerers-Lab-VESIT-ETRX/IoT-based-Weather-monitoring-8>

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## **Introduction**

### **A. Existing problem:**

Weather plays an important part in day to day life. Hence it is necessary to monitor it accurately. Information about the current weather can help influence important decisions. It can also help in predicting various parameters such as rainfall. A common example where this is used is during cricket matches on rainy days. It is decided whether to continue play with the help of temperature, humidity, pressure, rainfall and other such important information made available through weather monitoring systems.

### **B. Overview:**

A weather monitoring is to be made with the help of Arduino Uno and DHT11. Arduino IDE is the software required. The data from DHT11 would be stored in a database through which it will be displayed in a web-app.

### **C. Purpose:**

The objective of this project is to make a weather monitoring system where the user can get final output at the click of a button by visiting a web-app.

## **Literature Review**

### **Problem Statement:**

An IOT based weather system needs to be made. It is necessary to define what is meant by the term weather for this problem. Temperature and humidity are chosen for this project. The next step should be to choose appropriate sensors to detect the above-mentioned quantities. DHT11 is chosen for this project. The sensors should then be able to communicate the required data to the central database, which is Google Firebase Realtime Database in this project. The final step would be displaying this data in a proper format for the end user. Thus, the end user should be able to get the data by simply visiting a website.

### **Hardware requirements:**

1. Arduino uno
2. DHT11

### **Software requirements:**

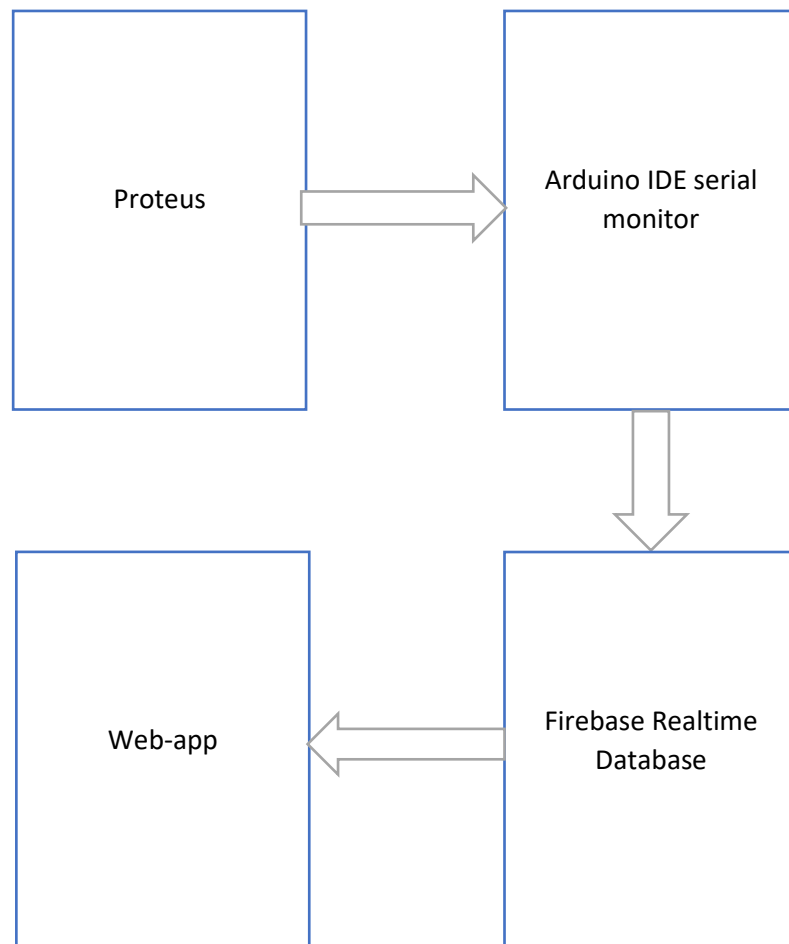
1. Arduino IDE
2. Proteus
3. Eltima Virtual Serial Port Driver

**Additions and updates:** Additional sensors can be used to monitor other quantities such as pressure and rainfall.

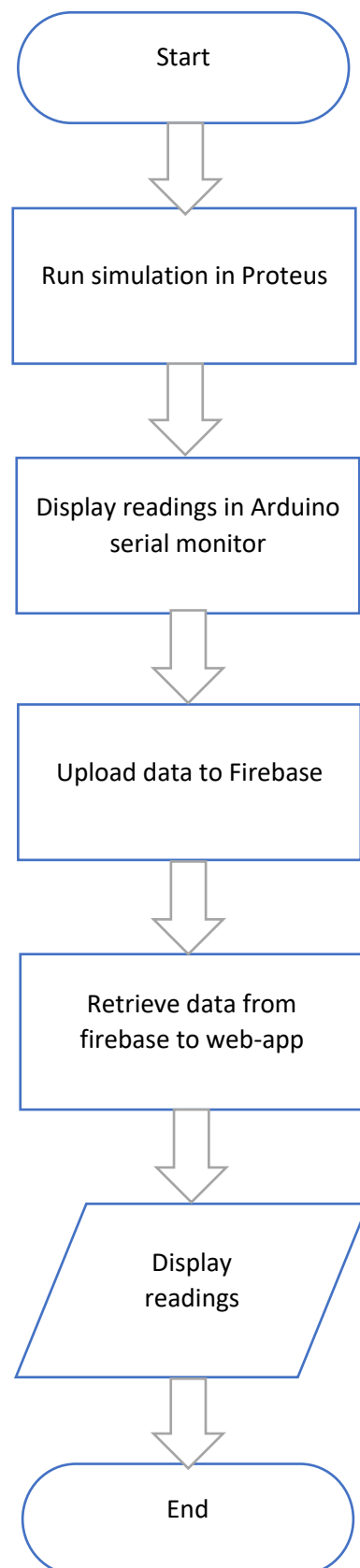
## Proposed Solution

The DHT11 sensor is interfaced by Arduino by writing an Arduino program in Arduino IDE. The DHT11 sensor in Proteus would then record temperature and humidity values and it can be displayed on serial monitor of Arduino. Eltima Virtual Serial Port Driver is used for linking actual COM port, used by Proteus, with Arduino COM port. By using a python program, the data from Arduino serial monitor can be uploaded on Google Firebase Realtime Database. Next a static website is deployed which retrieves data from Firebase and displays it to the end user.

Block Diagram:

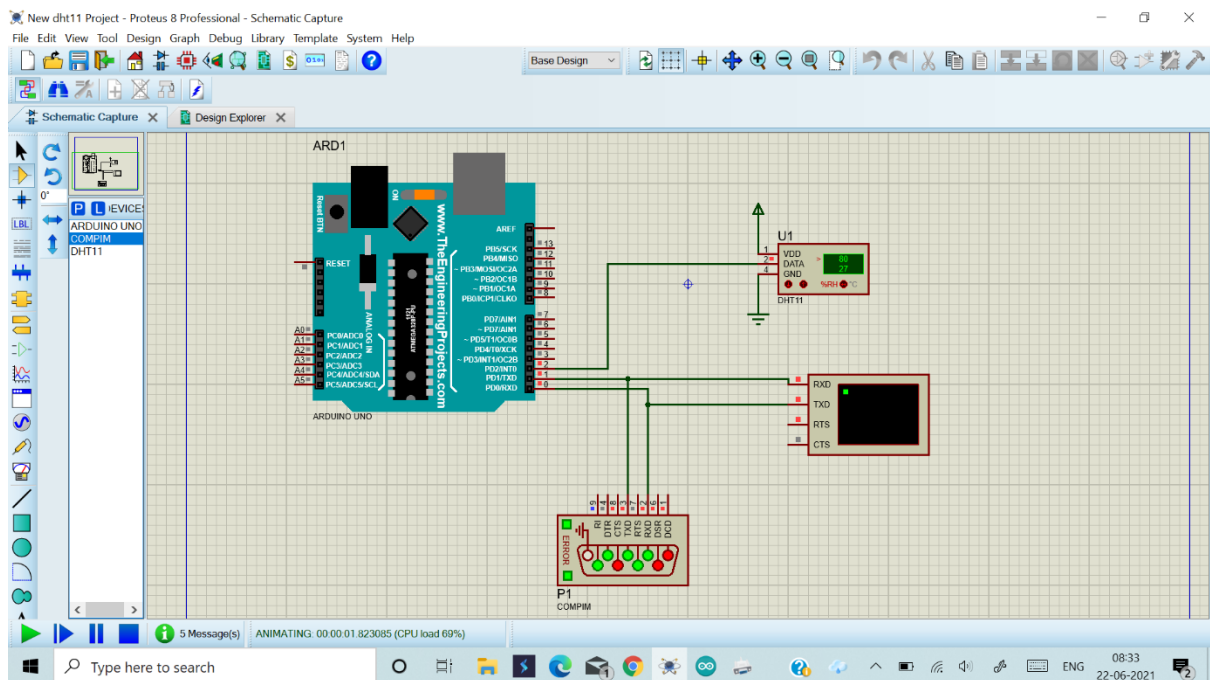


Flowchart:

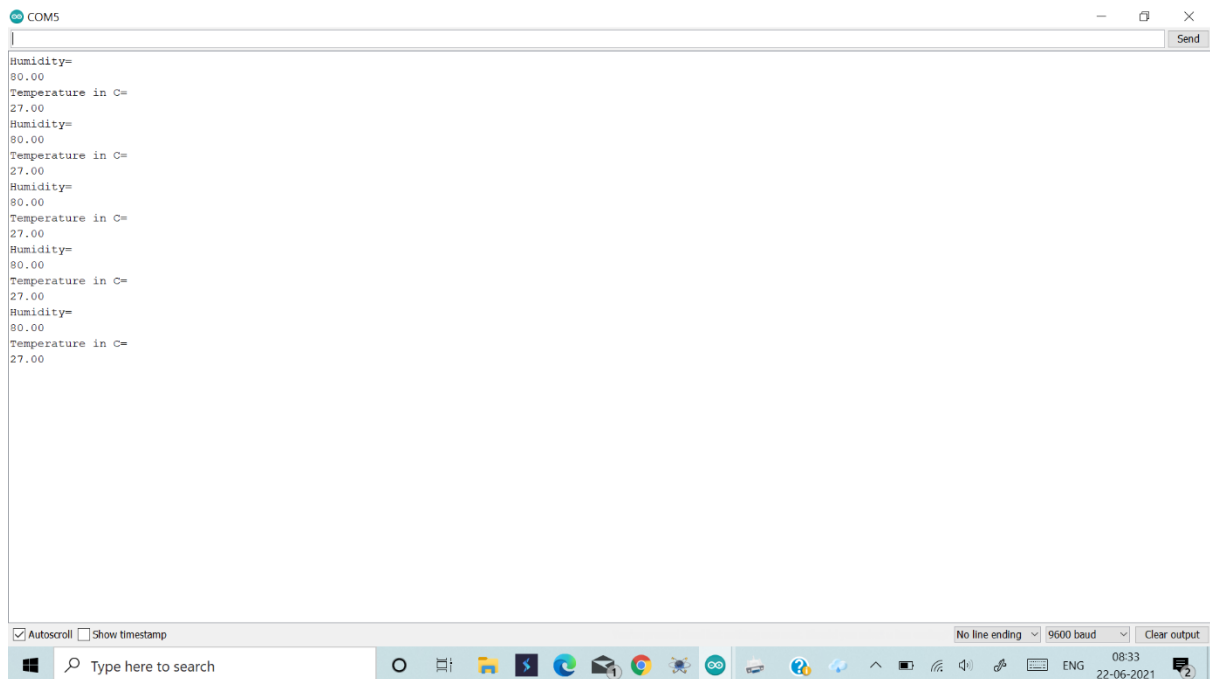




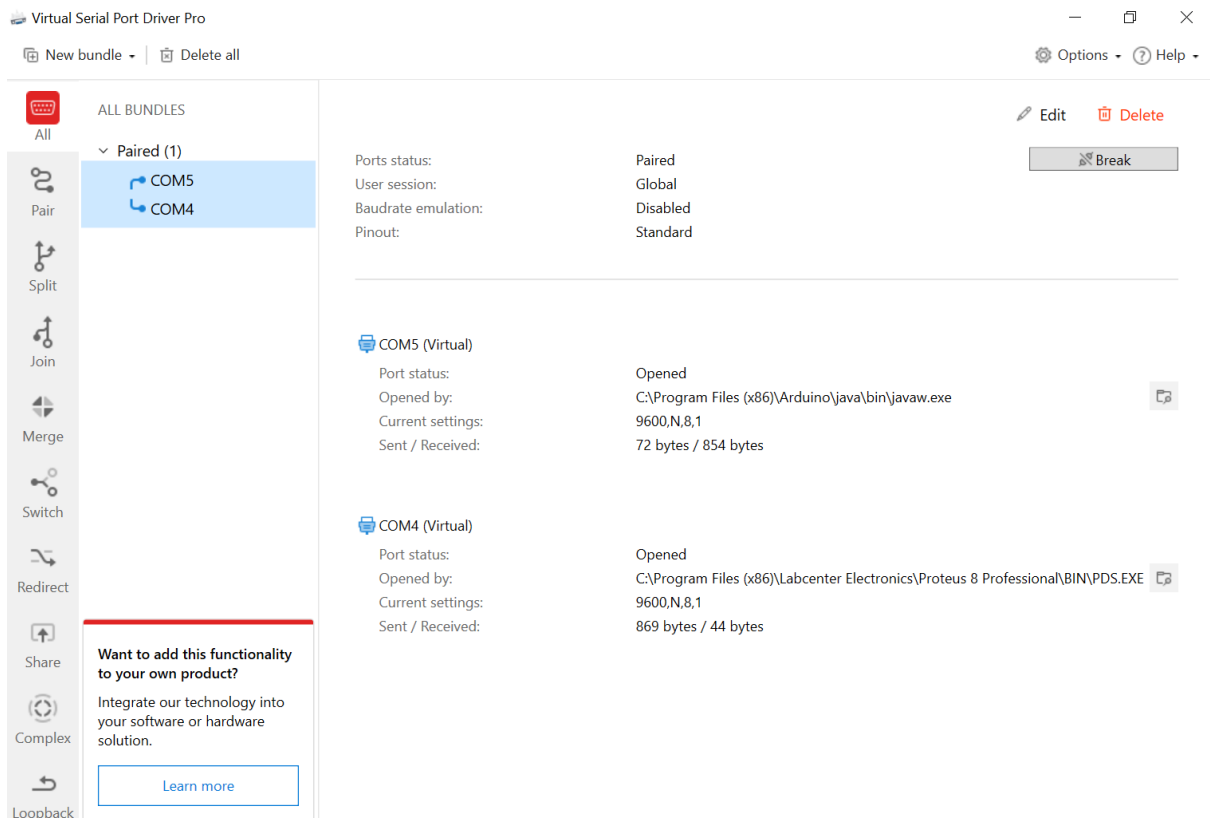
# Result



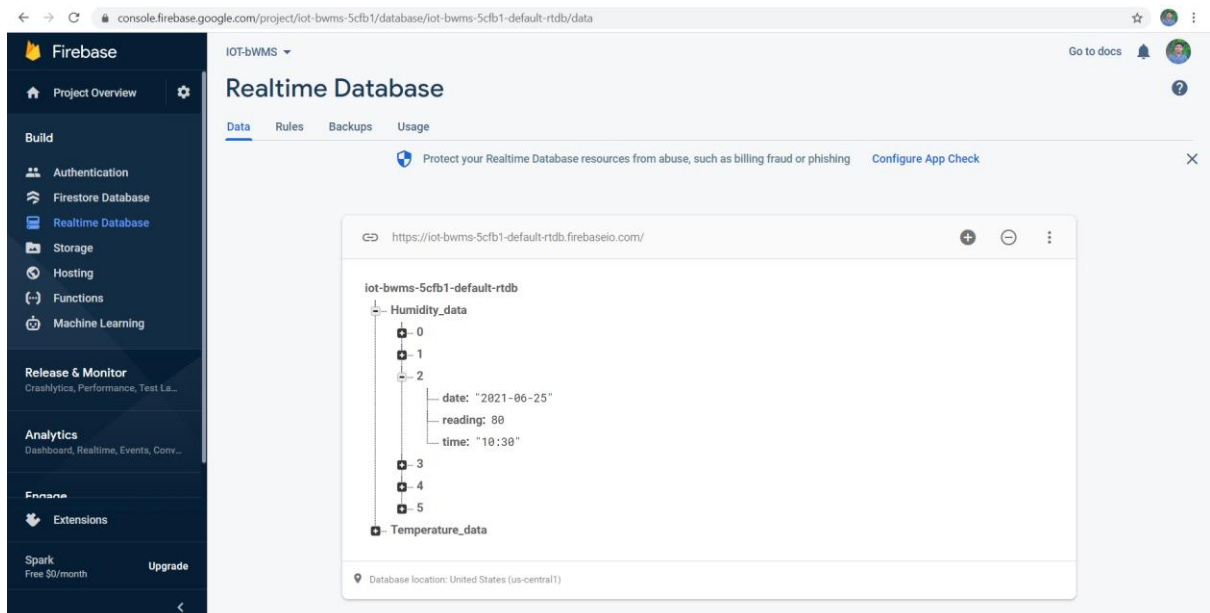
## Proteus simulation



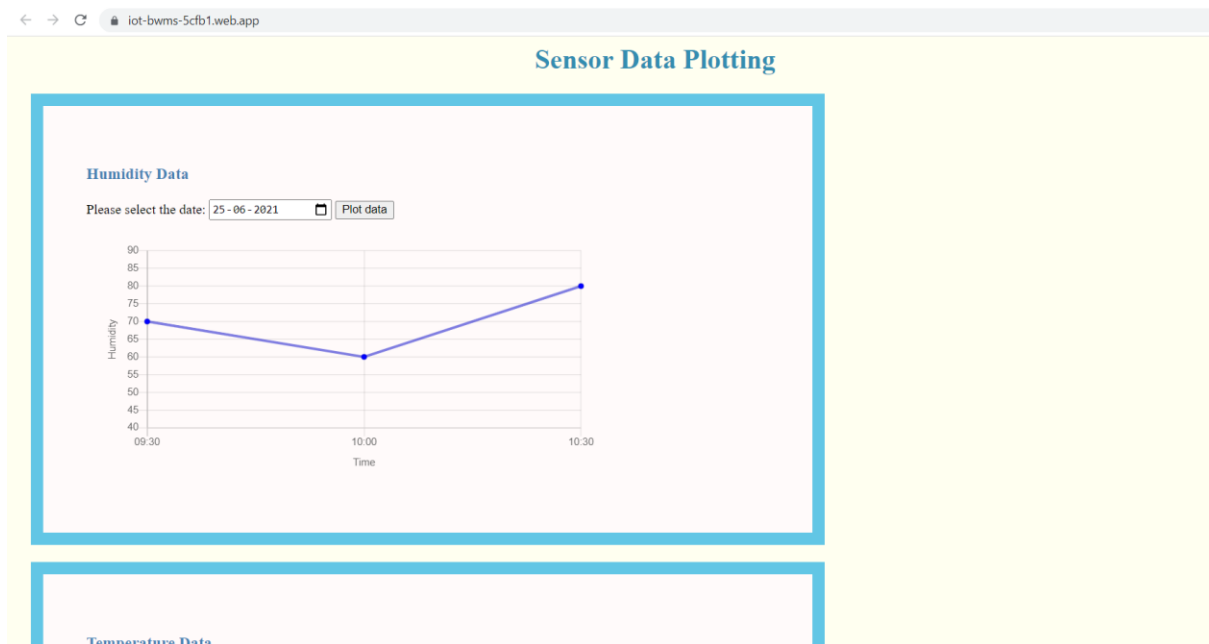
## Arduino serial monitor



Eltima virtual serial port driver



Firebase Realtime database



Screenshot of web-app 1



Screenshot of web-app 2

Web-app URL: <https://iot-bwms-5cfb1.web.app/>

Data is available for 25<sup>th</sup> and 26<sup>th</sup> June 2021.

## **Advantages and Disadvantages**

### **Advantages:**

1. The system is fully automated.
2. No manual intervention is needed.
3. It is a low-cost system.
4. It is fast yet reliable.
5. The final output is available in an easy to understand way.

### **Disadvantages:**

1. The system requires constant power supply.
2. Parameters can be measured accurately but it is difficult to predict them.
3. Only local data can be collected.

## **Applications**

Such systems can be used to determine climatic conditions of local areas. The system can be modified to suit different needs. For example, by using Wi-Fi modules the system can be placed in extreme climatic areas reducing human intervention. Also, such systems can be used in naval and aircraft navigation to give real-time weather updates.

## **Learning Outcomes**

1. Improved understanding of microcontrollers.
2. Better understanding of temperature and humidity sensors.
3. Able to interface sensors with Arduino Uno.
4. Able to simulate in Proteus.
5. Able to write database through Python.
6. Able to read database through HTTP requests.
7. Developed basic understanding of HTML, CSS, and JavaScript.
8. Able to develop web-app for end user.

## **Conclusion**

An automated system has been made and tested. Consequently, the web-app has been deployed. The user can view data at the web-app.

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## Appendix

- A. Arduino code: <https://github.com/Tinkerers-Lab-VESIT-ETRX/IoT-based-Weather-monitoring-8/blob/main/arduino%20code.ino>
- B. Firebase data upload: <https://github.com/Tinkerers-Lab-VESIT-ETRX/IoT-based-Weather-monitoring-8/blob/main/firebase%20upload.py>
- C. Web-app code: <https://github.com/Tinkerers-Lab-VESIT-ETRX/IoT-based-Weather-monitoring-8/blob/main/webapp.html>