

Raspberry Pi Assignment Report

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In this project, we aimed to create a system that collects data from the sensor DHT11 using a Raspberry Pi and then stores this data in a Firebase database.

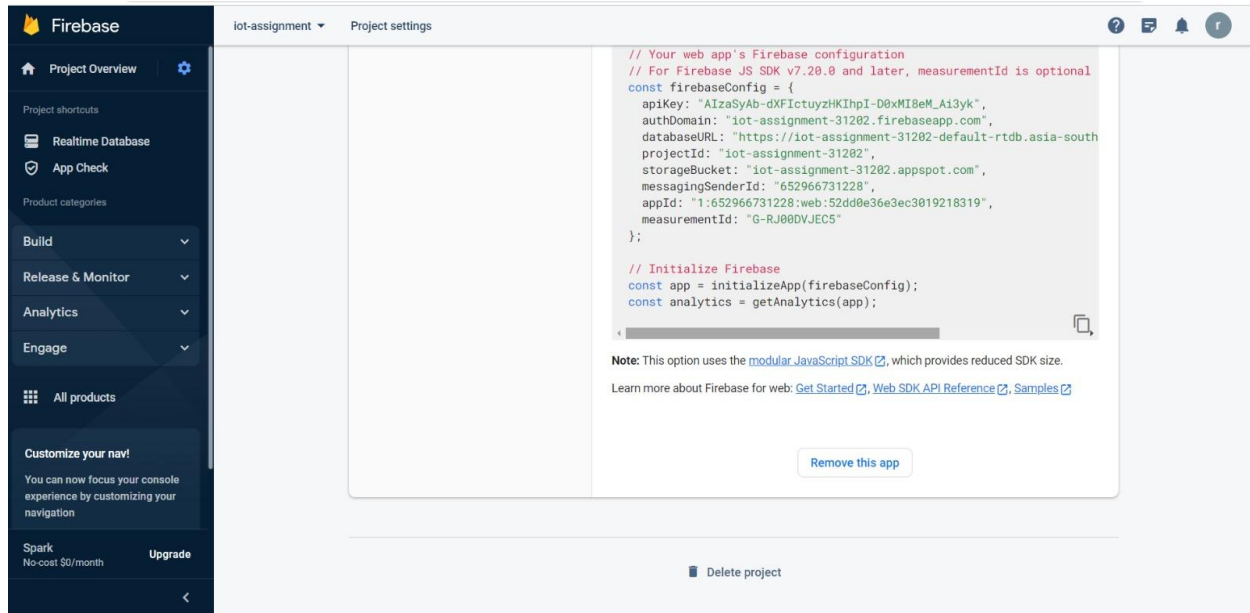
Components Used:

1. Raspberry Pi
2. DHT11 sensor
3. Jumper wires (female-to-female)
4. Firebase (Realtime Database)
5. Pyrebase library (for Firebase integration)

Steps:

1. Sensor Connection and Data Reading:

1. We connect the RaspberryPi with the SD card in which the OS is flashed, to the system. We have putty in our system through which we can open it.
2. We start capturing data using a sensor and raspberry pi collecting that data into a firebase database, by first making a project in the firebase. We then go to project settings and take our project configurations.



```
// For Firebase JS SDK v7.20.0 and later, measurementId is optional
const firebaseConfig = {
  apiKey: "AIzaSyAb-dXF1ctuyzHKIhpl-D0xMI8eM_Ai3yk",
  authDomain: "iot-assignment-31202.firebaseio.com",
  databaseURL:
    "https://iot-assignment-31202-default-rtdb.asia-southeast1.firebaseio.com",
  projectId: "iot-assignment-31202",
  storageBucket: "iot-assignment-31202.appspot.com",
  messagingSenderId: "652966731228",
  appId: "1:652966731228:web:52dd0e36e3ec3019218319",
  measurementId: "G-RJ00DVJEC5"
};
```

(our firebase configurations)

3. The DHT sensor used in this project has three pins: VCC (power), GND (ground), and DATA (data signal).
4. We connected the DHT sensor to the Raspberry Pi as follows:
 - a. VCC pin of the DHT sensor to a 5V pin on the Raspberry Pi
 - b. GND pin of the DHT sensor to a GND pin on the Raspberry Pi.
 - c. DATA pin of the DHT sensor to a GPIO 4 pin on the Raspberry Pi.
5. To read data from the sensor, we installed the Adafruit DHT library using pip.

pip install Adafruit_DHT

6. We created a Python script to read data from the DHT sensor. The script identified the GPIO pin and sensor type (DHT11) and then attempted to read data from the sensor. It printed temperature and humidity values to the terminal.

2. Firebase Integration:

1. We created a Firebase project and accessed the project settings to obtain the project configurations.
2. The Raspberry Pi with the OS flashed was connected to the system using tools like Putty for remote access.
3. We connected the sensor to the Raspberry Pi, in our case to pin number 4, and ensured the ground and vcc connection.
4. Using the Putty terminal, we opened our Python code file and modified it to include Firebase integration. We initialized Firebase with our project configurations.

Code in the putty- ls->cd documents-> nano DHT_sensor_reader.py

Code:

```
import Adafruit_DHT
import time
import pyrebase

config = {
    "apiKey": "AlzaSyAb-dXF1ctuyzHKIhpl-D0xMI8eM_Ai3yk",
    "authDomain": "http://iot-assignment-31202.firebaseio.com",
    "databaseURL":
    "your_database_urlhttps://iot-assignment-31202-default-rtdb.asia-southeast1.firebaseio.com",
    "storageBucket": "http://iot-assignment-31202.appspot.com"}

firebase = pyrebase.initialize_app(config)

db = firebase.database()

sensor = Adafruit_DHT.DHT11
```

```
pin = 4
```

```
while True:
```

```
    humidity, temperature = Adafruit_DHT.read_retry(sensor, pin)
```

```
    if humidity is not None and temperature is not None:
```

```
        print('Temp={0:0.1f}*C Humidity={1:0.1f}%'.format(temperature, humidity))
```

```
        data = {"Temperature" : temperature, "Humidity" : humidity}
```

```
        db.child("Status").push(data)
```

```
        db.update(data)
```

```
        print("Sent to Firebase")
```

```
    else:
```

```
        print('Failed to get reading. Try again!')
```

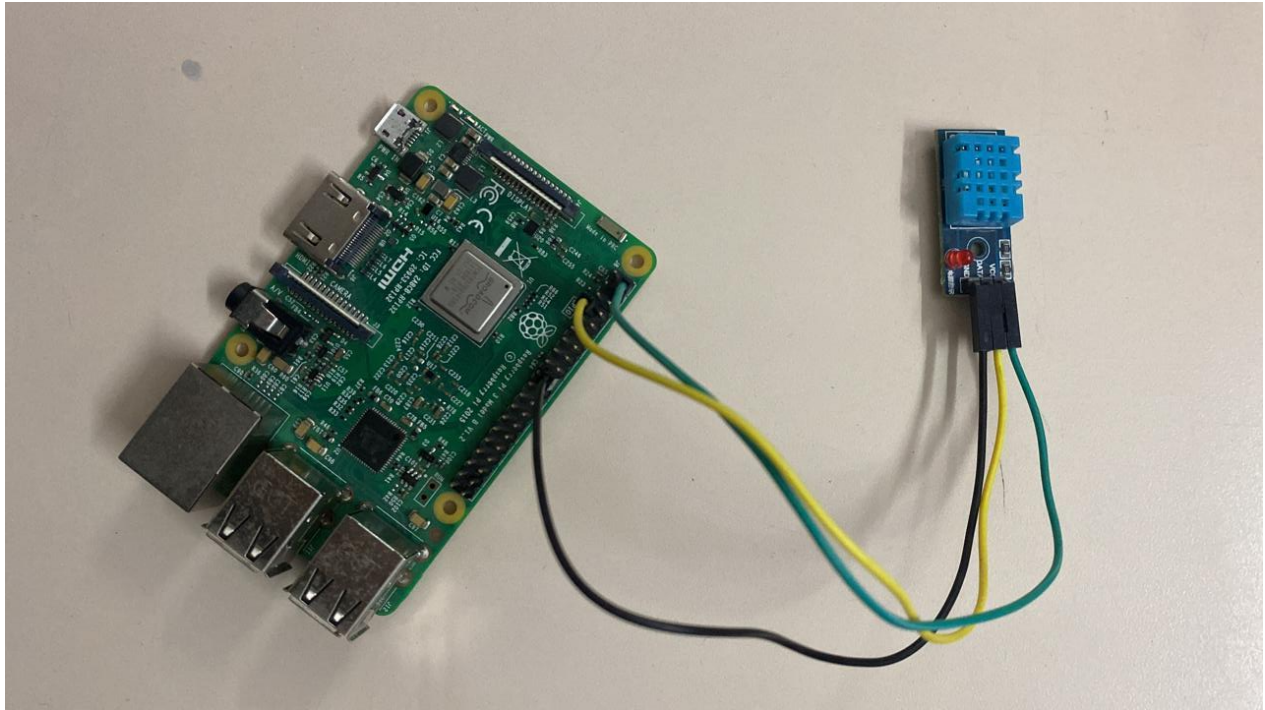
```
    time.sleep(1)
```

5. We used the Pyrebase library for Firebase integration, allowing us to push data to Firebase Realtime Database. The code uses a library pyrebase which is a simple python wrapper for the Firebase API.
6. After modifying the code for our configuration, we executed the Python script on the Raspberry Pi using the command `python3 DHT_sensor_reader.py`.

Project Outcome:

As a result of this project, we successfully collected data from a DHT 11 sensor connected to a Raspberry Pi and stored this data in a Firebase Realtime Database. The collected data, which includes temperature and humidity values, can be accessed and monitored in real-time from anywhere using Firebase's cloud storage and database capabilities.

This project provides a foundation for various IoT applications where sensor data needs to be collected, stored, and analyzed remotely. It demonstrates the integration of hardware components with cloud-based services, offering scalability and accessibility to the collected data.



iot-assignment

Realtime Database

Data Rules Backups Usage Extensions **NEW**

Protect your Realtime Database resources from abuse, such as billing fraud or phishing [Configure App Check](#) X

GD <https://iot-assignment-31202-default-rtdb.asia-southeast1.firebaseio.com> > Status

```
{
  "Humidity": 58,
  "Temperature": 32,
  "-Nemdg71G-ttn0U5D7rF": {
    "Humidity": 58,
    "Temperature": 32
  },
  "-NemdgYBVdMn0-nvH5c5": {
    "Humidity": 58,
    "Temperature": 32
  },
  "-NemdgJGnIUaAqSdcqj": {
    "Humidity": 58,
    "Temperature": 32
  }
}
```

Database location: Singapore (asia-southeast1)