VIETNAMESE - GERMAN UNIVERSITY
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEER

IoT Gateway Python Report

Group member:

Student 1: Hoàng Minh Trí - 10421123
Student 2: Nguyễn Nho Minh Trí - 10421061
Student 3: Nguyễn Phước Thiên Phú - 10421101
Student 4: Mai Nguyễn Việt Phú - 10421047
Student 5: Đoàn Quang Tiến - 10421059
Student 6: Lâm Thanh Tuệ - 10421108

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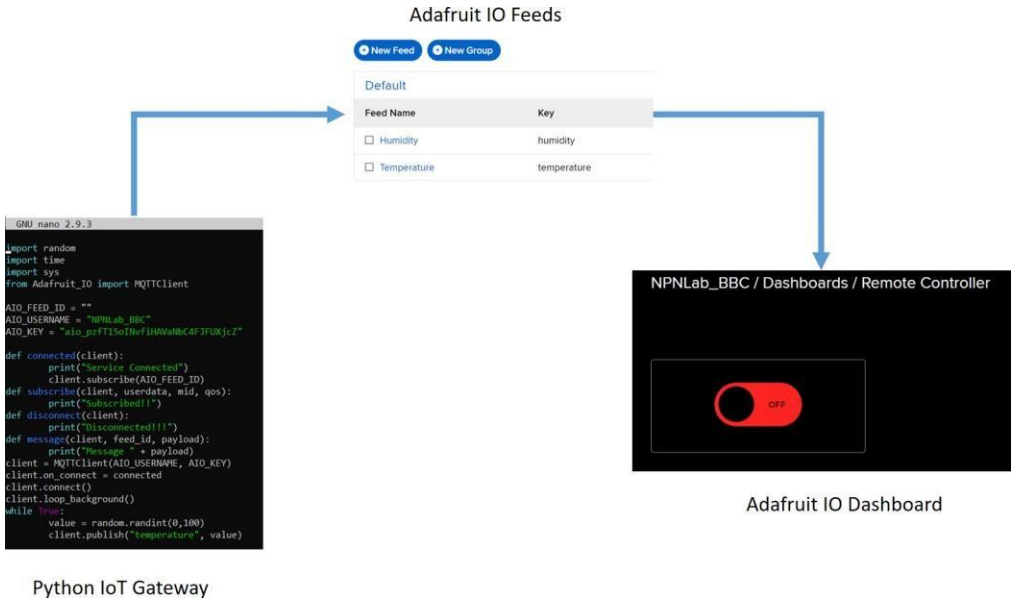
Content

1 Introduction

This report is a summary of the implementation of a project for the Information Technology course. There are 2 different project types, which students need to choose one to implement and report: IoT Gateway Python and Android App Project. Our group chose IoT Gateway Python.

2 IoT Gateway Python

In this project, the Python implementation on a Linux-based Operating System is required (e.g. Windows Subsystem for Linux). The structure of the project is depicted as follows:



Hình 1: *System Architecture For Project 1*

As shown in the figure 1, there are 3 components that should be reported. Students are required to present their works in the following subsections.

2.1 Adafruit IO Feeds

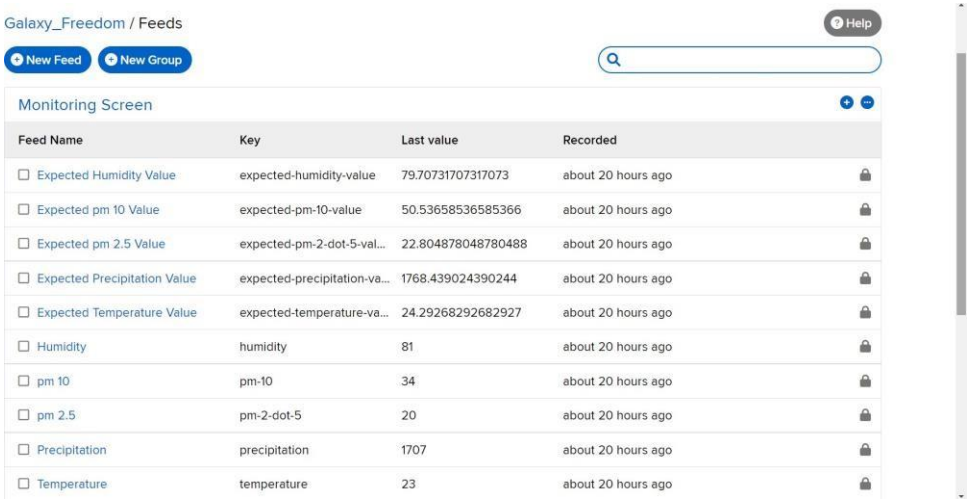
As shown below, there are 10 feeds: Expected humidity value: measures the expected weight of water vapor per unit weight of air.
Expected pm 10 value: measures the expected number of tiny particles or droplets in the air that are 10 microns or less in width.
Expected pm 2.5 value: measures the expected number of tiny particles or droplets in the air that are 2.5 microns or less in width.
Expected precipitation value: measure the anticipated amount of water that falls from the clouds towards the ground.
Expected temperature value: measure the expected degree or intensity of heat in a substance or object.
Humidity: measures the weight of water vapor per unit weight of air, from 75 g/m3 to 85 g/m3.

Pm 10: refers to tiny particles or droplets in the air that are 10 microns or less in width, from 25 $\mu g/m^3$ to 73 $\mu g/m^3$.

Pm 2.5: refers to tiny particles or droplets in the air that are 2.5 microns or less in width, from 8 $\mu g/m^3$ to 35 $\mu g/m^3$.

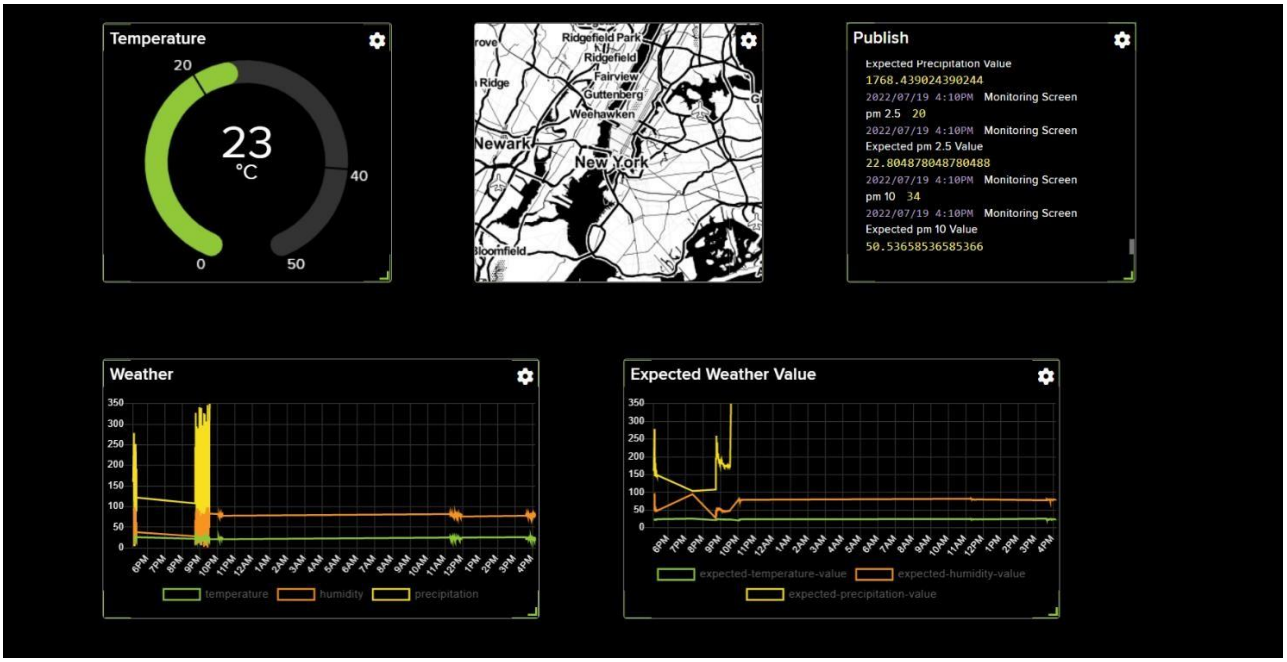
Precipitation: measure the amount of water that falls from the clouds towards the ground, from 1500mm to 2000mm.

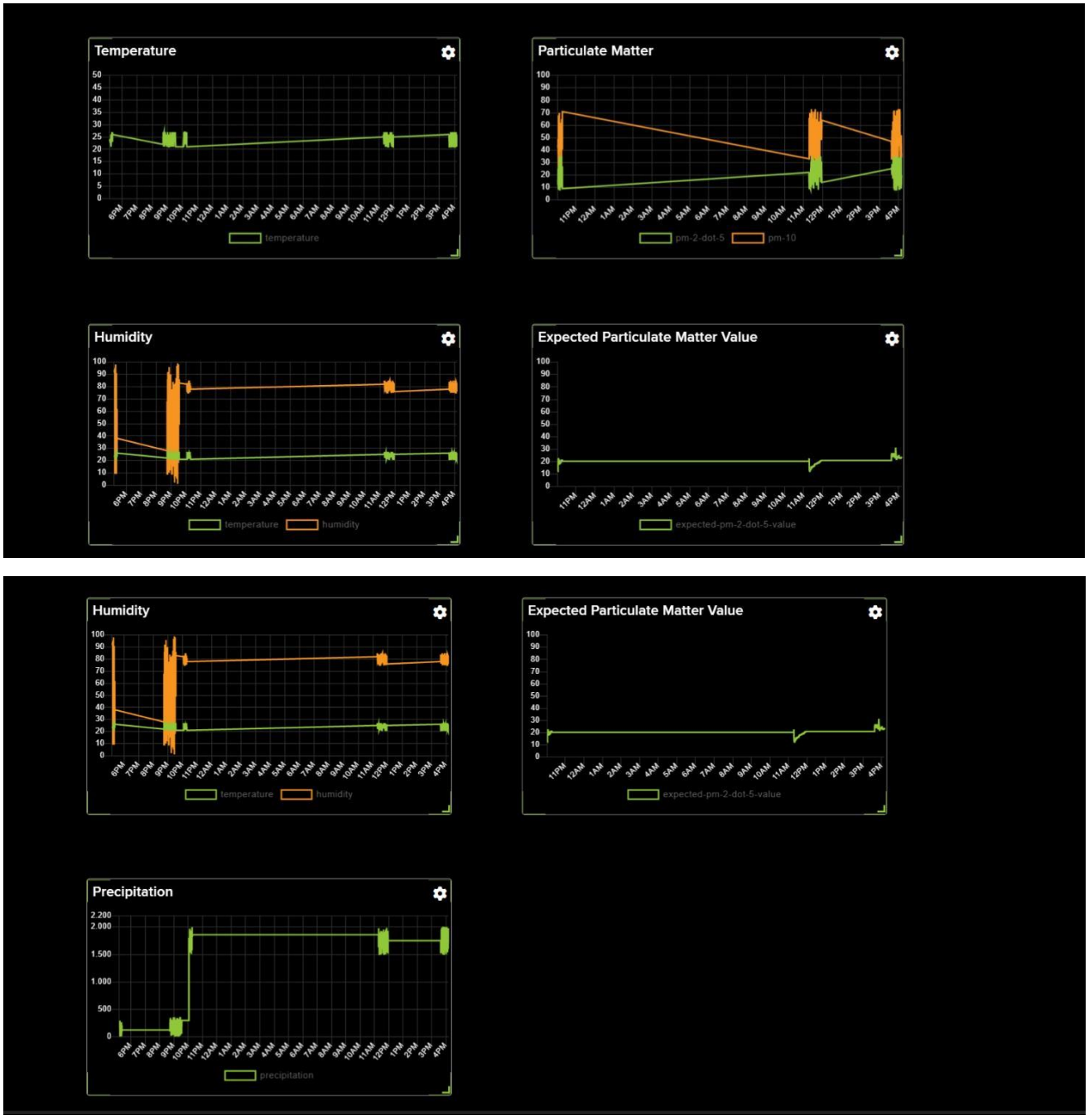
Temperature: show the degree or intensity of heat present in a substance or object, from 21°C to 27°C.



Hình 2: *Adafruit feeds*

2.2 Adafruit IO Dashboard





2.3 Python IOT Gateway

```
while True:
    temperature_value = random.randint(21, 27)
    sum_temperature_value += temperature_value
    expected_temperature_value = sum_temperature_value / value_length
    client.publish("Temperature", temperature_value)
    client.publish("Expected Temperature Value", ↩
        expected_temperature_value)
    print("Temperature Update:", temperature_value)
    print("Expected Temperature Value:", expected_temperature_value)


```

```
11      humidity_value = random.randint(75, 85)
12      sum_humidity_value += humidity_value
13      expected_humidity_value = sum_humidity_value / value_length
14      client.publish("Humidity", humidity_value)
15      client.publish("Expected Humidity Value", expected_humidity_value)
16      print("Humidity Update:", humidity_value)
17      print("Expected Humidity Value", expected_humidity_value)
18
19
20      precipitation_value = random.randint(1500, 2000)
21      sum_precipitation_value += precipitation_value
22      expected_precipitation_value = sum_precipitation_value / ↔
           value_length
23      client.publish("Precipitation", precipitation_value)
24      client.publish("Expected Precipitation Value", ↔
           expected_precipitation_value)
25      print("Precipitation Update:", precipitation_value)
26      print("Expected Precipitation Value", expected_precipitation_value↔
           )
27
28      pm2_5_value = random.randint(8, 35)
29      sum_pm2_5_value += pm2_5_value
30      expected_pm2_5_value = sum_pm2_5_value / value_length
31      client.publish("pm 2.5", pm2_5_value)
32      client.publish("Expected pm 2.5 Value", expected_pm2_5_value)
33      print("pm 2.5 Value", pm2_5_value)
34      print("Expected pm 2.5 Value", expected_pm2_5_value)
35
36      pm10_value = random.randint(25, 73)
37      sum_pm10_value += pm10_value
38      expected_pm10_value = sum_pm10_value / value_length
39      client.publish("pm 10", pm10_value)
40      client.publish("Expected pm 10 Value", expected_pm10_value)
41      print("pm 10 Value", pm10_value)
42      print("Expected pm 10 Value", expected_pm10_value)
43
44      value_length += 1
45      time.sleep(30)
```

As shown above, a while loop is implemented. In each feed, the value is randomized. For example, in the temperature feed, the value is randomized from 21 to 27. The expected value of each feed is determined by the division between the sum of randomized value and its value length. For instance, to calculate the expected value of temperature: 21+22+23+24+25+26+27/7.

3 Conclusion

In conclusion, throughout the project, we have learned about IoT basics, its structure, and the implementation of Python concerning an IoT web. Also, our web is the foundation of a live weather app. With further development and real-time inputs (sensors), we can have a fully functional weather web that displays the live weather of the area measured.