Connected Devices

Lab Module Assignment – Final Project

Name and Course

- Name: Dharani Thirumalaisamy
- Course: Connected Devices
- Semester and Year: Spring’19

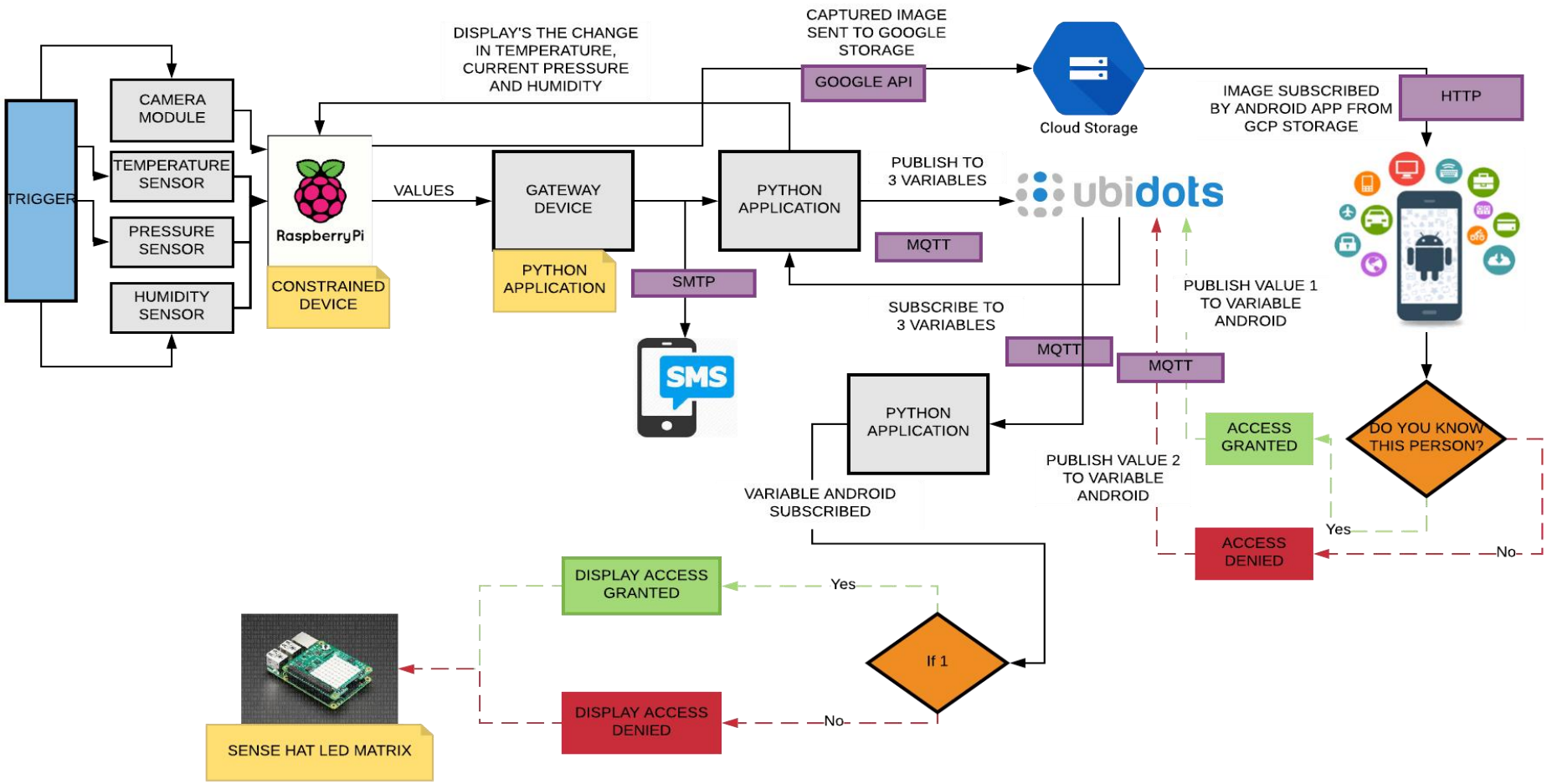
Description

- Description: An End-to-End Facial Recognition based Security System.

URL TO PROJECT DEMO : https://youtu.be/LZh16xVoErY

URL TO PROJECT SCRIPTS AND REPORT : https://github.com/Dharani-Thirumalaisamy/IOT-Workspace/tree/master

FLOW DIAGRAM



Problem Statement :

Robbery has become a common incident in many places around the world today. As IOT is trying to solve many problems that is present in the society, my idea is to implement a IOT based security door which will be able to capture pictures of people who stand outside the door and send a warm welcome message to the owner and will notify the owner that there is a intruder and ask if it should provide access or not.

Protocols Used :

1. Mqtt – To publish and subscribe to variables created on Ubidots
2. SMTP – To send text message
3. HTTP – To access the image on Google Cloud Storage

Sensors Used :

1. Raspberry pi camera module/sensor

2. Humidity Sensor

3. Temperature Sensor

4. Pressure Sensor

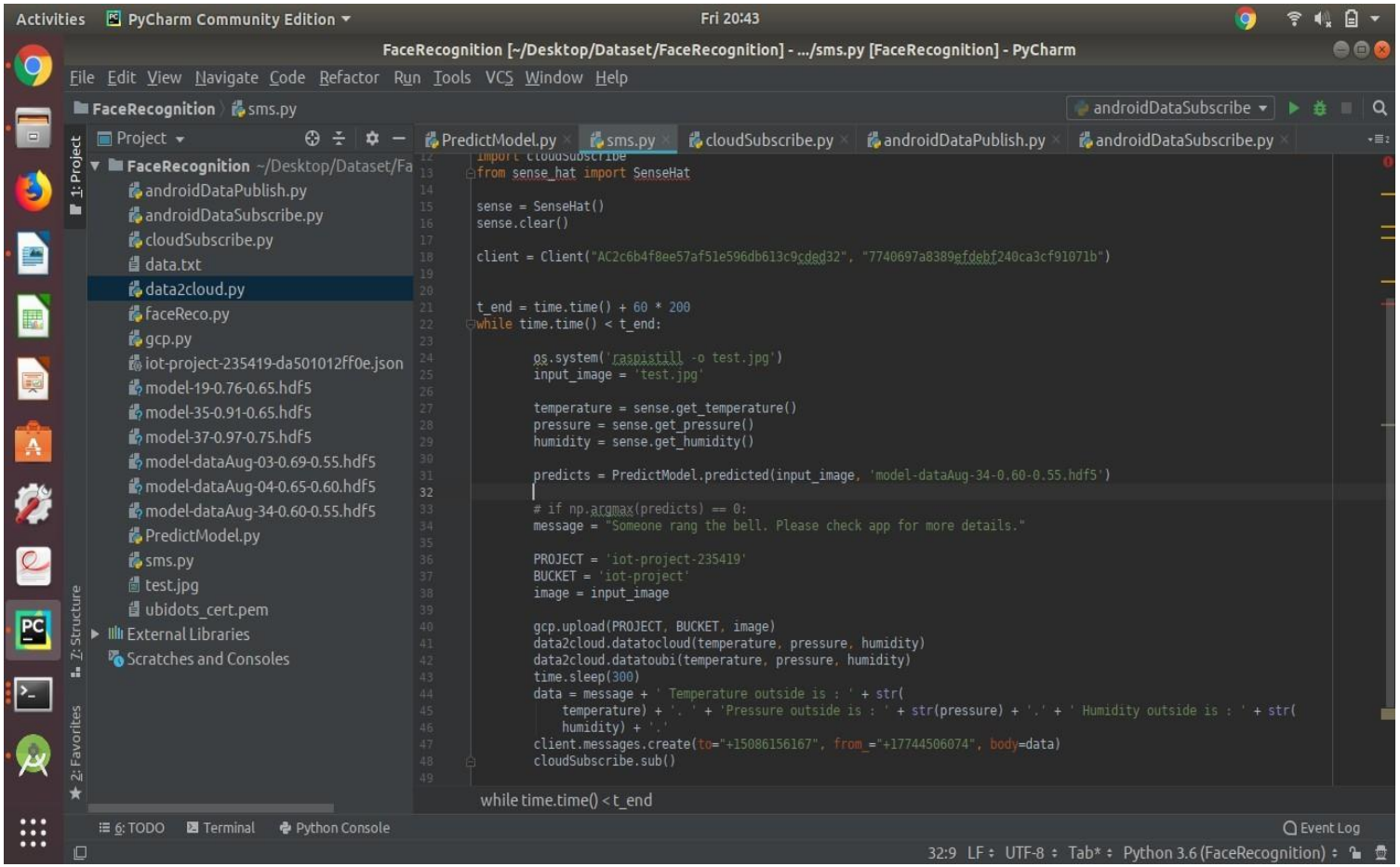
Cloud Services:

1. Google Cloud Platform

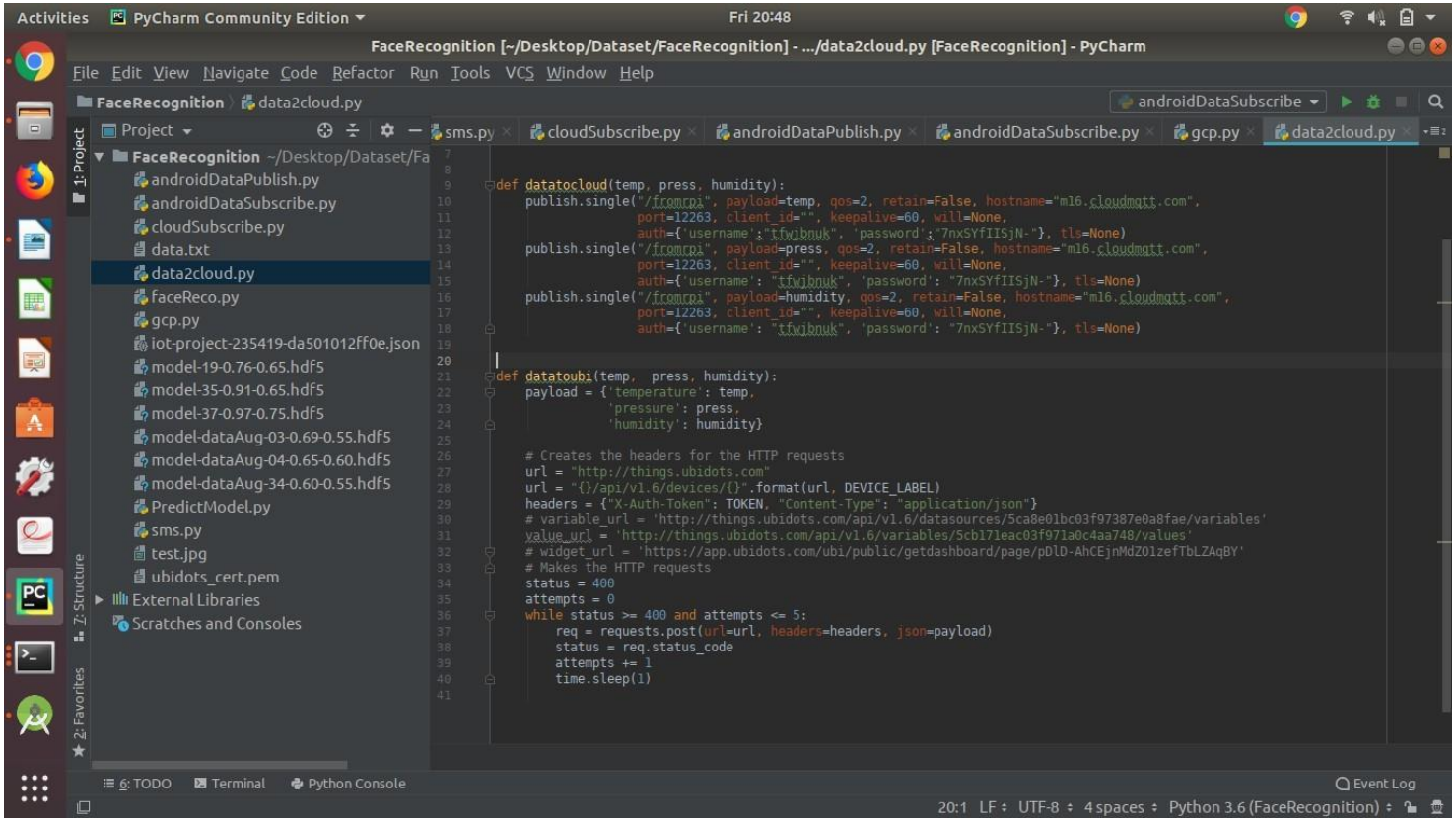
2. UBIDOTS

Application Script :

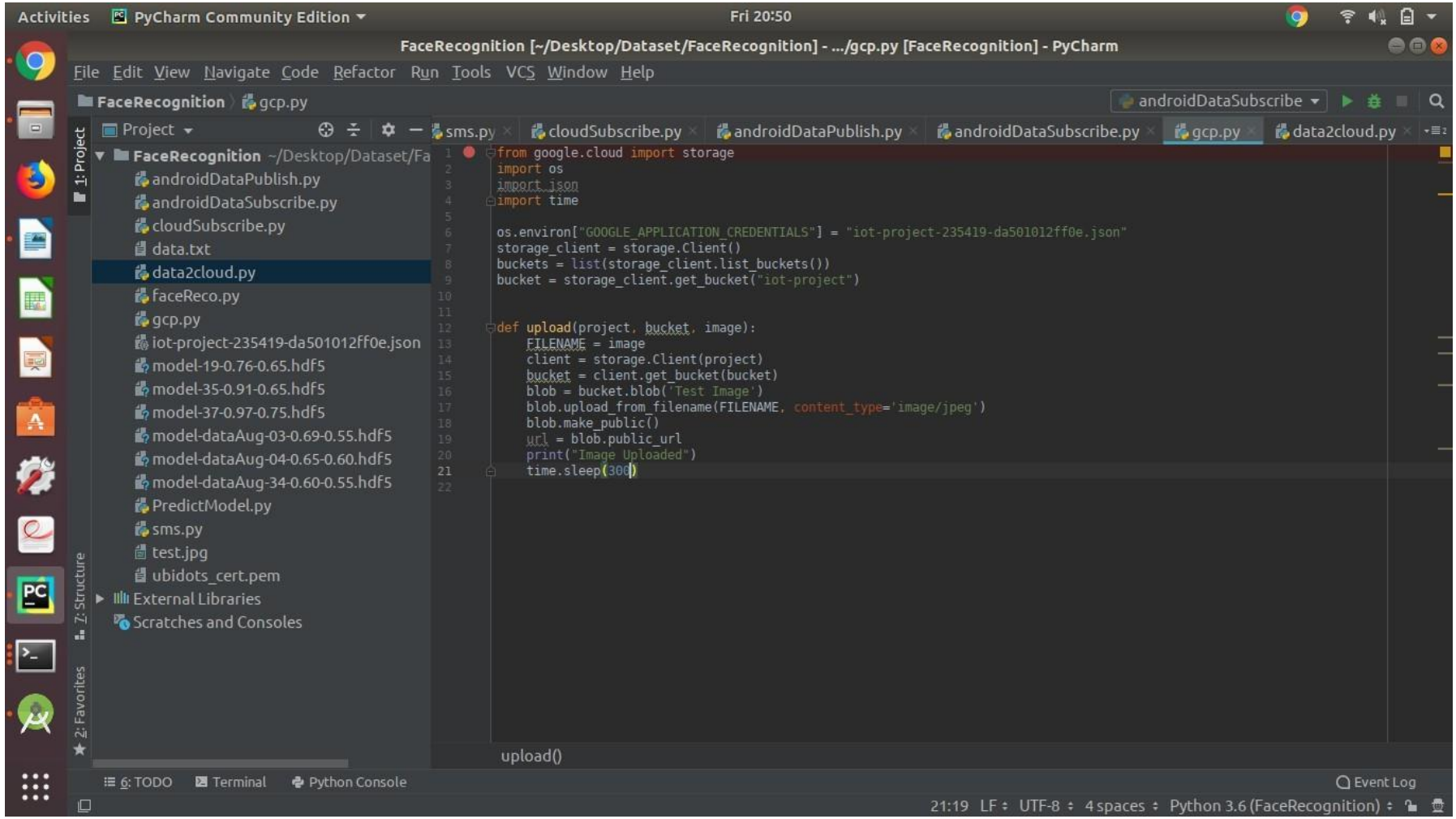
1. Trigger the sensor



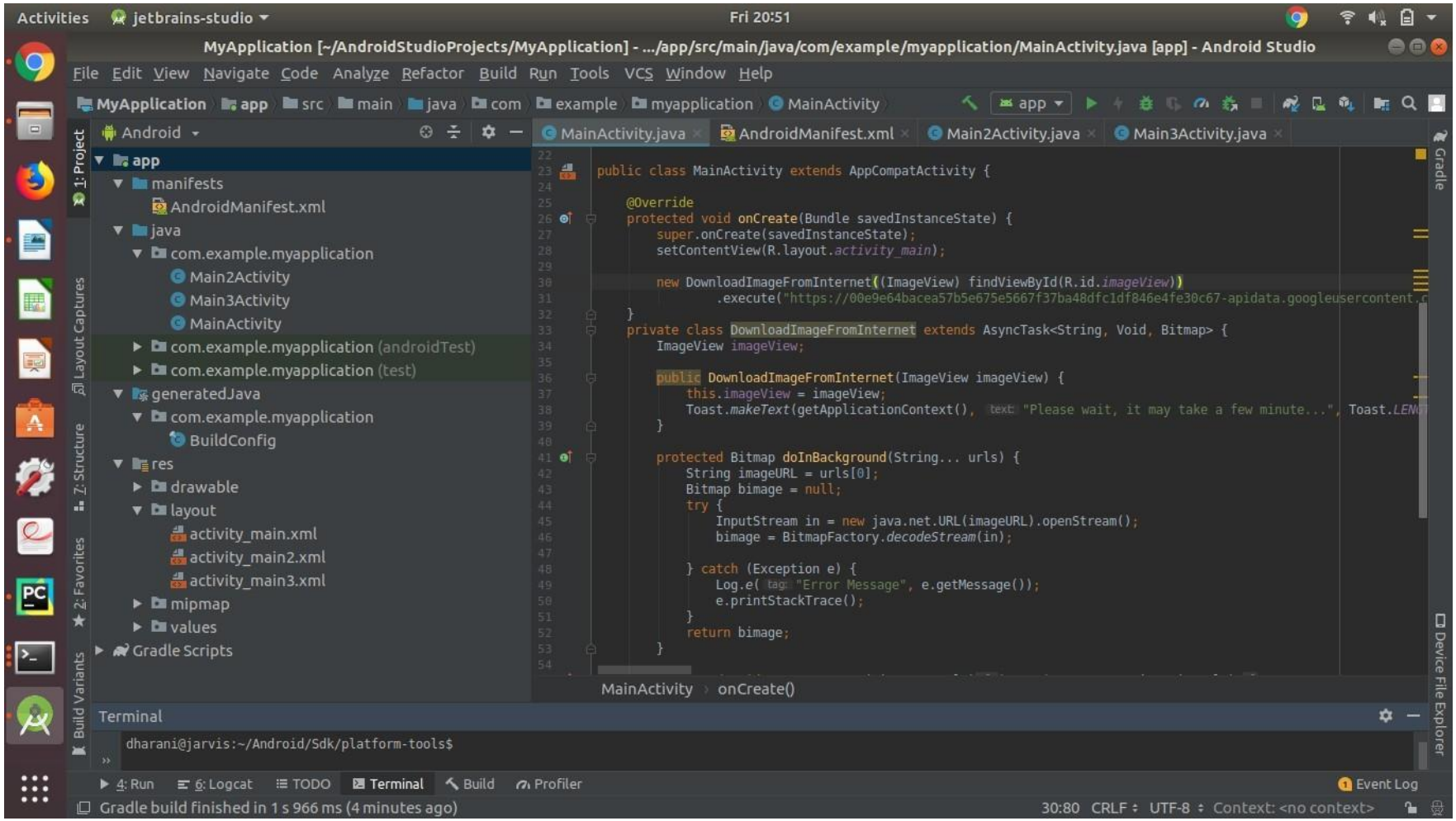
2. Send data to gateway and cloud :



3. Image to Google Cloud :



4. Image to Android App:



Activities jetbrains-studio Fri 20:51

MyApplication [~/AndroidStudioProjects/MyApplication] - .../app/src/main/java/com/example/myapplication/MainActivity.java [app] - Android Studio

File Edit View Navigate Code Analyze Refactor Build Run Tools VCS Window Help

MyApplication › app › src › main › java › com › example › myapplication › MainActivity

app

Android

- app
  - manifests
    - AndroidManifest.xml
  - java
    - com.example.myapplication
      - Main2Activity
      - Main3Activity
      - MainActivity
    - com.example.myapplication (androidTest)
    - com.example.myapplication (test)
  - generatedJava
    - com.example.myapplication
      - BuildConfig
  - res
    - drawable
    - layout
      - activity_main.xml
      - activity_main2.xml
      - activity_main3.xml
    - mipmap
    - values
- Gradle Scripts

MainActivity.java | AndroidManifest.xml | Main2Activity.java | Main3Activity.java

```java
        protected Bitmap doInBackground(String... urls) {
            String imageURL = urls[0];
            Bitmap bimage = null;
            try {
                InputStream in = new java.net.URL(imageURL).openStream();
                bimage = BitmapFactory.decodeStream(in);

            } catch (Exception e) {
                Log.e( tag: "Error Message", e.getMessage());
                e.printStackTrace();
            }
            return bimage;
        }

        protected void onPostExecute(Bitmap result) { imageView.setImageBitmap(result); }
    }
    public void onButtonClick(View v){
        Intent intent  = new Intent(getBaseContext(), Main2Activity.class);
        intent.putExtra( name: "Yes",  value: "Access Granted");
        Log.d( tag: "STATE", msg: "Access Granted");
        startActivity(intent);
    }
    public void onButtonClick2(View v){
        Intent intent  = new Intent(getBaseContext(), Main3Activity.class);
        intent.putExtra( name: "No",  value: "Access Denied");
        Log.d( tag: "STATE", msg: "Access Denied");

        startActivity(intent);
    }

}
```

MainActivity › onCreate()

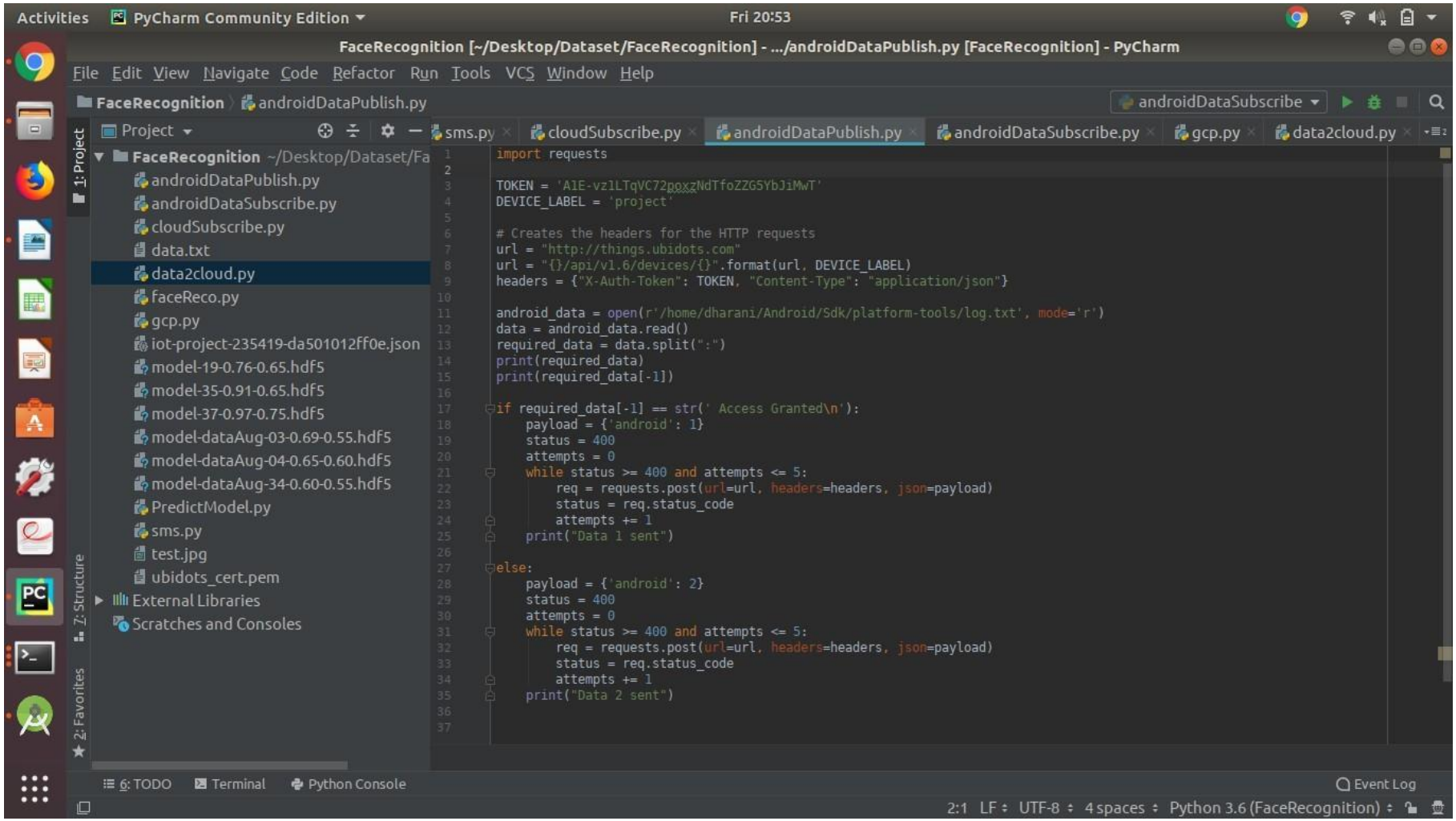
Terminal

```
dharani@jarvis:~/Android/Sdk/platform-tools$
```

4: Run | 6: Logcat | TODO | Terminal | Build | Profiler | Event Log

Gradle build finished in 1 s 966 ms (4 minutes ago) 30:80 CRLF UTF-8 Context: <no context>

5. Android data publish and subscribe :



Activities PyCharm Community Edition Fri 20:53

FaceRecognition [~/Desktop/Dataset/FaceRecognition] - .../androidDataSubscribe.py [FaceRecognition] - PyCharm

File Edit View Navigate Code Refactor Run Tools VCS Window Help

FaceRecognition androidDataSubscribe.py

androidDataSubscribe

Project

FaceRecognition ~/Desktop/Dataset/Fa

- androidDataPublish.py
- androidDataSubscribe.py
- cloudSubscribe.py
- data.txt
- data2cloud.py
- faceReco.py
- gcp.py
- iot-project-235419-da501012ff0e.json
- model-19-0.76-0.65.hdf5
- model-35-0.91-0.65.hdf5
- model-37-0.97-0.75.hdf5
- model-dataAug-03-0.69-0.55.hdf5
- model-dataAug-04-0.65-0.60.hdf5
- model-dataAug-34-0.60-0.55.hdf5
- PredictModel.py
- sms.py
- test.jpg
- ubidots_cert.pem

External Libraries

Scratches and Consoles

sms.py | cloudSubscribe.py | androidDataPublish.py | androidDataSubscribe.py | gcp.py | data2cloud.py

```python
import requests
from sense_hat import SenseHat

sense = SenseHat()

TOKEN = 'A1E-vz1LTqVC72poxzNdTfoZZG5YbJiMwT'
DEVICE_LABEL = 'project'

url = "http://things.ubidots.com"
url = "{}/api/v1.6/devices/{}".format(url, DEVICE_LABEL)
headers = {"X-Auth-Token": TOKEN, "Content-Type": "application/json"}
# variable_url = 'http://things.ubidots.com/api/v1.6/datasources/5ca8e01bc03f97387e0a8fae/variables'
android_url = 'http://things.ubidots.com/api/v1.6/variables/5cb908dfc03f9745cb92ca39/values'

data = requests.get(url=android_url, headers=headers)
data = data.json()
print(data)

required_value = data['results'][0]['value']
print(required_value)

if required_value == 1.0:
    # print("Green")
    sense.show_message("Access Granted")

else:
    # print('Red')
    sense.show_message("Access Denied")
```

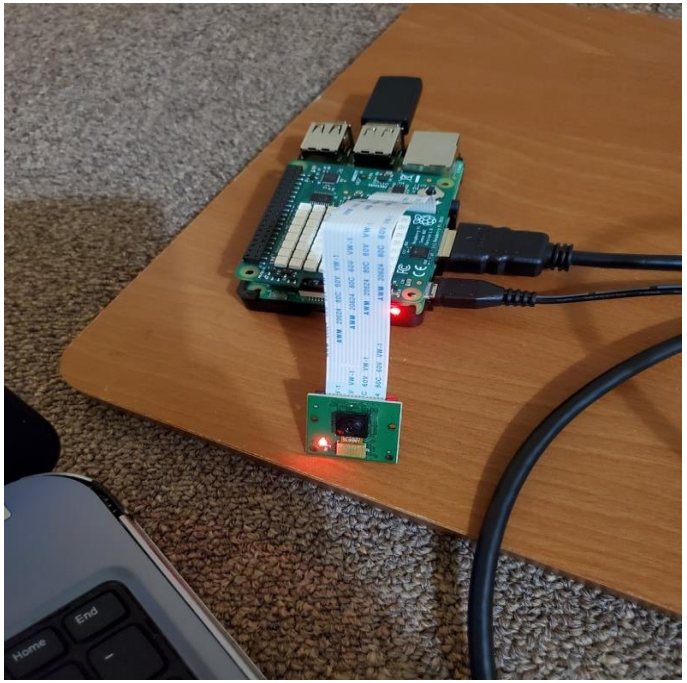
else

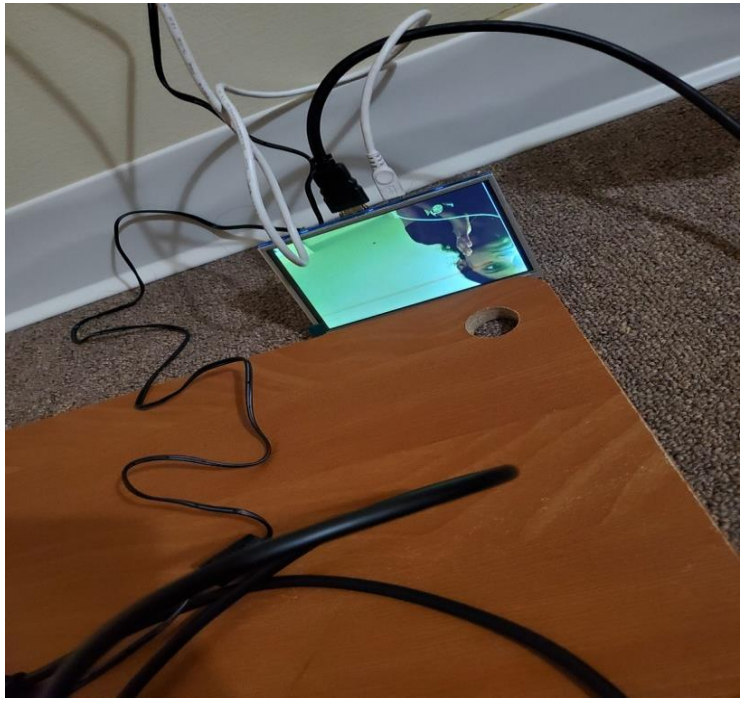
6: TODO Terminal Python Console Event Log

28:39 LF UTF-8 4 spaces Python 3.6 (FaceRecognition)

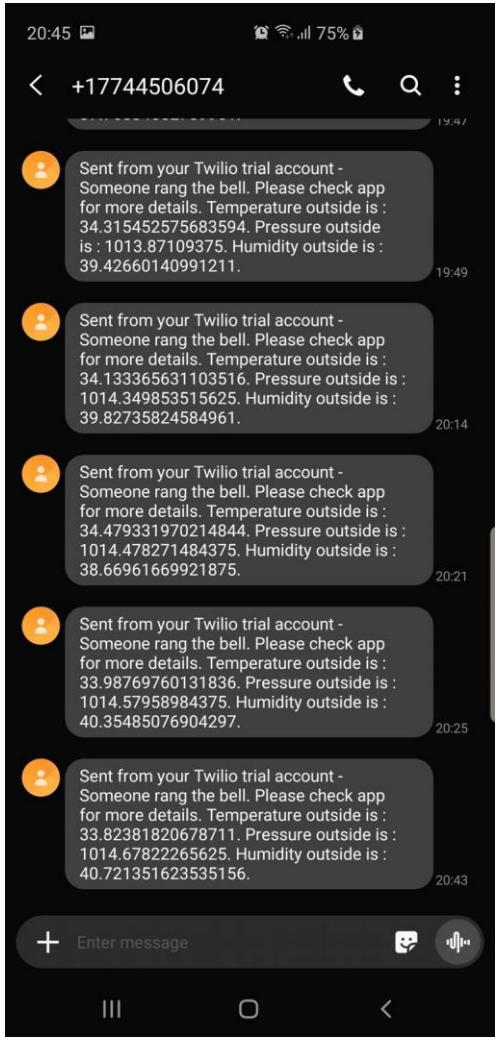
OUTPUT : (2 hours) :

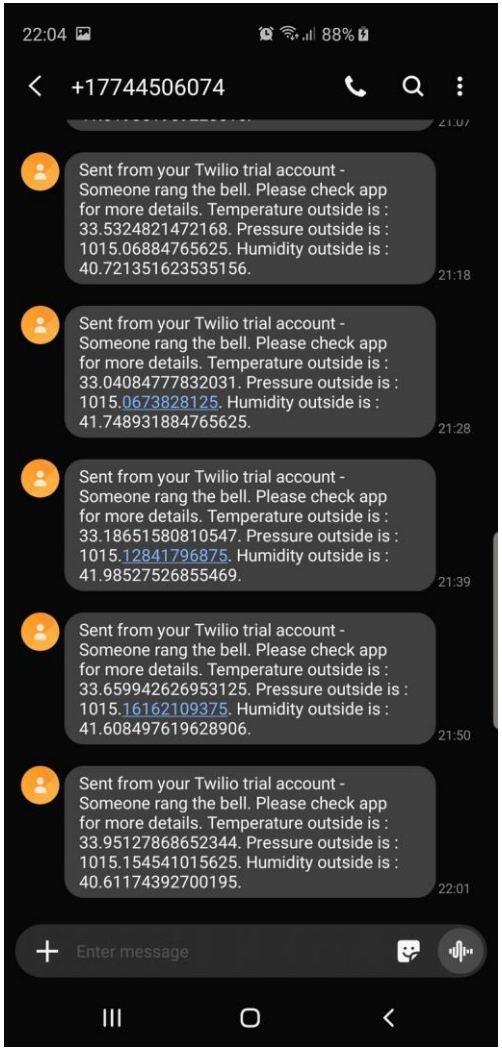
1. Activating Camera module



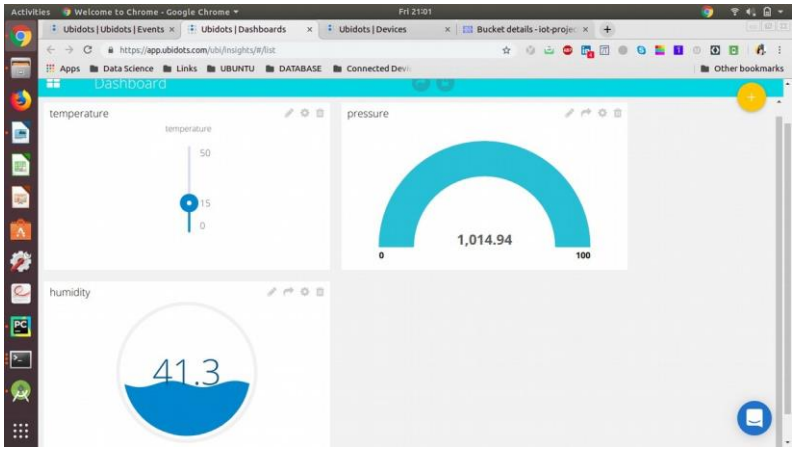


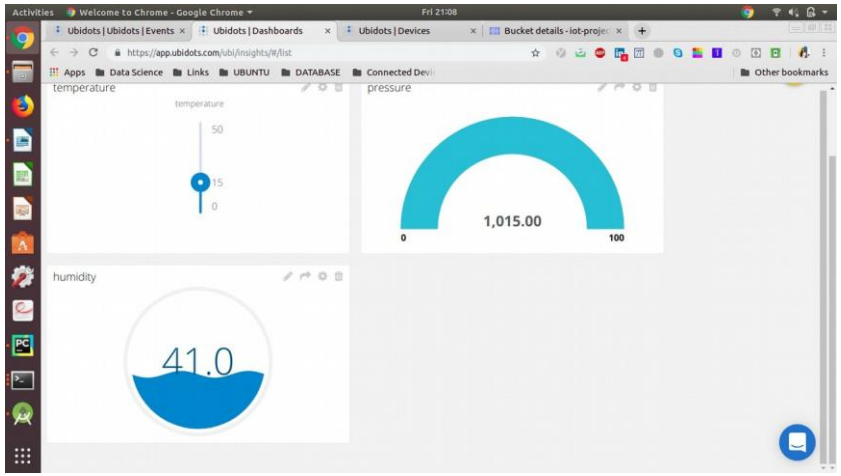
2. Sending Text Message :

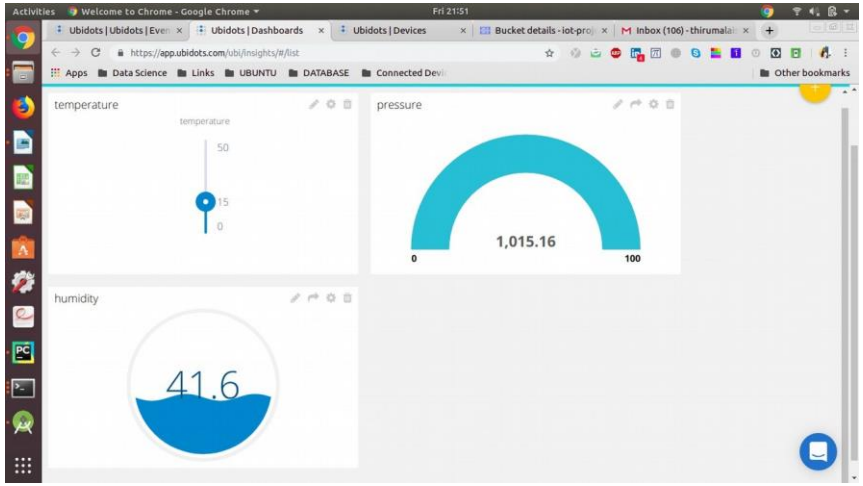


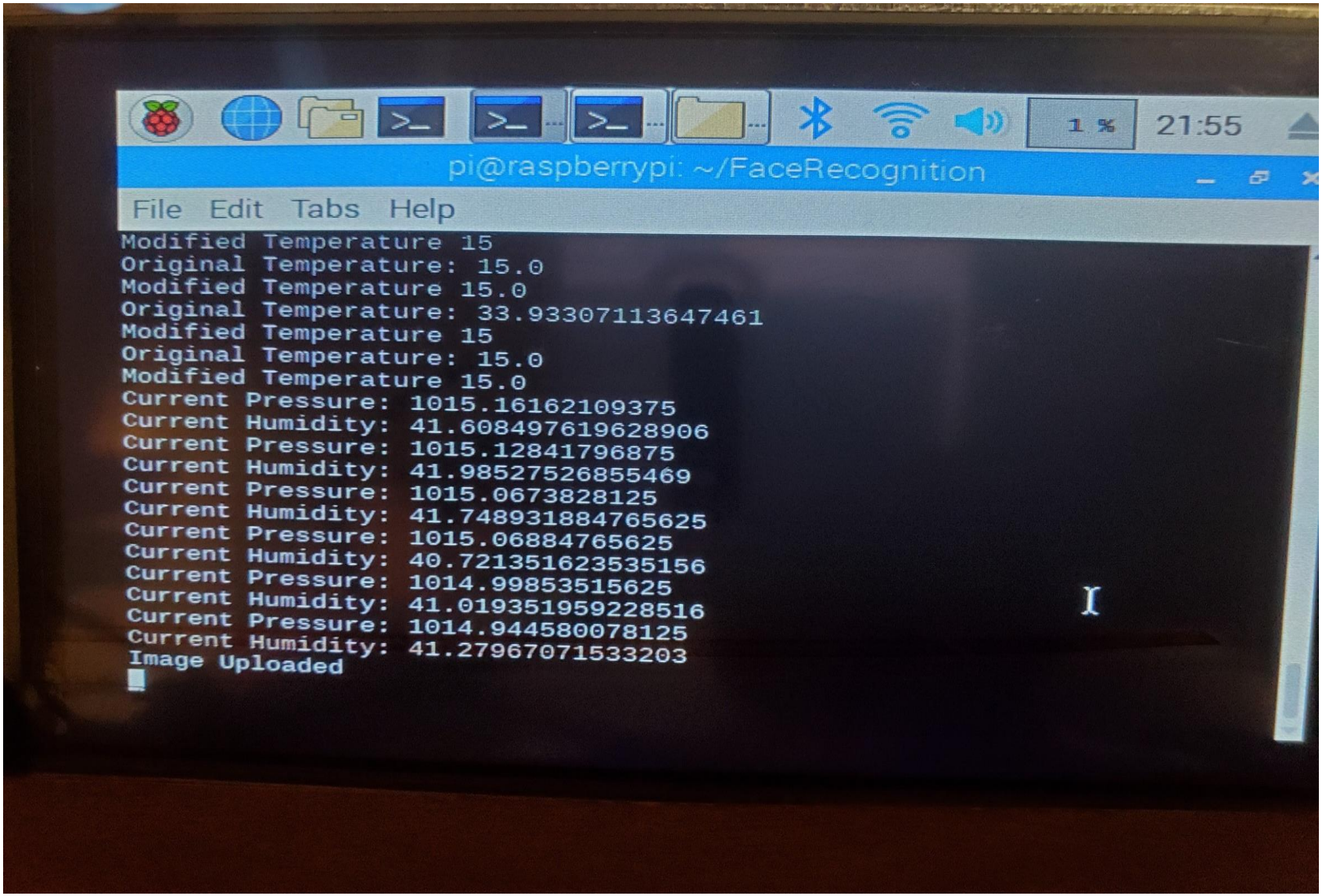


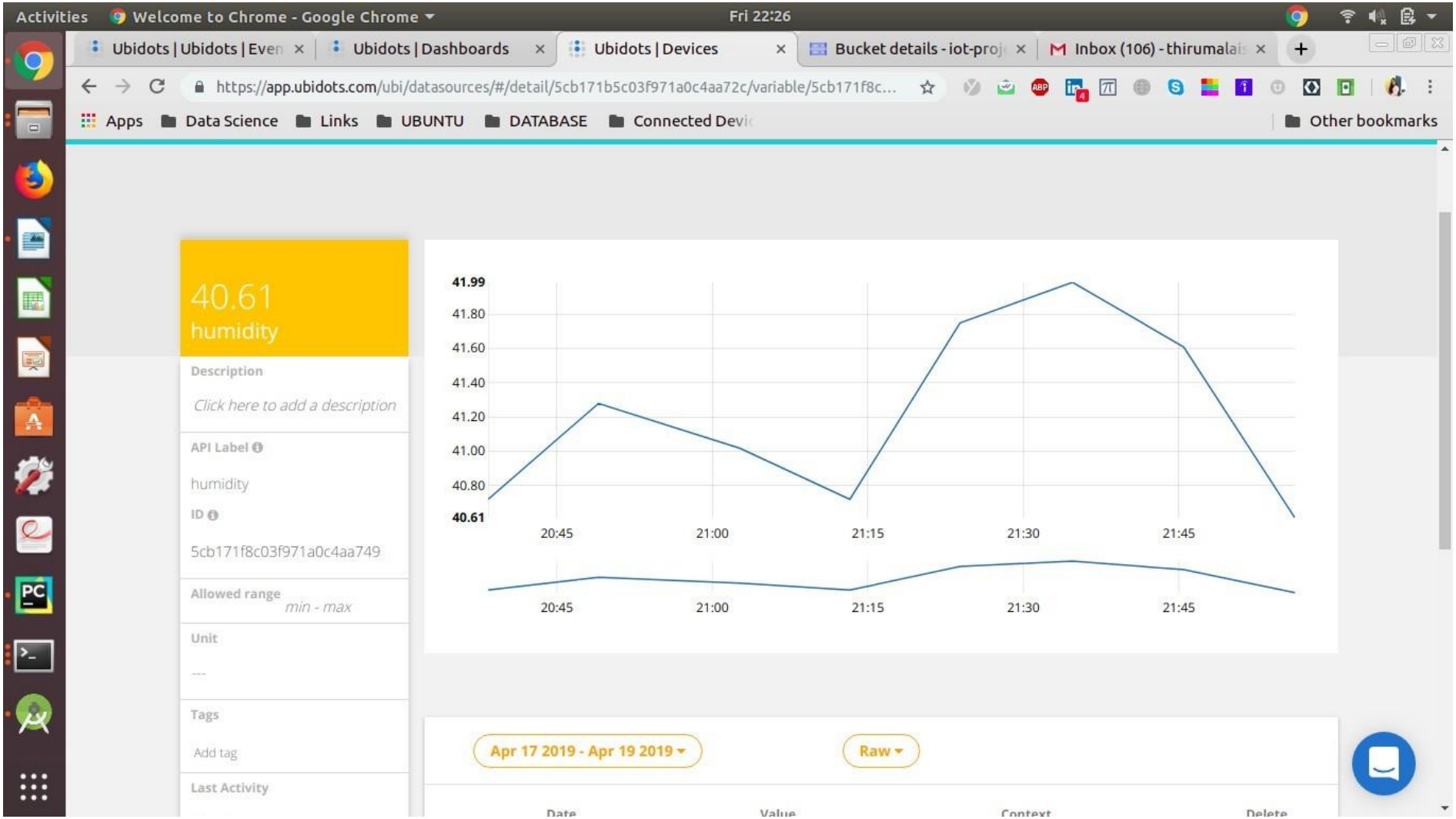
3. Sending data to ubidots and back:



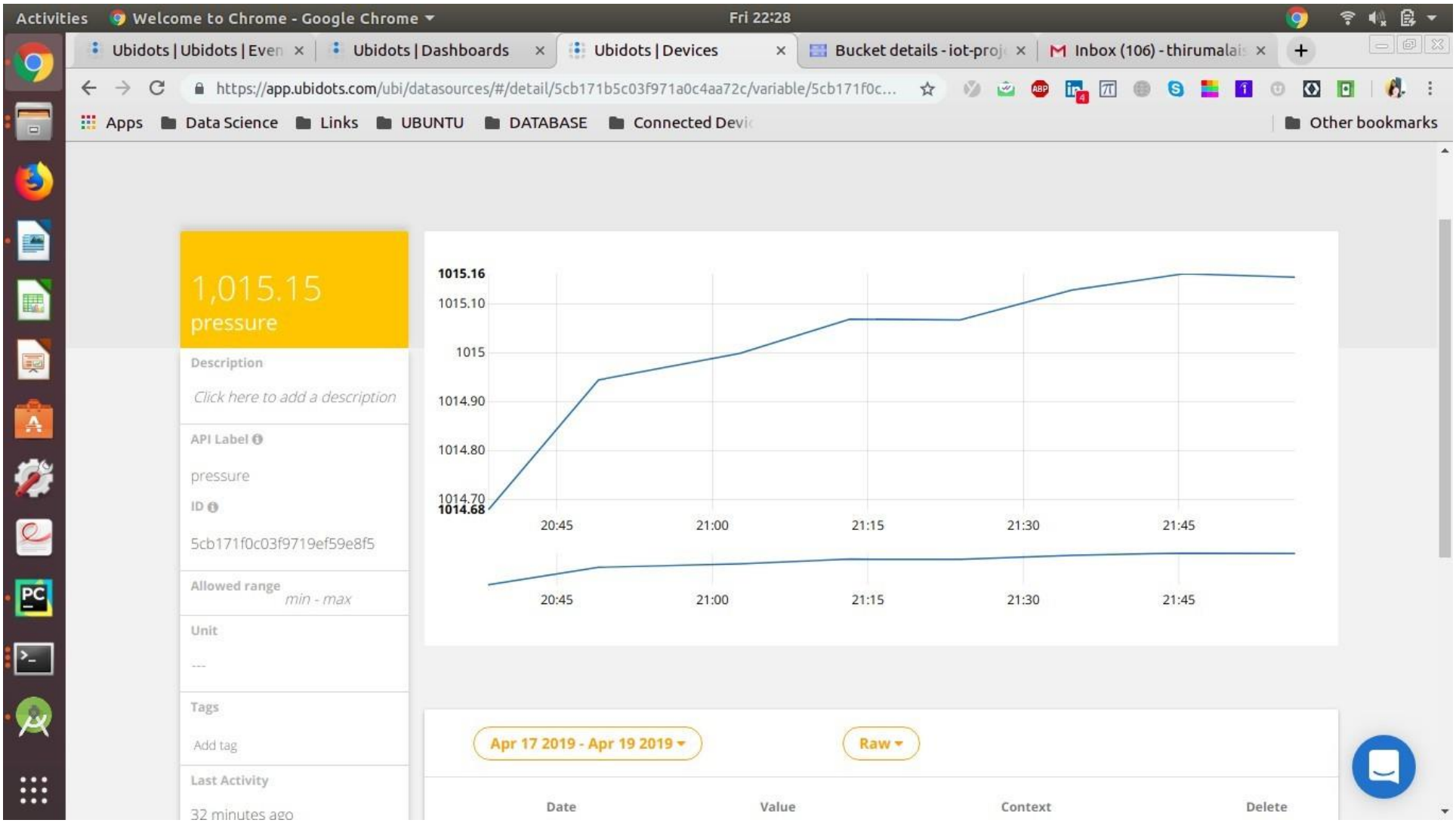




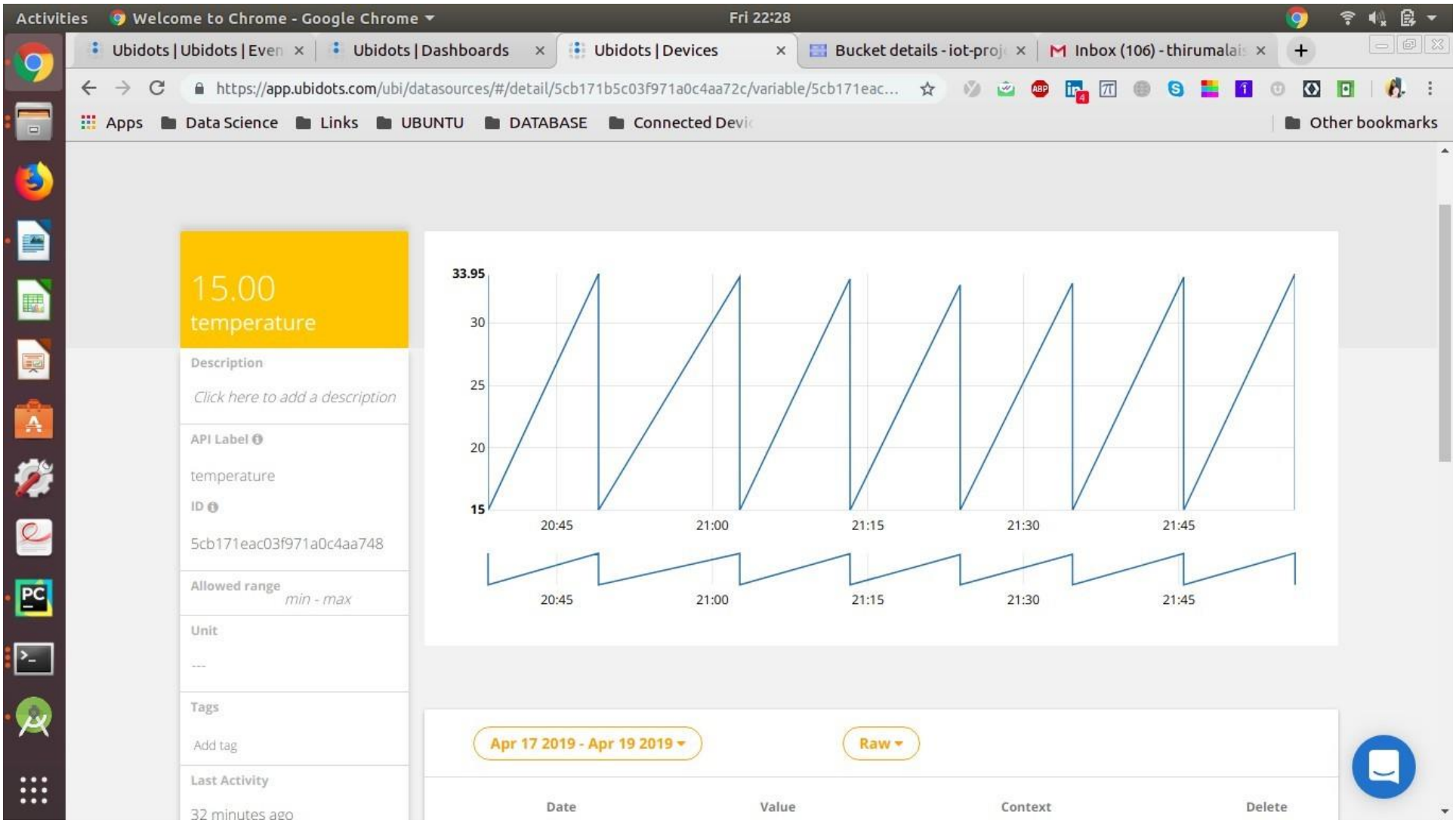

1 %
21:55
pi@raspberrypi: ~/FaceRecognition
File Edit Tabs Help
Modified Temperature 15
Original Temperature: 15.0
Modified Temperature 15.0
Original Temperature: 33.93307113647461
Modified Temperature 15
Original Temperature: 15.0
Modified Temperature 15.0
Current Pressure: 1015.16162109375
Current Humidity: 41.608497619628906
Current Pressure: 1015.12841796875
Current Humidity: 41.98527526855469
Current Pressure: 1015.0673828125
Current Humidity: 41.748931884765625
Current Pressure: 1015.06884765625
Current Humidity: 40.721351623535156
Current Pressure: 1014.99853515625
Current Humidity: 41.019351959228516
Current Pressure: 1014.944580078125
Current Humidity: 41.27967071533203
Image Uploaded


Activities
Welcome to Chrome - Google Chrome
Fri 22:26
Ubidots | Ubidots | Even
Ubidots | Dashboards
Ubidots | Devices
Bucket details - iot-proj
Inbox (106) - thirumalai
https://app.ubidots.com/ubi/datasources/#/detail/5cb171b5c03f971a0c4aa72c/variable/5cb171f8c...
Apps
Data Science
Links
UBUNTU
DATABASE
Connected Devi
Other bookmarks
40.61
humidity
Description
Click here to add a description
API Label
humidity
ID
5cb171f8c03f971a0c4aa749
Allowed range
min - max
Unit

Tags
Add tag
Last Activity
41.99
41.80
41.60
41.40
41.20
41.00
40.80
40.61
20:45
21:00
21:15
21:30
21:45
Apr 17 2019 - Apr 19 2019
Raw
Date
Value
Context
Delete

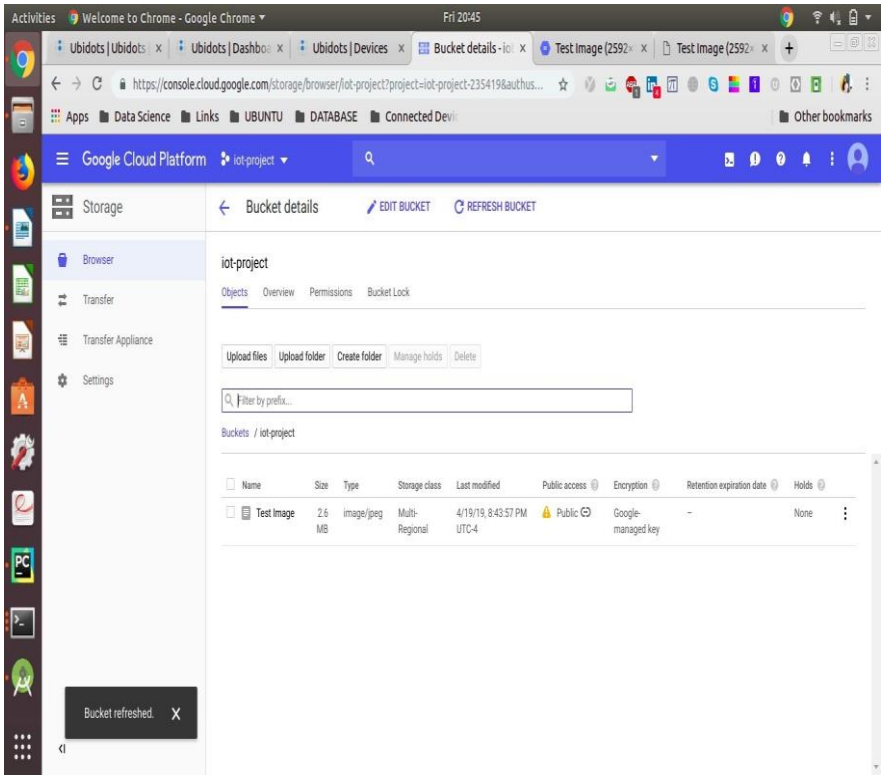

Activities
Welcome to Chrome - Google Chrome
Fri 22:28
Ubidots | Ubidots | Even
Ubidots | Dashboards
Ubidots | Devices
Bucket details - iot-proj
Inbox (106) - thirumalai
https://app.ubidots.com/ubi/datasources/#/detail/5cb171b5c03f971a0c4aa72c/variable/5cb171f0c...
Apps
Data Science
Links
UBUNTU
DATABASE
Connected Devi
Other bookmarks
1,015.15
pressure
Description
Click here to add a description
API Label
pressure
ID
5cb171f0c03f9719ef59e8f5
Allowed range
min - max
Unit

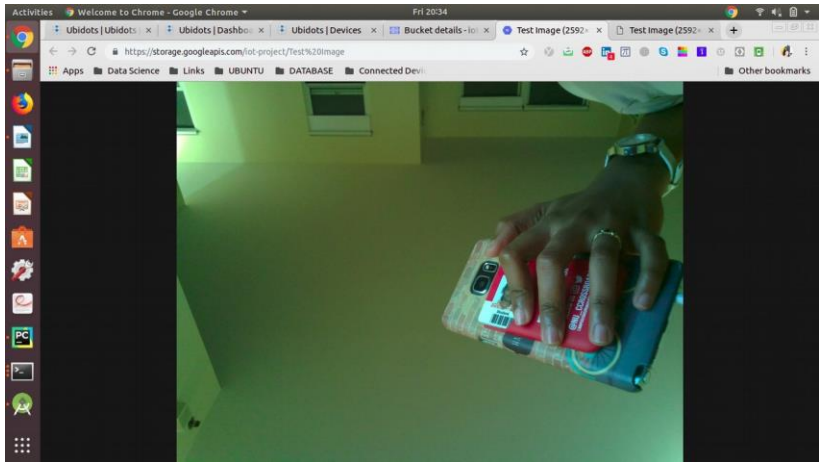
Tags
Add tag
Last Activity
32 minutes ago
1015.16
1015.10
1015
1014.90
1014.80
1014.70
1014.68
20:45
21:00
21:15
21:30
21:45
Apr 17 2019 - Apr 19 2019
Raw
Date
Value
Context
Delete

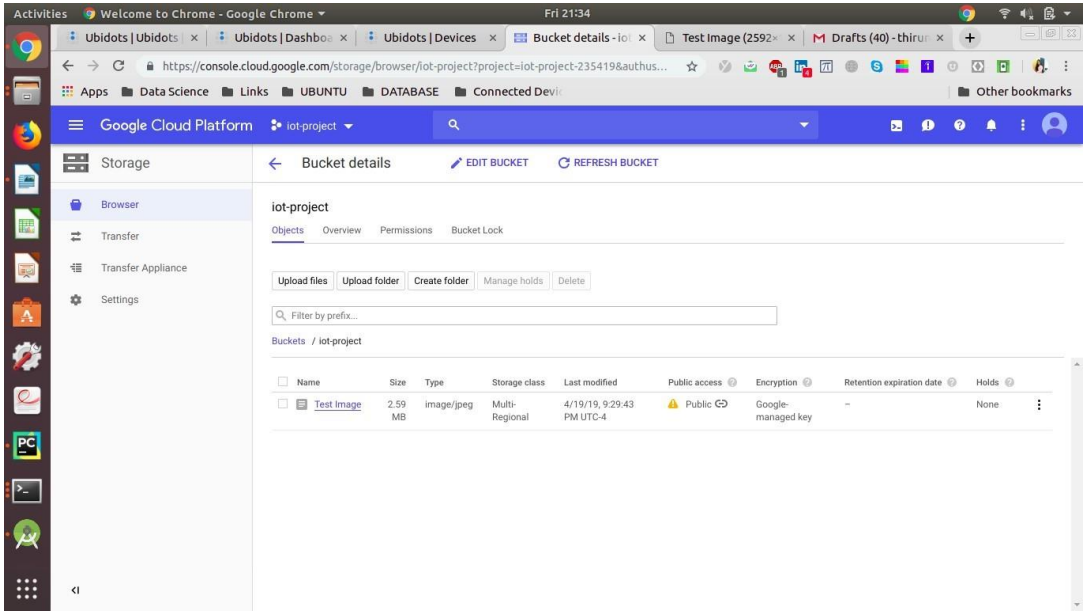

Activities
Welcome to Chrome - Google Chrome
Fri 22:28
Ubidots | Ubidots | Even
Ubidots | Dashboards
Ubidots | Devices
Bucket details - iot-proj
Inbox (106) - thirumalai
https://app.ubidots.com/ubi/datasources/#/detail/5cb171b5c03f971a0c4aa72c/variable/5cb171eac...
Apps
Data Science
Links
UBUNTU
DATABASE
Connected Devi
Other bookmarks
15.00
temperature
Description
Click here to add a description
API Label
temperature
ID
5cb171eac03f971a0c4aa748
Allowed range
min - max
Unit

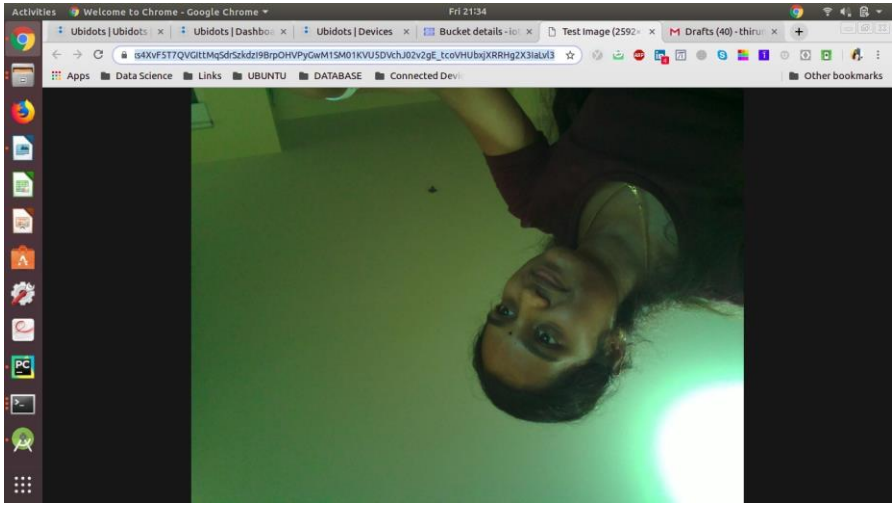
Tags
Add tag
Last Activity
32 minutes ago
33.95
30
25
20
15
20:45
21:00
21:15
21:30
21:45
Apr 17 2019 - Apr 19 2019
Raw
Date
Value
Context
Delete

4. Sending image to Google Cloud Storage*[f]* :

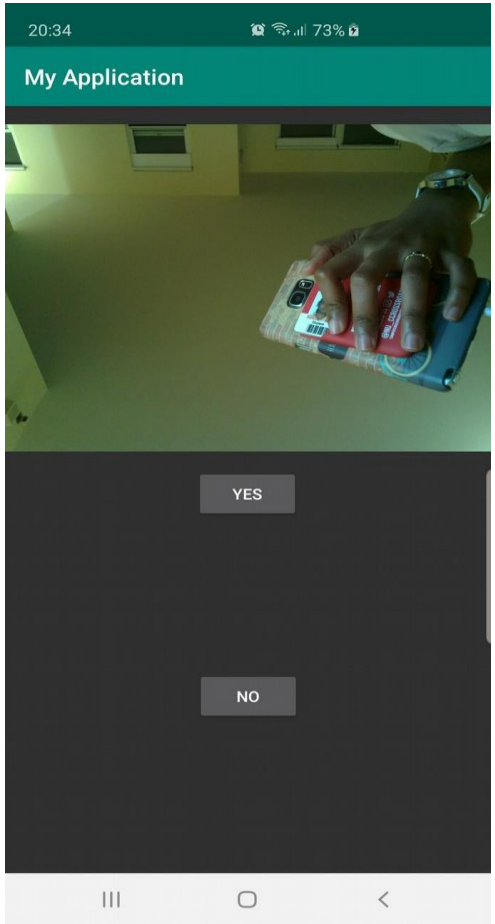


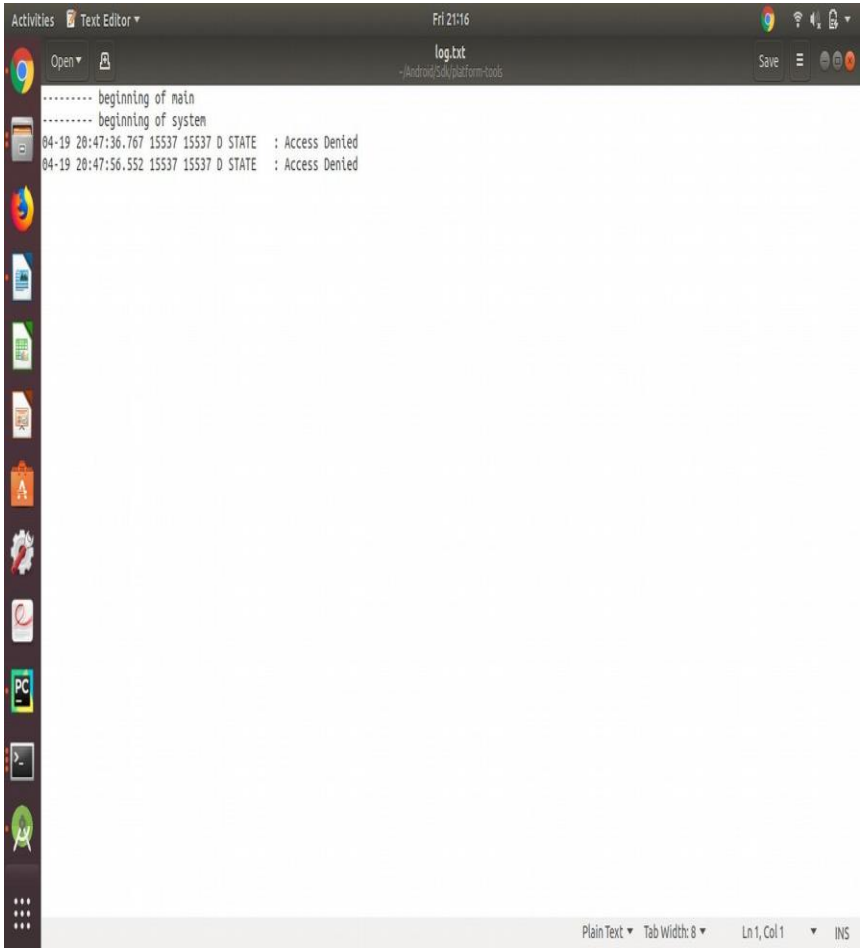


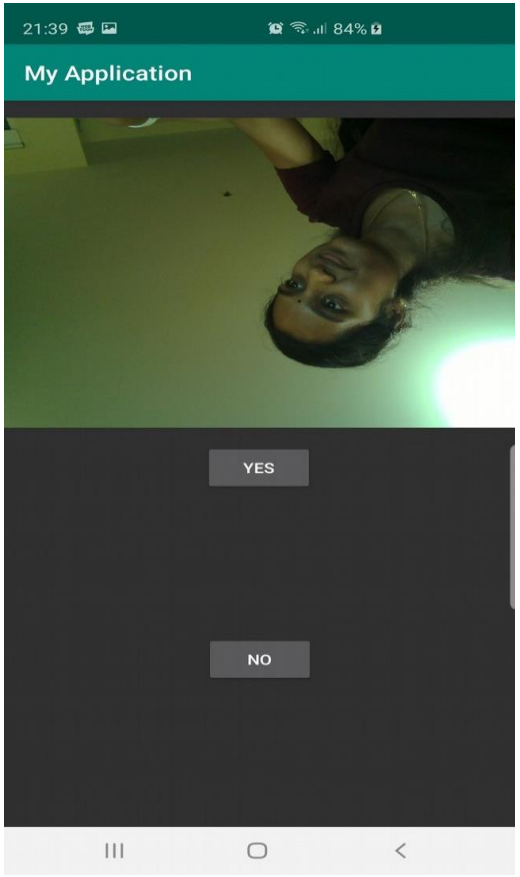

Activities
Welcome to Chrome - Google Chrome
Fri 21:34
Ubidots | Devices
Bucket details - iot
Test Image (2592
Drafts (40) - thirur
https://console.cloud.google.com/storage/browser/iot-project?project=iot-project-235419&authus...
Apps
Data Science
Links
UBUNTU
DATABASE
Connected Devi
Other bookmarks
Google Cloud Platform
iot-project
Storage
Bucket details
EDIT BUCKET
REFRESH BUCKET
Browser
Transfer
Transfer Appliance
Settings
iot-project
Objects
Overview
Permissions
Bucket Lock
Upload files
Upload folder
Create folder
Manage holds
Delete
Filter by prefix...
Buckets / iot-project
Name
Size
Type
Storage class
Last modified
Public access
Encryption
Retention expiration date
Holds
Test Image
2.59 MB
image/jpeg
Multi-Regional
4/19/19, 9:29:43 PM UTC-4
Public
Google-managed key
–
None

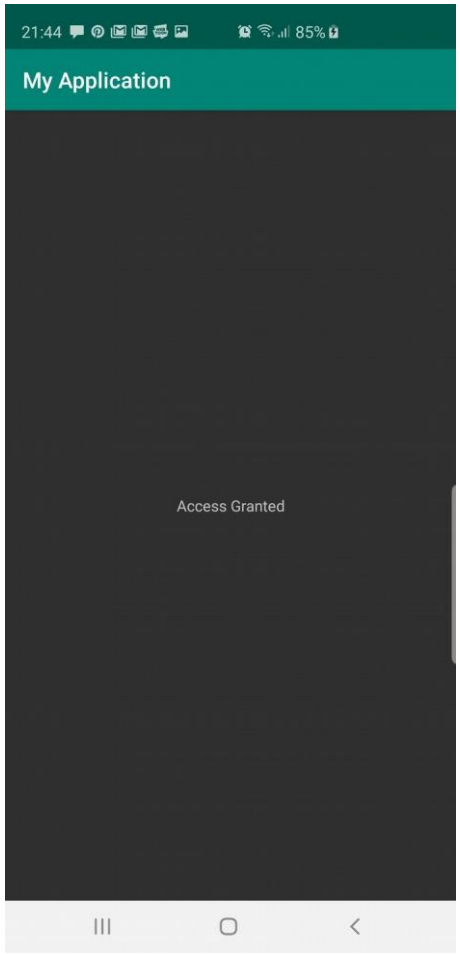

Activities
Welcome to Chrome - Google Chrome
Fri 21:34
Ubidots | Devices
Bucket details - iot
Test Image (2592
Drafts (40) - thirur
Apps
Data Science
Links
UBUNTU
DATABASE
Connected Devi
Other bookmarks

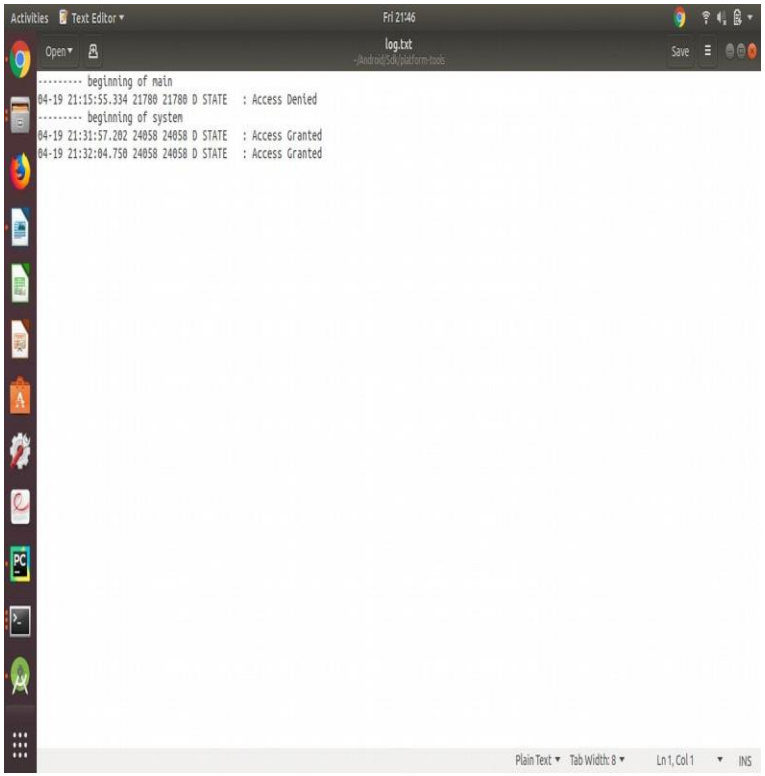
5. Android App accessing the data *[b]*:

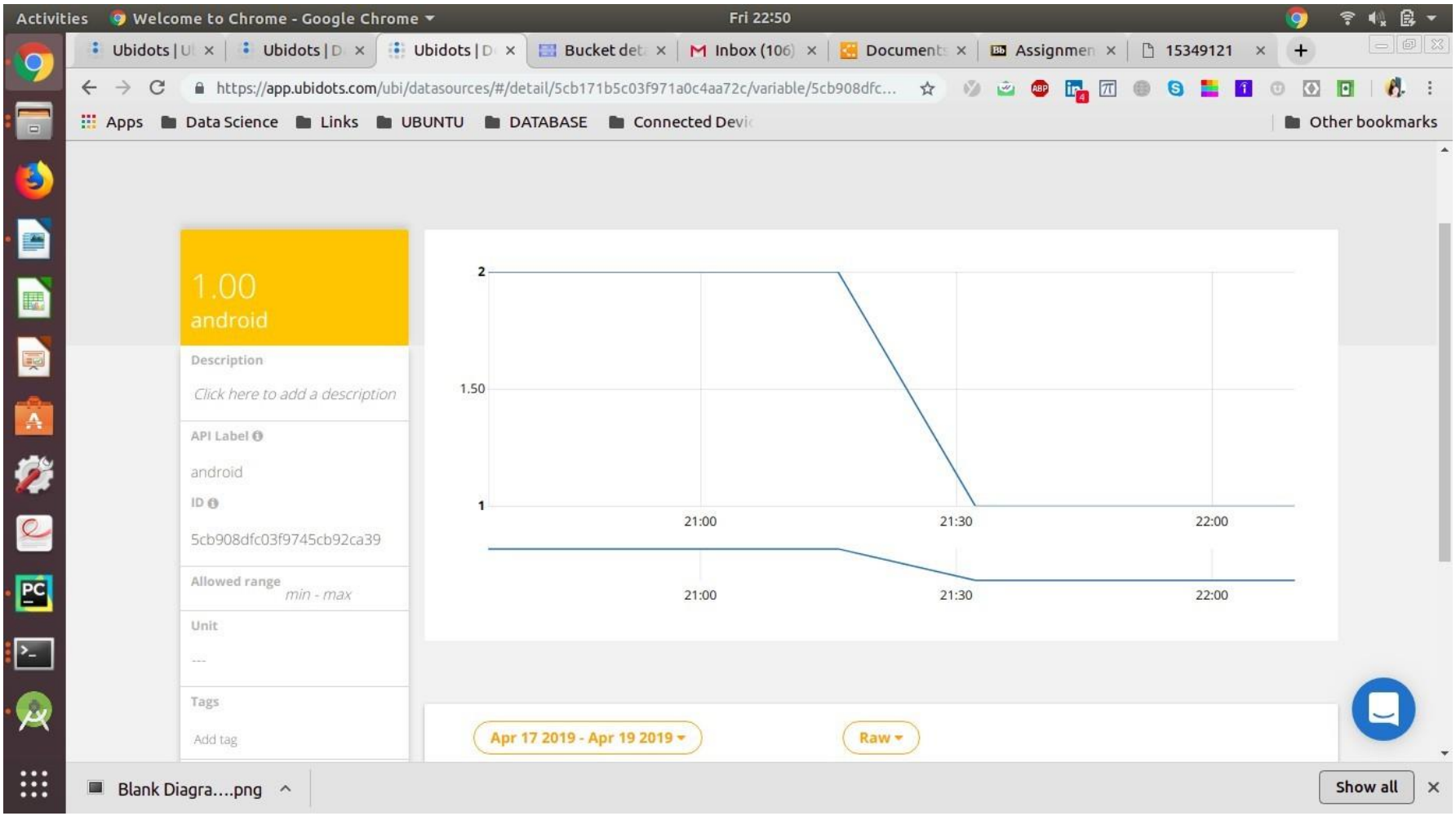





21:39
84%
My Application
YES
NO


21:44
85%
My Application
Access Granted


Activities
Text Editor
Fri 21:46
Open
log.txt
Save
--------- beginning of main
04-19 21:15:55.334 21780 21780 D STATE : Access Denied
--------- beginning of system
04-19 21:31:57.202 24058 24058 D STATE : Access Granted
04-19 21:32:04.750 24058 24058 D STATE : Access Granted
Plain Text
Tab Width: 8
Ln 1, Col 1
INS



6. Sense Hat matrix Displaying images *[a]*:

https://youtu.be/xa_9HWD0yGU

REFERENCES :

[a] projects.raspberrypi.org

[b] developer.android.com [c]

sites.google.com

[d] wildanmsyah.wordpress.com

[e] projects.raspberrypi.org

[f] console.cloud.google.com