Assignment 2

Aim: Design and implement parameter monitoring IoT system keeping records on Cloud such as 'environment humidity and temperature monitoring'.

Objective: To get familiar with cloud environment and upload remote sensor data on it.

Theory:

Thingspeak is an open-source IoT analytics platform service and API that allows you to aggregate, visualize, analyze live data streams in the cloud and send alerts using web services. It enables the creation of sensor logging applications, location tracking applications, and a social network of things with status updates.

1. Follow the website link https://thingspeak.com/ and sign up to Thingspeak acoount.
2. After creating the account or logging in, click on new channel as shown in fig. 4.1.

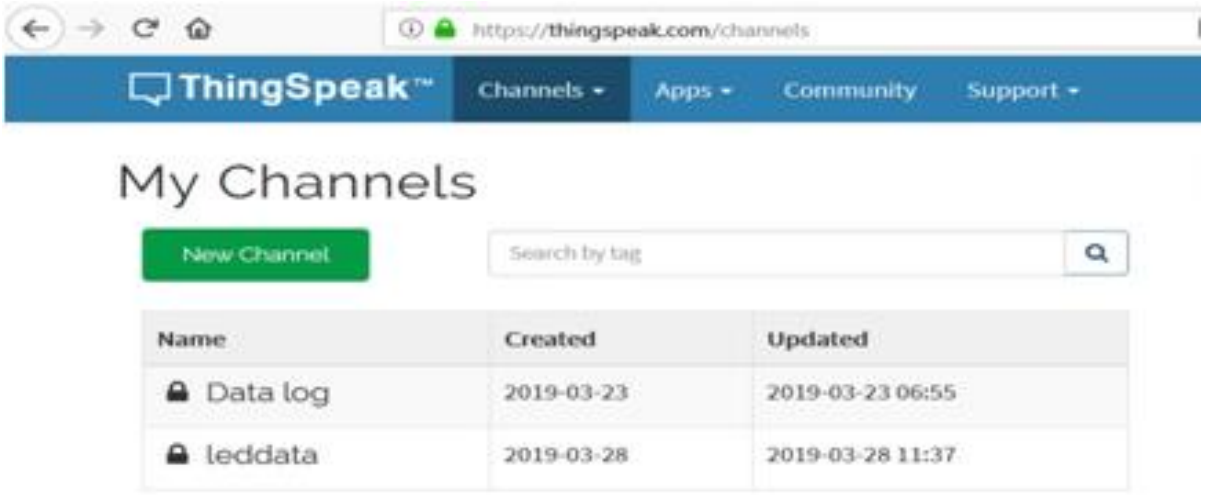

Figure 4.1: Creating a channel on thingspeak.com

3. Fill the information about the channel. Select two fields because we will be sending the data for the two fields from the raspberry pi as shown in fig. 4.2. Leave the other information as it is and save the channel.

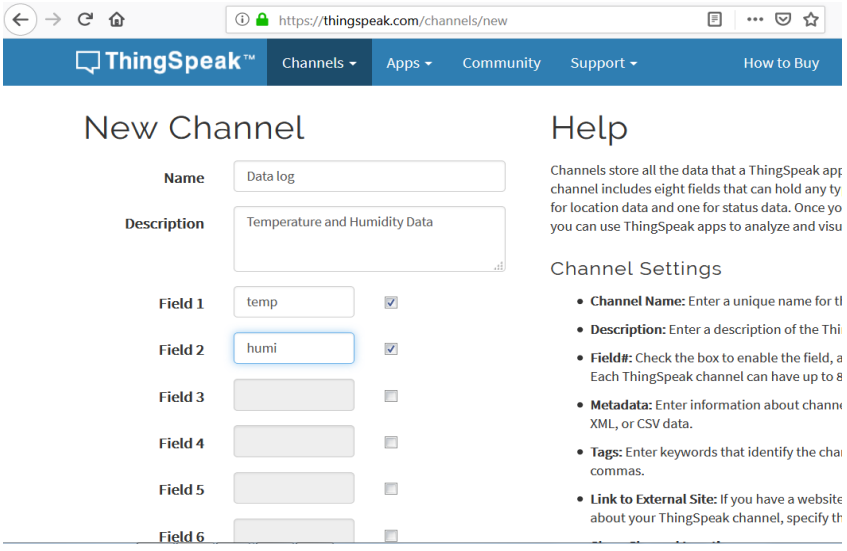

Figure 4.2: Creating fields in a channel on thingspeak.com

4. Go to the API keys tab, copy the write API key. The API key as shown in fig. 4.3 at which we will send the data from the Raspberry Pi.

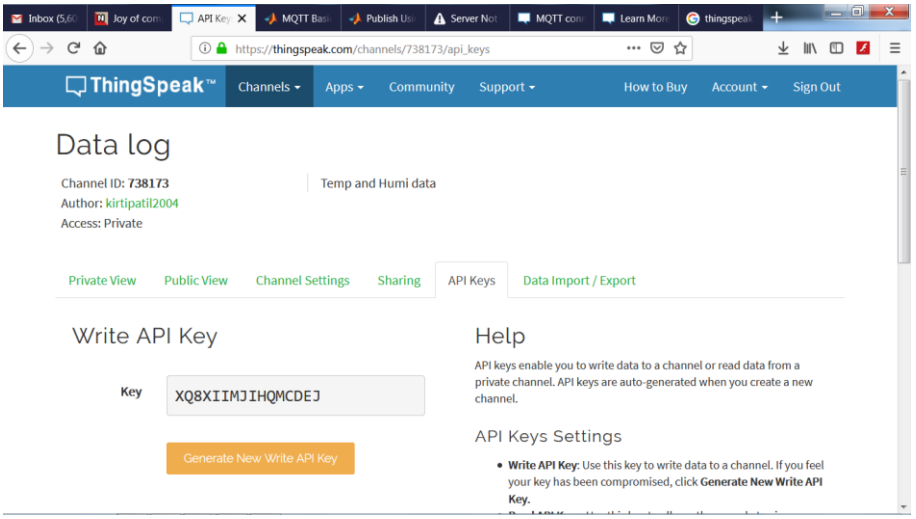

Figure 4.3: Write API key of created channel

5. Use baseURL provided as shown in figure 4.4.

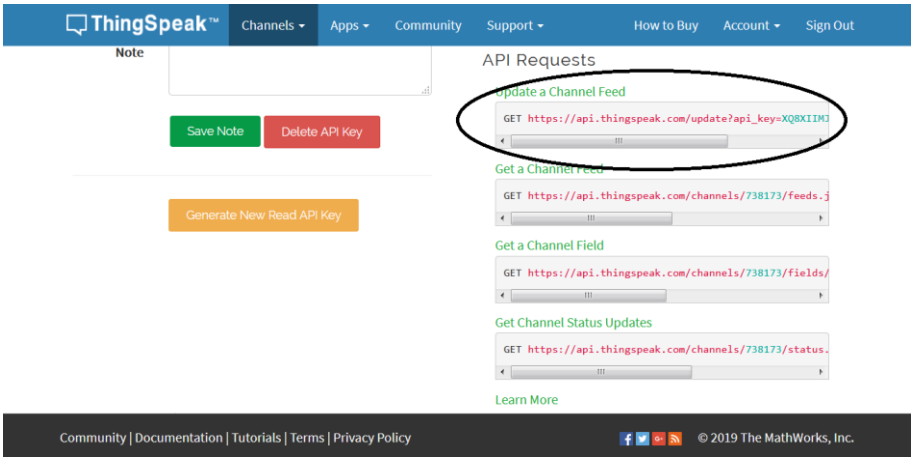

Figure 4.4: BaseURL to update the created channel

Circuit Diagram

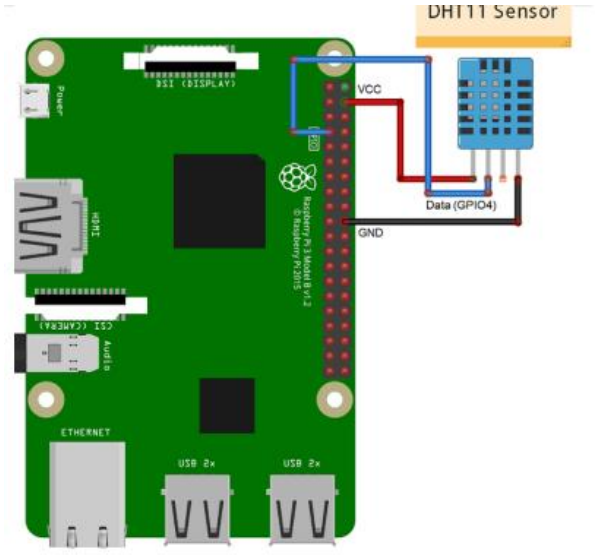

Figure 4.5: Circuit diagram connecting DHT11 with Raspberry pi

Components Required:

1) Raspberry Pi
2) Temperature and Humidity Sensor DHT11
3) Jumper wires
4) Breadboard
5) Resistor 1KΩ

Procedure:

1. Install the DHT11 Library:
   - *git clone https://github.com/adafruit/Adafruit_Python_DHT.git*
2. Then enter in to the installed directory using the below command
   - *cd Adafruit_Python_DHT*
3. Now download the required modules using the below command
   - *sudo apt-get install build-essential python-dev*
4. Then install the library using the below command
   - *sudo python setup.py install*

As shown fig. 4.5 circuit diagram,

5. Connect VCC of DHT11 to the 3.3V power supply pin of Raspberry Pi through the resistor via the jumper wires and breadboard.
6. Connect GND of DHT11 to ground of Raspberry Pi via the jumper wires and breadboard.
7. Other end of resistor should be connected to the ground on the breadboard.
8. Connect GPIO 04 (Pin No. 07) of Raspberry Pi to the OUT pin of DHT11.
9. Now power up and boot Raspberry Pi.
10. Open terminal and type *nano DHT11.py* or use text editor/Python IDE to write the program.
11. Write the pseudo code and save the file. In nano editor use *'ctrl+w'* to write and *'ctrl+x'* to exit from the black nano editor environment.
12. Run the code. Type *python DHT11.py* in the terminal.
13. Temperature and Humidity will be displayed in the terminal.
14. Press '*ctrl+c'* to stop program execution in terminal.

After execution, sensor data is sent to the cloud in two fields, 'temp' and 'humi' respectively. Figure 4.5 shows output visualization in graph in thingspeak cloud environment.

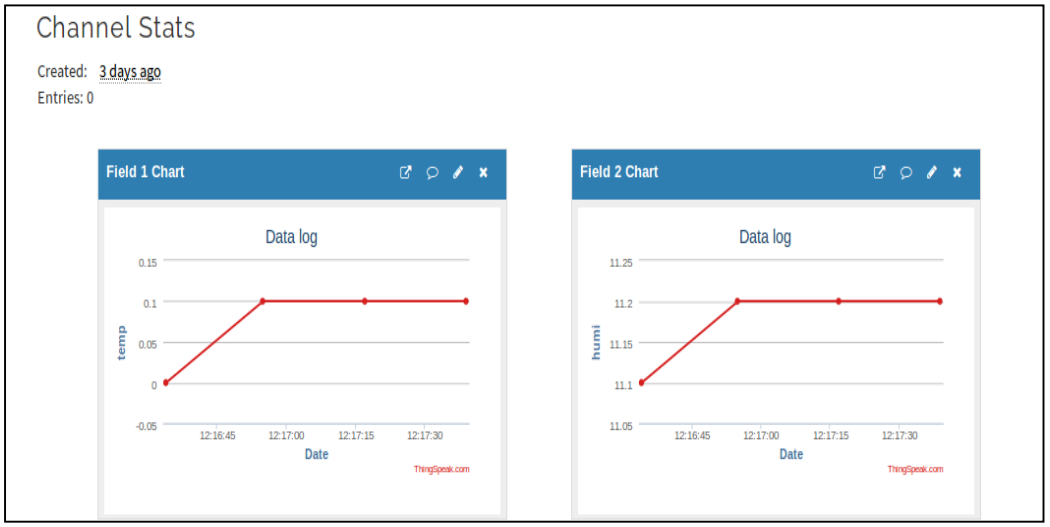

Figure 4.5: Output Visualization of sensor data received

Conclusion: