

IOT Assignment 3  
Name – Vinuth Kalmidi  
SUID - 551345236

### Development Process:

I started by creating a new ThingSpeak channel with three fields: CO<sub>2</sub>, temperature, and humidity. To securely publish data via MQTT, I then set up an MQTT device in the "MQTT Devices" section of my ThingSpeak account, which provided the necessary Client ID, Username, and Password.

In my Python script, I used the random library to generate simulated sensor readings within realistic ranges (temperature: -50 to 50°C, humidity: 0 to 100%, CO<sub>2</sub>: 300 to 2000 ppm). These values were sent every 15 seconds to ThingSpeak's MQTT broker using the paho-mqtt library, with a unique station ID for identification.

Additionally, I wrote a separate script to retrieve sensor data and log all readings into sensor\_log.txt for offline access. The system was validated by monitoring live graphs on ThingSpeak to ensure successful transmission and display of MQTT messages.




### Screenshots:


MQTT Device credentials:

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MQTT Credentials

Use these MQTT credentials to publish and subscribe to ThingSpeak channels. [Learn More](#)

Client ID	DiwhDggPKw08HiQnNTgcKR4	
Username	DiwhDggPKw08HiQnNTgcKR4	
Password	.....	



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Channel Details:

ThingSpeak™

Channels ▾ Apps ▾ Devices ▾ Support ▾

Commercial Use How to Buy VK

## Assignment\_3

Channel ID: 2894431  
Author: mwa000036845251  
Access: Private

Private View Public View Channel Settings Sharing API Keys Data Import / Export

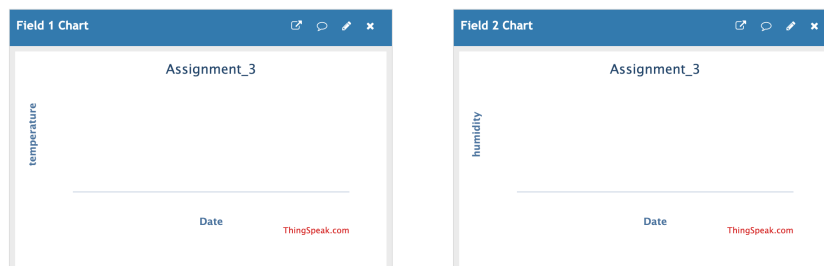
Add Visualizations Add Widgets Export recent data

MATLAB Analysis MATLAB Visualization

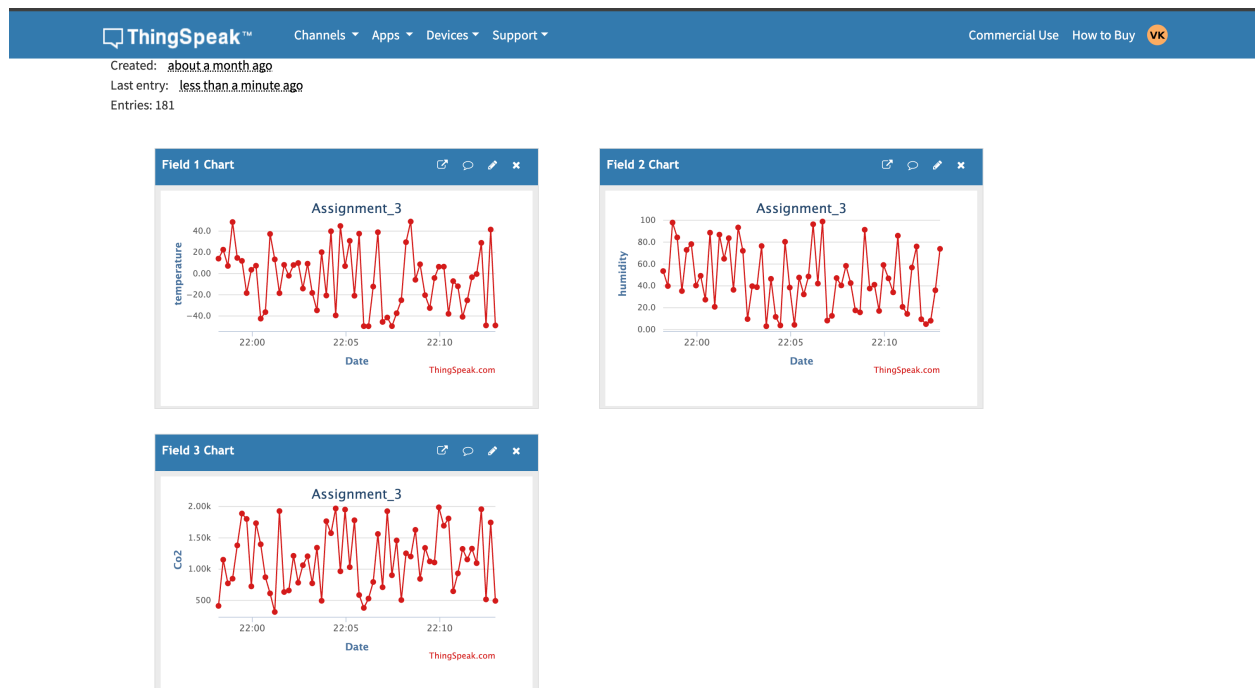
Channel 2 of 2 < >

### Channel Stats

Created: less than a minute ago  
Entries: 0



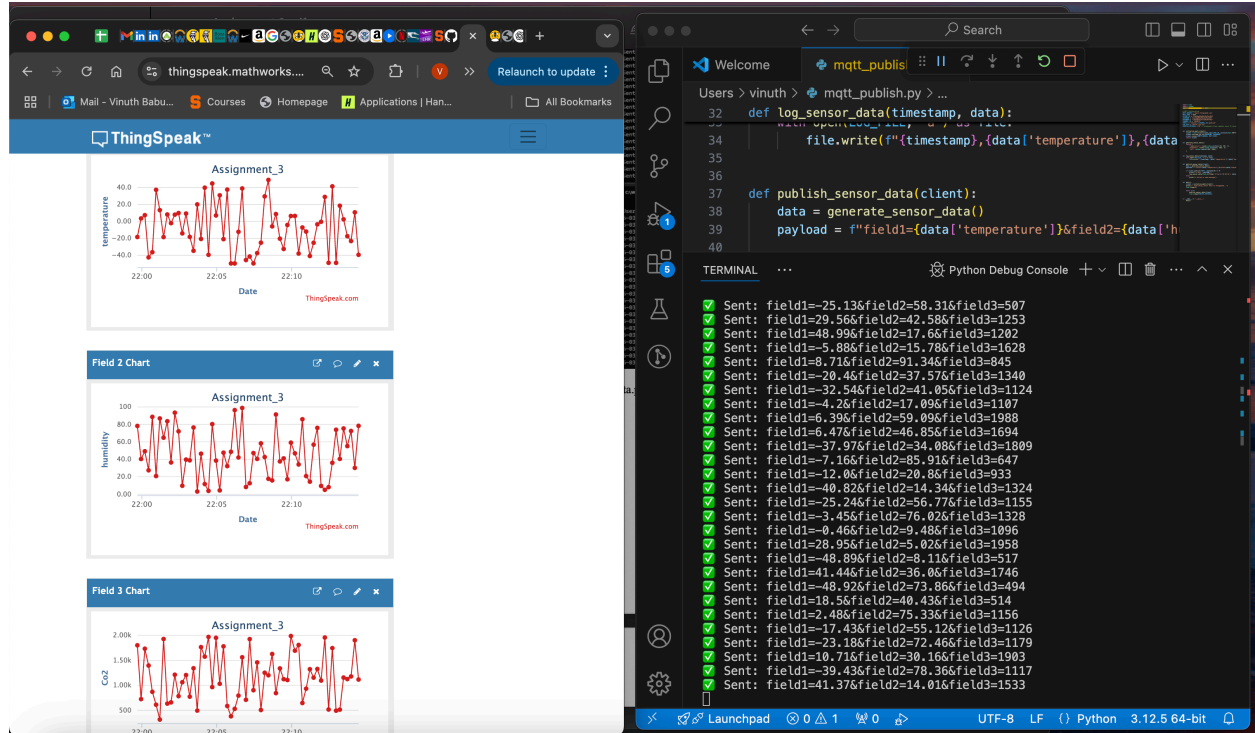
## Graph for all the fields:



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Output Saved in a text file:

```
Users > vinuth > sensor_log.txt
1 2025-03-26 21:33:56,-24.39,83.79,877
2 2025-03-26 21:34:11,-22.61,89.38,1856
3 2025-03-26 21:34:26,7.46,64.82,1234
4 2025-03-26 21:34:41,-6.91,2.01,752
5 2025-03-26 21:34:56,-27.44,68.96,1094
6 2025-03-26 21:35:11,-15.97,34.84,1156
7 2025-03-26 21:35:26,3.52,79.77,1508
8 2025-03-26 21:35:41,36.2,17.95,1120
9 2025-03-26 21:35:56,21.63,72.72,508
10 2025-03-26 21:36:11,8.94,73.99,1175
11 2025-03-26 21:36:26,18.8,25.93,665
12 2025-03-26 21:36:41,-13.59,77.58,1847
13 2025-03-26 21:36:56,-48.72,30.72,431
14 2025-03-26 21:37:11,-7.64,89.07,1602
15 2025-03-26 21:37:26,46.22,3.76,1521
16 2025-03-26 21:37:41,-23.1,95.32,1434
17 2025-03-26 21:37:56,31.2,58.83,1762
18 2025-03-26 21:38:11,42.12,79.74,1036
19 2025-03-26 21:38:26,0.85,79.23,333
20 2025-03-26 21:38:41,-16.64,14.25,1282
21 2025-03-26 21:38:56,0.04,95.36,1936
22 2025-03-26 21:39:11,48.94,62.26,450
23 2025-03-26 21:39:26,-19.83,44.05,870
24 2025-03-26 21:39:41,33.22,82.82,1831
25 2025-03-26 21:39:56,39.19,43.94,632
26 2025-03-26 21:40:11,39.89,5.53,949
27 2025-03-26 21:40:26,-28.97,20.6,798
28 2025-03-26 21:40:41,40.04,93.78,1669
29 2025-03-26 21:40:56,-37.9,90.58,441
30 2025-03-26 21:41:11,0.71,77.09,1245
31 2025-03-26 21:41:26,-14.67,55.82,1018
32 2025-03-26 21:41:41,-22.39,58.49,1943
33 2025-03-26 21:41:56,-0.71,62.79,727
```

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**Github Link:**

[https://github.com/vinuthBabu01/mqtt\\_simulation](https://github.com/vinuthBabu01/mqtt_simulation)

**Outcomes:**

While I was already familiar with ThingSpeak and MQTT, this assignment gave me the opportunity to apply that knowledge in a more structured and practical way. The real challenge wasn't establishing the MQTT connection itself but ensuring that the data was correctly formatted, assigned to the right fields, and displayed in real-time on the ThingSpeak dashboard. I also had to carefully verify that the MQTT credentials were accurate and that the client ID and topic structure met ThingSpeak's requirements.

An entirely new aspect for me was implementing a local logging system and developing a script to extract the last five hours of data from the log file. This required a deeper understanding of time-based data filtering and how to efficiently process historical data for analysis. Additionally, I improved my proficiency with GitHub and Git, especially in handling merge conflicts and integrating my local project with an existing remote repository.

Overall, this assignment not only reinforced my technical skills but also helped me refine how I organize and present my work, which is just as essential as writing effective code.