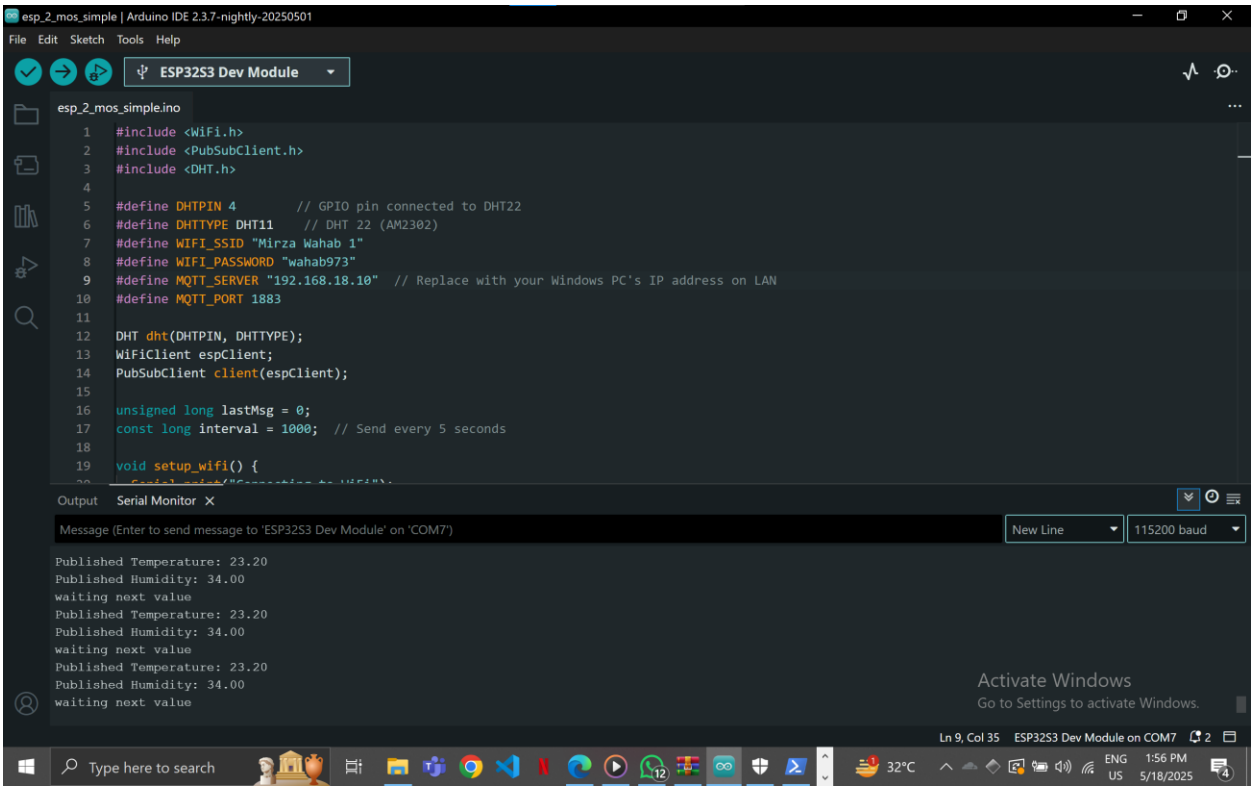
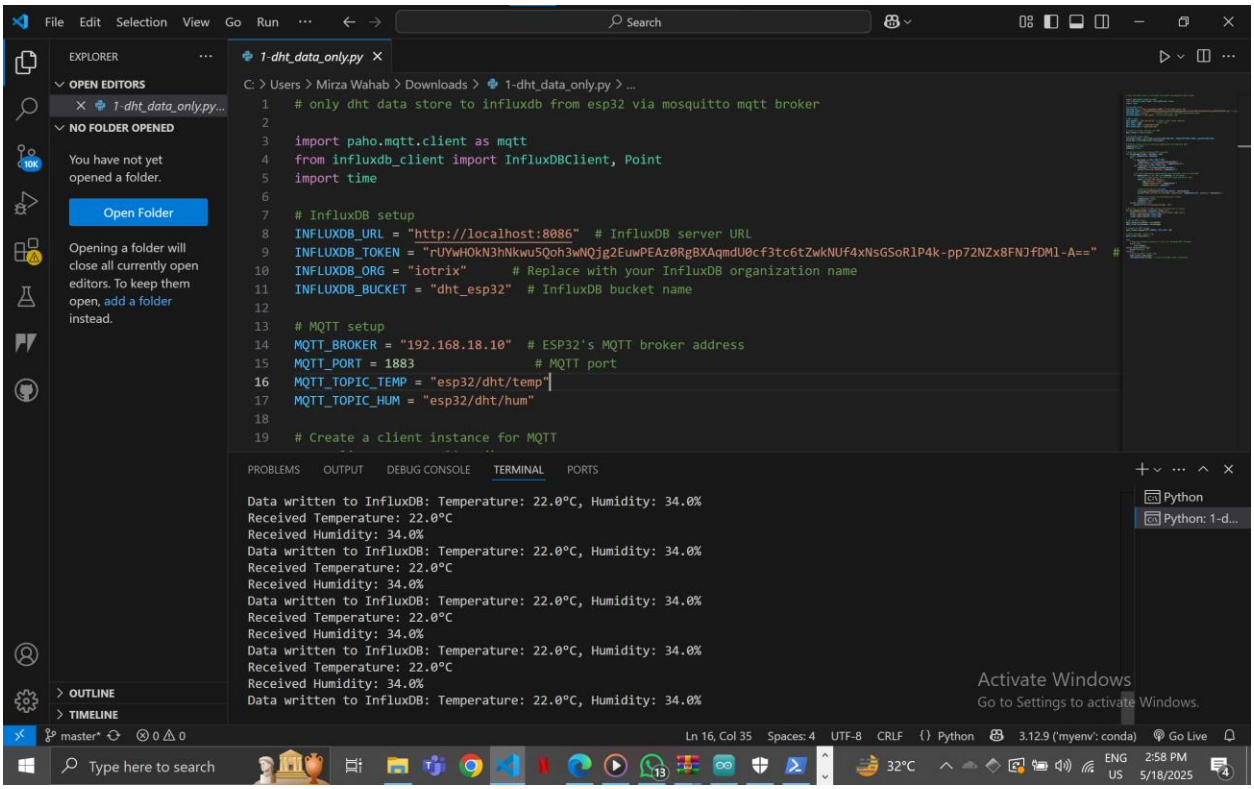
LAB:13 IOT

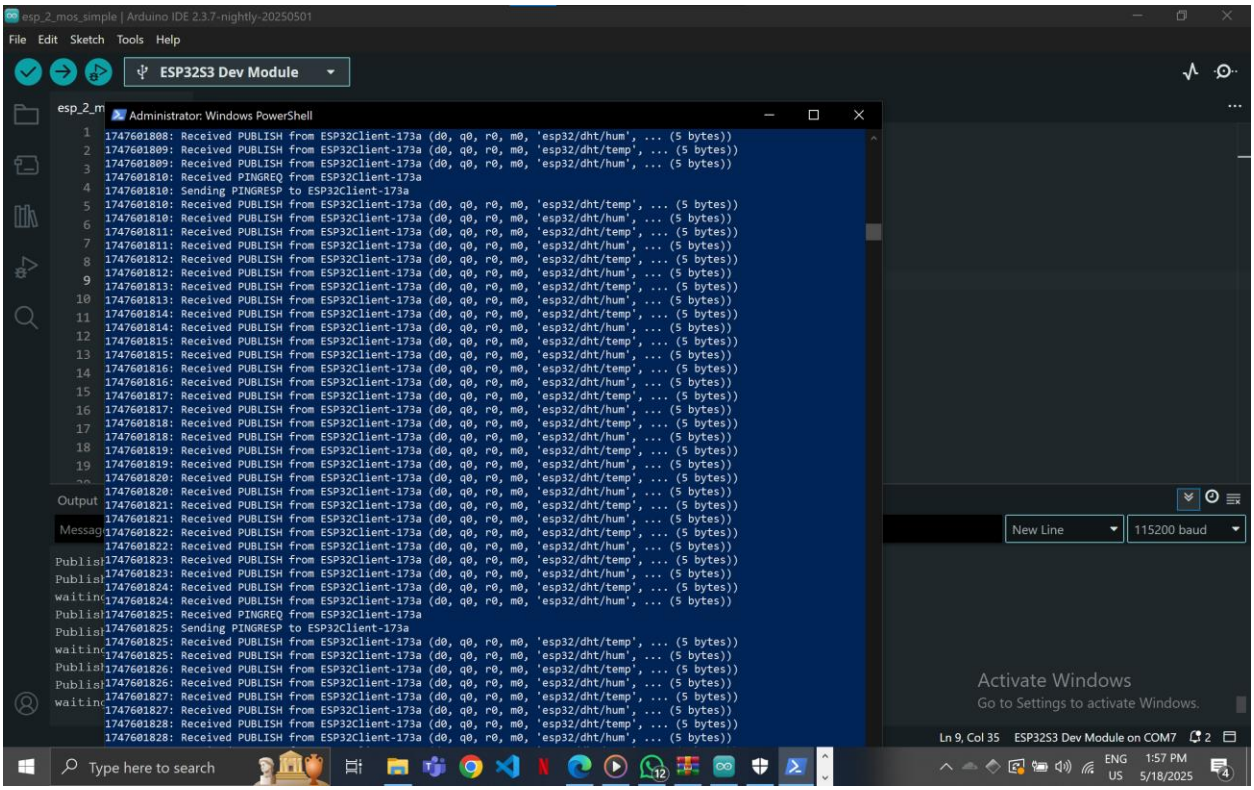
ABDUL WAHAB

22-NTU-CS-1337

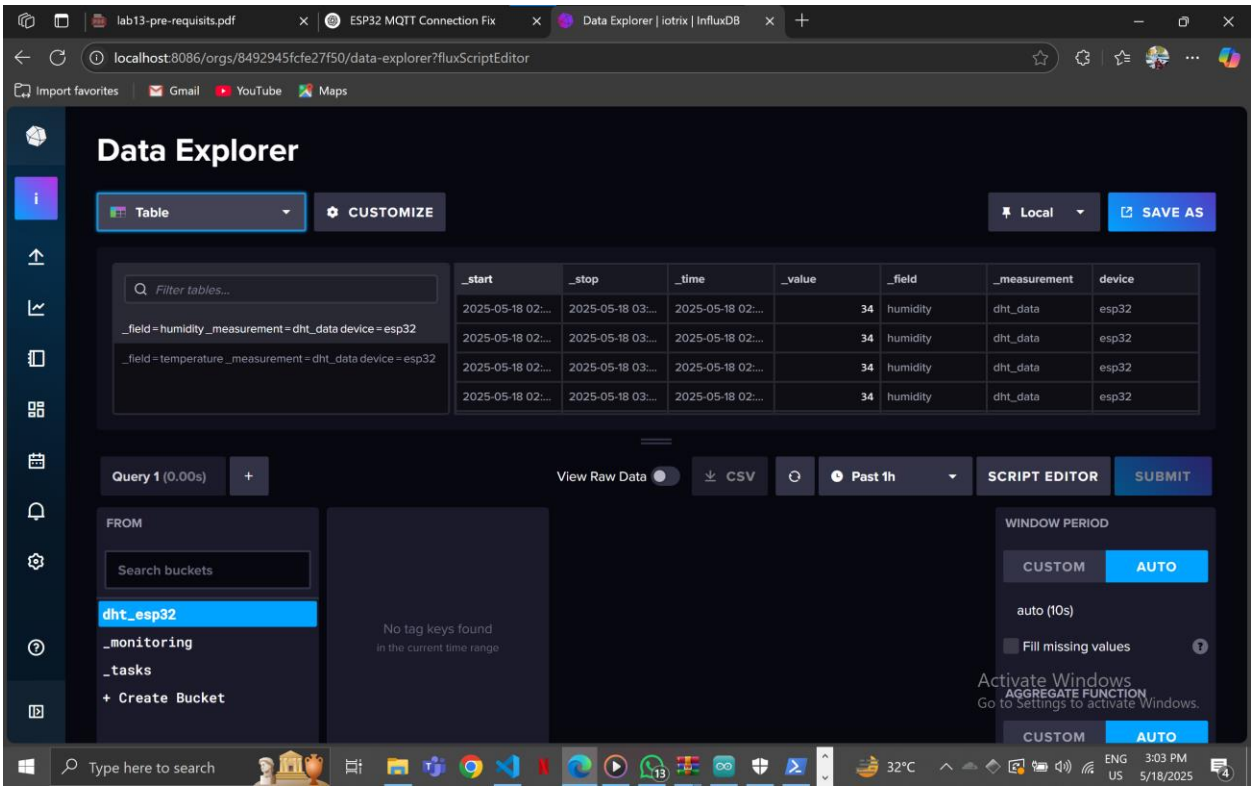
1. Run the Arduino-based code to **publish DHT sensor data to the Mosquitto MQTT broker**.



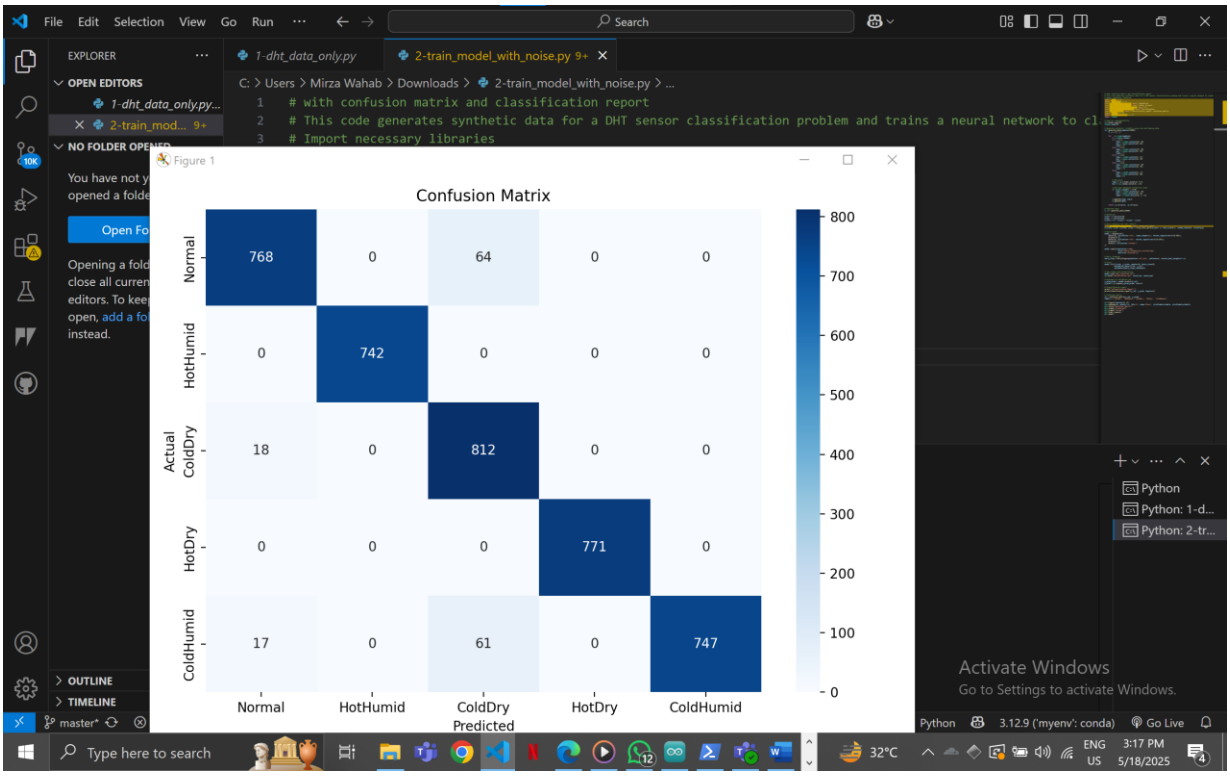

File Edit Selection View Go Run
Search
EXPLORER
OPEN EDITORS
1-dht_data_only.py...
NO FOLDER OPENED
You have not yet opened a folder.
Open Folder
Opening a folder will close all currently open editors. To keep them open, add a folder instead.
1-dht_data_only.py
C: > Users > Mirza Wahab > Downloads > 1-dht_data_only.py > ...
# only dht data store to influxdb from esp32 via mosquitto mqtt broker
import paho.mqtt.client as mqtt
from influxdb_client import InfluxDBClient, Point
import time
# InfluxDB setup
INFLUXDB_URL = "http://localhost:8086" # InfluxDB server URL
INFLUXDB_TOKEN = "rUYwHOkN3hNkwu5Qoh3wNQjg2EuwPEAz0RgBXAqmdU0cf3tc6tZwkNUf4xNsGSoRlP4k-pp72NZx8FNJfDMl-A==" #
INFLUXDB_ORG = "iotrix" # Replace with your InfluxDB organization name
INFLUXDB_BUCKET = "dht_esp32" # InfluxDB bucket name
# MQTT setup
MQTT_BROKER = "192.168.18.10" # ESP32's MQTT broker address
MQTT_PORT = 1883 # MQTT port
MQTT_TOPIC_TEMP = "esp32/dht/temp"
MQTT_TOPIC_HUM = "esp32/dht/hum"
# Create a client instance for MQTT
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
Data written to InfluxDB: Temperature: 22.0°C, Humidity: 34.0%
Received Temperature: 22.0°C
Received Humidity: 34.0%
Data written to InfluxDB: Temperature: 22.0°C, Humidity: 34.0%
Received Temperature: 22.0°C
Received Humidity: 34.0%
Data written to InfluxDB: Temperature: 22.0°C, Humidity: 34.0%
Received Temperature: 22.0°C
Received Humidity: 34.0%
Data written to InfluxDB: Temperature: 22.0°C, Humidity: 34.0%
Received Temperature: 22.0°C
Received Humidity: 34.0%
Data written to InfluxDB: Temperature: 22.0°C, Humidity: 34.0%
Python
Python: 1-d...
OUTLINE
TIMELINE
Activate Windows
Go to Settings to activate Windows.
master*
Ln 16, Col 35 Spaces: 4 UTF-8 CRLF Python 3.12.9 ('myenv': conda) Go Live
Type here to search
32°C
ENG US
2:58 PM
5/18/2025


esp_2_mos_simple | Arduino IDE 2.3.7-nightly-20250501
File Edit Sketch Tools Help
ESP32S3 Dev Module
Administrator: Windows PowerShell
1747601808: Received PUBLISH from ESP32Client-173a (d0, q0, r0, m0, 'esp32/dht/hum', ... (5 bytes))
1747601809: Received PUBLISH from ESP32Client-173a (d0, q0, r0, m0, 'esp32/dht/temp', ... (5 bytes))
1747601809: Received PUBLISH from ESP32Client-173a (d0, q0, r0, m0, 'esp32/dht/hum', ... (5 bytes))
1747601810: Received PINGREQ from ESP32Client-173a
1747601810: Sending PINGRESP to ESP32Client-173a
1747601810: Received PUBLISH from ESP32Client-173a (d0, q0, r0, m0, 'esp32/dht/temp', ... (5 bytes))
1747601810: Received PUBLISH from ESP32Client-173a (d0, q0, r0, m0, 'esp32/dht/hum', ... (5 bytes))
1747601811: Received PUBLISH from ESP32Client-173a (d0, q0, r0, m0, 'esp32/dht/temp', ... (5 bytes))
1747601811: Received PUBLISH from ESP32Client-173a (d0, q0, r0, m0, 'esp32/dht/hum', ... (5 bytes))
1747601812: Received PUBLISH from ESP32Client-173a (d0, q0, r0, m0, 'esp32/dht/temp', ... (5 bytes))
1747601812: Received PUBLISH from ESP32Client-173a (d0, q0, r0, m0, 'esp32/dht/hum', ... (5 bytes))
1747601813: Received PUBLISH from ESP32Client-173a (d0, q0, r0, m0, 'esp32/dht/temp', ... (5 bytes))
1747601813: Received PUBLISH from ESP32Client-173a (d0, q0, r0, m0, 'esp32/dht/hum', ... (5 bytes))
1747601814: Received PUBLISH from ESP32Client-173a (d0, q0, r0, m0, 'esp32/dht/temp', ... (5 bytes))
1747601814: Received PUBLISH from ESP32Client-173a (d0, q0, r0, m0, 'esp32/dht/hum', ... (5 bytes))
1747601815: Received PUBLISH from ESP32Client-173a (d0, q0, r0, m0, 'esp32/dht/temp', ... (5 bytes))
1747601815: Received PUBLISH from ESP32Client-173a (d0, q0, r0, m0, 'esp32/dht/hum', ... (5 bytes))
1747601816: Received PUBLISH from ESP32Client-173a (d0, q0, r0, m0, 'esp32/dht/temp', ... (5 bytes))
1747601816: Received PUBLISH from ESP32Client-173a (d0, q0, r0, m0, 'esp32/dht/hum', ... (5 bytes))
1747601817: Received PUBLISH from ESP32Client-173a (d0, q0, r0, m0, 'esp32/dht/temp', ... (5 bytes))
1747601817: Received PUBLISH from ESP32Client-173a (d0, q0, r0, m0, 'esp32/dht/hum', ... (5 bytes))
1747601818: Received PUBLISH from ESP32Client-173a (d0, q0, r0, m0, 'esp32/dht/temp', ... (5 bytes))
1747601818: Received PUBLISH from ESP32Client-173a (d0, q0, r0, m0, 'esp32/dht/hum', ... (5 bytes))
1747601819: Received PUBLISH from ESP32Client-173a (d0, q0, r0, m0, 'esp32/dht/temp', ... (5 bytes))
1747601819: Received PUBLISH from ESP32Client-173a (d0, q0, r0, m0, 'esp32/dht/hum', ... (5 bytes))
1747601820: Received PUBLISH from ESP32Client-173a (d0, q0, r0, m0, 'esp32/dht/temp', ... (5 bytes))
1747601820: Received PUBLISH from ESP32Client-173a (d0, q0, r0, m0, 'esp32/dht/hum', ... (5 bytes))
1747601821: Received PUBLISH from ESP32Client-173a (d0, q0, r0, m0, 'esp32/dht/temp', ... (5 bytes))
1747601821: Received PUBLISH from ESP32Client-173a (d0, q0, r0, m0, 'esp32/dht/hum', ... (5 bytes))
1747601822: Received PUBLISH from ESP32Client-173a (d0, q0, r0, m0, 'esp32/dht/temp', ... (5 bytes))
1747601822: Received PUBLISH from ESP32Client-173a (d0, q0, r0, m0, 'esp32/dht/hum', ... (5 bytes))
1747601823: Received PUBLISH from ESP32Client-173a (d0, q0, r0, m0, 'esp32/dht/temp', ... (5 bytes))
1747601823: Received PUBLISH from ESP32Client-173a (d0, q0, r0, m0, 'esp32/dht/hum', ... (5 bytes))
1747601824: Received PUBLISH from ESP32Client-173a (d0, q0, r0, m0, 'esp32/dht/temp', ... (5 bytes))
1747601824: Received PUBLISH from ESP32Client-173a (d0, q0, r0, m0, 'esp32/dht/hum', ... (5 bytes))
1747601825: Received PINGREQ from ESP32Client-173a
1747601825: Sending PINGRESP to ESP32Client-173a
1747601825: Received PUBLISH from ESP32Client-173a (d0, q0, r0, m0, 'esp32/dht/temp', ... (5 bytes))
1747601825: Received PUBLISH from ESP32Client-173a (d0, q0, r0, m0, 'esp32/dht/hum', ... (5 bytes))
1747601826: Received PUBLISH from ESP32Client-173a (d0, q0, r0, m0, 'esp32/dht/temp', ... (5 bytes))
1747601826: Received PUBLISH from ESP32Client-173a (d0, q0, r0, m0, 'esp32/dht/hum', ... (5 bytes))
1747601827: Received PUBLISH from ESP32Client-173a (d0, q0, r0, m0, 'esp32/dht/temp', ... (5 bytes))
1747601827: Received PUBLISH from ESP32Client-173a (d0, q0, r0, m0, 'esp32/dht/hum', ... (5 bytes))
1747601828: Received PUBLISH from ESP32Client-173a (d0, q0, r0, m0, 'esp32/dht/temp', ... (5 bytes))
1747601828: Received PUBLISH from ESP32Client-173a (d0, q0, r0, m0, 'esp32/dht/hum', ... (5 bytes))
Output
New Line
115200 baud
Activate Windows
Go to Settings to activate Windows.
Ln 9, Col 35 ESP32S3 Dev Module on COM7
Type here to search
ENG US
1:57 PM
5/18/2025

2. Execute the Python script 1-dht_data_only.py to **store MQTT data in InfluxDB**.



3. Run 2-train_model_with_noise.py and **record the confusion matrix and classification report**

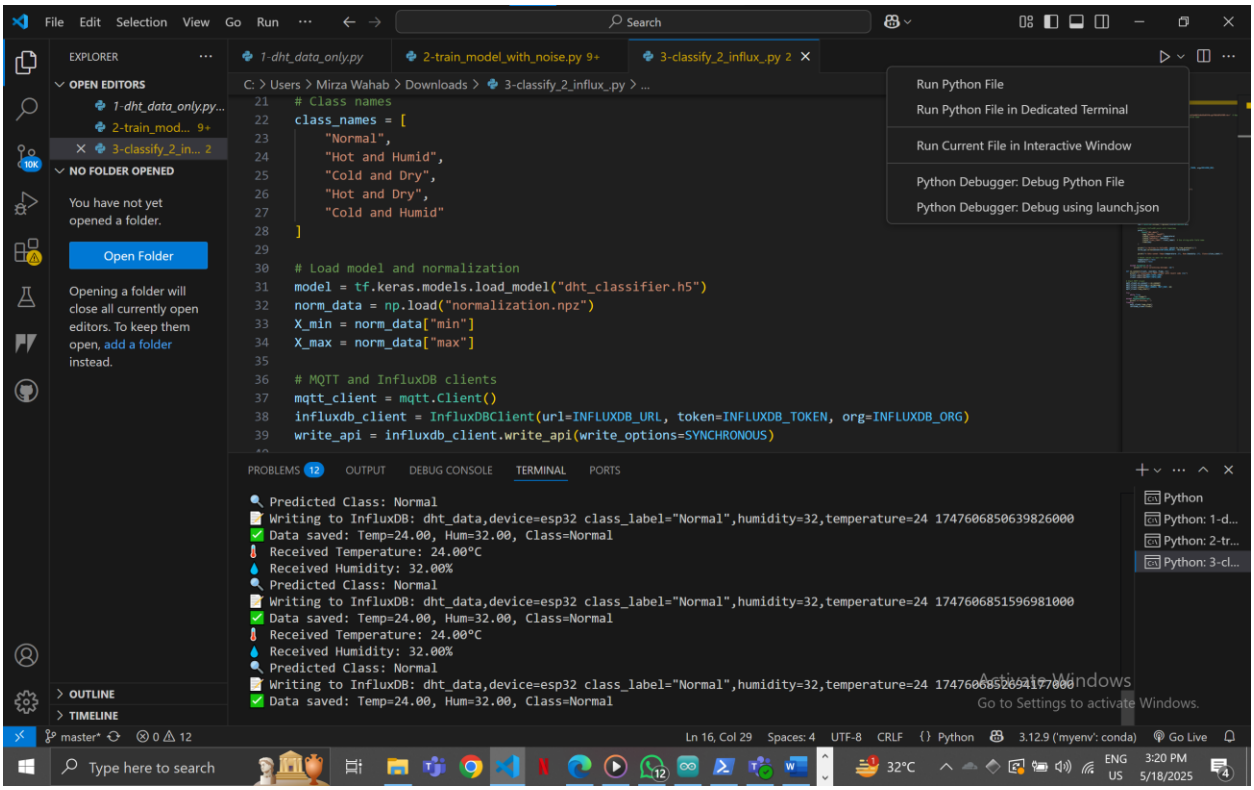


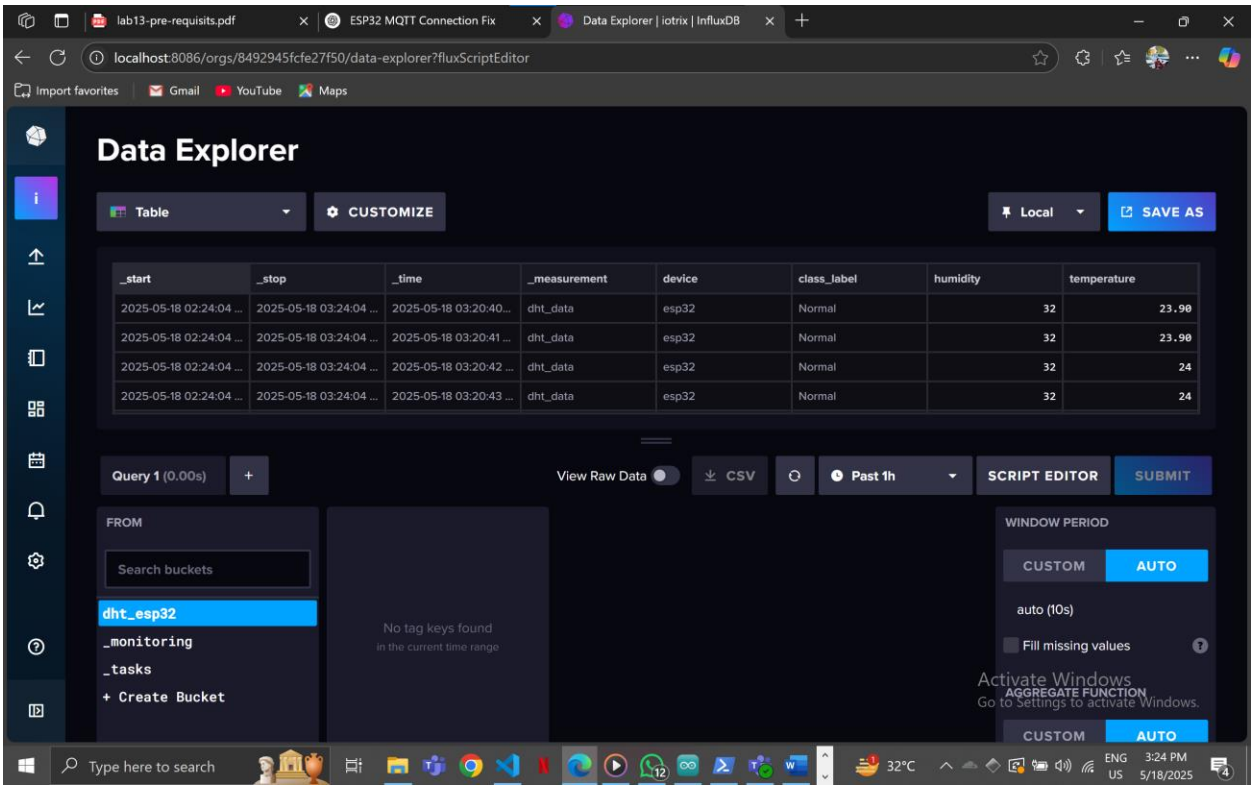

```
Classification Report:
              precision    recall  f1-score   support

           0     0.8957    0.9700    0.9313       832
           1     0.9987    1.0000    0.9993       742
           2     0.9415    0.9506    0.9460       830
           3     1.0000    1.0000    1.0000       771
           4     1.0000    0.9055    0.9504       825

    accuracy                         0.9640      4000
   macro avg     0.9672    0.9652    0.9654      4000
weighted avg     0.9659    0.9640    0.9642      4000
```

4. Execute 3-classify_2_influx.py and **verify InfluxDB data** for temperature, humidity, and classification results




lab13-pre-requisits.pdf
ESP32 MQTT Connection Fix
Data Explorer | iotrix | InfluxDB
localhost:8086/orgs/8492945fcfe27f50/data-explorer?fluxScriptEditor
Import favorites
Gmail
YouTube
Maps
Data Explorer
Table
CUSTOMIZE
Local
SAVE AS
_start
_stop
_time
_measurement
device
class_label
humidity
temperature
2025-05-18 02:24:04 ...
2025-05-18 03:24:04 ...
2025-05-18 03:20:40...
dht_data
esp32
Normal
32
23.90
2025-05-18 03:20:41 ...
2025-05-18 03:20:42 ...
24
2025-05-18 03:20:43 ...
Query 1 (0.00s)
View Raw Data
CSV
Past 1h
SCRIPT EDITOR
SUBMIT
FROM
Search buckets
dht_esp32
_monitoring
_tasks
+ Create Bucket
No tag keys found
in the current time range
WINDOW PERIOD
CUSTOM
AUTO
auto (10s)
Fill missing values
Activate Windows
Go to Settings to activate Windows.
AGGREGATE FUNCTION
Type here to search
32°C
ENG
US
3:24 PM
5/18/2025