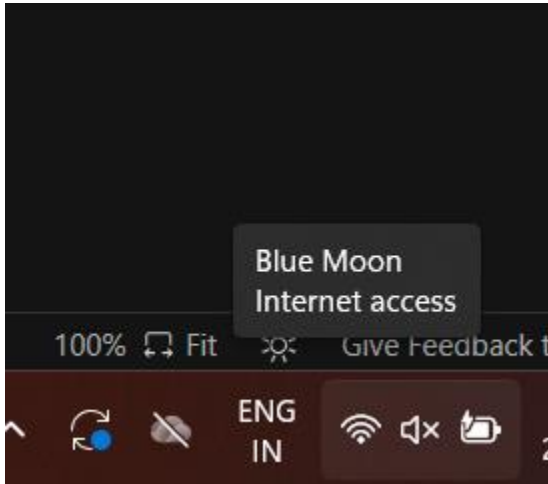


# Data Collection Steps

1. Turn On your mobile hotspot.
2. Connect your PC with the mobile hotspot.



3. Open the 'command prompt' and give the command 'ipconfig' and note down the ip address of your PC.

```
C:\Users\Admin>ipconfig

Windows IP Configuration

Wireless LAN adapter Local Area Connection* 1:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . :

Wireless LAN adapter Local Area Connection* 2:

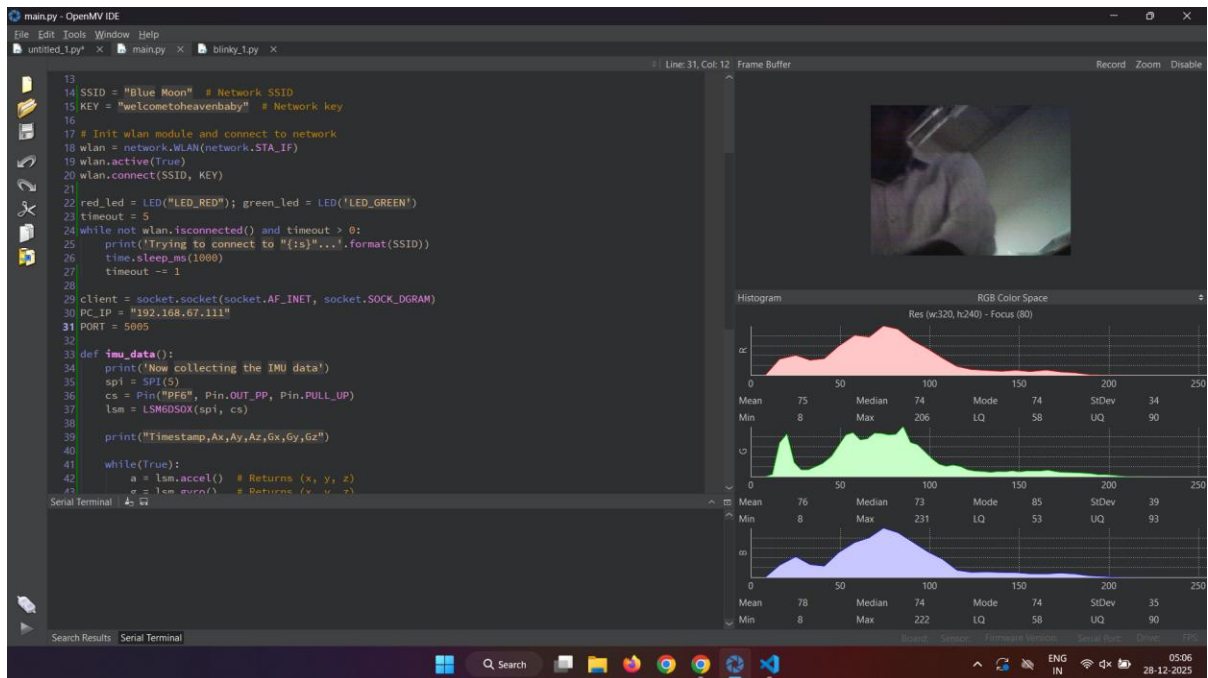
    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . :

Wireless LAN adapter Wi-Fi:

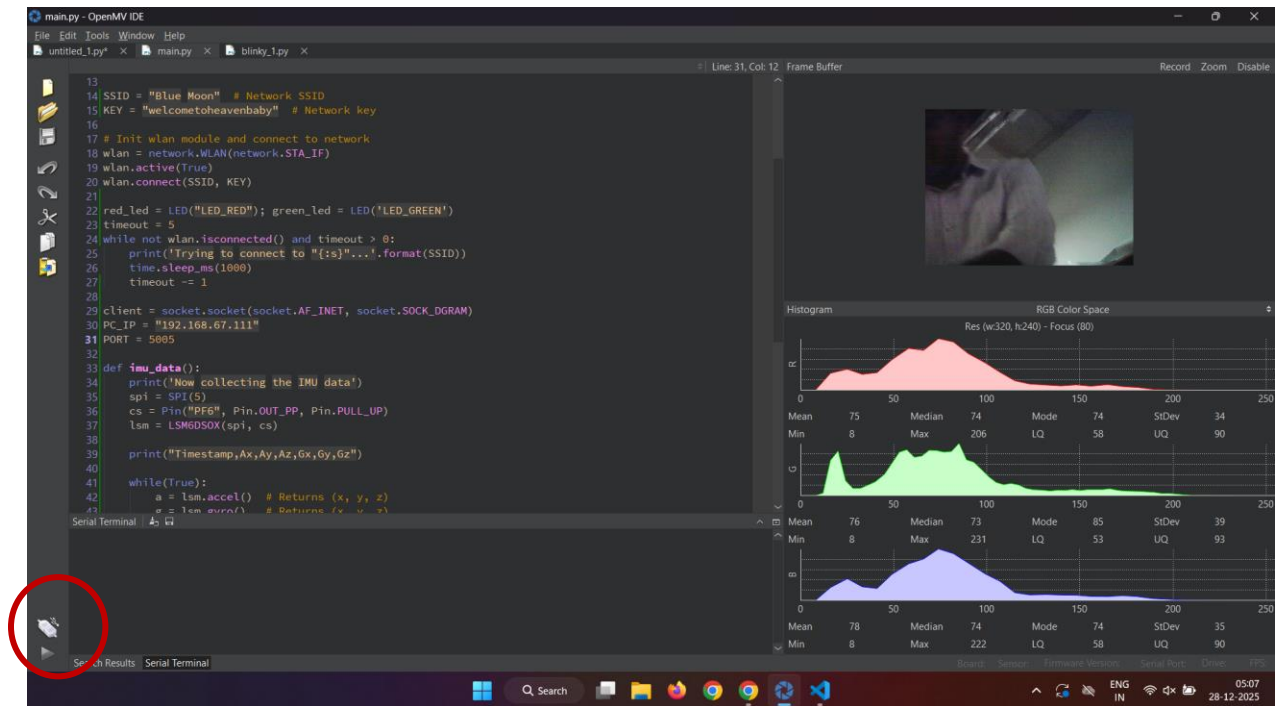
    Connection-specific DNS Suffix  . :
    IPv6 Address. . . . . : 2401:4900:16e2:c3ea:759b:23be:526c:a27a
    Temporary IPv6 Address. . . . . : 2401:4900:16e2:c3ea:a07a:45e1:57ea:8025
    Link-local IPv6 Address . . . . . : fe80::dfc0:2dff:fb9d:a67e%5
    IPv4 Address. . . . . : 192.168.67.111
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 192.168.67.206

C:\Users\Admin>
```

4. Establish the wired connection of nicla vision to the PC.
5. Open the OpenMV IDE.



6. Now, connect the board to the PC.

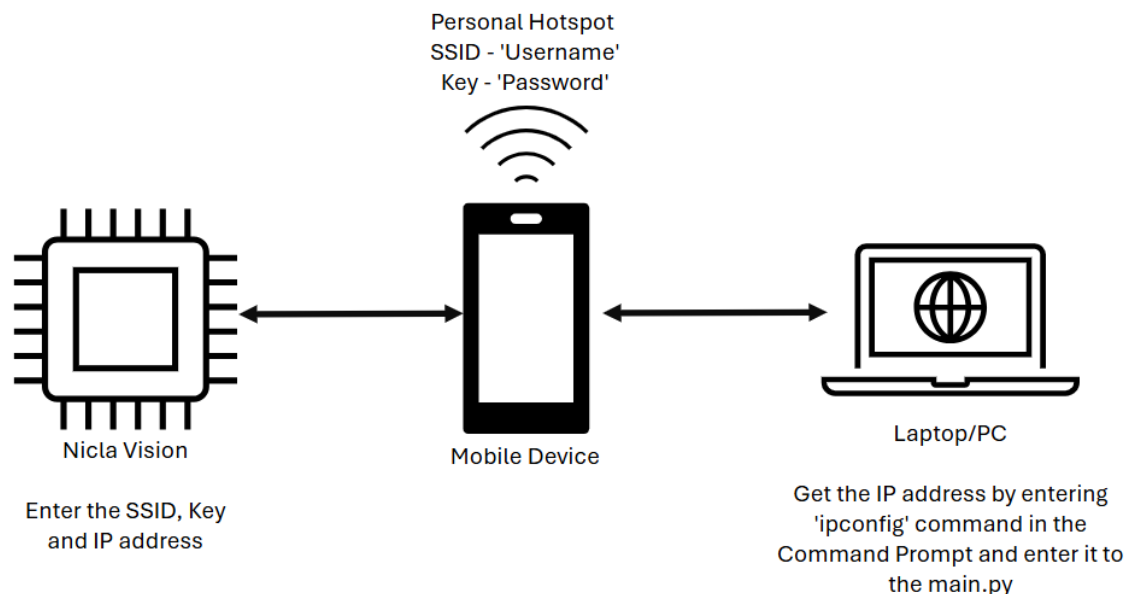


7. Copy the main.py file into the USB drive of your PC.
8. Then do the changes like change username (SSID), key, and ip address (PC\_IP) according to your mobile hotspot.
9. Then Upload and run the main.py by clicking the 'green run' button at the bottom left corner of the window.
10. Once, it runs successfully. The board will light up a green light.

11. Now, you can disconnect the board wired to the PC.
12. And now you can connect it to the power bank, pc, or any other compatible power source.
13. Now, copy the receive\_data.py in the code editor (VS Code).

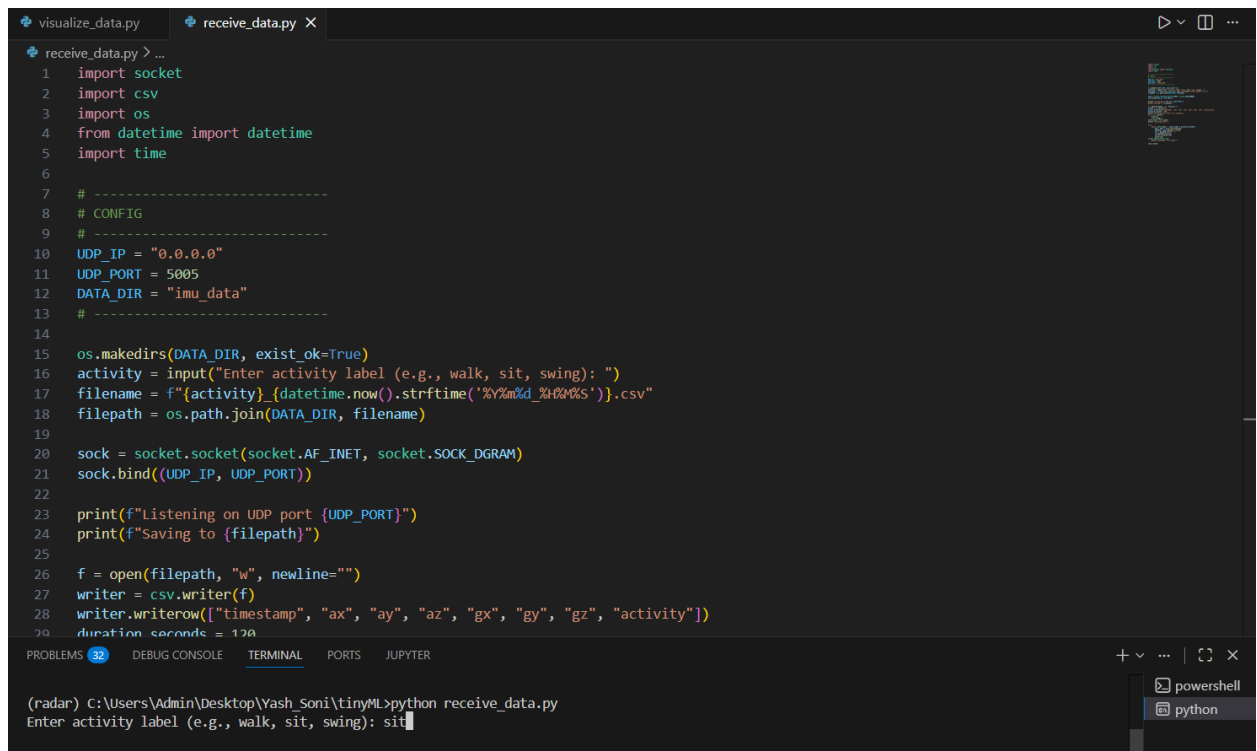
```
visualize_data.py  receive_data.py X
receive_data.py > ...
1  import socket
2  import csv
3  import os
4  from datetime import datetime
5  import time
6
7  # -----
8  # CONFIG
9  # -----
10 UDP_IP = "0.0.0.0"
11 UDP_PORT = 5005
12 DATA_DIR = "imu_data"
13 # -----
14
15 os.makedirs(DATA_DIR, exist_ok=True)
16 activity = input("Enter activity label (e.g., walk, sit, swing): ")
17 filename = f"{activity}_{datetime.now().strftime('%Y%m%d_%H%M%S')}.csv"
18 filepath = os.path.join(DATA_DIR, filename)
19
20 sock = socket.socket(socket.AF_INET, socket.SOCK_DGRAM)
21 sock.bind((UDP_IP, UDP_PORT))
22
23 print(f"Listening on UDP port {UDP_PORT}")
24 print(f"Saving to {filepath}")
25
26 f = open(filepath, "w", newline="")
27 writer = csv.writer(f)
28 writer.writerow(["timestamp", "ax", "ay", "az", "gx", "gy", "gz", "activity"])
29 duration_seconds = 120
```

14. A glimpse of connecting the Board and PC on the same network.



**Both PC and Nicla Vision should be connected to the same network.**

15. Now run the file in the VS code terminal by the following command 'python receive\_data.py'
16. Then you will be asked about the activity type. Enter the available options.



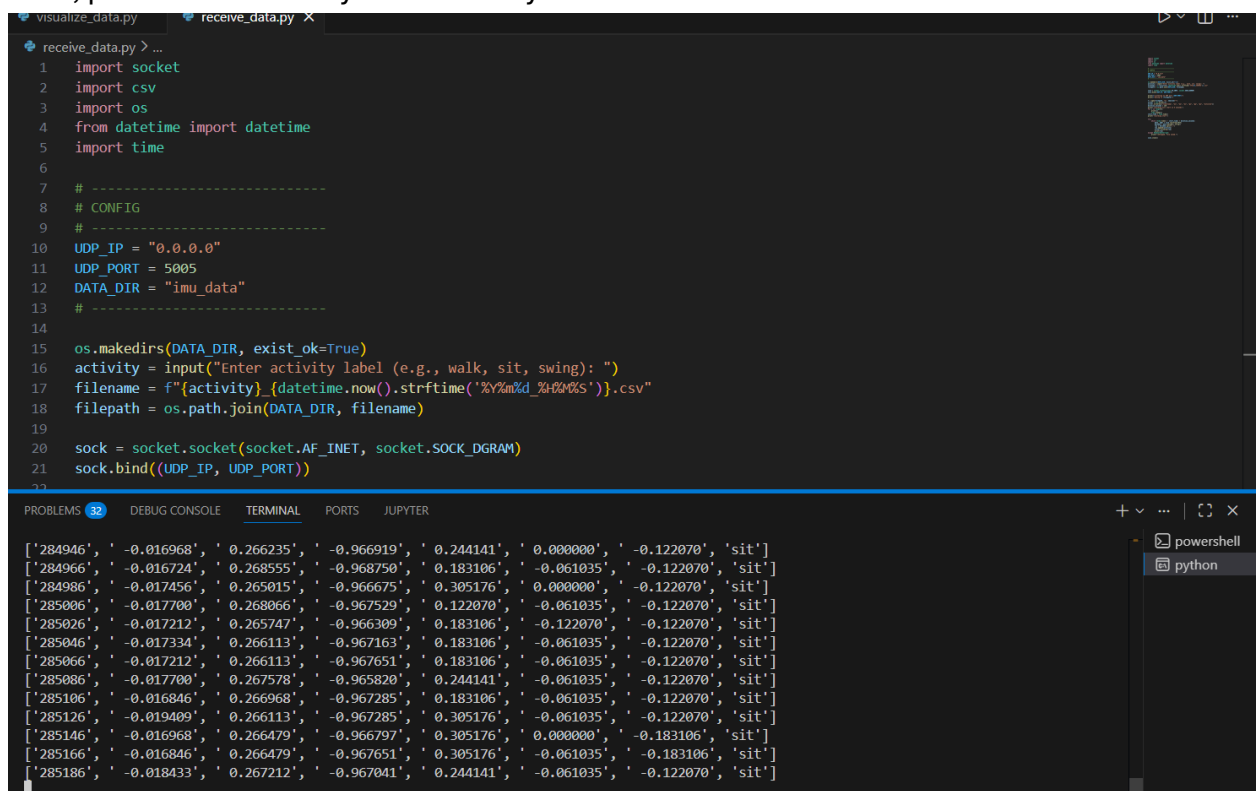
The screenshot shows the VS Code editor with the file `receive_data.py` open. The script is a Python program that listens on a UDP port (5005) and receives data from a sensor. It prompts the user to enter an activity label (e.g., walk, sit, swing) and saves the data to a CSV file. The terminal shows the command `python receive_data.py` being executed, and the user has entered 'sit' as the activity label.

```
receive_data.py > ...
1 import socket
2 import csv
3 import os
4 from datetime import datetime
5 import time
6
7 # -----
8 # CONFIG
9 # -----
10 UDP_IP = "0.0.0.0"
11 UDP_PORT = 5005
12 DATA_DIR = "imu_data"
13 # -----
14
15 os.makedirs(DATA_DIR, exist_ok=True)
16 activity = input("Enter activity label (e.g., walk, sit, swing): ")
17 filename = f"{activity}_{datetime.now().strftime('%Y%m%d_%H%M%S')}.csv"
18 filepath = os.path.join(DATA_DIR, filename)
19
20 sock = socket.socket(socket.AF_INET, socket.SOCK_DGRAM)
21 sock.bind((UDP_IP, UDP_PORT))
22
23 print(f"Listening on UDP port {UDP_PORT}")
24 print(f"Saving to {filepath}")
25
26 f = open(filepath, "w", newline="")
27 writer = csv.writer(f)
28 writer.writerow(["timestamp", "ax", "ay", "az", "gx", "gy", "gz", "activity"])
29 duration_seconds = 120
```

PROBLEMS 32 DEBUG CONSOLE TERMINAL PORTS JUPYTER

(radan) C:\Users\Admin\Desktop\Yash\_Soni\ML>python receive\_data.py  
Enter activity label (e.g., walk, sit, swing): sit

17. Now, perform the activity. In terminal you will see the below interface.



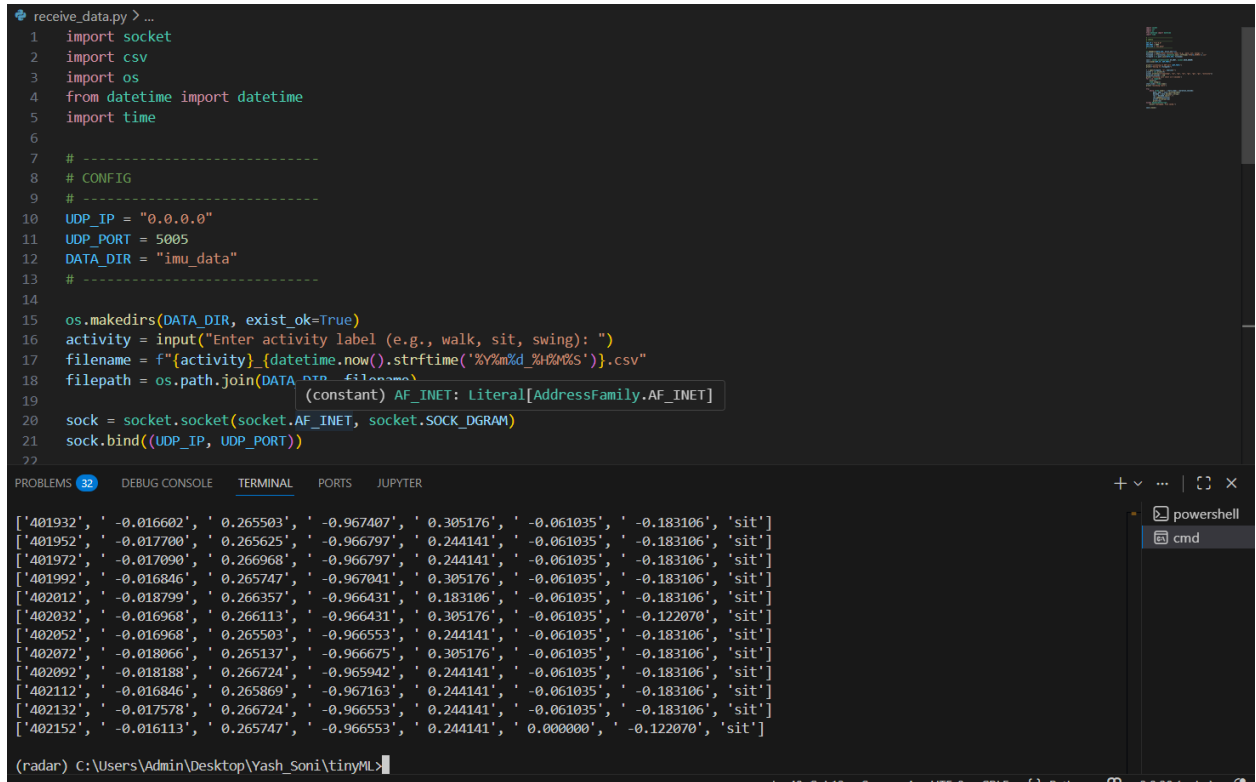
The screenshot shows the VS Code editor with the file `receive_data.py` open. The script is the same as in the previous screenshot. The terminal shows the command `python receive_data.py` being executed, and the user has entered 'sit' as the activity label. The terminal now displays a list of sensor data points, including timestamp, acceleration (ax, ay, az), gyration (gx, gy, gz), and activity.

```
receive_data.py > ...
1 import socket
2 import csv
3 import os
4 from datetime import datetime
5 import time
6
7 # -----
8 # CONFIG
9 # -----
10 UDP_IP = "0.0.0.0"
11 UDP_PORT = 5005
12 DATA_DIR = "imu_data"
13 # -----
14
15 os.makedirs(DATA_DIR, exist_ok=True)
16 activity = input("Enter activity label (e.g., walk, sit, swing): ")
17 filename = f"{activity}_{datetime.now().strftime('%Y%m%d_%H%M%S')}.csv"
18 filepath = os.path.join(DATA_DIR, filename)
19
20 sock = socket.socket(socket.AF_INET, socket.SOCK_DGRAM)
21 sock.bind((UDP_IP, UDP_PORT))
22
23 print(f"Listening on UDP port {UDP_PORT}")
24 print(f"Saving to {filepath}")
25
26 f = open(filepath, "w", newline="")
27 writer = csv.writer(f)
28 writer.writerow(["timestamp", "ax", "ay", "az", "gx", "gy", "gz", "activity"])
29 duration_seconds = 120
```

PROBLEMS 32 DEBUG CONSOLE TERMINAL PORTS JUPYTER

['284946', '-0.016968', '0.266235', '-0.966919', '0.244141', '0.000000', '-0.122070', 'sit']  
['284966', '-0.016724', '0.268555', '-0.968750', '0.183106', '-0.061035', '-0.122070', 'sit']  
['284986', '-0.017456', '0.265015', '-0.966675', '0.305176', '0.000000', '-0.122070', 'sit']  
['285006', '-0.017700', '0.268066', '-0.967529', '0.122070', '-0.061035', '-0.122070', 'sit']  
['285026', '-0.017212', '0.265747', '-0.966309', '0.183106', '-0.122070', '-0.122070', 'sit']  
['285046', '-0.017334', '0.266113', '-0.967163', '0.183106', '-0.061035', '-0.122070', 'sit']  
['285066', '-0.017212', '0.266113', '-0.967651', '0.183106', '-0.061035', '-0.122070', 'sit']  
['285086', '-0.017700', '0.267578', '-0.965820', '0.244141', '-0.061035', '-0.122070', 'sit']  
['285106', '-0.016846', '0.266968', '-0.967285', '0.183106', '-0.061035', '-0.122070', 'sit']  
['285126', '-0.019409', '0.266113', '-0.967285', '0.305176', '-0.061035', '-0.122070', 'sit']  
['285146', '-0.016968', '0.266479', '-0.966797', '0.305176', '0.000000', '-0.183106', 'sit']  
['285166', '-0.016846', '0.266479', '-0.967651', '0.305176', '-0.061035', '-0.183106', 'sit']  
['285186', '-0.018433', '0.267212', '-0.967041', '0.244141', '-0.061035', '-0.122070', 'sit']

18. Activity should be performed for 2 minutes. Otherwise, the data should not be collected properly.
19. Once the data is collected, the receive\_data.py program terminates automatically. You will see the below completion image.



```
receive_data.py > ...
1  import socket
2  import csv
3  import os
4  from datetime import datetime
5  import time
6
7  # -----
8  # CONFIG
9  # -----
10 UDP_IP = "0.0.0.0"
11 UDP_PORT = 5005
12 DATA_DIR = "imu_data"
13 # -----
14
15 os.makedirs(DATA_DIR, exist_ok=True)
16 activity = input("Enter activity label (e.g., walk, sit, swing): ")
17 filename = f"{activity}_{datetime.now().strftime('%Y%m%d_%H%M%S')}.csv"
18 filepath = os.path.join(DATA_DIR, filename)
19                                     (constant) AF_INET: Literal[AddressFamily.AF_INET]
20 sock = socket.socket(socket.AF_INET, socket.SOCK_DGRAM)
21 sock.bind((UDP_IP, UDP_PORT))
22
PROBLEMS 32  DEBUG CONSOLE  TERMINAL  PORTS  JUPYTER
['401932', '-0.016602', '0.265503', '-0.967407', '0.305176', '-0.061035', '-0.183106', 'sit']
['401952', '-0.017780', '0.265625', '-0.966797', '0.244141', '-0.061035', '-0.183106', 'sit']
['401972', '-0.017090', '0.266968', '-0.966797', '0.244141', '-0.061035', '-0.183106', 'sit']
['401992', '-0.016846', '0.265747', '-0.967041', '0.305176', '-0.061035', '-0.183106', 'sit']
['402012', '-0.018799', '0.266357', '-0.966431', '0.183106', '-0.061035', '-0.183106', 'sit']
['402032', '-0.016968', '0.266113', '-0.966431', '0.305176', '-0.061035', '-0.122070', 'sit']
['402052', '-0.016968', '0.265503', '-0.966553', '0.244141', '-0.061035', '-0.183106', 'sit']
['402072', '-0.018066', '0.265137', '-0.966675', '0.305176', '-0.061035', '-0.183106', 'sit']
['402092', '-0.018188', '0.266724', '-0.965942', '0.244141', '-0.061035', '-0.183106', 'sit']
['402112', '-0.016846', '0.265869', '-0.967163', '0.244141', '-0.061035', '-0.183106', 'sit']
['402132', '-0.017578', '0.266724', '-0.966553', '0.244141', '-0.061035', '-0.183106', 'sit']
['402152', '-0.016113', '0.265747', '-0.966553', '0.244141', '0.000000', '-0.122070', 'sit']
(radar) C:\Users\Admin\Desktop\Yash_Soni\tinyML>
```

20. The collected data will be shown in the imu\_data folder in the same directory.

