Process of Installation for the Home Security System Project

1. Hardware Setup

- **Components Required**:
    1. Raspberry Pi (with OS installed).
    2. DHT11 sensor (for temperature and humidity).
    3. Gas sensor connected via MCP3008 ADC module.
    4. Ultrasonic sensor (HC-SR04).
    5. Buzzer and LED for alerts.
- **Connections:**
    1. Connect the sensors and actuators to the GPIO pins of Raspberry Pi as specified in the code.
    2. Use jumper wires for prototyping.
    3. Ensure the power supply is adequate for all components.

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2. Software Installation

- **Install Required Libraries:**
  Run the following commands in the Raspberry Pi terminal to install necessary Python libraries:
    1. sudo apt update && sudo apt upgrade
    2. sudo apt install python3-pip
    3. pip3 install Flask Adafruit-DHT Adafruit-GPIO requests
- **Adafruit MCP3008 Library:**
  Clone and install the library for MCP3008 ADC:
    1. git clone https://github.com/adafruit/Adafruit_Python_MCP3008.git
    2. cd Adafruit_Python_MCP3008
    3. sudo python3 setup.py install

3. Network Configuration

- **ThingSpeak Account:**
  - Create an account on ThingSpeak.
  - Set up a new channel for data logging and note the Write API Key.
- **Flask Server:**
  - Update the IP address in the cam.py code to match your Raspberry Pi's IP address.
  - Ensure port 5000 is open for Flask communication.

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4. Deployment

- **Run the Flask Server:**

1. python cam.py

Verify the server is running by sending a test POST request or uploading an image via API.

- **Run the Integrated System:**

1. python3 integrated.py

This script handles sensor monitoring, data logging, and alerting.

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5. Testing the System

- Verify all sensors (DHT11, gas sensor, and ultrasonic) are functioning as expected.
- Simulate different conditions (low gas levels, proximity) to trigger alerts.
- Check ThingSpeak for data logs.
- Send test images to the Flask server and verify they are saved locally.

Library Installation

1. **Update System Packages**

   sudo apt update && sudo apt upgrade

2. **Install Python3 and pip**

   sudo apt install python3 python3-pip -y

3. **Flask (for the web server)**

   pip3 install Flask

4. **Adafruit_DHT (for the DHT11 sensor)**

   pip3 install Adafruit_DHT

5. **Adafruit_GPIO (for GPIO and MCP3008 ADC module)**

   pip3 install Adafruit-GPIO

6. **Requests (for ThingSpeak integration)**

   pip3 install requests

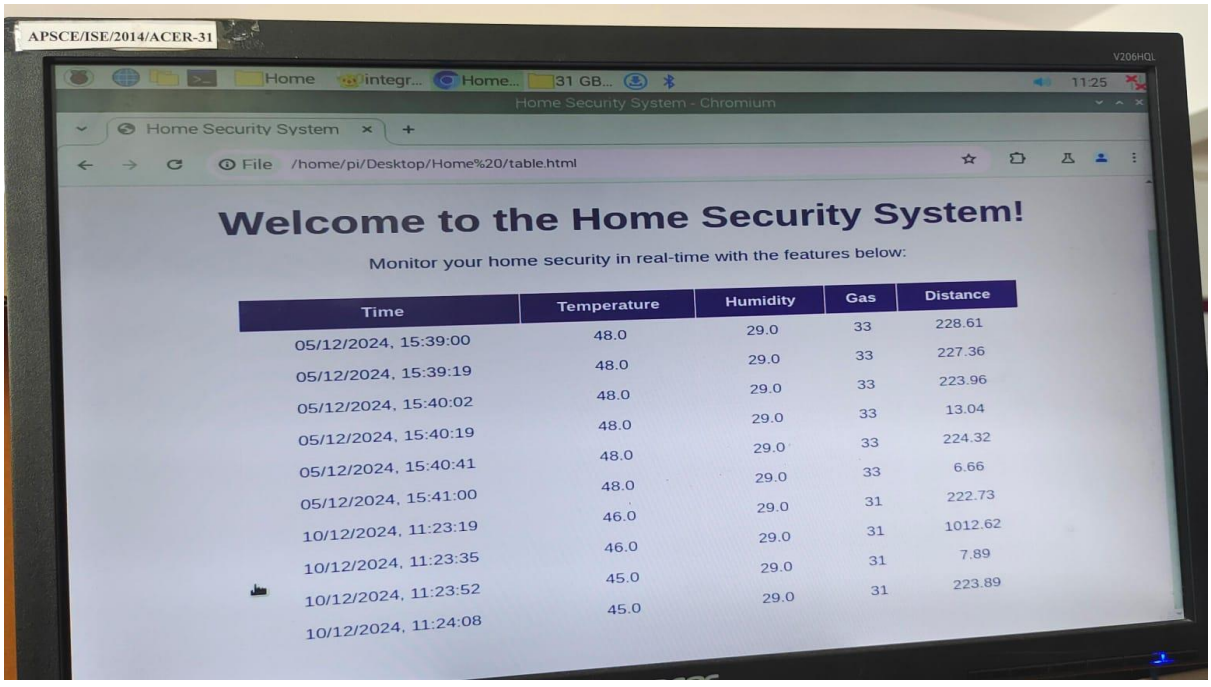
7. **Install Adafruit MCP3008 Library**

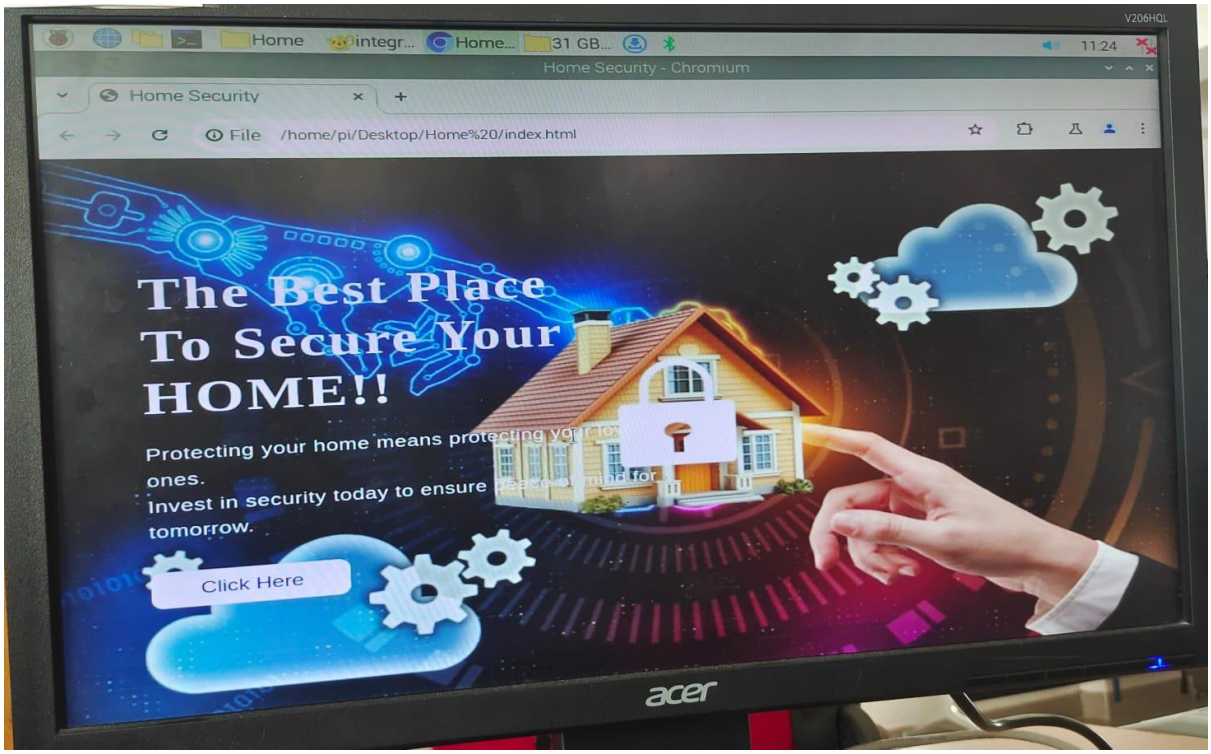
   git clone https://github.com/adafruit/Adafruit_Python_MCP3008.git

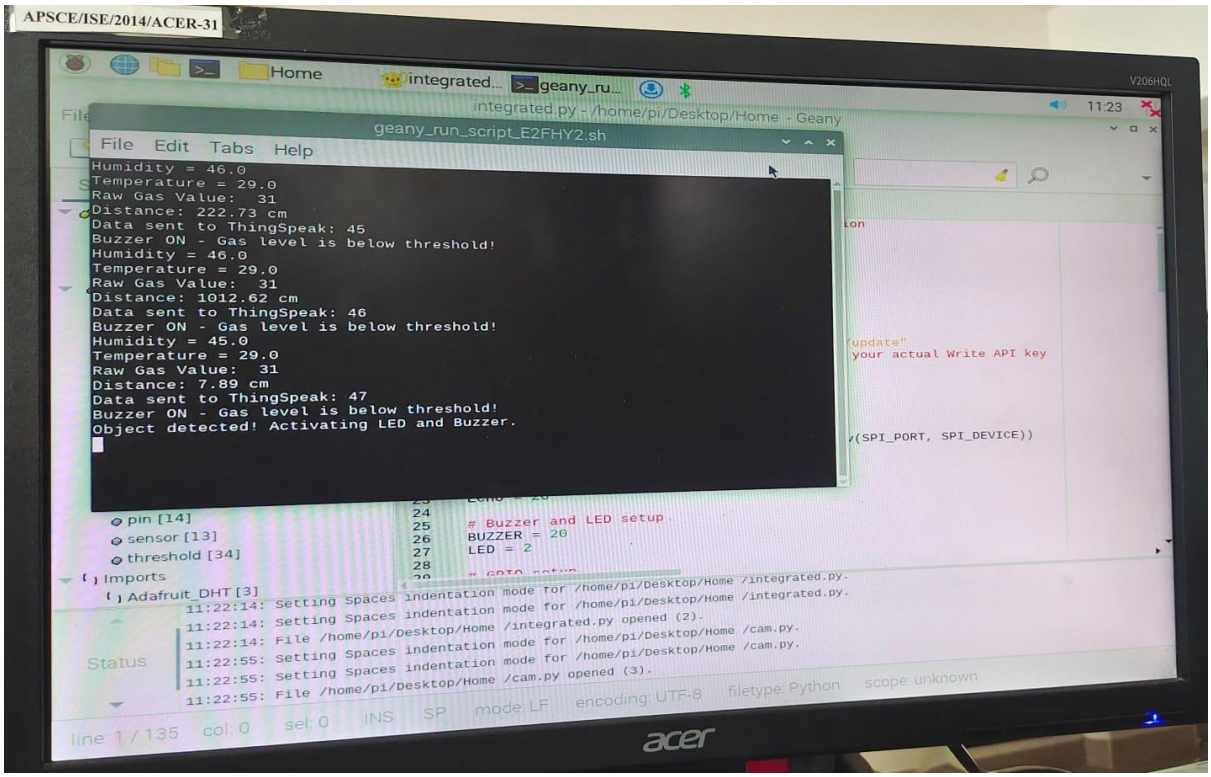
   cd Adafruit_Python_MCP3008

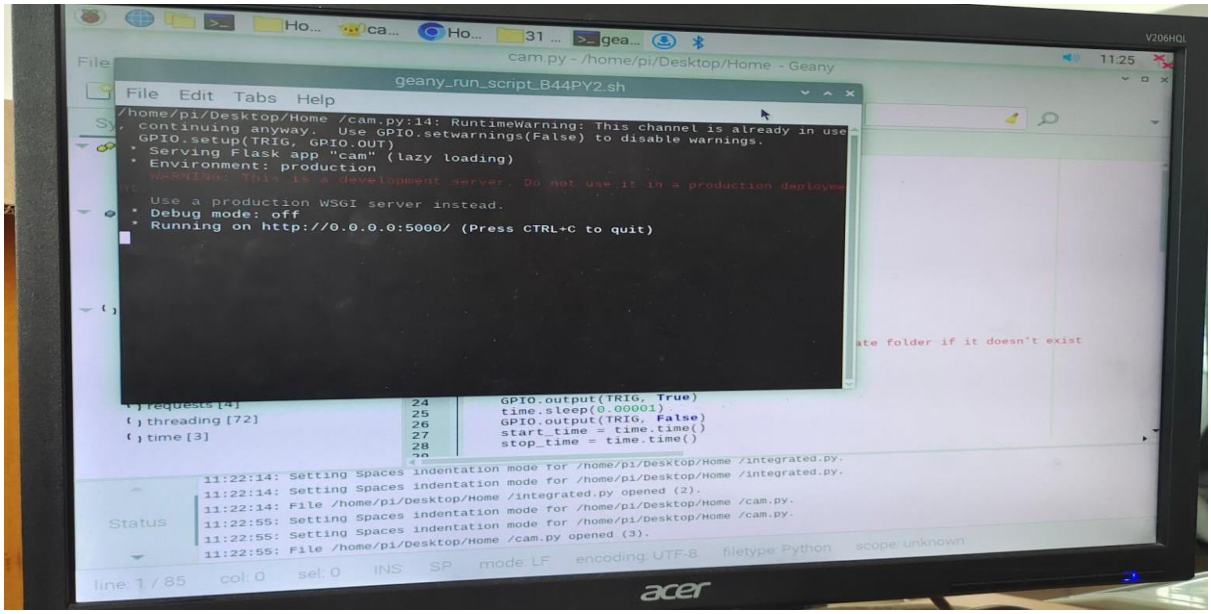
   sudo python3 setup.py install

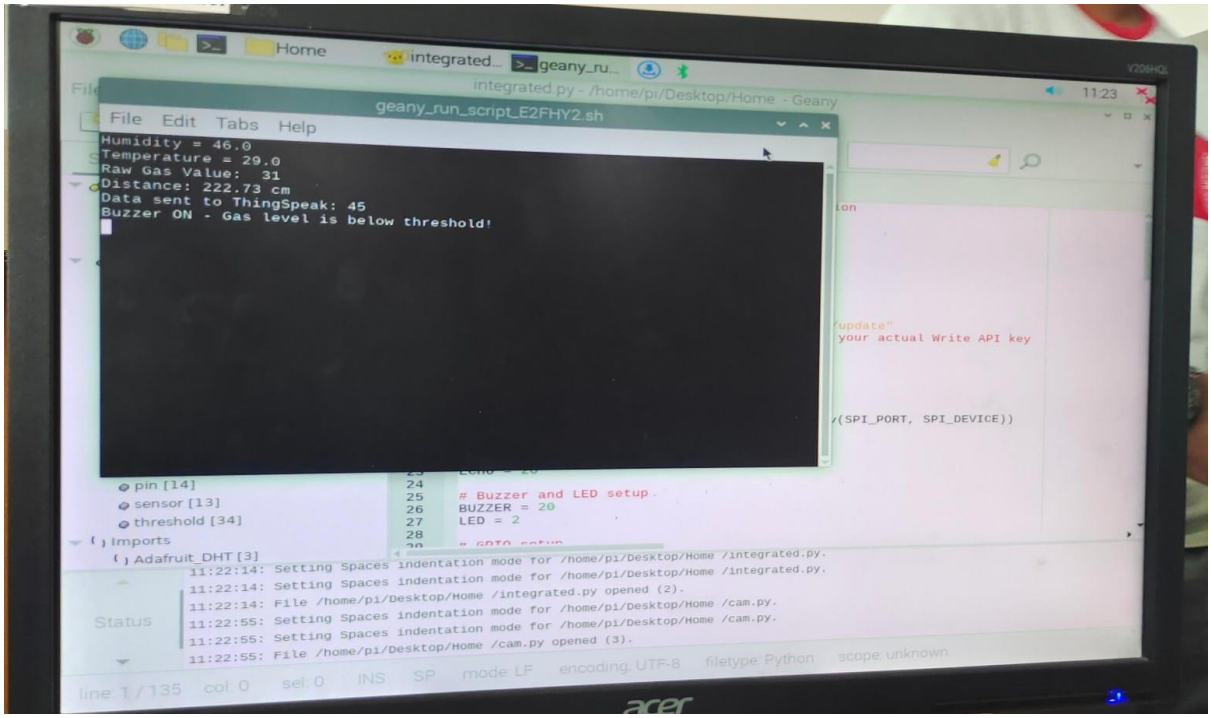
SCREEN SHOTS

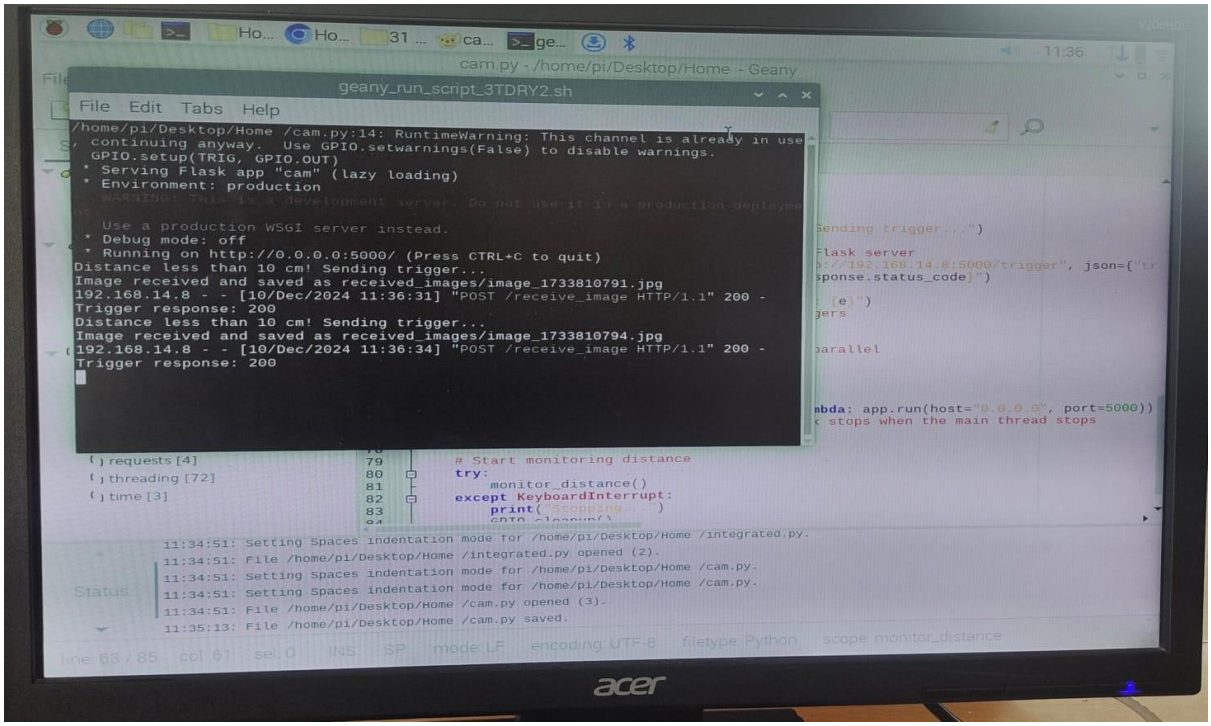


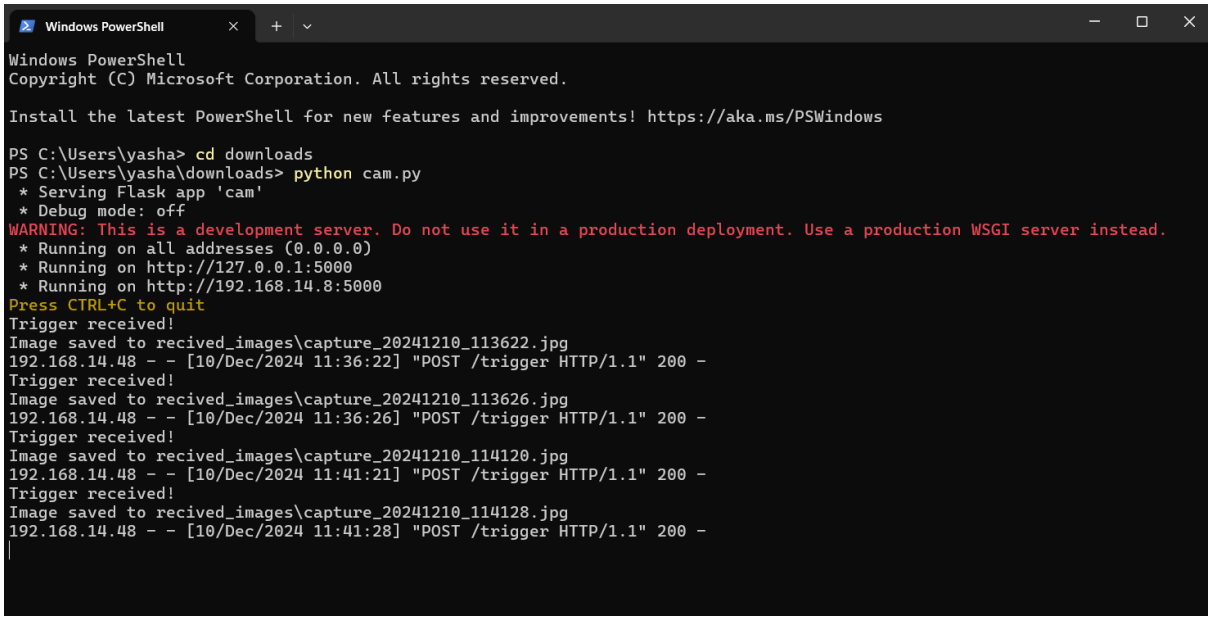

Home Security - Chromium
Home Security
File /home/pi/Desktop/Home%20/index.html
The Best Place To Secure Your HOME!!
Protecting your home means protecting your
ones.
Invest in security today to ensure
tomorrow.
Click Here
acer

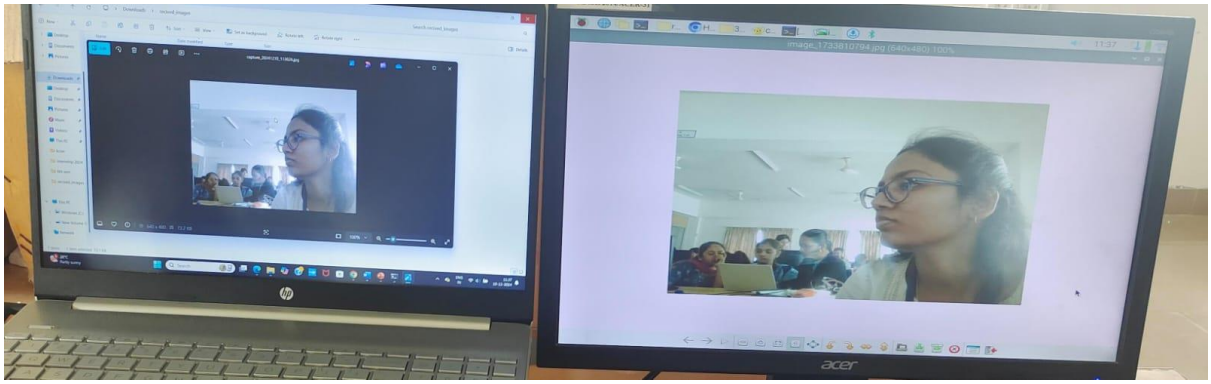

APSCE/ISE/2014/ACER-31
geany_run_script_E2FHY2.sh
File Edit Tabs Help
Humidity = 46.0
Temperature = 29.0
Raw Gas Value: 31
Distance: 222.73 cm
Data sent to ThingSpeak: 45
Buzzer ON - Gas level is below threshold!
Humidity = 46.0
Temperature = 29.0
Raw Gas Value: 31
Distance: 1012.62 cm
Data sent to ThingSpeak: 46
Buzzer ON - Gas level is below threshold!
Humidity = 45.0
Temperature = 29.0
Raw Gas Value: 31
Distance: 7.89 cm
Data sent to ThingSpeak: 47
Buzzer ON - Gas level is below threshold!
object detected! Activating LED and Buzzer.
acer


geany_run_script_B44PY2.sh
File Edit Tabs Help
/home/pi/Desktop/Home /cam.py:14: RuntimeWarning: This channel is already in use
, continuing anyway. Use GPIO.setwarnings(False) to disable warnings.
GPIO.setup(TRIG, GPIO.OUT)
* Serving Flask app "cam" (lazy loading)
* Environment: production
Use a production WSGI server instead.
* Debug mode: off
* Running on http://0.0.0.0:5000/ (Press CTRL+C to quit)
cam.py - /home/pi/Desktop/Home - Geany
acer


geany_run_script_E2FHY2.sh
File Edit Tabs Help
Humidity = 46.0
Temperature = 29.0
Raw Gas Value: 31
Distance: 222.73 cm
Data sent to ThingSpeak: 45
Buzzer ON - Gas level is below threshold!
integrated.py - /home/pi/Desktop/Home - Geany
acer


geany_run_script_3TDRY2.sh
File Edit Tabs Help
/home/pi/Desktop/Home /cam.py:14: RuntimeWarning: This channel is already in use, continuing anyway. Use GPIO.setwarnings(False) to disable warnings.
GPIO.setup(TRIG, GPIO.OUT)
* Serving Flask app "cam" (lazy loading)
* Environment: production
Use a production WSGI server instead.
* Debug mode: off
* Running on http://0.0.0.0:5000/ (Press CTRL+C to quit)
Distance less than 10 cm! Sending trigger...
Image received and saved as received_images/image_1733810791.jpg
192.168.14.8 - - [10/Dec/2024 11:36:31] "POST /receive_image HTTP/1.1" 200 -
Trigger response: 200
Distance less than 10 cm! Sending trigger...
Image received and saved as received_images/image_1733810794.jpg
192.168.14.8 - - [10/Dec/2024 11:36:34] "POST /receive_image HTTP/1.1" 200 -
Trigger response: 200
acer


Windows PowerShell
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.
Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows
PS C:\Users\yasha> cd downloads
PS C:\Users\yasha\downloads> python cam.py
* Serving Flask app 'cam'
* Debug mode: off
WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
* Running on all addresses (0.0.0.0)
* Running on http://127.0.0.1:5000
* Running on http://192.168.14.8:5000
Press CTRL+C to quit
Trigger received!
Image saved to recived_images\capture_20241210_113622.jpg
192.168.14.48 - - [10/Dec/2024 11:36:22] "POST /trigger HTTP/1.1" 200 -
Trigger received!
Image saved to recived_images\capture_20241210_113626.jpg
192.168.14.48 - - [10/Dec/2024 11:36:26] "POST /trigger HTTP/1.1" 200 -
Trigger received!
Image saved to recived_images\capture_20241210_114120.jpg
192.168.14.48 - - [10/Dec/2024 11:41:21] "POST /trigger HTTP/1.1" 200 -
Trigger received!
Image saved to recived_images\capture_20241210_114128.jpg
192.168.14.48 - - [10/Dec/2024 11:41:28] "POST /trigger HTTP/1.1" 200 -


acer