Smart Home Sensor Dashboard

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Step-by-Step Guide for Your Smart Home Sensor Dashboard Project

1. Software Installations

To run the project, ensure all necessary software and dependencies are installed.

1. **Install Python and Required Libraries**:
    - Install Python (preferably version 3.9 or later).
    - Install Flask and sensor-related libraries:
    - pip install Flask RPi.GPIO spidev Adafruit_DHT
2. **Set up Raspberry Pi GPIO**:
    - Enable GPIO access:
    - sudo raspi-config
    - Go to *Interfacing Options* > *GPIO* and enable it.
3. **Install Additional GPIO Support**:
    - Update your system and install libraries:
    - sudo apt update
    - sudo apt install python3-rpi.gpio

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2. Project Setup

1. **Project Files Placement**:
    - Place app.py in the project root directory.
    - Place index.html in a folder named templates inside the root directory (/templates/index.html).
    - Place temperature.html in the same templates folder (/templates/temperature.html).
2. **Verify GPIO Pin Connections**:

- Ensure all physical pin connections on your Raspberry Pi match the pin numbers specified in app.py. For example:
    - **Light Sensor**: Pin 33.
    - **DHT Sensor**: Pin 4.
    - **Motion Sensor**: Pins 19 (TRIG) and 26 (ECHO).

3. **Configure ADC and Sensors**:
    - The ADC reads data from gas sensors or additional analog inputs (SPI setup already defined in app.py).
4. **API Endpoints**:
    - Verify API endpoints and their functionality:
        - /light: Light monitoring.
        - /temperature: Temperature and humidity data.
        - /motion: Motion detection.
        - /gas: Gas level monitoring.

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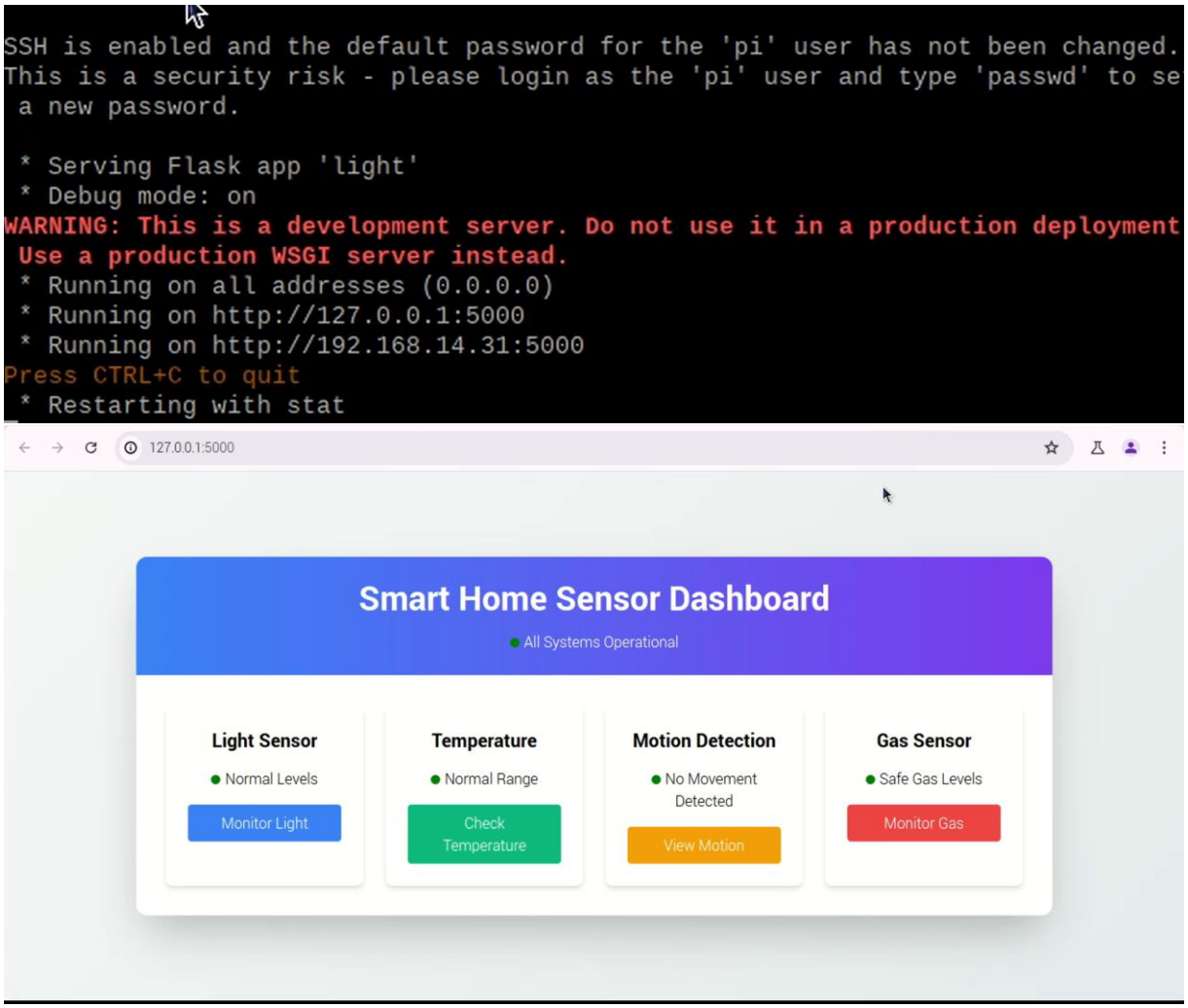
3. Running the Project

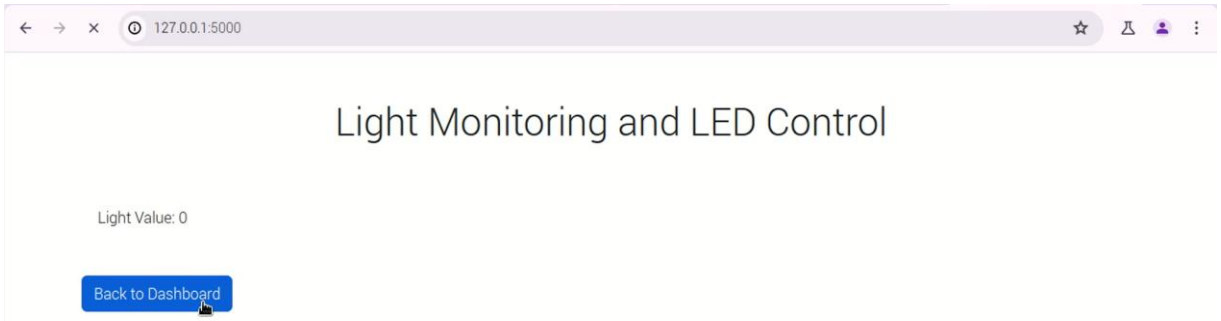
1. **Start the Flask Server**:
    - Run the app.py file:
    - python app.py
    - The server will run on http://0.0.0.0:5000.
2. **Access the Dashboard**:
    - Open a browser on your Raspberry Pi or a connected device and visit:
    - http://<raspberry-pi-ip>:5000
    - Replace <raspberry-pi-ip> with the IP address of your Raspberry Pi.
3. **Monitor Components**:
    - Use the dashboard links:
        - **Light Sensor**: /light.
        - **Temperature and Humidity**: /temperature.
        - **Motion Detection**: /motion.

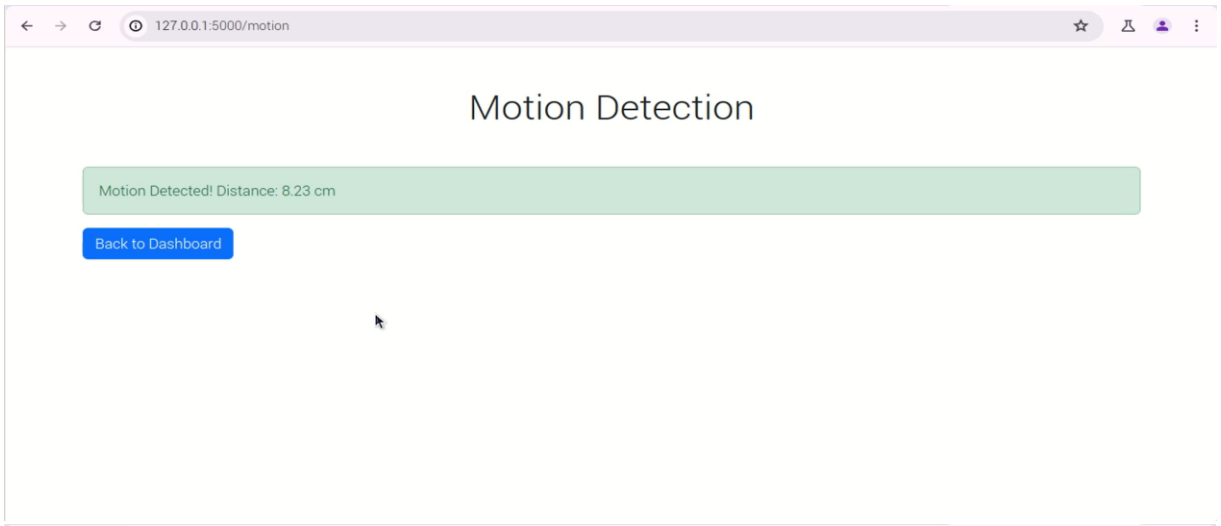
- **Gas Sensor**: /gas.

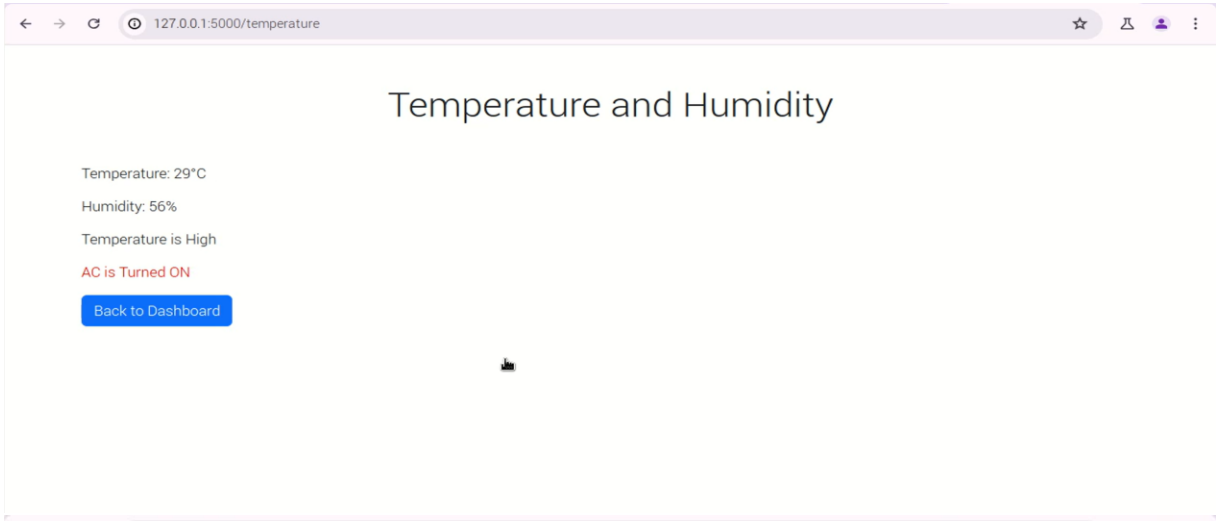
4. **Debugging and Logs**:
    - Monitor the console for logs or errors while the server is running.
    - Test hardware functionality through their respective API routes or endpoints.
5. **Polling and Real-Time Updates**:
    - Pages like temperature.html fetch live data every 2 seconds and adjust the display based on readings.

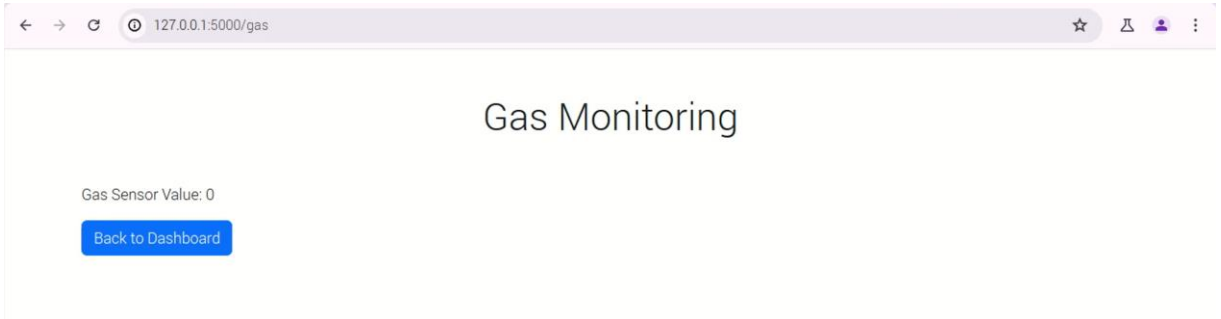
SCREENSHOTS




127.0.0.1:5000
Light Monitoring and LED Control
Light Value: 0
Back to Dashboard


127.0.0.1:5000/motion
Motion Detection
Motion Detected! Distance: 8.23 cm
Back to Dashboard


127.0.0.1:5000/temperature
Temperature and Humidity
Temperature: 29°C
Humidity: 56%
Temperature is High
AC is Turned ON
Back to Dashboard


127.0.0.1:5000/gas
Gas Monitoring
Gas Sensor Value: 0
Back to Dashboard