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**Experiment Title: Real-Time Temperature and Humidity Monitoring using DHT11 Sensor and Flask**

Python program for flask application and DHT11 integration:

from flask import Flask, render\_template, jsonify

import adafruit\_dht

import board

app = Flask(\_\_name\_\_)

DHT\_SENSOR\_PIN = board.D4 # GPIO4

def read\_dht\_sensor():

dht\_sensor = adafruit\_dht.DHT11(DHT\_SENSOR\_PIN)

try:

temperature = dht\_sensor.temperature

humidity = dht\_sensor.humidity

return temperature, humidity

except RuntimeError:

return None, None

finally:

dht\_sensor.exit()

@app.route('/')

def index():

return render\_template('index.html')

@app.route('/sensor-data')

def sensor\_data():

temperature, humidity = read\_dht\_sensor()

if temperature is not None and humidity is not None:

data = {

"temperature": f"{temperature:.1f} °C",

"humidity": f"{humidity:.1f} %"

}

else:

data = {"error": "Unable to read sensor data."}

return jsonify(data)

if \_\_name\_\_ == '\_\_main\_\_':

app.run(host='0.0.0.0', port=5000, debug=False)

Index.html:

<!DOCTYPE html>

<html lang="en">

<head>

<meta charset="UTF-8">

<meta name="viewport" content="width=device-width, initial-scale=1.0">

<title>Temperature and Humidity</title>

<script>

function updateSensorData() {

fetch('/sensor-data')

.then(response => response.json())

.then(data => {

if (data.error) {

document.getElementById('temperature').innerText = data.error;

document.getElementById('humidity').innerText = '';

} else {

document.getElementById('temperature').innerText = "Temperature: " + data.temperature;

document.getElementById('humidity').innerText = "Humidity: " + data.humidity;

}

})

.catch(error => console.error('Error fetching sensor data:', error));

}

// Refresh sensor data every 2 seconds

setInterval(updateSensorData, 2000);

window.onload = updateSensorData;

</script>

</head>

<body>

<h1>Temperature and Humidity</h1>

<p id="temperature">Loading...</p>

<p id="humidity"></p>

</body>

</html>