Data Logger for Sensor Readings

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1. Introduction

- This Data Logger project simulates sensor data like temperature and humidity and logs it into a CSV file with timestamps. It can be extended to real sensors in IoT applications.

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2. Project Overview

- **Goal**: To simulate temperature and humidity data and store it in a CSV file with timestamps.
- **Bonus**: We plot the logged data using **Matplotlib** for easy visualisation.

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3. Requirements To run the project, you need:

- **Python libraries**:
    - `random` — For simulating sensor values.
    - `csv` — For writing to and reading from CSV files.
    - `datetime` — For generating timestamps.
    - `time` — To introduce delays between data logs.
    - `pandas` — To read and manipulate the CSV file.
    - `matplotlib` — For plotting the data.

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4. Project Structure The project contains:

1. **Sensor Data Simulation** (`get_sensor_data`) - Generates random values for temperature and humidity.

2. **CSV Initialization** (`init_csv`) - Creates a CSV file to log the data.

3. **Data Logging** (`log_data_to_csv`) - Logs the sensor data to the CSV file with timestamps.

4. **Plotting Data** (`plot_data`) - Uses Matplotlib to plot the data

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5. Future Enhancements

- **Real Sensor Integration**: You can integrate actual sensors like **DHT11/DHT22** for real-time data.

- **Data Storage**: Expand the project to store data in databases like **MySQL** or **MongoDB** for large-scale applications.

- **Real-Time Plotting**: Implement real-time plotting as new data gets logged.

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6. Conclusion This project demonstrates a simple yet effective method for logging sensor data and visualizing it. The skills gained from building this project can be applied to more advanced IoT applications, where continuous data logging and analysis are required.