


Autonomous PV Fault Analyzer (LangChain + Gemini)

 Upload PV Sensor CSV File



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pv_sample_with_example.csv 1.8KB



 Describe scenario or paste a system status log:

detect the error



CSV uploaded successfully.



Run Agent Analysis



Agent Suggestions

The analysis of the PV system CSV data reveals several areas for optimization and action. The most common issues are underperformance (likely due to panel soiling or shading), low inverter efficiency (suggesting wiring problems), and high module temperature (potentially caused by cooling issues or over-irradiance). The suggested actions include checking panel cleaning and shading, inspecting inverter wiring, addressing cooling issues, and implementing regular monitoring, preventive maintenance, and data analysis.

Few-Shot Assistant Response

Okay, I will analyze the information provided to detect the error.

Here's the breakdown of my analysis:

- **Expected vs. Actual Generation:** The system generated 4.2 kWh, while the expectation was 5.5 kWh. This is a significant difference ($5.5 - 4.2 = 1.3$ kWh shortfall).
- **Inverter Efficiency:** The inverter efficiency is 97%, which is within a normal and acceptable range. This suggests the inverter is not the primary cause of the underperformance.

Possible Errors and Next Steps:

Given the information, the most likely errors are related to factors *before* the inverter. Here's a breakdown of potential issues and suggested actions:

1. Soiling (Dust, Dirt, Pollen):

- **Error:** Accumulation of dirt or debris on the panels reduces the amount of sunlight reaching the solar cells.
- **Action:** Visually inspect the panels for soiling. If present, consider cleaning the panels. The frequency of cleaning depends on the environment (e.g., dusty areas require more frequent cleaning).

2. Shading (Partial or Full):

- **Error:** Obstructions (trees, buildings, etc.) casting shadows on the panels, even for a short period, can significantly reduce output. Partial shading can disproportionately affect performance.
- **Action:** Observe the panels throughout the day to identify any shading issues. If shading is present, consider trimming trees or relocating panels if possible.

3. Panel Degradation:

- **Error:** Solar panels degrade over time, resulting in reduced output.
- **Action:** Check the panel's age and compare its current output to its expected output based on its degradation rate (typically specified in the panel's datasheet).

4. Module Mismatch:

- **Error:** If panels have different electrical characteristics, it can lead to reduced overall system performance.
- **Action:** Check the panel specifications and ensure they are compatible.

5. Wiring Issues:

- **Error:** Loose connections, damaged wiring, or corrosion can increase resistance and reduce power output.
- **Action:** Inspect all wiring connections for tightness and signs of damage or corrosion.

6. Incorrect System Configuration:

- **Error:** The system may not have been configured correctly during installation.
- **Action:** Review the system design and configuration to ensure it matches the intended specifications.

7. Weather Data Accuracy:

- **Error:** The expected generation calculation might be based on inaccurate weather data (irradiance, temperature).
- **Action:** Verify the accuracy of the weather data used for the expected generation calculation.

In summary, the most likely errors are soiling or shading. A visual inspection of the panels and their surroundings is the first step. If those are ruled out, further investigation into panel degradation, wiring, and system configuration is necessary.