

## Project Problem Statement

The world is rapidly shifting toward renewable energy to fight climate change and reduce carbon emissions. **Solar energy** plays a major role in this transition, but solar panels often suffer from faults such as **clean, dusty, bird drop, electrical damage , physical damage and snow-covered** , which reduce their efficiency and increase maintenance costs.

Manual inspection of large solar farms is time-consuming, expensive, and prone to human error. To address this challenge, this project develops an **AI-based image classification system** that automatically identifies defective solar panels, helping ensure efficient energy production and promoting **sustainable energy management** in line with **UN SDG Goal 7 – Affordable and Clean Energy**.

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### Objectives

- To automatically detect faults in solar panels using image data.
  - To improve solar energy efficiency through timely fault detection.
  - To reduce maintenance costs using an AI-based monitoring system.
  - To contribute toward clean and sustainable energy generation.
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## DataSet

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### Dataset Name : Solar Panel fault detection dataset

Dataset which classify fault in solar system

### About dataset

The accumulation of dust, snow, bird drops etc. on the surface of solar panels reduces the efficiency of the solar modules and hence the amount of produced energy. Monitoring and cleaning solar panels is a crucial task, hence

developing an optimal procedure to monitor and clean these panels is very important in order to increase modules efficiency, reduce maintenance cost and reducing the use of resources.

The objective of this dataset is to investigate the ability of different machine learning classifiers to detect dust, snow, bird drops, physical and electrical on solar panel surfaces with the highest possible accuracy.

**Source: Kaggle**

**Link :** <https://www.kaggle.com/datasets>

### **Next Steps**

- 1. Collect & Prepare Dataset**
  - 2. Train the CNN Model**
  - 3. Evaluate & Test Model Accuracy**
  - 4. Build Web Interface (Optional)**
  - 5. Test Complete Application**
  - 6. Deploy & Document**
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