Title:

SolNet: A Convolutional Neural Network for Detecting Dust on Solar Panels.

Project Problem Statement:

The efficiency of solar photovoltaic panels significantly decreases due to the accumulation of dust on their surfaces, leading to energy loss and reduced system performance. Traditional dust detection methods such as thermal imaging and IoT-based sensors are costly, require frequent maintenance, and offer limited accuracy. Therefore, there is a need for a low-cost, image-based, and automated solution. This project aims to develop a Convolutional Neural Network (CNN) model to accurately detect and classify solar panel surface conditions as clean or dusty from captured images, thereby improving maintenance scheduling and ensuring maximum energy output from solar panels.

Dataset:

*   **Dataset Name:** Solar Panel Dust Detection

*   **Source:** Kaggle – by Hemanthsai7

*   **Type:** Image Dataset

*   **Purpose:** To classify solar panel surfaces as *clean* or *dusty* using image recognition.

Key Features

- **Total Images:** Few hundred (varies by version)

- **Classes:** *Clean* and *Dusty*

- **Format:** JPG/PNG images

- **Usability:** Compatible with TensorFlow, Keras, and PyTorch

- **Use Case:** Sustainable energy management – monitoring and maintaining solar panel cleanliness automatically.