

Title: Detect the quality of photovoltaic panels

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What is PV panel defect detection?

The task of PV panel defect detection is to identify the category and location of defects in EL images.

Can visible light imaging be used for photovoltaic panels?

Visible light imaging offers broad coverage and low cost, enabling extensive inspections. To address the current limitations of low precision and high image data requirements in defect detection algorithms based on visible light imaging, this paper proposes a novel visible light image defect detection algorithm for photovoltaic panels.

What is PVL-AD dataset for photovoltaic panel defect detection?

To meet the data requirements, Su et al. 18 proposed PVEL-AD dataset for photovoltaic panel defect detection and conducted several subsequent studies 19,20,21 based on this dataset. In recent years, the PVEL-AD dataset has become a benchmark for photovoltaic (PV) cell defect detection research using electroluminescence (EL) images.

Can EL images be used for photovoltaic panel defect detection?

Buerhop et al. 17 constructed a publicly available dataset using EL images for optical inspection of photovoltaic panels. Based on this dataset, researchers have developed numerous algorithms 9,10,12 for photovoltaic panel defect detection.

In photovoltaic defect detection, surface flaws on panels often present multi-scale patterns, subtle details, and are easily affected by background noise, placing high demands on the feature ...

This review provides a practical overview of the recent advancements in deep learning-based tools and techniques for detecting defects in solar panels. Our review complements another ...

Photovoltaic (PV) panels are essential for harnessing renewable energy in the photovoltaic industry; however, they often encounter various damage risks when deployed on a large ...

Detecting defects on photovoltaic panels using electroluminescence images can significantly enhance the production quality of these panels. Nonetheless, in the process of defect ...

# Detect the quality of photovoltaic panels

Solar panels play a crucial role in producing renewable electricity power for the grid, and this role grows more significant each year. However, defects in solar panels can significantly drop ...

Efficient and intelligent surface defect detection of photovoltaic modules is crucial for improving the quality of photovoltaic modules and ensuring the reliable operation of large-scale ...

In this study, PV-YOLOv12n is introduced as an optimized variant of YOLOv12n, tailored for defect detection in electroluminescence (EL) images of PV panels.

**Abstract** This paper presents a defect analysis and performance evaluation of photovoltaic (PV) modules using quantitative electroluminescence imaging (EL). The study analyzed three ...

Visible light imaging offers broad coverage and low cost, enabling extensive inspections. To address the current limitations of low precision and high image data requirements in defect ...

This is critical for maintaining the quality standards of solar panels, which directly impact energy conversion efficiency and long-term reliability. In conclusion, my proposed LPV-YOLO ...

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