

# Fish scale pattern on photovoltaic panel surface

Does PV panel surface defect approach improve map?

By comparing this method with five state-of-the-art methods, the proposed PV panel surface defect approach has improved the mAP by at least 27.8%, and the single image detection time consumed is in the same order of magnitude, balancing detection accuracy and detection speed.

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.

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.

Is there a semi-supervised anomaly detection model for PV panel defect detection?

F.L. et al. proposed a semi-supervised anomaly detection model based on adversarial generative networks for PV panel defect detection. In, an automatic detection method for optoelectronic components was proposed based on texture analysis and supervised learning for the processing of infrared images.

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 ...

Article Open access Published: 08 July 2025 ResNet-based image processing approach for precise detection of cracks in photovoltaic panels Montaser Abdelsattar, Ahmed AbdelMoety & ...

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Therefore, by designing different photovoltaic layout scenarios, this paper studies the impact of different photovoltaic layouts on water quality and fish, providing scientific basis and data ...

A facade inspired by fish scales formed from integrated photovoltaic panels defines a home that seamlessly adapts to the desert climate while promoting energy efficiency and sustainable living.

We used a shade net to simulate photovoltaic panels, and studied the effects of different proportions of photovoltaic panels on water and fish.

This paper presents a robust framework for detecting faults in PV panels using Convolutional Neural Networks (CNNs) for feature extraction and Bitterling Fish Optimization (BFO) ...

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A huge amount of fish scales is being disregarded in different food industry sectors, contributing to the amount of bio-waste materials here in our country. Fish scales are rich in different ...

Second, the article designs a Multi-Scale Context-Aware Feature Enhancement (MFCARAFE) module, which processes outputs from multiple convolutional layers in order to ...

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

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