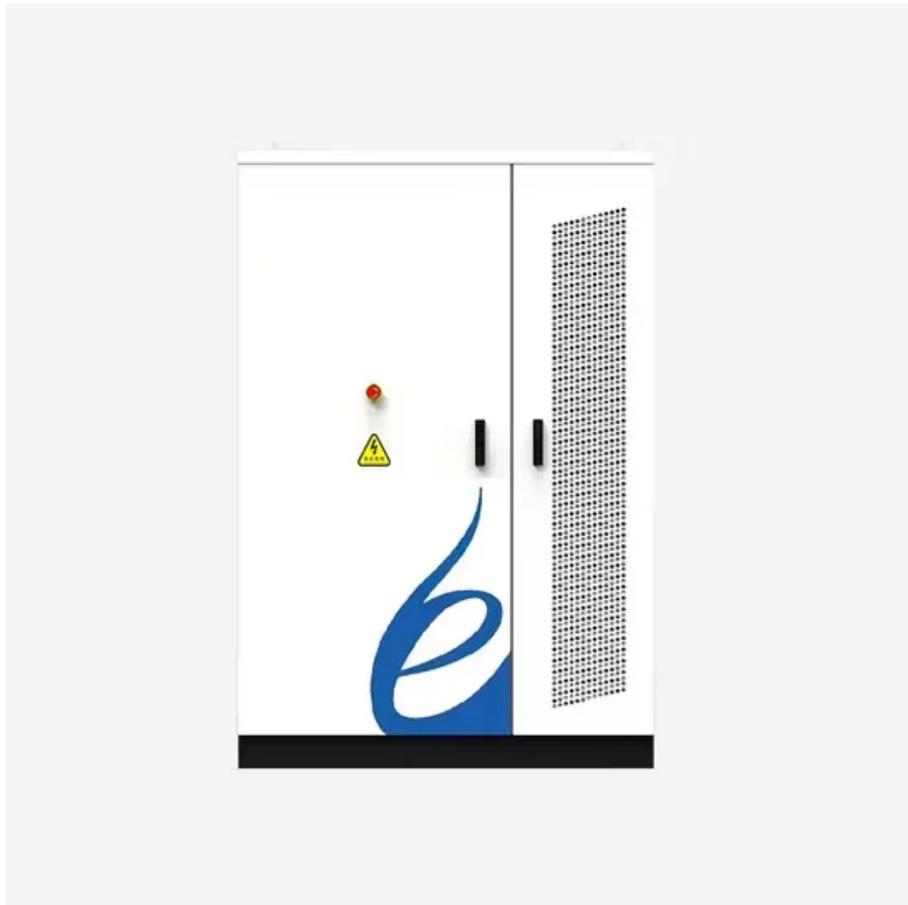


Infrared detection of cracks in photovoltaic panels



Overview

To address the challenges of high missed detection rates, complex backgrounds, unclear defect features, and uneven difficulty levels in target detection during the industrial process of photovoltaic panel defect detection, this article proposes an infrared detection method based on computer vision. This study presents a new approach for detecting defects in photovoltaic modules by applying infrared images. It shows a high level of accuracy and efficiency over traditional manual inspections by employing advanced algorithms to identify issues like cracks, hot spots, short circuits, and. Abstract—Utility-scale solar arrays require specialized inspection methods for detecting faulty panels. Photovoltaic (PV) panel faults caused by weather, ground leakage, circuit issues, temperature, environment, age, and other damage can take many forms but often symptomatically exhibit temperature. Solar cell microcracks, often just 10-100 micrometers wide, can expand under thermal and mechanical stress to significantly impact panel performance. These defects, while initially microscopic, can reduce power output by up to 2.5% annually if left undetected.

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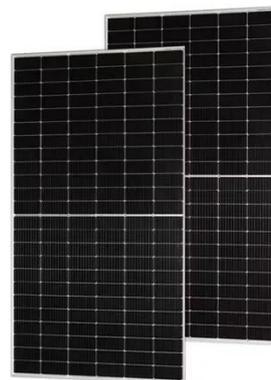
Electroluminescence Imaging for Microcrack Detection in Solar Cells

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Photovoltaic panel defect detection algorithm based on infrared imaging

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ST-YOLO: A defect detection method for photovoltaic modules based on

The adoption of a deep learning-based infrared image detection algorithm for PV modules significantly reduces the cost of manual inspection and greatly improves the accuracy and efficiency of PV defect detection.



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