

How machine vision is used in photovoltaic panel defect detection?

Machine vision-based approaches have become an important direction in the field of defect detection. Many researchers have proposed different algorithms 11, 15, 16 for photovoltaic panel defect detection by creating their own datasets.

How to improve the detection speed of photovoltaic module defects?

Improving detection speed is the focus of the one-stage method, while the two-stage method emphasizes detection accuracy. In the practical detection of photovoltaic module defects, we should consider not only the detection speed but also the detection accuracy. The VarifocalNet is an anchor-free detection method and has higher detection accuracy 5.

Does varifocalnet detect photovoltaic module defects?

The VarifocalNet is an anchor-free detection method and has higher detection accuracy<sup>5</sup>. To further improve both the detection accuracy and speed for detecting photovoltaic module defects, a detection method of photovoltaic module defects in EL images with faster detection speed and higher accuracy is proposed based on VarifocalNet.

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<sup>9,10,12</sup> for photovoltaic panel defect detection.

Can a real-time defect detection model detect photovoltaic panels?

Efforts have been made to develop models capable of real-time defect detection, with some achieving impressive accuracy and processing speeds. However, existing approaches often struggle with feature redundancy and inefficient representations of defects in 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.

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