

PIENAAR ENERGY (PTY) LTD

Photovoltaic panel infrared spot



Overview

One of the most effective ways to monitor solar panels for early signs of problems is by using thermal imaging. The energy crisis and environmental problems have attracted global attention, thus the photovoltaic (PV) power generation technology comes to people's mind. The application of unmanned aerial vehicle (UAV) inspection technology can overcome the disadvantages of large scale and high risk of this. Infrared scanning detects hotspots in solar cells, identifying overheating areas that can lead to efficiency loss. Aiming at the problem of difficult operation and maintenance of PV power plants in complex backgrounds and combined with image processing technology, a method for detecting hot spot defects in infrared image PV panels that combines segmentation and detection, Deeplab-YOLO, is proposed.

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Applying RetinaNet Machine Learning Models for Hot-Spot Detection ...

In this study, our research group proposes an application of RetinaNet to develop a model capable of detecting hot spots in photovoltaic panels through processing thermal images. © 2025 ...

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A bright spot detection and analysis method for infrared photovoltaic

This paper based on U-Net network and HSV space, proposes a method of PV infrared image segmentation and location detection of hot spots, which is used to detect and analyze the ...



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A machine learning framework to identify the hotspot in photovoltaic

In this paper, a hybrid features based support vector machine (SVM) model is proposed using infrared thermography technique for hotspots detection and classification of photovoltaic (PV) ...

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(PDF) Hotspots Detection in Photovoltaic Modules Using Infrared

In this approach, thermal images or thermograms of an operating PV module were taken using an infrared camera. These thermograms were analyzed by a Hotspot Detection algorithm ...



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IR Inspections of Photovoltaic Systems

Performed from either the topside or underside of panels, infrared inspections provide the most cost effective method for detecting defects within installed panels.

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How Infrared Scanning Detects Hotspots in Solar Cells

Infrared scanning detects hotspots in solar cells, identifying overheating areas that can lead to efficiency loss. This technology plays a crucial role in maintaining solar panel performance ...



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Deeplab-YOLO: a method for detecting hot-spot defects in infrared ...



This paper investigates the detection of hot-spot defects on PV panels under complex background in infrared images, and proposes a Deeplab-YOLO hot-spot defect detection method.

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Thermal Vision: AI-Powered Infrared Anomaly Detection for Solar Panels

One of the most effective ways to monitor solar panels for early signs of problems is by using thermal imaging. Infrared (IR) anomaly detection has become a powerful tool for spotting ...

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Deep Learning-Based Hot Spot Detection in Aerial Infrared Images of

To address these challenges, we propose a rapid detection method for hot spots in photovoltaic panels using deep convolutional neural networks, combined with unmanned aerial ...

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How to Use Thermal Infrared Inspection for Hotspot Detection in PV ...

One of the most effective methods for identifying and addressing issues within PV systems is through thermal infrared inspection. This powerful diagnostic tool can detect hotspots and ...

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