

PEES Power Systems

UAV analysis of photovoltaic panels



Overview

This study presents a comprehensive evaluation of five state-of-the-art object detection models: YOLOv3, Faster R-CNN, RetinaNet, EfficientDet, and Swin Transformer, for identifying physical and electrical defects as well as surface contaminants such as dust, dirt, and bird. This study presents a comprehensive evaluation of five state-of-the-art object detection models: YOLOv3, Faster R-CNN, RetinaNet, EfficientDet, and Swin Transformer, for identifying physical and electrical defects as well as surface contaminants such as dust, dirt, and bird. This paper provides an in-depth literature review on image processing techniques, focusing on deep learning approaches for anomaly detection and classification in photovoltaics. It examines key components of UAV-based PV inspection, including data acquisition protocols, panel segmentation and. Abstract—Since photovoltaic (PV) plants require periodic maintenance, using Unmanned Aerial Vehicles (UAV) for in-spections can help reduce costs. Usually, the thermal and visual inspection of PV installations works as follows. A UAV equipped with a Global Positioning System (GPS) receiver is. Abstract—Timely and accurate detection of defects and con-taminants in solar panels is critical for maintaining the efficiency and reliability of photovoltaic systems. However, the large area of photovoltaic power generation, coupled with a substantial number of photovoltaic panels and complex geographical environments, renders manual inspection methods highly.

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Photovoltaic plant monitoring and inspection through synergic

In this paper, we propose a new approach where each panel is embedded with IoT sensors that communicate inspection requests to a sensed UAV swarm. This allows to create a specific inspection plan for each ...

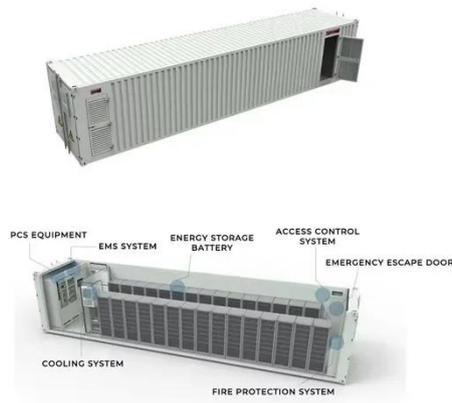
Autonomous Intelligent Monitoring of Photovoltaic Systems: An In ...

This review covers a wide range of topics related to PV monitoring and analysis, including the selection of UAVs for PV plant applications, various cameras used for PV monitoring, considerations related to standards for ...



UNMANNED AERIAL VEHICLE (UAV) DECISION ...

Therefore, it enables near real-time monitoring of the PV plant, early detection, accurate localization of faults and geolocation of defects, leading to ...



Leveraging unmanned aerial vehicle images improves vegetation ...

Here, we assess vegetation conditions within these facilities by integrating nationwide field surveys in China with satellite observations, using high-resolution unmanned aerial vehicle



Vision-Based Object Detection for UAV Solar Panel Inspection Using ...

UAV-based inspection enables the rapid identification of contaminated areas and the isolation of physically or electrically damaged panels before cleaning, ensuring maintenance efficiency and preventing further damage.

UNMANNED AERIAL VEHICLE (UAV) DECISION-MAKING FOR

PHOTOVOLTAIC (PV)

Therefore, it enables near real-time monitoring of the PV plant, early detection, accurate localization of faults and geolocation of defects, leading to time-and cost-efficient PV plant



Thermal and Visual Tracking of Photovoltaic Plants for Autonomous ...

Abstract--Since photovoltaic (PV) plants require periodic maintenance, using Unmanned Aerial Vehicles (UAV) for inspections can help reduce costs. Usually, the thermal and visual inspection of PV installations works ...

Towards a Holistic Approach for UAV-Based Large-Scale Photovoltaic

It examines key components of UAV-based PV inspection, including data acquisition protocols, panel segmentation and geolocation, anomaly classification, and optimizations for model generalization.



A comprehensive review of

unmanned aerial vehicle-based approaches ...



This study aims to give an overview of the existing approaches for PV plant diagnosis, focusing on unmanned aerial vehicle (UAV)-based approaches, that can support PV plant diagnostics using imaging ...

Towards autonomous photovoltaic panels health monitoring: UAV ...

This analysis underscores the critical importance of proactive maintenance and monitoring in sustaining the efficiency, longevity, and safety of solar energy systems.



A METHOD FOR DETECTING PHOTOVOLTAIC PANEL FAULTS USING ...

manual inspection methods highly inefficient and inadequate for modern photovoltaic power stations. To address this issue, this paper proposes a method and system for hot spot detection on photovoltaic panels using ...

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