

What is PV fault detection & classification?

Various faults may occur in either DC or AC side of the PVS. The detection, classification, and localization of such faults are essential for mitigation, accident prevention, reduction of the loss of generated energy, and revenue. In recent years, the number of works of PV fault detection and classification has significantly increased.

How are photovoltaic (PV) defects classified?

Photovoltaic (PV) defects can be classified using various techniques such as infrared (IR) imaging, electroluminescence (EL), large-area laser beam induced current, and current-voltage characteristics [6,7]. Recent advancements in EL imaging have made it possible to extract defect information hidden within the PV cell.

What are 'defects' and 'faults' in PV systems?

Although the terms 'defects' and 'faults' were interchangeably used in the literature, it was observed that the reference to 'defects' was typically related to the physical components or materials used in the PV system, such as physical anomalies in PV modules (e.g., cracks, hotspots, delamination, disconnections, etc.).

Why is Defect Classification important in PV cells?

The importance of defect classification in PV cells lies in controlling the quality and output power of PV cells. The fast and accurate determination of the defect locations in PV module and cell is very important.

What are the challenges of defect detection in PV systems?

Main challenges of defect detection in PV systems. Although data availability improves the performance of defect diagnosis systems, big data or large training datasets can degrade computational efficiency, and therefore, the effectiveness of these systems. This limits the deployment of DL-based techniques in practical applications with big data.

Can a deep feature-based model be used for automated PV Defect Classification?

In another study, Demirci et al. (2021) used the same dataset and proposed a deep feature-based (DFB-SVM) model to design an automated PV defect classification approach. For the feature extraction, a CNN model was used and the mRMR algorithm was employed for the feature selection.

Among the elements of the PV system, the solar panels are considered the most susceptible elements to failure, which has made many researchers propose various ...

The proposed methodology comprises four main steps: defect detection, ...

The present study is carried out for automatic defects classification of PV cells in electroluminescence images. Two machine learning approaches, features extraction-based ...

Photovoltaic (PV) system performance and reliability can be improved through the detection of defects in PV modules and the evaluation of their effects on system operation. ...

Photovoltaic (PV) fault detection and classification are essential in maintaining the reliability of the PV system (PVS). Various faults may occur in either DC or AC side of the ...

In this paper, a new classification model is proposed to detect and classify ...

In this paper, we applied several deep learning networks such as AlexNet, ...

The paper is organised into seven sections: Section 2 provides an overview of the categorised data analysis methods for PV system defect detection including Imaging ...

The perfect defect classification of solar cells can help to enhance the PV system performance, quality, and reliability. The paper is ...

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Overall, solar cell defect identification and classification play a critical role in improving the quality and efficiency of solar energy systems, helping to meet the increasing demand for clean and ...

The size and the complexity of photovoltaic solar power plants are increasing, and it requires advanced and robust condition monitoring systems for ensuring their reliability. ...

In case of PV solar cells, Li et al. conduct one dimensional CNN to classify the different kinds of PV module defects such as yellowing, dust ...

Solar photovoltaic technology can be regarded as a safe energy generation system with relatively less pollution, noiseless, and abundant solar source. The operation and ...

In this paper, a new classification model is proposed to detect and classify defects in PV systems. This model is called Hybrid Classification Model (HCM) and consists of ...

In this paper, we applied several deep learning networks such as AlexNet, SENet, ResNet18, ResNet34, ResNet50, ResNet101, ResNet152, GoogleNet (Inception V1), ...

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