Solar cell classification problem

Why is classification of solar cell defects a difficult task?
Discussions Classification of solar cell defects in EL image is a challenging task in general because solar cells contain crystal grain boundariescaused by the internal silicon structure. This makes distinguishing defective and normal areas harder.

Is there a new automatic defect detection and classification framework for solar cells?
In this study,a novel automatic defect detection and classification framework for solar cells is proposed.

Are solar cell El images a defect detection and classification framework?
In this study, a novel automatic defect detection and classification framework for solar cell EL images is proposed. Feature extraction, selection and classification of defective solar cells is performed using a public dataset consisting of both monocrystalline and polycrystalline solar cell EL images.

How are solar cell defects classified?
Solar cell defects are divided into seven classessuch as one non-defective and six defective classes. Feature extraction algorithms such as histograms of oriented gradients (HOG),KAZE,Scale-Invariant Feature Transform (SIFT) and speeded-up-robust features (SURF) are used to train the SVM classifier. Finally,the performance results are compared.

How can we improve solar cell image classification?
Efficient solar cell Electroluminescence image classification methods are proposed. A novel fast-learning lightweight convolutional neural network model is proposed. Faster feature extraction performed using pre-trained Deep Neural Networks. State-of-art results achieved using feature selection and machine learning methods.

Can SVM and CNN be used to classify solar cell defects?
In this research,features extraction-based SVM and CNN methods are presented for the classification of solar cell defects. The successful classification of defects in a polycrystalline silicon PV cell is a challenging taskdue to its background texture.

This paper presents an algorithm for the detection of micro-crack defects in the multicrystalline solar cells. This detection goal is very challenging due to the presence of ...

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

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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Solar cell classification. The PIDcon allows routine quality control of the PID susceptibility of solar cells in a short time and independent from the influence of EVA and glass. ... Potential induced ...

In this study, a novel automatic defect detection and classification framework for solar cells is proposed. In the proposed Deep Feature-Based (DFB) method, the image ...

images of silicon solar cells, which solved the problem that the efficiency of manual detection cannot meet the needs of the manufacturing industry. Tian et al. [7] ...

To solve the solar cell patent classification problem, we propose a keyword extraction method and a deep neural network-based solar cell patent classification method. ...

A nondestructive detection method that combines convolutional neural network (CNN) and photoluminescence (PL) imaging was proposed for the multi-classification and multi-grading of defects during the fabrication process ...

Photovoltaic (PV) installations have experienced significant growth in the past 20 years. During this period, the solar industry has witnessed technological advances, cost ...

This paper presents a novel hybrid model employing Artificial Neural Networks (ANN) and Mathematical Morphology (MM) for the effective detection of defects in solar cells. Focusing ...

2.3 Solar Cell Parameter Identification Problem. The five parameters involved in the single diode equivalent circuit of solar cells and the seven parameters involved in the ...

The perfect defect classification of solar cells can help to enhance the PV system performance, quality, and reliability. The paper is structured as follows: the basic theory of solar module defects and machine ...

A nondestructive detection method that combines convolutional neural network (CNN) and photoluminescence (PL) imaging was proposed for the multi-classification and ...

In this work, we proposed a compact classification framework based on hybrid data augmentation and deep learning models for detection of the defective solar cells. In the ...

Stoicescu, " Automated Detection of Solar Cell Defects with Deep Learning," in 2018 26th European Signal Processing Conference (EUSIPCO), 2018, pp. 2035-2039.

Among the general defects of solar cells, the characteristics of hidden cracks of solar cell defects increases the identifying difficulty of model. To improve the average precision of general defect ...

The appropriate hyperparameters, algorithm optimizers, and loss functions were employed to achieve optimal performance in the seven-class classification of solar cell ...

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