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| Abstract |  |
| The detection of faults in solar panels is essential for generating increased amounts of renewable green energy. Solar panels degrade over time due to physical damage, dust, or other faults. Numerous studies have been conducted to detect and monitor solar panel faults in real-time. This research examines the deployment of deep learning models for identifying these faults. In this research, we propose a novel deep learning model combining the InceptionV3-Net with U-Net architecture. The proposed architecture applies the InceptionV3 base with ImageNet weights, enhanced by convolutional layers, squeeze-and-excitation (SE) blocks, residual connections, and global average pooling. The model includes two dense layers with LeakyReLU and batch normalization, ending with a Soft-Max output layer. Incorporating image segmentation into deep learning models significantly improves the precision and test accuracy of identifying issues in solar panels. The proposed model achieves exceptional performance, having a validation accuracy of 98.34%, a test accuracy of 94.35% with an F1 score of 0.94, a precision of 0.94, and a Recall of 0.94. | |