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Rice Disease Identification Using Vision Transformer (ViT) Based Network

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Abstract

Rice crop plays a significant role in upholding India's and global food security. However, the potential yield of rice crops is continuously threatened by various types of diseases throughout its growth stages. Researchers are devising advanced & automated disease

identification and management techniques instead of manual inspection to combat this issue. In this context, deep learning-based techniques appear as promising avenues, demonstrating impressive performance in disease identification using digital images. In this work, we implemented a vision transformer-based network, which was implemented to identify and classify the images of rice crops into 11 distinct predefined categories. To ensure the network's robustness, the rice crop images were collected from experimental fields of diverse locations across the country. We also applied augmentation techniques to expand the rice image dataset significantly. The proposed network was developed using four transformer encoders, each comprising a multi-head self-attention function and dense layer. The outcomes of the experimentations of the proposed network on the rice image dataset were remarkable, showcasing classification accuracy of 98.83% and the f1-score of 98.87%. Therefore, employing advanced technologies like vision transformer-based networks offers a lot of hope to the farm community for effectively identifying diseases in rice crops.

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