

Deep Hybrid Learning Framework for Plant Disease Recognition

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Abstract - Following better agricultural practices is the key to catering for the ever-increasing food demand. While new technologies have been adapted over the years, there is still a need for effective plant disease recognition systems because of the existence of harmful plant diseases that can spread rapidly. Effective and early recognition of plant diseases is vital to minimize the damage to crops and hence can save the farmers from potential loss. It is also important for many countries to maintain economic stability, especially for the countries that completely rely on agriculture. In the past, many traditional and deep learning-based approaches have been proposed for plant disease recognition. While traditional approaches need insightful domain expertise, deep learning-based approaches require large sets of labeled data. Further, most of the existing methods fail to meet benchmark performances in terms of recognition accuracy. Therefore, in this study, a novel deep hybrid architecture is proposed to perform plant disease recognition from plant leaf images. The Google Inception and ResNet architectures are utilized as the core networks to construct the proposed network. The proposed framework is evaluated on a newly constructed dataset with large sample size. The comparative analysis reveals that the proposed approach can outperform other state-of-the-art deep networks.

Keywords - artificial neural network, deep learning, hybrid network, plant disease recognition