"LEAFCHECK"
UTILIZING DEEP LEARNING TECHNIQUES FOR TEA LEAF DISEASE DETECTION THROUGH IMAGE ANALYSIS

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ABSTRACT

Tea is a commonly grown, highly favored culinary plant with a distinctive flavor and a wealth of nutrients in the agricultural industry. The harvest from tea is often good, and it is significant to global trade and agricultural production. Numerous causes, including bacteria, viruses, fungi, etc., frequently contribute to the diseases that affect tea. As a result, the threat that these diseases provide to farming is significant. Therefore, identifying these leaf diseases is crucial for disease prevention and for raising crop yields of both high quality and quantity.

Currently, the process of designing convolutional neural network architectures relies heavily on human expertise and effort. While CNNs have demonstrated remarkable success in various computer vision tasks, the field of deep learning is constantly evolving, and novel models can lead to significant advancements. In this research, the author proposes a novel deep convolutional neural network model while combining the use of image processing tasks and the use of a reinforcement learning algorithm to optimize the decision-making process.

An image dataset of tea leaves that included five different disease classes and a healthy leaf class was used to evaluate the performance of the suggested methodology. A dataset of 51,300 images was used for training and validation of the suggested Deep Convolutional Neural Network model. An additional set of 5,700 images was used to examine the classification performance of the proposed algorithm as well as current cutting-edge methods. The gathered data showed that the suggested algorithm has an average accuracy of 97% on the test data, successfully diagnosing and categorizing diseases affecting tea leaves.

Keywords: *Tea leaf disease detection, Image processing, Convolutional neural network, Reinforcement learning, Deep learning, Image classification, Neural architecture search*

Subject Descriptors:

- *Computing methodologies → Computer vision → Machine learning algorithms → Reinforcement learning → Image processing → Decision making*
- *Computing applications → Agriculture → Crop management → Disease Detection*
- *Computing Milieux → Mobile computing → Image-based approach*

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