Deep Learning Approach to Identifying Disease in Tea Leaves in Sri Lanka Using Image Processing

Janith Palihawadana

A dissertation submitted in partial fulfilment of the requirement for

Bachelor of Engineering (Honours) degree in Software Engineering.

School of Computing

Informatics Institute of Technology, Sri Lanka

in collaboration with

University of Westminster, UK

2023

ABSTRACT

In Sri Lanka, the agricultural industry has always operated as a significant economic force, offering a unique contribution to the national economy. One of Sri Lanka's main industries for earning foreign currency is the manufacturing of tea.

One of Sri Lanka's biggest issues present is the spread of tea leaf diseases, which lowers the quality and reduces the production of tea. As a result, the plant's natural condition is harmed by this leaf disease, which changes or damages several of its key processes, including fertilization. The traditional, outdated way of treating and identifying plant diseases depends only on physical examination and is both extremely slow and inaccurate. Additionally, the availability of experts makes it difficult to identify the conditions and takes time.

To detect and prevent tea leaf diseases, image processing and convolution neural network (CNN) were utilised. First, TRI professionals verified the dataset. The photographs were then preprocessed using data augmentation to remove the background and resize them before being added to the network. To avoid the overfitting issue and increase CNN accuracy, the iteration numbers have been adjusted at times. Two models were made; one scored 86.25%, and the other 77.22%. Thus, by increasing the dataset, the CNN-based method can be used to image classification and successfully improve the identification performance of tea leaf diseases.

Keywords: Deep Learning, Convolution Neural Network, Image Classification, Tea leaves diseases classification