A framework to identify tea plant varieties in Sri Lanka using Convolutional Neural Networks (CNN)

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Tea cultivation is one of the main sources of foreign exchange earnings in Sri Lanka and the Tea Research Institute (TRI) is the only national institution in Sri Lanka for generating and disseminating related new technologies. TRI has introduced tea clones under several series. These clones cannot be grown everywhere in the country. Clones should be grown in cultivation zones recommended by the TRI. When obtaining tea shoots for tea nurseries, it is very important to know what kind of tea clones that the mother plant belongs to. The selected clone types should be clones recommended for the cultivation zone we are going to plant. Otherwise, diseases in the tea plantation may increase and the cultivation may be destroyed. The subtle differences between tea clones make it difficult to distinguish them. It is the main problem for tea growers (especially novices). The major aim of this research is to minimize the difficulty of identifying the three most widely grown tea clones in Sri Lanka, namely TRI 2023, TRI 2025, and TRI 2026. This study found that tea clones can be distinguished using the second and fourth normal leaves. A Convolutional Neural Network (CNN) was trained using images of these leaves to distinguish these three types of tea clones, achieving 97% accuracy in 30 epochs. The implemented framework was tested using the test dataset contained (30) images collected from small tea holdings. This study significantly proposes a web application and a framework which are to provide predictions for distinguishing above tea clones.

Keywords: Tea, Clone, TRI, Plant, Shoots

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