Deep Learning based Image Classifiers for Detection of CSSVD in Cacao Plants

Authors : Atuhurra Jesse, N'guessan Yves-Roland Douha, Pabitra Lenka

Abstract : The detection of diseases within plants has attracted a lot of attention from computer vision enthusiasts. Despite the progress made to detect diseases in many plants, there remains a research gap to train image classifiers to detect the cacao swollen shoot virus disease or CSSVD for short, pertinent to cacao plants. This gap has mainly been due to the unavailability of high quality labeled training data. Moreover, institutions have been hesitant to share their data related to CSSVD. To fill these gaps, image classifiers to detect CSSVD-infected cacao plants are presented in this study. The classifiers are based on VGG16, ResNet50 and Vision Transformer (ViT). The image classifiers are evaluated on a recently released and publicly accessible KaraAgroAI Cocoa dataset. The best performing image classifier, based on ResNet50, achieves 95.39\% precision, 93.75\% recall, 94.34\% F1-score and 94\% accuracy on only 20 epochs. There is a +9.75\% improvement in recall when compared to previous works. These results indicate that the image classifiers learn to identify cacao plants infected with CSSVD.