
Abstract

Detecting plant diseases in field images is hampered by complex backgrounds (many other objects beside the leaf) that prevent CNN models from achieving good accuracy. This thesis addresses this issue by proposing a two-stage method on a dataset of 9,047 images from the FieldPlant dataset that has been developed, consists of cassava, corn, and tomato. The first stage uses the pretrained Segment Anything Model 2 (SAM2) for leaf segmentation, followed by a classification stage using ensemble stacking that combines three pretrained models (EfficientNetB0, MobileNetV3Large, DenseNet201) that have been fine-tuned and modified, with random forest as the meta-learner. Test results show good performance with an accuracy of 90.37% on the segmented test data. In conclusion, the proposed method has proven to improve system robustness, validated by its ability to achieve an accuracy of 82.71% when tested on original (unsegmented) field images, demonstrating its potential for real-world implementation.

Keywords: mobilenetv3large, ensemble, plant disease classification, segment anything model, squeeze-and-excitation, cnn
