Plant Health Assessment from Images Using a YOLOv8-Based Framework

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Abstract

Diseases of plants can significantly reduce the yield and agricultural productivity. Early identification of the health of the plants can help the farmers to act promptly and lose less. The paper presents an automated system that scans the images of plants to support the determination of the health of plants. The system is used to get images of entire plants and isolates significant components of the plant like leaves, fruits and flowers. An object detection model (YOLOv8) is used to detect these parts of plants in tomato, potato, and egg plant photographs. This model was trained on a combination of data and tested on a 572 image validation set with 1,963 annotated plant parts. The trained model had an average precisions (mAP 50): 0.724, precision of 0.787 and recall of 0.609. It was also demonstrated to be really fast and had an average inference time of approximately 6 milliseconds per image with a NVIDIA RTX 4050. The findings also show that the suggested solution is capable of identifying plant parts in the right manner and aiding in automated tracking of plant conditions in order to manage crops better.

Index Terms

Computer Vision, Deep Learning, Object Detection, Yolov8, Plant Image Analysis