

ABSTRACT

Inspecting plant diseases is the key to preventing a decline in agricultural production quality. The inspection process, carried out through human observation, requires careful detection of plant diseases. However, this manual approach is time-consuming and exhausting for humans, especially farmers. Therefore, a cutting-edge method is needed to make inspections more effective and efficient. With the introduction of You Only Look Once (YOLO) object detection model, it is hoped to bring innovation in the form of an inspection system that can accurately and quickly detect plant diseases.

YOLO is a Deep Learning-based object detection model that replicates human brain's way of processing information – neural networks evaluate the entire image in a single pass. YOLOV7 is a model developed from previous YOLO series, offering a trainable bag-of-freebies method to enhance accuracy and speed without increasing inference and training costs during detection, thus achieving optimal performance results.

This research proposes a plant disease inspection system using YOLOV7 object detection model. The best configuration parameters obtained from this research are hyperparameters scratch tiny, image size 416×416, batch size 16, and learning rate 0.01. The testing results show an accuracy of mAP 98.9%, precision of 95.9%, recall of 97.4%, and F1 score of 98.12%.

Keywords: plants, detection, deep learning, YOLO, YOLOV7, mAP