

An Efficient Faster R-CNN Based System for Agricultural Pest Image Recognition

Yishan Lin

Quanzhou University of Information Engineering, Fujian, China

Wenqiang Huang

Quanzhou University of Information Engineering, Fujian, China

Junfeng Lin

Quanzhou University of Information Engineering, Fujian, China

Mingkai Shen

Quanzhou University of Information Engineering, Fujian, China

Chingmai Ko*

Quanzhou University of Information Engineering, Fujian, China

Abstract:

In global agricultural production, pest infestations severely threaten crop growth and yield. Precise and efficient pest species identification is crucial for targeted control. Traditional manual methods are labor-intensive, time-consuming, and subject to subjective errors. Deep learning offers a new approach, with object detection algorithms showing strong performance in image recognition. This study builds a pest image recognition system based on Faster R-CNN. Image data of over a dozen common pests like aphids and locusts were collected. Data pre-processing, including adjusting brightness, contrast, cropping, and flipping, was done to enhance quality and diversity. Pests were carefully annotated for model training. Faster R-CNN, a two-stage algorithm, uses RPN to generate candidate regions for classification and location. The Adam optimization algorithm was used in training. The system can quickly and accurately identify pests, achieving high accuracy. It provides an efficient solution for pest identification, facilitating automated and intelligent pest monitoring, reducing costs, and improving control. Future research can expand the dataset and optimize the model for better performance in complex environments.