

CNN-Driven Pest Recognition System for Precision Crop Protection

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Abstract

Pest infestation is a major factor affecting crop productivity and quality in modern agriculture. Traditional pest detection methods are manual, time-consuming, and prone to human error, leading to delayed interventions. This paper presents an AI-powered pest detection system that uses deep learning and computer vision techniques to automatically identify pests in crop images. A Convolutional Neural Network (CNN) model is trained on a large dataset of pest images to recognize multiple pest classes with high accuracy. The system supports real-time detection and can be integrated with mobile devices, drones, or IoT-based field monitoring systems for continuous surveillance. Experimental results demonstrate that the proposed approach significantly improves early pest identification, reduces crop losses, and enhances decision-making in precision agriculture. This work highlights the potential of AI-driven solutions for sustainable crop protection and smart farming applications.

Keywords

Artificial Intelligence, Deep Learning, Pest Detection, Convolutional Neural Networks (CNN), Computer Vision, Precision Agriculture, Crop Protection, Image Classification, Smart Farming, Automated Monitoring.