

# Plant Disease Detection

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**Abstract:** *Plant diseases pose a significant threat to agricultural productivity and food security worldwide. Early and accurate detection of plant diseases is essential for effective management and control. This project presents a deep learning-based approach for the automatic detection and classification of plant diseases using Convolutional Neural Networks (CNN). The system is trained on a large dataset of plant leaf images, covering a variety of crops and disease types. The CNN model automatically extracts key features from the images, eliminating the need for manual feature engineering. The proposed model achieves high accuracy in identifying and classifying diseases, demonstrating the effectiveness of deep learning in agricultural diagnostics. This approach can assist farmers and agronomists by providing a fast, reliable, and cost-effective tool for disease detection, ultimately contributing to improved crop management and yield. Agricultural productivity is highly dependent on the health of crops, and early detection of plant diseases plays a crucial role in preventing significant losses. Traditional methods of disease detection are often time-consuming, require expert knowledge, and are not always accessible to farmers. Early and accurate detection of plant diseases is crucial for improving crop yield and ensuring food security. Traditional methods of disease identification are time-consuming, labor-intensive, and often prone to human error.*

**Keywords:** Agriculture, plant diseases, early detection, deep learning, CNN, automation, accuracy, crop yield, food security, productivity