INFORMATICS INSTITUTE OF TECHNOLOGY

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In Collaboration with

UNIVERSITY OF WESTMINSTER

Automated Plant Disease Detect System

Final Project Report by

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ABSTRACT

Problem:
In agricultural practices, early and accurate detection of plant diseases is crucial for preventing crop losses and ensuring food security. However, existing plant disease detection systems largely depend on high-quality image inputs, limiting their accessibility and accuracy in rural or resource-constrained environments where farmers often capture low-quality images with inexpensive devices. The lack of focus on enhancing these low-quality images results in poor detection performance, leading to misdiagnosis and ineffective treatment recommendations.

Methodology:
To address this challenge, we propose a plant disease detection system that integrates advanced image processing techniques to enhance low-quality images, making the system more accessible and reliable for farmers. The system applies edge-preserving denoising, contrast enhancement, and GAN-based super-resolution to improve the quality of low-resolution images while preserving critical disease features.

Initial Results:The proposed system for the plant disease detection system was developed using a combination of edge-preserving denoising techniques (bilateral filtering) and a GAN-based super-resolution approach (ESRGAN) to enhance low-quality images. A comparison was conducted against a baseline method,To assess the accuracy, precision, recall and F1- score were used. After the training the model observed an accuracy of 97.84 %, precision of 97.86%, recall of 97.84%, and an F1 score of 97.84% were achieved.

Subject Descriptors:

- Computing methodologies -> Machine learning -> Machine learning approaches -> Neural networks
- Information systems -> Information retrieval -> Multimedia information systems -> Image processing

Keywords: Plant Disease Detection, Image Super-Resolution, Neural Networks, Agricultural Technology