Title of the Project : Plant-disease-detection using images

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ABSTRACT

Early and accurate detection of plant diseases plays a vital role in ensuring high agricultural productivity, reducing crop losses, and supporting sustainable farming practices. Traditional methods of disease identification rely on manual inspection by experts, which is time-consuming, expensive, and often inaccessible to small-scale farmers. To address these challenges, this project presents a **Plant Disease Recognition System** that leverages **image processing** and **machine learning** techniques to identify plant leaf diseases automatically.

The system allows users to upload an image of a plant leaf through a simple web interface. Using **Convolutional Neural Networks (CNN)**, the model analyzes the image and classifies it into healthy or diseased categories, along with the specific disease type if detected. The dataset consists of pre-labeled images of various plant species and their corresponding diseases, enabling the model to learn distinguishing visual features such as spots, color changes, and texture variations. Techniques such as **data pre-processing**, **augmentation**, and **feature extraction** are applied to improve the model’s generalization and accuracy.

The backend is implemented using **Python**, with frameworks such as **TensorFlow/Keras** for deep learning and **Flask** for creating the web application. Once trained, the model can provide fast, accurate predictions, making it a practical tool for real-world use. Farmers, agricultural experts, or researchers can use the system to detect diseases early, take corrective measures, and minimize yield losses.

In conclusion, the Plant Disease Recognition System demonstrates how **AI-powered solutions** can support smart agriculture by automating the disease detection process. Future enhancements may include support for real-time detection using mobile cameras, adding more plant species, and integrating the system with IoT devices for continuous field monitoring. This approach offers a scalable and cost-effective method to improve crop health management and promote sustainable farming.