



Crop Disease Prediction System

Subject : Artificial Intelligence and Machine
Learning
Course Code : 23PCCE501L

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Problem Statement



- Early and accurate detection of crop diseases is difficult for farmers due to limited expertise and visual symptom similarity between different diseases.
- Manual disease identification is time-consuming, error-prone, and often results in delayed treatment, reducing overall crop yield.
- Existing solutions lack automated, real-time diagnosis and struggle to provide confidence-based predictions in field conditions.
- There is a need for an AI-driven system using CNNs to classify plant diseases with confidence scores and identify healthy crops reliably.



Aim / Objectives



- To build and train a CNN model capable of classifying multiple crop diseases from leaf images.
 - To provide confidence-based predictions for each detected disease to improve decision-making accuracy.
 - To enable early detection of diseases, helping reduce crop loss and improve farming efficiency.
 - To design a user-friendly interface for farmers to upload leaf images and receive instant diagnosis.
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Dataset & Technologies used

DATASET:

- 1000 high-resolution images from kaggle
- Healthy, Anthracnose, Leaf Crinkle, Powdery Mildew, and Yellow Mosaic

FRONTEND:

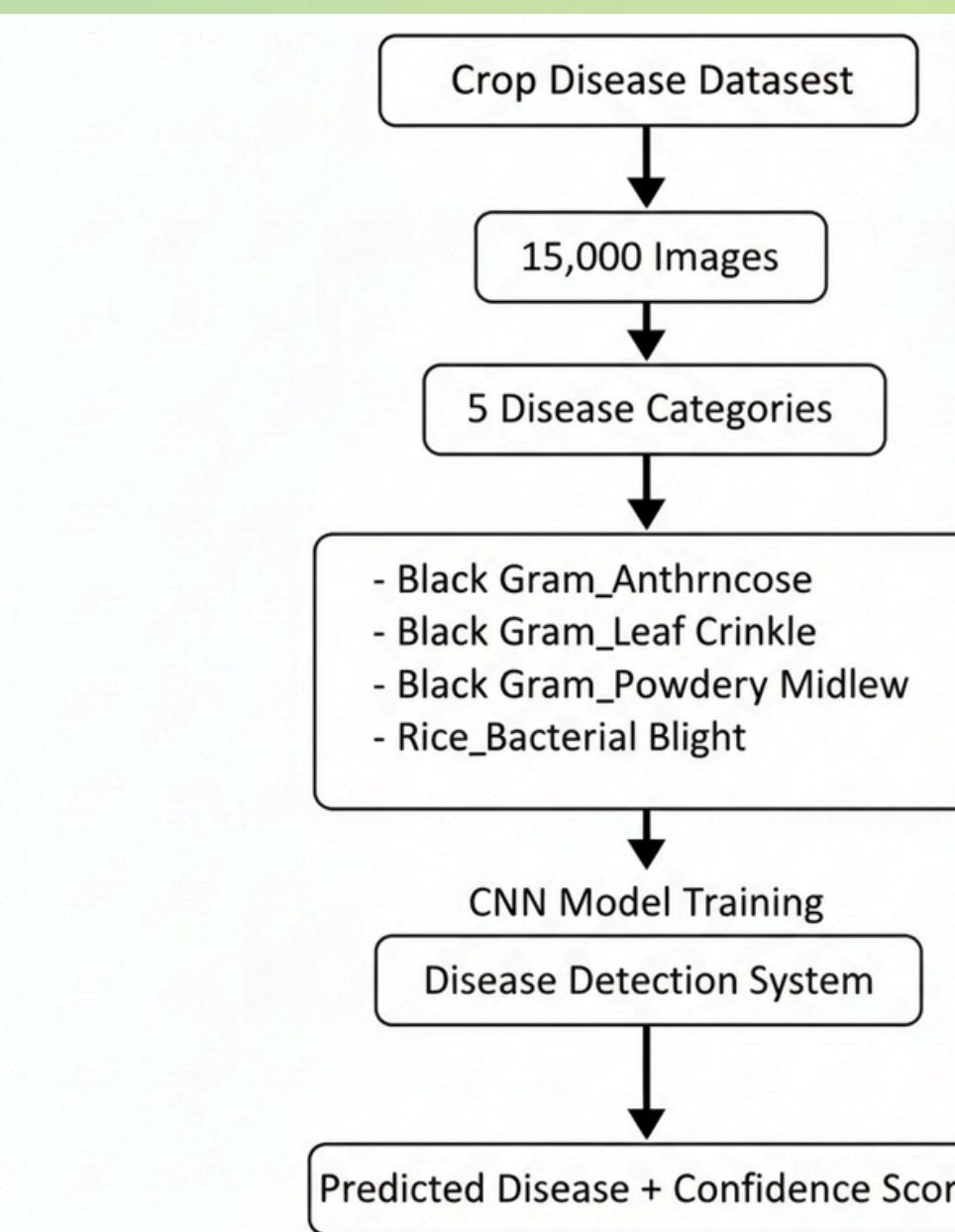
- HTML
- CSS
- Javascript

BACKENT :

Python

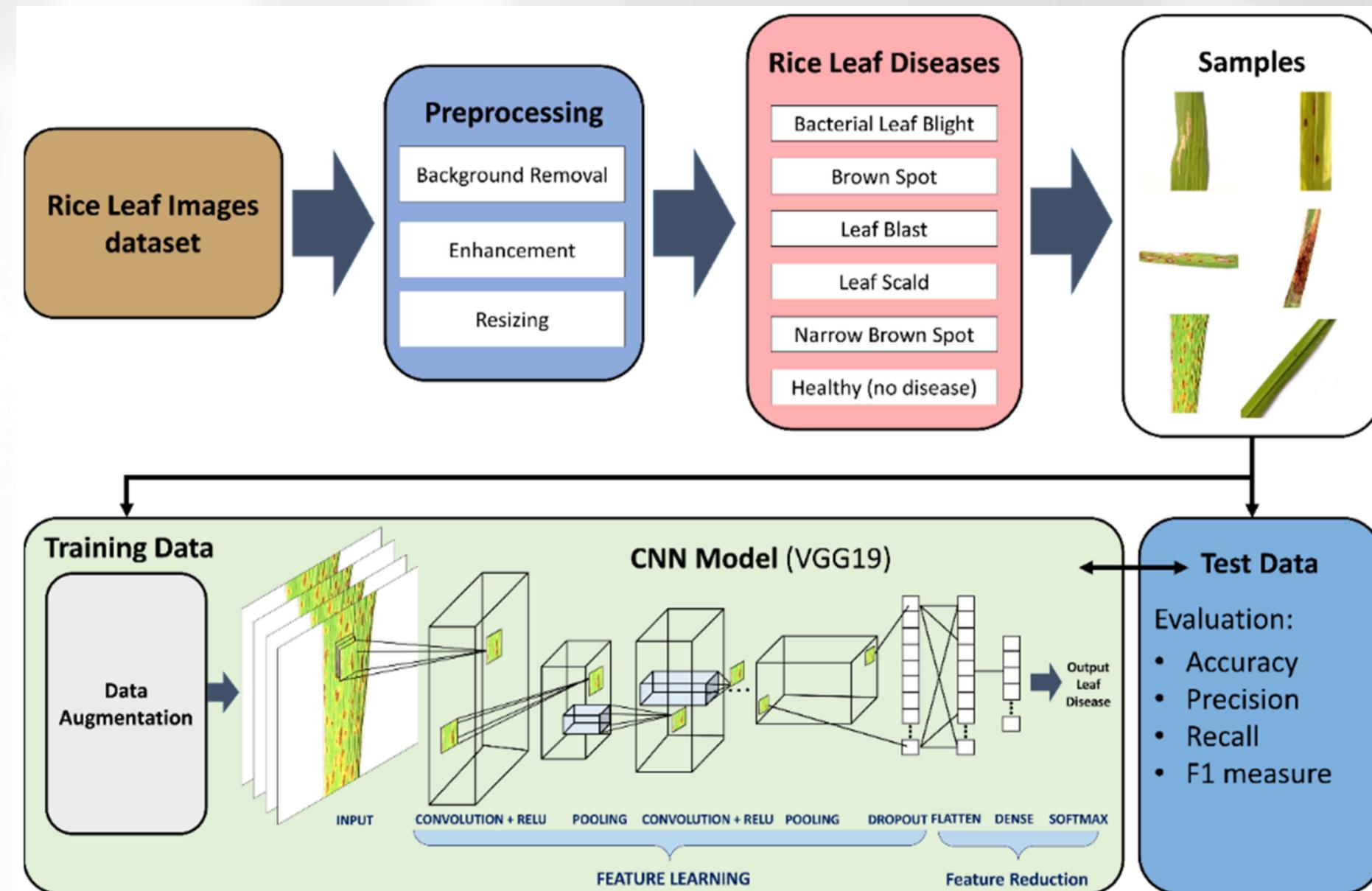
MACHINE LEARNING :

Multi Layer CNN



Workflow

- The system uses a dataset of 15,000 leaf images collected from multiple crop conditions.
- These images are categorized into 5 disease classes: Black Gram Anthracnose, Black Gram Healthy, Black Gram Leaf Crinkle, Black Gram Powdery Mildew, and Rice Bacterial Blight.
- A Convolutional Neural Network (CNN) model is trained on these labeled images for feature extraction and disease classification.
- When a leaf image is given as input, the system detects the disease category and provides a confidence percentage for the prediction.



Key Features

Convolution Layers:
Extract spatial features like edges, textures, and patterns using learnable filters.

ReLU Activation:
Adds non-linearity, allowing the network to learn complex visual features.

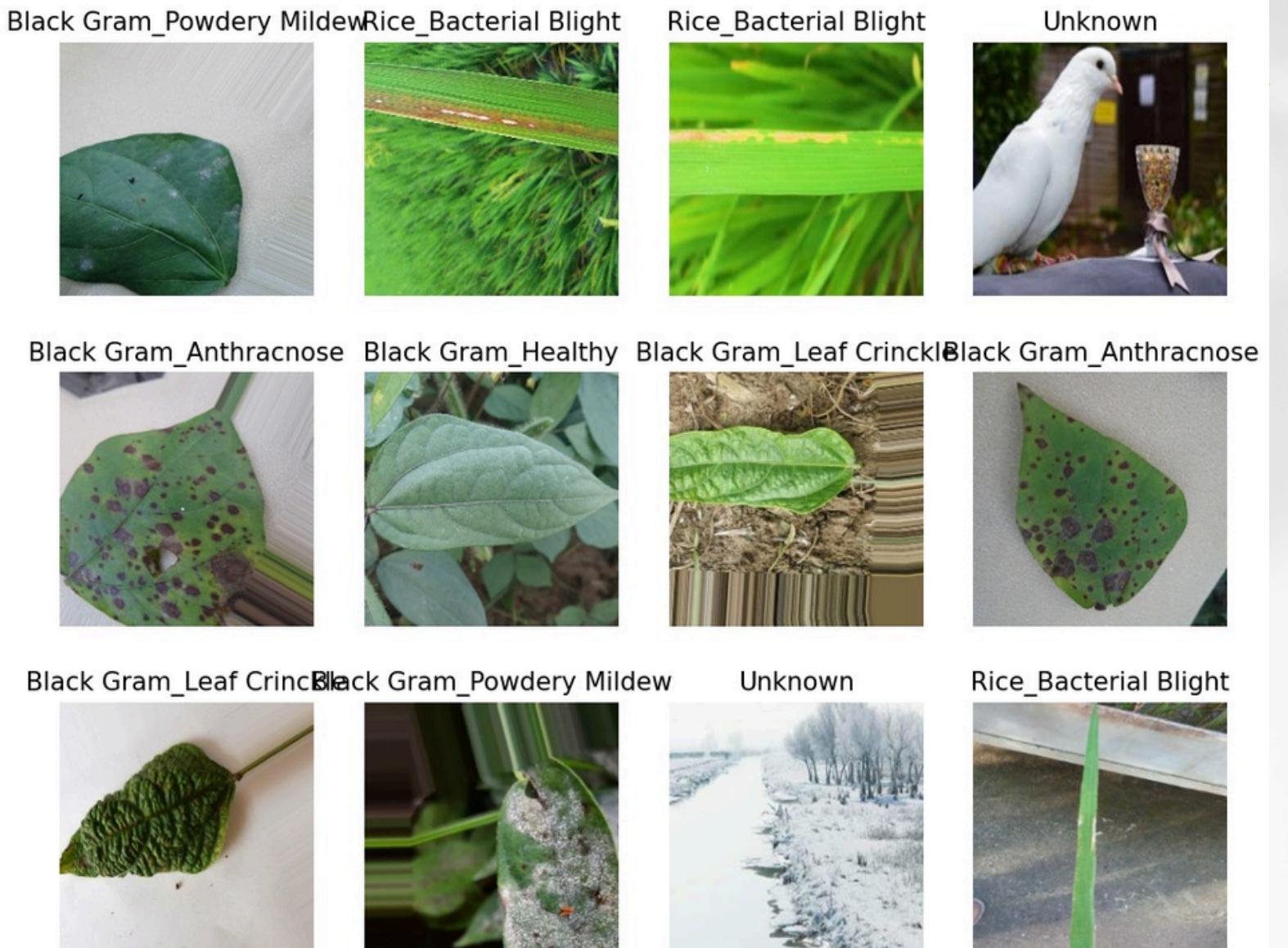
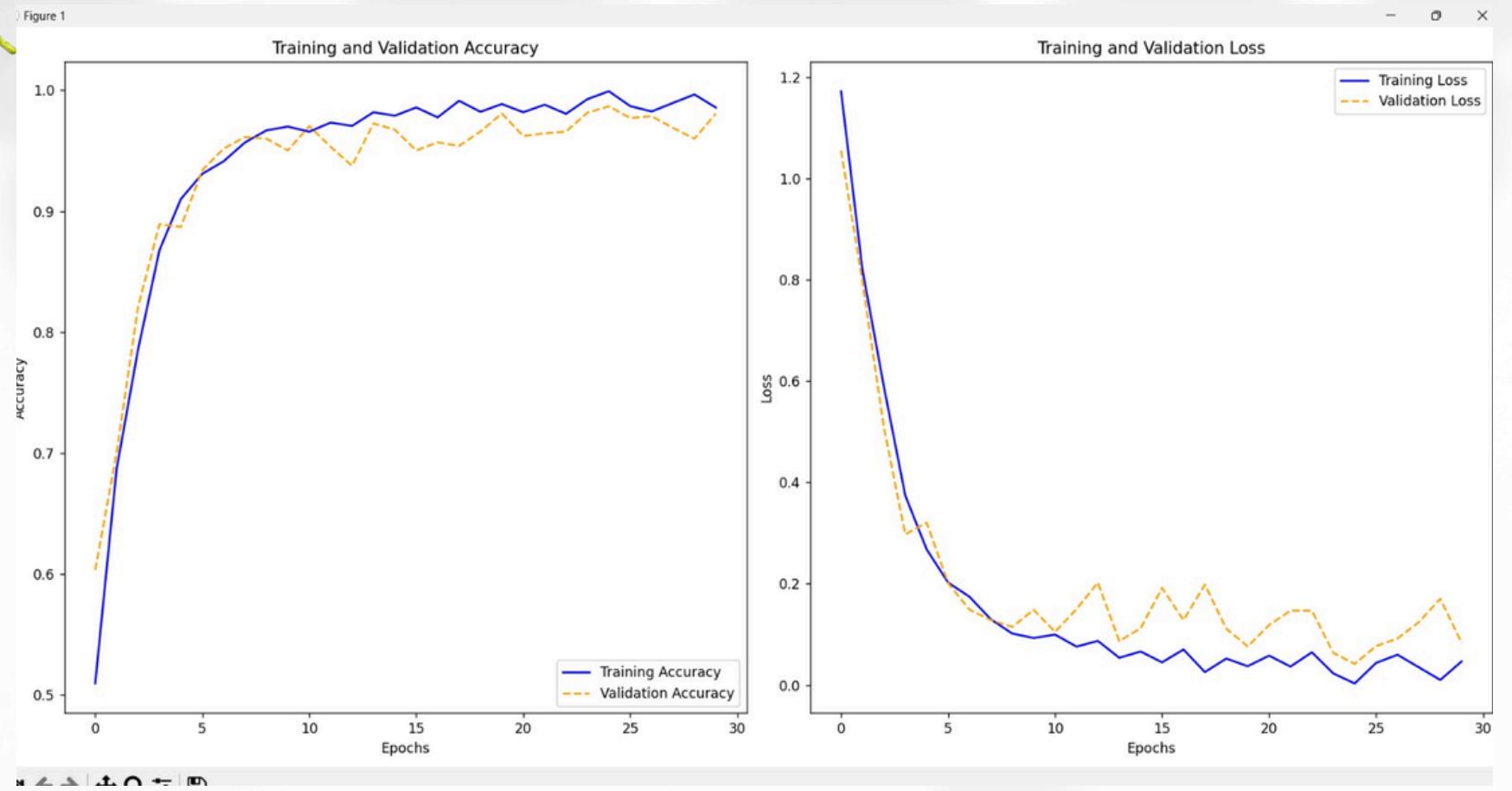
Pooling Layers:
Reduce dimensions, remove noise, and retain important information.

Flatten Layer:
Converts feature maps into a 1D vector for classification.

Fully Connected Layers:
Combine extracted features to predict the final class.

Results

- Model trained on a large dataset of 15,000 labeled crop images.
- Successfully detects 5 major crop disease categories with high accuracy.
- Achieved excellent performance in disease classification using a custom CNN model.
- Provides real-time predictions along with confidence percentage for every detection.
- Accurately identifies healthy vs. diseased leaves within seconds.
- Helps farmers take early action to reduce crop loss and improve yield.



Conclusion & Future Scope

Conclusion

- The system successfully uses a CNN-based approach to accurately detect crop diseases from leaf images.
- It provides fast and reliable predictions along with confidence scores, making diagnosis easier for farmers.
- The model effectively distinguishes between healthy and diseased leaves across five major categories.
- This solution demonstrates strong potential to support smart agriculture and reduce crop losses through early detection.

Future Scope

- Integrate a remedy recommendation module that suggests treatments, fertilizers, and preventive measures for each detected disease.
- Develop a mobile application to enable farmers to capture leaf images directly from the field.
- Expand the dataset to include more crops, more diseases, and real-field images for higher robustness.
- Implement multilingual voice guidance to make the system accessible to all farmers.



Thank You.