Project Name

Crops Disease Prediction

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BE Third Year

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Introduction or Project Overview

Agriculture is one of the most essential pillars of the Indian economy, and plant diseases significantly reduce crop productivity every year. Early and accurate detection of crop diseases enables farmers to take timely action, reduce losses, and improve overall yield. Traditional disease diagnosis relies on expert knowledge, which is time-consuming, costly, and often unavailable in rural areas.

This project aims to develop an **AI-powered Crop Disease Detection System** using **Deep Learning (MobileNetV2)** and **image classification**. The model identifies leaf diseases from four major crops:

- **Cashew**
- **Cassava**
- **Maize**
- **Tomato**

The system includes:

- A cleaned and restructured dataset
- A deep learning model trained on ~88,000 images
- A Flask-based web application
- A confidence-based prediction system
- A disease information module (symptoms, treatment, etc.)

The final model achieves **~80% validation accuracy**, and the web app can detect diseases with visual probability bars.

Problem Statement

Farmers face major challenges in identifying plant leaf diseases at early stages. These include:

- **Lack of availability of trained experts in rural regions**
- **High cost and delay of laboratory diagnosis**
- **Many diseases show similar visual symptoms**
- **Difficulty in identifying diseases with the naked eye**
- **Delay in taking corrective agricultural measures**

This leads to rapid disease spread and significant economic loss.

Therefore, the need is for a system that:

- **Automatically identifies diseases from leaf images**
- **Works in real-time**
- **Provides actionable information like symptoms and treatment**
- **Is low-cost and deployable on the web or mobile**
- **Helps farmers diagnose diseases without expert assistance**

This project solves the above by building an AI classifier using leaf images and deploying it with a simple, user-friendly UI.

Overview of the Dataset used

Dataset Sourcs:-

https://data.mendeley.com/datasets/bwh3zbpkpv/1

Dataset Size

After Cleaning:-

Crop	Disease Classes	Total Images
Cashew	4	~19,000
Cassava	4	~23,000
Maize	4	~24,000
Tomato	5	~22,000
Total	**17 classes**	**~88,000 images**

Disease Classes Included:

Cashew:

- Anthracnose
- Gumosis
- Healthy
- Red Rust

Cassava:

- Mosaic
- Brown Spot
- Bacterial Blight
- Healthy

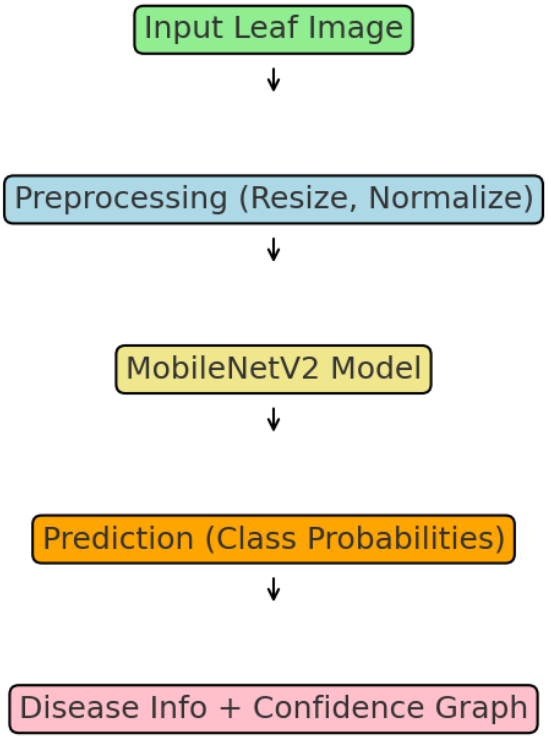
Maize:

- Leaf Blight
- Leaf Spot
- Streak Virus
- Healthy

Tomato:

- Leaf Spot
- Leaf Blight
- Curl
- Verticillium Wilt
- Healthy

Project Workflow



Step 1 — Dataset Collection
Collection of ~88k images across 17 disease classes.

Step 2 — Dataset Cleaning & Restructuring
Removing pests, corrupted images, inconsistent folders.
Step 3 — Train/Validation Split (80/20)

Splitting dataset for training & evaluation.
Step 4 — Deep Learning Model (MobileNetV2)

Transfer learning on top of pre-trained ImageNet weights.
Step 5 — Model Training

20 epochs + checkpoint saving + dropout regularization.
Step 6 — Model Evaluation
~80% validation accuracy.

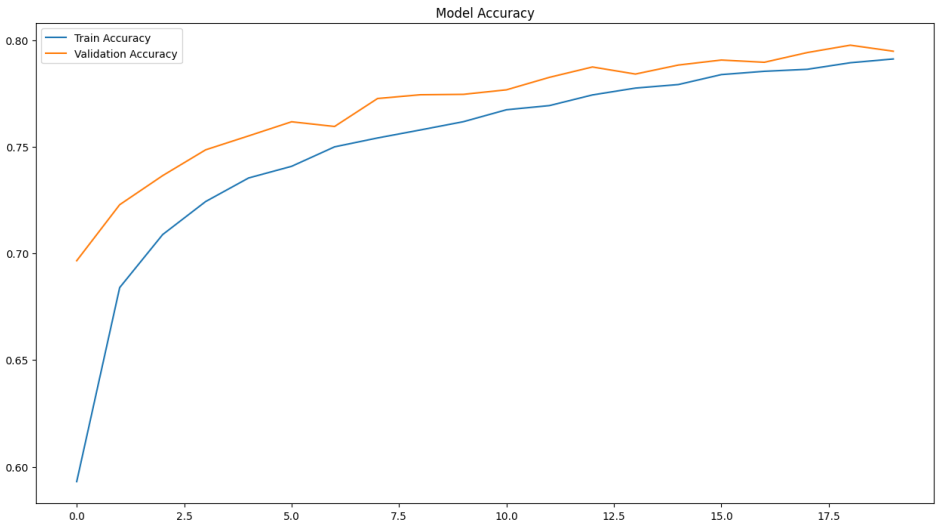
Step 7 — Deployment Using Flask
Web app with upload interface, prediction, confidence graph, and disease details.

Results

Here's the text for the results section:

Model Training Results:

- Validation Accuracy: **~80%**
- Validation Loss: **~0.55**
- Best epoch: **Epoch 19** (saved as best_model.h5)
- Training epochs: **20**

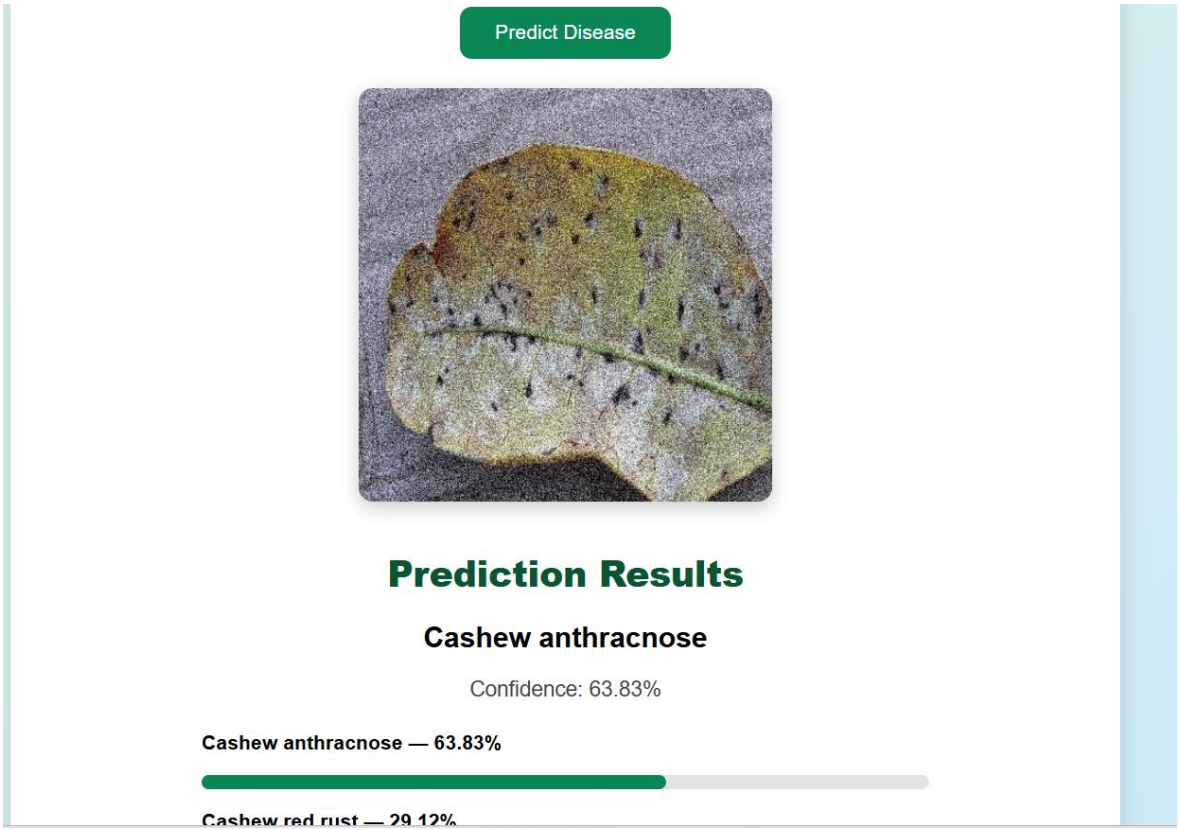


Sample Output from Web App:

- Uploaded leaf image
- Predicted disease with confidence percentage
- Top 5 probability bars
- Symptoms + Treatment suggestions

Unknown Disease Case:

If confidence < 40%, the app outputs **Unknown Disease**, preventing incorrect predictions.



Conclusion

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The project successfully implements an AI-powered crop disease detection system capable of identifying 17 diseases across cashew, cassava, maize, and tomato plants. With a validation accuracy of ~80%, the model performs reliably on real-world data. The web-based interface allows users to upload leaf images and receive instant predictions along with confidence scores and disease information.

This solution helps farmers detect diseases early, reduces dependency on agricultural experts, and provides actionable treatment steps. The system can be further extended to additional crops, mobile deployment, live drone imaging, and integration with IoT sensors for precision agriculture.