

Plant Disease Detection Using: Computer Vision

Identifying and addressing plant diseases through computer vision.



Midterm: Final Project Proposal

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Project Tier: 1



The Problem

Plant disease detection plays a critical role in safeguarding agricultural productivity. I will be using Computer Vision to analyze photos of plants and detect early signs of disease or nutrient deficiencies.

Who Does this Affect?

Farmers suffer considerable economic losses due to plant diseases.

The cost of managing diseases, including potential crop failures, can place farmers in a difficult financial position

Why?

Plant diseases threaten food security.
When crops fail, it causes shortages,
impacting food availability and affordability.

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The Impact of Plant Diseases

The Solution: Computer Vision

Image processing and machine learning allow for quick and accurate plant health diagnosis.



Technical Approach:



Object Detection, VLM



Model: BLIP



PyTorch

My model will detect what kind of plant it is and generate a response to keep any plant healthy

Data Plan

Training Data

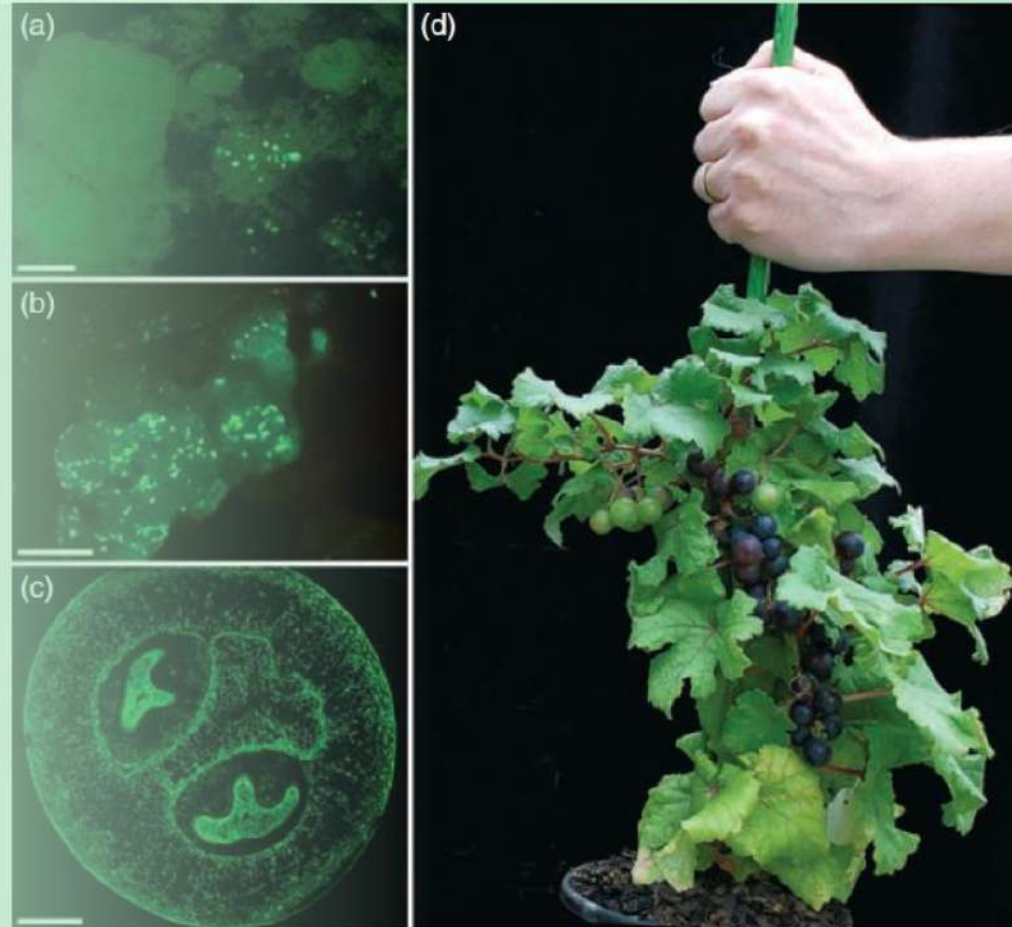
20.6k + Images

Kaggle dataset:

<https://www.kaggle.com/code/osamanayfeh/plant-disease-detection>

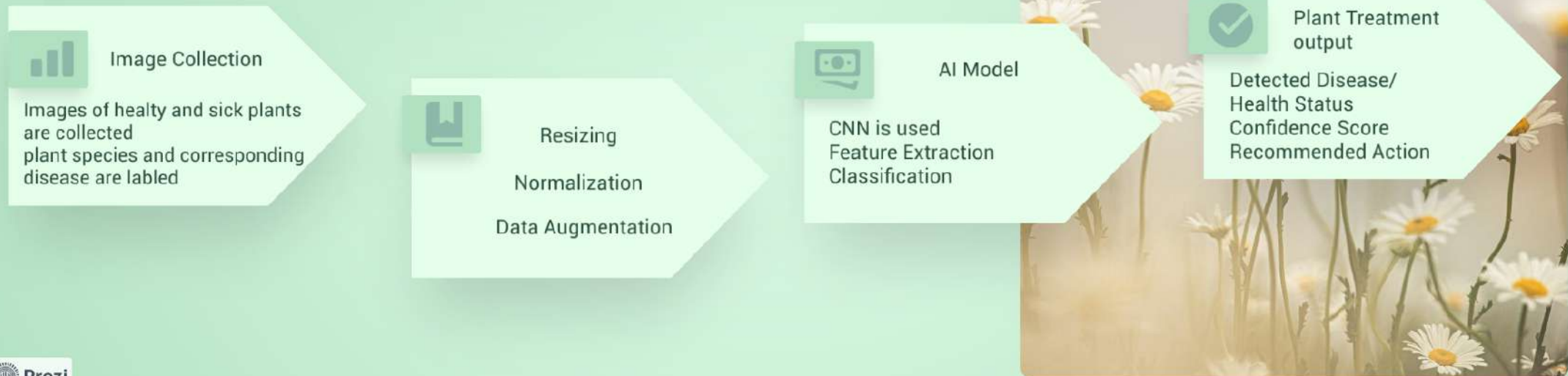
Factors causing plant diseases

Water	Pathogens
Temperature	Pests
Nutrients	Weeds



System Diagram

A structured approach to gather and prepare data for effective plant disease detection using computer vision.



Success Metrics: Measuring Effectiveness

Evaluating the impact of my computer vision system on plant disease detection

90%

Accuracy of disease
detection

2
seconds

Speed of diagnosis

20%

Improvement in
successful disease
control outcomes

Week-by-Week Plan:

Week 1 (Oct 30 - Nov 5)

Project Setup
Dataset Sourcing
Data Inspection

Week 2 (Nov 6 - Nov 12)

Data Cleaning
Caption Generation
Data Splitting
Model Integration

Week 3 (Nov 13 - Nov 19)

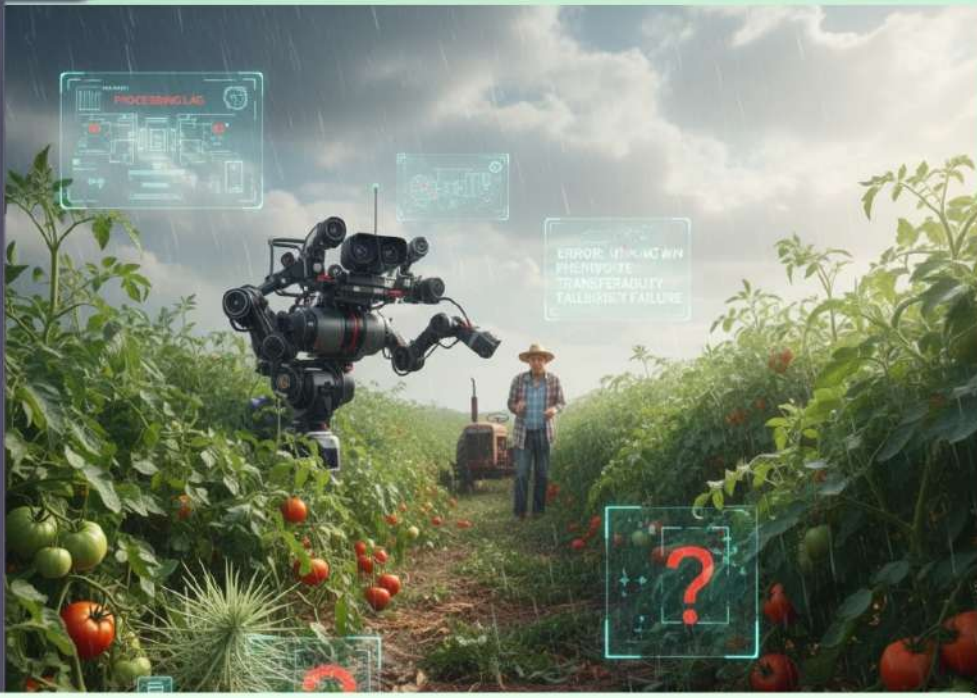
Fine-Tuning
Initial Training
Hyperparameter Tuning

Week 4 (Nov 20 - Nov 26)

Full Evaluation
API Development
Prototype

Week 5 (Nov 27 - Dec 4)

Optimization and Latency
Testing
Documentation
Deployment



Challenges

Model Size and Latency
Resource Requirements
Difficulty distinguishing weed from a crop



Backup Plan

Model compression to reduce latency
Revert to a semantic segmentation approach for challenging images

Resources Needed



Keggle



Frameworks: PyTorch, Hugging Face



Estimated Cost \$0



Google Colab



GitHub