Crop Disease Prediction and Recommendation System

Empowering Famers with AI-driven Agricultural Solutions

By Kaa Rada Data

Business Understanding

Agriculture is the backbone of many African economies, including Kenya. However, crop losses due to pests and diseases pose a major threat to food security and farmers' livelihoods. These losses often go undetected until it's too late, especially among smallholder farmers who may lack access to timely agronomic advice or diagnostics.

Business Understanding

Problem:

Small holder farmers often lack:

- Timely diagnosis of plant diseases

- Access to expert advice or affordable treatment

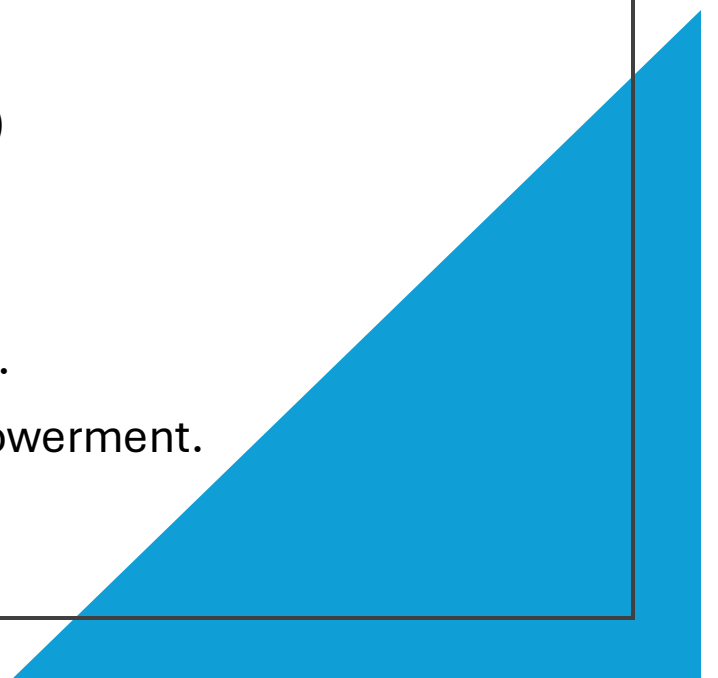- Scalable, easy-to-use tools

What they need:

A smart system to predict diseases early and offer actionable solutions.

Objectives

<u>Main Goal</u>

Build an AI-powered system that detects crop diseases and provides relevant treatment recommendations.

<u>Specific Objectives:</u>

1. Collect and clean image + metadata of crops (healthy and diseased)

2. Train an ML/DL model to identify crop diseases

3. Develop a recommendation engine for treatment and prevention

4. Build a user-friendly platform for farmers to interact with the system.

5. Demonstrate potential impact on yield, cost saving and power empowerment.

Solution Components

Disease Detection

Computer Vision (CNNs) to analyze crop images

Recommendation Engine

Custom advice based on diagnosis: chemical, organic and prevention tips

Farmer Interface

Model/web app for farmers to upload images and receive recommendations.

Localization

Advice tailored to regional conditions and available agrovet supplies

Anticipated Impact

- Improved food security at community and national levels

- Scalable access to expert-level advice

- Increased yield and income for smallholder farmers

- Reduced crop losses due to early detection

Data Sources

Mendeley Data

The TOM2024 dataset is a valuable resource for agricultural research, comprising 25,844 raw images and 12,227 labeled images of tomato, onion, and maize crops. These images are categorized into 30 classes, facilitating precise identification of pests and diseases, which is crucial for improving crop management and food security. The dataset supports sustainable agriculture by promoting early and accurate pest and disease detection, reducing reliance on pesticides.

Target Audience

- Local Farmers

- Agrovets

- Ministry of Agriculture (Kenya)