AgriVision

AI-Powered Real-Time Crop Health Monitoring and Sustainable Solutions

Problem Statement:

Agricultural productivity faces significant threats from pests and diseases, causing major crop losses. This project aims to develop an AI-based solution that uses drone imagery, and machine learning to monitor crops for early signs of infestation or disease, providing real-time alerts and eco-friendly intervention recommendations to farmers.

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Introduction

Agriculture stands as a cornerstone of India's economy, contributing around 17-18% to the nation's GDP and providing employment to 58% of India's population.

Despite its importance, agriculture faces persistent challenges from pests and diseases, resulting in substantial crop losses and economic setbacks. Traditional pest control methods are often inefficient, environmentally harmful, and lack the precision needed to target specific threats effectively.

This project introduces an AI-driven solution that leverages high-resolution plant imagery and advanced machine learning models to monitor crops for early signs of pest infestations and diseases. The system provides real-time alerts to farmers, recommending targeted actions to address the issues early, preventing widespread damage and reducing the detrimental impact of traditional pest control methods.

$17 billion in Crop Value

Annual Crop Losses Due to Pests (estimated by the Food and Agriculture Organization)

62,000 metric tons

Pesticides used in 2023 in india (Council of Public Relations)

20% to 40%

Amount of crop yield affected annually

Objectives

Project Objectives

1. **Early Detection:**
   Identify early signs of pest infestations and diseases using high-resolution drone imagery and sensor data.

2. **Real-Time Alerts:**
   Send immediate notifications to farmers about detected issues for timely action.

3. **Targeted Solutions:**
   Recommend precise, eco-friendly interventions like precision spraying or natural predator introduction.

4. **Minimize Crop Losses:**
   Minimize chemical use and promote environmentally sustainable farming practices.

Solution Overview

Gather Dataset

Fetch high-resolution images of crops for precise analysis of plant health.

Build an AI Model

A deep learning Convolutional Neural Network (CNN), trained on a labeled dataset to detect early signs of pests and diseases with high accuracy.

Web Application Deployed

The AI model is integrated into a user-friendly web application, allowing farmers to easily access crop monitoring results.

Send Alerts to farmers

The system shows alerts to the farmers with details of the detected disease and recommended eco-friendly interventions.

Dashboard

A real-time dashboard displays crop health metrics, disease trends, and intervention recommendations for effective farm management.

Weather Updates

Weather update for the current day to help them make informed decisions about their farming activities.

Project Stages And Technology Stack

Project stages

30%

Stage 1

- Images to real time
- Streamlit to flask

60%

Stage 2

- Market research
- Add USP features

90%

Stage 3

Added salient features like dashboard,weather condition prediction

	Stage 1	Stage 2	Stage 3
Streamlit	✓	✓	✖
Python Notebook	✓	✓	✓
HTML / CSS	✖	✖	✓
Open Weather API	✖	✖	✓
CNN	✓	✓	✓
Flask	✖	✖	✓
Canvas Js	✖	✖	✓

Workflow

Workflow

Plant Image Data Collection

Pre-processing

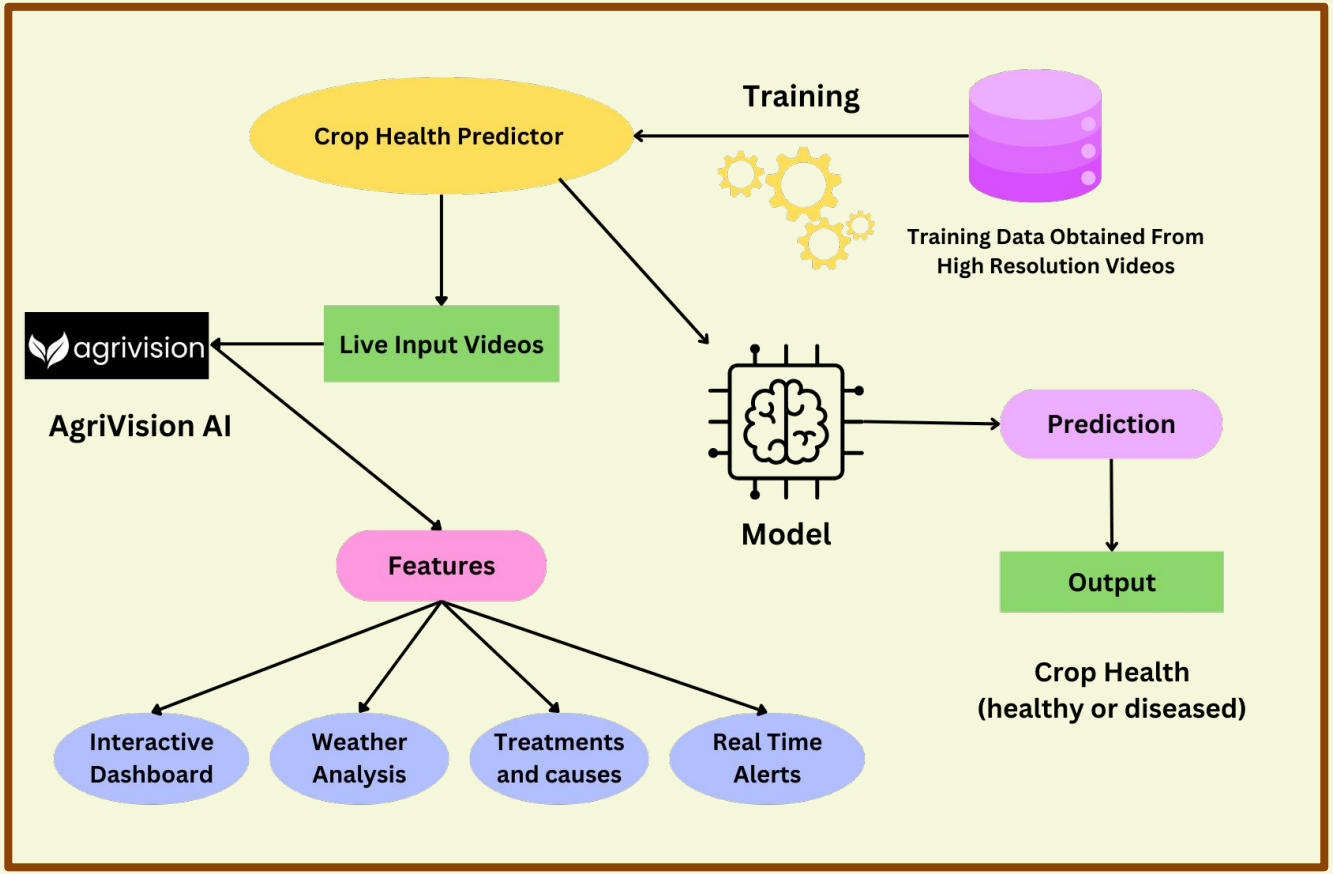
Training the model

Model Evaluation

Real Time Detection and Alerts

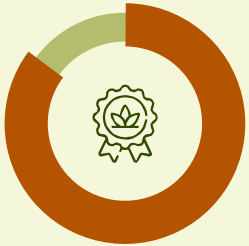
Intervention Recommendations

Block Diagram

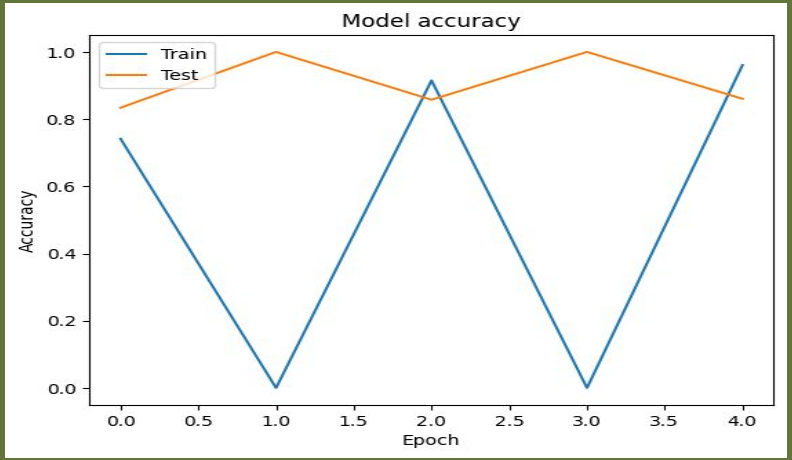


Implementation process of our AI-driven solution, showcasing the coding workflow

Model Evaluation



86.05%
Accuracy



Why choose AgriVision?

USP Of AgriVision

- Real Time Analysis
- Easy-to-understand Dashboards
- Reduced Crop Losses
- Weather Forecast
- Digitized Farms with Cutting Edge Technology
- Improved Revenue and ROI

Future Scope

Email

Sends an EMail automatically when a diseased crop is detected.

Self Learning System

The system learns from the farmer's feedback and improves its recommendations.

Drone Dataset

Approach authorized personnels for access to private/authorized drone datasets.

References

- https://www.cropin.com/segments/farming-companies
- https://heyfarmer.in/
- Farm2fam
- BharatAgri Smart Farming Solution
- J. K. Kamble, "Plant Disease Detector," 2018 International Conference On Advances in Communication and Computing Technology (ICACCT), Sangamner, India, 2018
- Automated and Fine- Tuned Image Detection and Classification System for Plant Leaf Diseases," 2023 International Conference on Recent Advances in Electrical, Electronics, Ubiquitous Communication, and Computational Intelligence (RAEEUCCI), Chennai, India, 2023

Meet Our Team

Developers Of AgriVision

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“From pests to progress, precision's the key—empowering farmers, and securing food for all to see.”

Thank you!