GenAI

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AI based crop monitoring system 2024 - 2025

Nurture smart, harvest better.

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Project Guide

Requirement / Problem statement

Crop diseases often go undetected until significant damage occurs, leading to reduced yields. Traditional methods of monitoring are slow and labor-intensive. There is a need for an automated, real-time solution to detect crop diseases early and provide farmers with timely recommendations to protect their crops and improve yields.

Description

This AI-based Crop Monitoring System uses camera modules, microcontrollers, and machine learning to detect crop diseases early and provide actionable treatment recommendations. It helps farmers reduce crop loss, improve yield, and save time by automating disease detection and analysis. The system benefits individuals, communities, and industries by enhancing food security, promoting sustainable agriculture, and optimizing farming practices.

Scope

The AI-based Crop Monitoring System uses camera modules and machine learning to detect crop diseases early, providing real-time alerts and treatment recommendations. It helps farmers improve yield, reduce loss, and promote sustainable farming practices. The system is scalable, AI-integrated, and adaptable to various crops and farming environments.

GenAI | AI

AI detects diseases through image analysis, provides real-time recommendations, learns from user data, and predicts future crop health trends.

Key factors & features

AI disease detection, real-time alerts, cloud storage, scalable, mobile access, continuous learning, and sustainable farming support.

Target Audience

Farmers, Agricultural experts & consultants, Agritech companies, Government Agencies & NGOs

Domain

Agricultural Technology
Artificial Intelligence
Machine Learning

Project Features

Comprehensive Data Integration

- Combines environmental (rainfall, temperature, soil nutrients) and economic (yield, production) data.
- Data sourced from Government websites and Kaggle.

Multiple Machine Learning Algorithms

- Uses Decision Trees, SVM, Logistic Regression, and Random Forest.
- Random Forest model gives highest accuracy (99%).

Tailored Crop and Fertilizer Recommendations

- Suggests optimal crop types based on location, soil, and climate data.
- Provides fertilizer recommendations based on soil nutrient deficiencies.

User-Friendly Interface

- Simple input interface for farmers to enter their data.

Data-Driven Insights

- Helps farmers make informed decisions to optimize yield and reduce resource waste.

Sustainability Focus

- Reduces chemical fertilizer usage and promotes eco-friendly practices.

Journey

User Journey (Crop Recommendation)

- Enter location, soil type, and nutrient data → System processes data → Random Forest model predicts suitable crops → Provides crop recommendations and actionable insights.

User Journey (Fertilizer Recommendation)

- Enter soil nutrients and crop type → System compares with ideal requirements → Identifies nutrient gaps → Suggests fertilizer types and quantities for optimal growth.

Presentation Layer

- HTML
- CSS
- FLASK

Application Layer

- Python
- Flask

Data Layer

- CSV Files
- External Data Sources (Government and Kaggle datasets)

Source Code

https://github.com/Harini0715/AI-based-crop-monitoring-system/tree/main

Methodology

- Data collection (government, Kaggle)
- Machine learning models (Random Forest)
- System testing and evaluation

Products, Tools & Utilities

- Python
- Kaggle
- Random Forest

Infrastructure

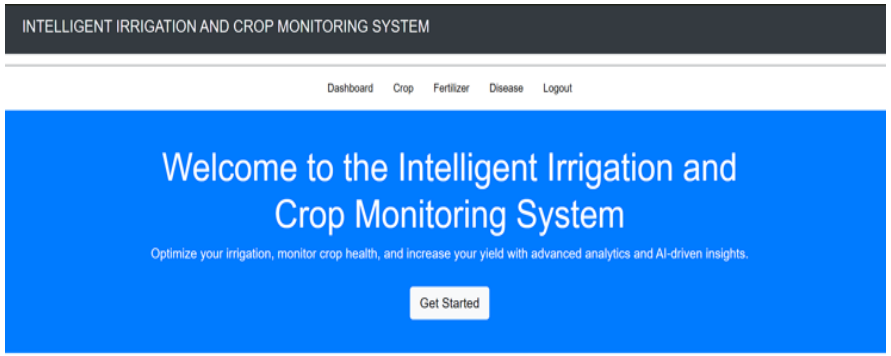
- Python
- AWS
- GitHub
- Flask and Kaggle

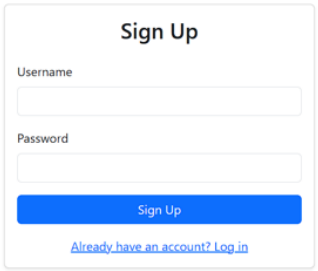
API

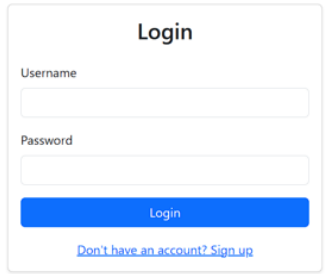
- https://www.kaggle.com/docs/api
- https://data.gov.in/
- https://openweathermap.org/api
- https://www.soilgrids.org/api

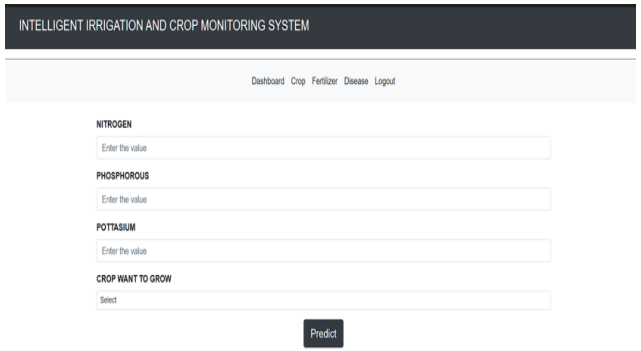
Note: Artefacts locations are provided as clickable hyperlink available as “Link”

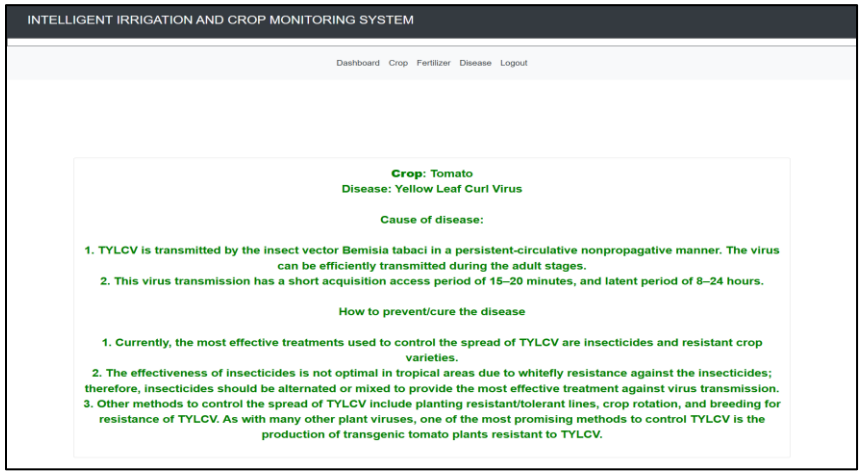
Wireframe | UI



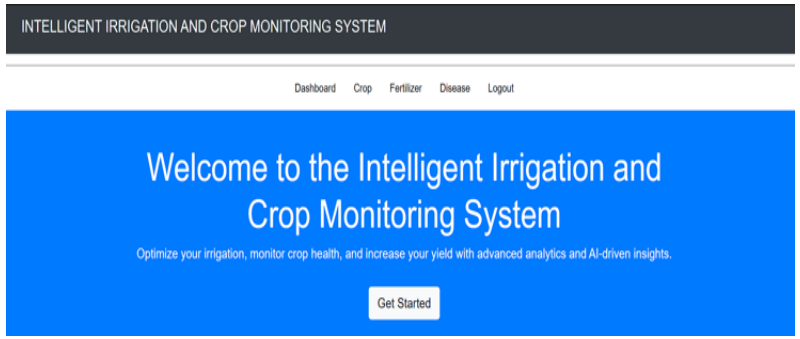


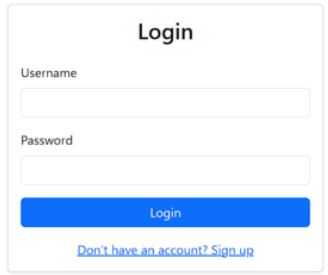


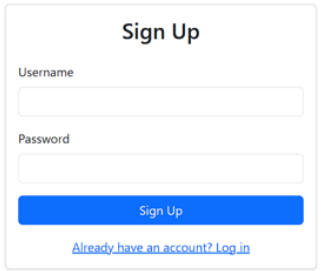


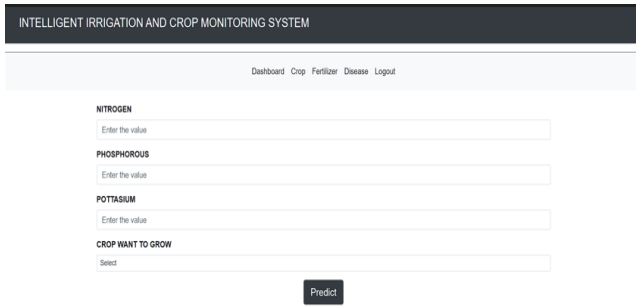


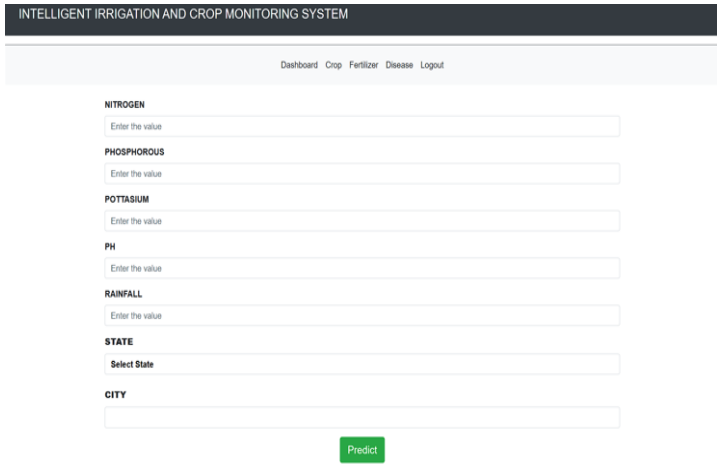
Application Screenshots

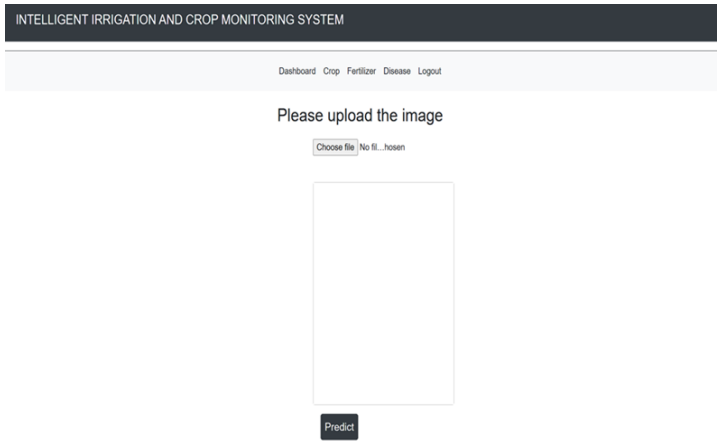


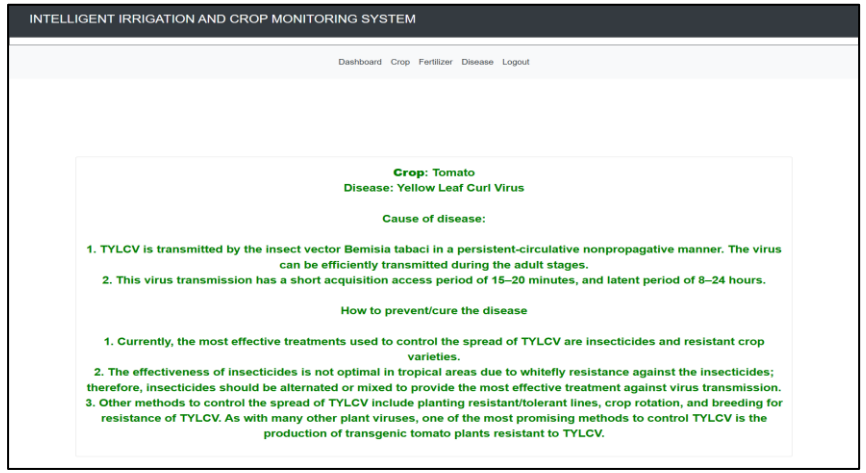












Project / Product Roadmap | Milestones | Features

Short Term	Mid Term	Long Term
• Crop recommendation based on soil and weather data. • Fertilizer suggestions based on nutrient levels. • User-friendly interface for data input. • Data collection from publicly available datasets (e.g., Kaggle, government sites).	• Real-time weather and soil data integration. • Personalized crop management advice. • Automated crop growth monitoring. • Improved recommendation accuracy with more data.	• AI-driven prediction of future crop yields. • Sustainability and resource optimization suggestions. • Integration with IoT devices for live data collection. • Global expansion with multi-region crop recommendations

Project Portal

Project Portal / website is available at Link

Presentation

Project presentation (this document) is available at Link

Requirement Document / Specification

Project requirement document / specification is available at Link

Technical Document / Specification

Project technical document / specification are available at Link

Source Code

Project code repository is available at Link

Wireframe | UI

Project wireframe / UI designs are available at Link

Application

Application is available at Link

DT Playbook

Project DT Playbook is available at Link

Overview Video

Project overview video is available at Link

Video provides project overview, presentations, journey wise Wireframe, UI, application demo as required and as applicable.

Note: All links are provided as clickable hyperlink available as “Link”

Thanks