

The background of the slide features a complex, abstract geometric pattern composed of various shades of gray and black. It includes several large, overlapping triangles and trapezoids, creating a sense of depth and perspective. Some areas are filled with fine, dark lines, while others are left as solid, lighter gray shapes.

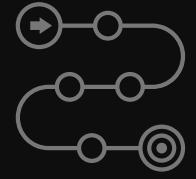
AI for Sustainable
Agriculture

Terrathon - CISCO Problem Statement

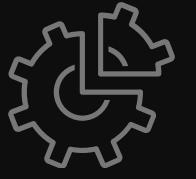
By:Rahul Gopalan



Overview



Proposed Roadmap



Comprehensive Model Features



Dashboard

The Challenge

- Unpredictable weather reduces crop yields significantly.
- Farmers struggle with optimal crop selection.**
- Lack of smart irrigation raises costs.

Model Accuracy

- Pathogen detection model achieves 97% accuracy.
- Weed detection model reaches 89.35% accuracy.
- Irrigation model ensures efficient water management.

Objective

- Improve crop health using AI-driven insights.
- Optimize resources with smart irrigation recommendations.
- Enhance market predictability with price forecasting.
- Minimize farming risks with real-time data analysis.
- Leverage LLM support for explainable agricultural insights.

Table of Contents

01

Overview

02

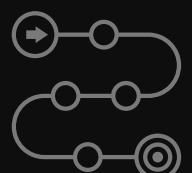
Methodologies

03

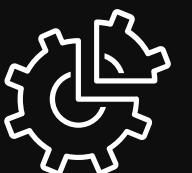
Model Analytics



Overview



Proposed Roadmap

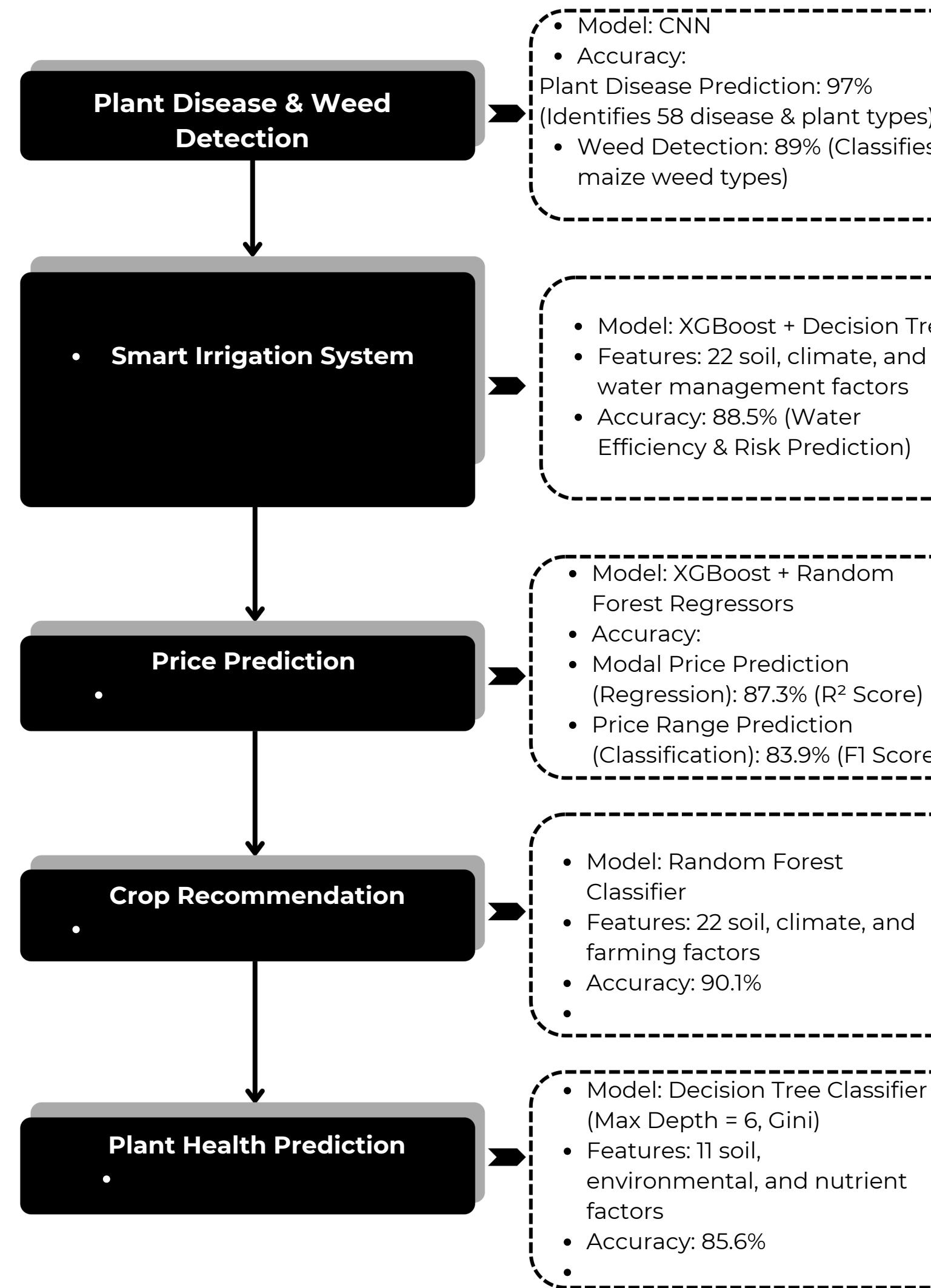


Comprehensive Model Features



Dashboard

Comprehensive AI-Driven Mental Health and Diagnostic Model



Feature Utilization for Accurate Predictions

1. Crop Recommendation, 22 Features

Soil Factors: N, P, K, pH, organic matter, soil moisture, soil type
Climate Conditions: Temperature, humidity, rainfall, sunlight exposure, wind speed, CO₂ concentration, frost risk
Farming Practices: Irrigation frequency, crop density, pest pressure, fertilizer usage, growth stage, urban area proximity, water source type, water usage efficiency

Market Trends: 8 Key Features

Economic Indicators: State, APMC, commodity, commodity arrivals, commodity traded, year, month, day

Smart Irrigation: 22 Crucial Factors

Soil Properties: N, P, K, pH, organic matter, soil moisture, soil type
Climate Conditions: Temperature, humidity, rainfall, sunlight exposure, wind speed, CO₂ concentration, frost risk
Farming Data: Irrigation frequency, crop density, pest pressure, fertilizer usage, growth stage, urban area proximity, water source type, water usage efficiency

Plant & Weed Detection: 70+ Classes

Plant Disease Model: Identifies 58 plant diseases and pests.
Weed Detection Model: Detects 12 weeds harmful to maize.

Scalability



Cloud and Edge AI

Works on cloud and edge devices for real-time analysis.



Modular Model Integration

Easily expandable with new AI models and datasets.



Easily Integrable with Real-Time Data

LLM can be customized accordingly.

Adaptable to Global Agriculture

Extendable to different crops, regions, and climates.

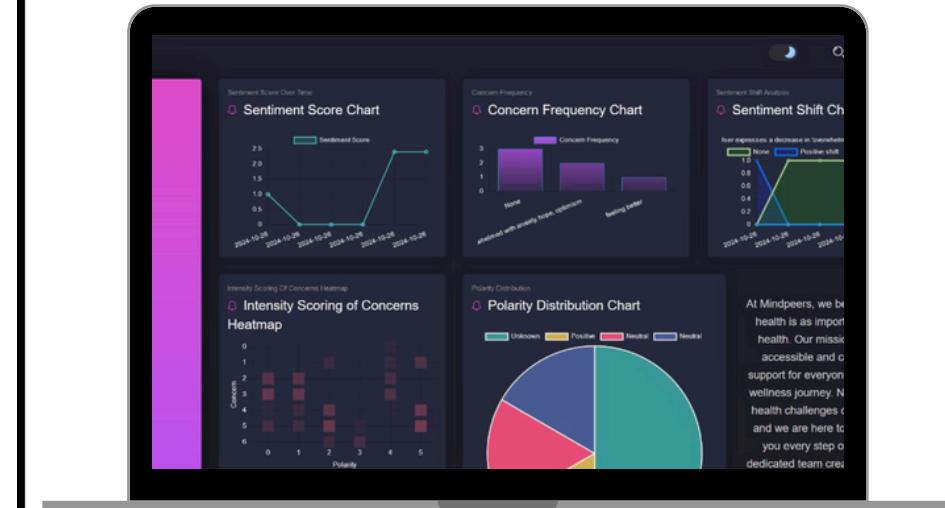
Future Insights and Unique Selling Point

- AI-Powered Pest Forecasting – Predict pest outbreaks using climate and migration data.**
- Autonomous Weed Management – AI-driven drones for real-time weed detection and removal.**
- Hyperlocal Weather-Based Advisory – Precision weather insights for optimized farming decisions.**
- Blockchain for Supply Chain – Secure, transparent farm-to-market price tracking.**
- Dynamic Market Price Alerts – AI-driven price predictions for better crop selling strategies.**
- Real-Time Soil Health Monitoring – IoT-based continuous tracking for soil quality improvement.**
- AI-Optimized Fertilizer Recommendations – Custom suggestions based on soil and crop health.**
- Flood & Drought Prediction – AI models analyze climate trends to prevent crop loss.**



We do it BETTER !

Our model boasts a high accuracy of over 95%, is extremely lightweight and scalable as its hosted on the cloud and offers multilingual support on the client side.



Multilingual Proficiency:

Understands and communicates in multiple Indian languages.



All-in-One Smart Agriculture

Integrated AI models for crop health, irrigation, and pricing.



Data-Driven Precision Farming

AI-based insights for increased yield and reduced waste.



Resource-Efficient Scalability:

Low computational demands for easy deployment.



THANK YOU