

Title

Canopy Sentinel – Krishi Sahay

AI-Powered Agricultural Land Intelligence & Farmer Query Resolution System

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Introduction

Agriculture is highly dependent on soil fertility, climate conditions, and proper crop selection.

However, most farmers do not have access to scientific land analysis tools.

Canopy Sentinel – Krishi Sahay is an Android-based smart agricultural decision-support system that uses:

- Satellite imagery
- Environmental and soil datasets
- Artificial Intelligence models

to provide farmers with intelligent land insights, crop recommendations, and productivity predictions directly on their smartphones.

Motivation

- Increasing crop failures due to wrong crop selection
 - Lack of real-time soil and climate information
 - Farmers relying only on traditional experience
 - Need for affordable mobile-based agricultural intelligence
 - Requirement of AI-driven support systems for modern farming
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Problem Statement

Farmers face several challenges:

- Purchasing land without knowing its fertility
- Choosing crops unsuitable for soil and climate
- Limited access to scientific agricultural data
- Lack of predictive tools for productivity estimation
- Climate variability causing uncertain yield outcomes

These problems lead to reduced agricultural productivity and financial losses.

Proposed Solution

Our system provides a smart AI-powered agricultural analysis platform that:

- Calculates land fertility score using environmental and satellite data
- Suggests suitable crops based on soil and climate conditions
- Predicts productivity using machine learning models
- Provides drought and risk alerts
- Offers a Generative AI chatbot to answer farmers' agricultural queries

Key Features

- Interactive agricultural land and fertility maps
- NDVI-based vegetation health analysis
- Soil moisture monitoring

- Weather and climate tracking
 - Crop suitability recommendations
 - AI-based yield prediction
 - Generative AI farmer assistance chatbot
 - Risk alerts for drought or low productivity zones
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System Architecture

The system consists of the following components:

- Android mobile application interface
- Satellite and environmental data APIs
- AI/ML prediction models
- REST-based backend services
- Generative AI query resolution module

These components work together to provide real-time agricultural intelligence.

Technology Stack

Frontend

- Kotlin
- Android Studio

- Material UI

Backend

- REST APIs
- AI/ML prediction models

Data Sources

- Satellite imagery datasets
- Environmental and climate data
- Soil information databases

Working Methodology

1. User selects the agricultural land location
2. Application fetches satellite, soil, and environmental data
3. AI models process the data for fertility and productivity analysis
4. Results are displayed as maps, fertility scores, and crop suggestions
5. Farmers interact with the AI chatbot for agricultural guidance

Advantages

- Provides scientific decision support for farmers

- Helps select suitable crops for specific land
 - Reduces risk of crop failure
 - Enables data-driven agricultural planning
 - Easy-to-use mobile interface accessible anywhere
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Future Scope

- Integration with IoT-based soil sensors
 - Multilingual AI chatbot for regional farmers
 - Real-time irrigation and fertilizer recommendations
 - Government agricultural scheme integration
 - Advanced predictive analytics for long-term yield forecasting
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Conclusion

Canopy Sentinel – Krishi Sahay integrates satellite data, environmental datasets, and artificial intelligence into a single mobile platform to provide intelligent agricultural insights. The system enables farmers to make informed, data-driven decisions, improving productivity and promoting sustainable farming practices.