

## Report on Project – Kisan Plant Doctor



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## ABSTRACT

Agriculture plays a crucial role in the livelihood of farmers, yet plant and crop diseases continue to be a major challenge affecting production and quality. Identifying these diseases at an early stage is difficult for many farmers due to limited technical knowledge and the similarity of symptoms across multiple diseases. As a result, farmers often fail to take timely and appropriate actions.

The proposed app-based solution is designed to assist farmers in diagnosing plant diseases quickly and accurately. Through the application, farmers can upload images of the affected plant or crop, which are then analyzed by agricultural experts. Based on the visual symptoms, experts provide accurate identification of the disease along with suitable treatments and preventive measures. This system creates a reliable communication link between farmers and experts, ensuring faster decision-making and improved crop management.

The solution aims to minimize crop loss, enhance productivity, and empower farmers with accessible, expert-backed guidance. By bridging the gap between farmers and agricultural specialists, this app contributes to more efficient and sustainable farming practices.

## INTRODUCTION

Agriculture is the primary source of livelihood for a large population, and the health of plants and crops plays a vital role in ensuring good yield and income for farmers. However, one of the major challenges in agriculture is the occurrence of plant diseases. These diseases often show similar symptoms, making it difficult for farmers to identify the exact problem. Without proper knowledge, farmers may apply incorrect treatments, which leads to crop damage, reduced productivity, and financial loss.

To address this issue, modern technology can provide an effective solution. The proposed app-based system helps farmers easily identify plant and crop diseases by allowing them to upload photos of the affected plants. These images are reviewed by agricultural experts, who then provide accurate diagnosis and suitable remedies. This direct communication bridge between farmers and experts enables quick decision-making and timely action.

This project aims to support farmers by offering a simple, accessible, and reliable platform for disease diagnosis. With the help of this system, farmers can improve crop health, reduce losses, and adopt better farming practices. The solution not only enhances productivity but also promotes sustainable agriculture.

## ❖ PROBLEM STATEMENT

Farmers face several challenges in agriculture, and one of the most significant issues is the occurrence of diseases in plants and crops. Due to the wide variety of crops and the numerous diseases that can affect them, it becomes difficult for farmers to correctly identify the specific disease affecting their plants. Many diseases also exhibit similar symptoms, which leads to confusion and delays in taking proper action. As a result, farmers often fail to apply the right treatment at the right time, causing reduced yield, poor crop health, and financial loss.

To address this issue, there is a need for a simple, accessible, and reliable solution that can help farmers identify plant diseases accurately. The proposed chatbot-based interaction system is designed to assist farmers by enabling them to upload images of diseased plants. These images are analyzed by agricultural experts, who provide accurate diagnosis and effective solutions. Additionally, the chatbot offers basic information, initial instructions, and guidance related to the plant's condition and can further recommend a plant doctor or specialist if needed.

This project aims to bridge the gap between farmers and agricultural experts through an interactive chatbot, ensuring timely support, better decision-making, and improved crop management.

## ❖ ROOT CAUSE ANALYSIS

### ❖ Causes Behind the Problem

1. Lack of timely information
2. Limited access to agricultural experts
3. Low awareness of modern farming techniques
4. Difficulty in identifying crop diseases early
5. Language and literacy barriers

### ❖ Why Existing Attempts Fail

1. Poor usability & complex UI
2. Generalized information
3. No conversational support
4. Limited offline support

### ❖ Gaps in Current Systems

1. Complicated agricultural apps
2. No real-time interaction
3. Insufficient disease-detection support
4. Lack of expert recommendation
5. No unified platform



**Fig 1:- Root Cause Analysis**

## ❖ PROPOSED SOLUTION

1. **Problem** – Farmers struggle with timely, accurate disease identification; chatbot acts as a virtual plant doctor.
2. **Data Collection** – Gather leaf images (Plant Village) and verified symptom–treatment info; label all data.
3. **Preprocessing** – Resize, normalize, and augment images; clean backgrounds.
4. **Model Development** –
  - CNN model for image-based disease detection.
  - Simple NLP/keyword system for text-based symptom input.
5. **Knowledge Base** – Database of diseases, symptoms, causes, treatments, and safe pesticide guidelines.
6. **Chatbot** – Built using LLM Model (Agent.ai built), LLM Vision , supports image upload, symptom Q&A, diagnosis, and guidance.
7. **Integration** – Chatbot sends image → model predicts → bot returns solution; asks extra questions if confidence is low.
8. **Testing** – Validate prediction accuracy and clarity with farmer feedback.
9. **Deployment** – Launch on Android, WhatsApp, or website with cloud backend.
10. **Maintenance** – Update database, retrain models, improve language support.
11. **Ethics** – Follow pesticide safety rules and ensure data privacy.

## ❖ Why We Did Not Use a Database

AgroCare is intentionally built without a traditional database to keep things simple, safe, and reliable for farmers.

**No accounts, no passwords, no complexity:** Farmers never have to sign up, remember credentials, or deal with “technical” issues like logins, OTPs, or failed sessions. The app is open and ready to use from the first click.

**Fewer things that can break:** By avoiding a database, there is no risk of “DB down”, corrupted tables, or migration errors. This stateless style makes the system easier to run and more resilient in real-world conditions.

**Faster and lighter for rural infrastructure:** Without a database layer, the app needs fewer backend services, which helps keep hosting costs low and performance stable even on modest college/NGO infrastructure.

**Privacy by design:** Farmer images, audio, and queries are processed in real time and are not permanently stored, which reduces the risk of data misuse and makes farmers more comfortable using the tool.[]

If required in future, a database can be plugged in for features like follow-up tracking or disease hotspot analytics, but the current design is optimized to remove all technical friction for farmers and make deployment as plug-and-play as possible for organizers.

## ❖ HOW IT WORKS (ARCHITECTURE / FLOW)

The proposed chatbot-based plant disease identification system follows a structured workflow that ensures smooth communication between farmers and agricultural experts. The architecture is designed to provide quick responses through AI assistance while also enabling expert-level diagnosis when required. The complete flow is explained below:

### 1. User Authentication (Login Module)

The system begins with a secure login process.

- Farmers create an account and log in using their credentials.
- The authentication module verifies user identity and grants access to the application.
- This ensures that all interactions, queries, and histories are linked to individual farmer profiles.

### 2. Farmer Interface

Once logged in, the farmer can interact with the application through a simple and user-friendly interface. The farmer can:

- **Select Preferred Language:** Multiple language options help farmers use the system comfortably.
- **Choose Category:** The farmer selects the type of plant or crop for which help is required.
- **Add New Query or View History:** Farmers can either submit a new issue or check past queries and solutions stored in the system.

### 3. Adding a Query

When the farmer submits a new issue:

- The app allows them to upload an image of the diseased plant or crop.
- The farmer can also enter a short description of the problem, including symptoms such as spots, discoloration, insects, or wilting.
- This information is then sent to the AI Chatbot module for initial processing.



#### **4. AI Chatbot Response**

The integrated AI chatbot processes the farmer's input:

- It analyzes the uploaded image (if AI model available) or reads the description.
- Provides instant basic guidance, such as:
  - Possible disease name
  - Early-stage symptoms
  - Simple home remedies
  - Preventive measures
- If the issue requires deeper analysis or expert confirmation, the chatbot forwards the query to an agricultural specialist.

#### **5. Expert Reference / Direct Contact**

If needed, the system assists the farmer in connecting with an expert:

- The chatbot can suggest contacting a specialist or plant doctor.
- The app provides call or WhatsApp contact options for further guidance.
- This ensures that farmers get accurate and detailed solutions for complex or unclear cases.

#### **6. Expert Side Workflow**

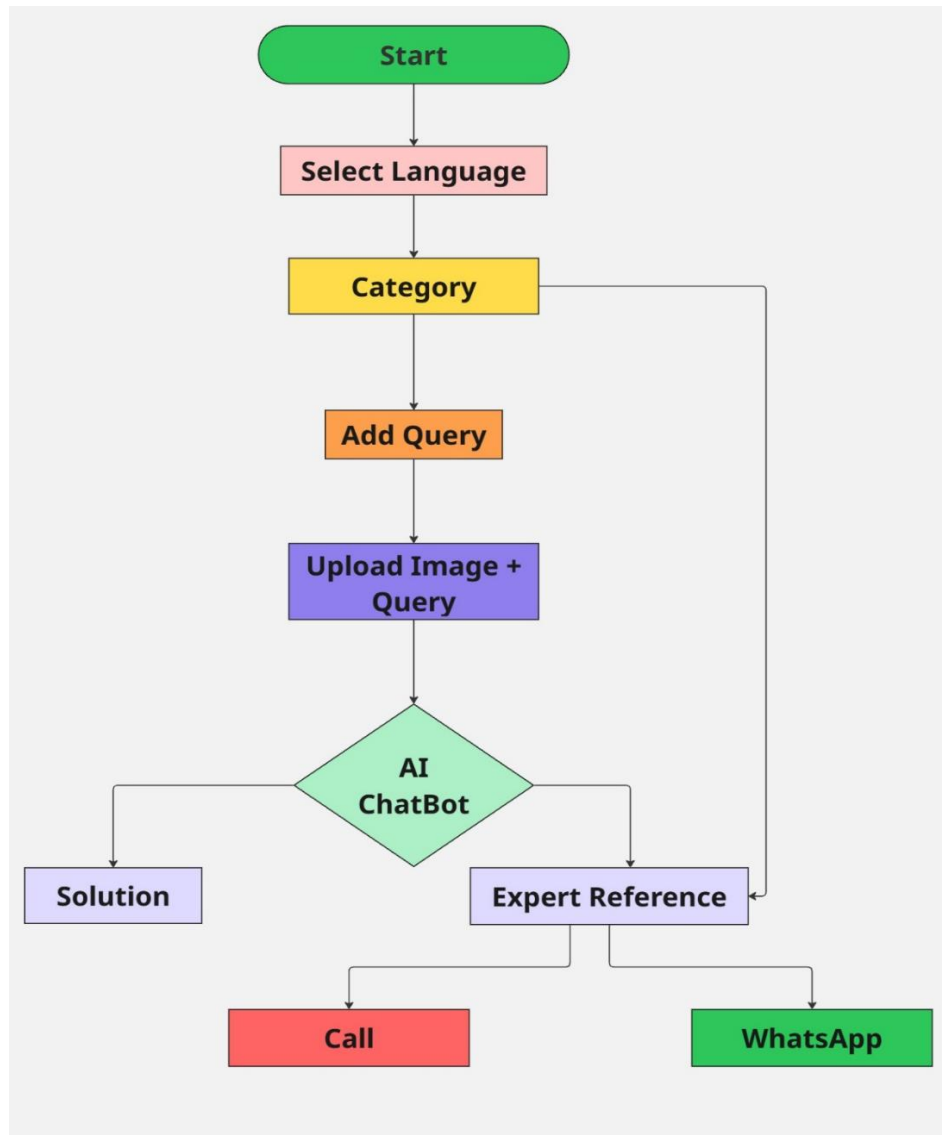
Experts have a separate interface to manage farmer queries:

- They can view all incoming queries, including uploaded images and descriptions.
- They analyze the issue and provide a verified solution, treatment method, pesticide recommendation, or preventive steps.
- The expert's response is sent back to the farmer and stored in the database.

#### **7. Database System**

The database acts as the backbone of the application:

- Stores farmer profiles, login details, and language preferences.
- Stores all queries, images, descriptions, chatbot responses, and expert solutions.
- Maintains a complete history so farmers can revisit previous solutions anytime.
- Helps track common diseases and trends, which can be used to improve the chatbot model over time.



**Fig 2:-Working Flow**

## ❖ FEATURES & FUNCTIONALITIES

### ➤ Key Features

- AI-based plant disease detection
- Image upload & instant diagnosis
- Treatment suggestions with step-by-step guide
- Expert call/WhatsApp support
- Multi-language chatbot
- Crop-specific tips & seasonal guidance
- Weather-based alerts
- Farmer-friendly simple UI

### ➤ Tech-Driven Elements

- Deep-learning image classification model
- Cloud-based processing for high accuracy
- Real-time chatbot powered by NLP
- Secure database for crop history & user data
- API integrations for expert helpline & weather data

### ➤ Sustainable Attributes

- Reduces chemical overuse through accurate diagnosis
- Minimizes crop loss and prevents waste
- Supports eco-friendly farming practices
- Promotes long-term soil and plant health

## ❖ TECHNOLOGY STACK

- HTML5 – used to structure the main project webpage where the agent is embedded.
- CSS3 / Tailwind CSS – used to style the chatbot widget and improve UI design.
- JavaScript – used to load and run the Agent.ai embed script inside the website.
- Agent.ai Platform – used to create the plant disease detection agent with no-code blocks.
- LLM Model (Agent.ai built-in) – used for understanding symptoms and generating responses.
- LLM Vision (Image Analysis) – used to analyze plant leaf photos and detect diseases.
- Condition & Fallback Logic (Agent.ai Blocks) – used to check confidence and show expert help when needed.
- Web Embed Script – used to connect the agent to the main project frontend.
- Hosting (GitHub Pages / Netlify / Vercel/ etc) – used to deploy and run the final project online.

## ❖ IMPLEMENTATION PLAN

### 1. Requirement Analysis

In this phase, all the needs of the system are collected and analyzed.

- The primary requirement is to assist farmers in identifying plant and crop diseases easily.
- The system must allow farmers to upload images, describe the disease symptoms, and receive guidance.
- Requirements for the AI chatbot, expert panel, database, and communication features (call/WhatsApp) are defined.
- Inputs (uploaded image, text description) and outputs (AI diagnosis or expert solution) are clearly identified.

This phase ensures that the project goals align with the actual problems faced by farmers.

## **2. System Design**

This phase focuses on planning the architecture and workflow of the AgroCare application.

- The design outlines how the AI model will process the farmer's input.
- The data flow is structured as: Image/Text Input → AI Model → Chatbot Response → Expert Review (if required).
- User interface (UI) layouts and backend structure are planned.
- Database design includes tables for users, queries, images, and expert responses.

The design phase provides a blueprint for the development of the entire system.

## **3. Implementation**

In this phase, the actual development of the system takes place.

- The plant disease detection model is created using machine learning or deep learning techniques.
- The chatbot interface is implemented to handle user questions and guide farmers.
- The mobile or web application UI is developed for farmers and experts.
- Backend services are developed to manage image upload, expert responses, and communication.
- A fallback mechanism is added so the system sends the query to experts when the AI cannot determine the disease.

This phase transforms the system design into a working application.

## **4. Testing**

Testing ensures the accuracy and reliability of the AgroCare system.

- The disease detection model is tested for prediction accuracy using various plant images.
- The chatbot is tested for correct responses and smooth interaction flow.
- Image upload, database storage, expert routing, and notification features are verified.

- Bugs and errors found during testing are fixed to improve system performance.

This phase guarantees that the system works properly before it is released.

## 5. Deployment

Once testing is complete, the AgroCare system is deployed for real users.

- The application is hosted on a cloud platform for easy access.
- The app is made live for farmers and experts.
- All components such as AI model, chatbot, and database are integrated and monitored.

Deployment makes the system available for actual use in farming communities.

## 6. Maintenance

After deployment, continuous maintenance is performed to improve and update the system.

- The disease database is regularly updated with new crops and diseases.
- The AI model accuracy is improved by adding more training data.
- Bugs, technical issues, and system errors are resolved.
- New features such as fertilizer suggestions, weather alerts, or voice assistance can be added over time.

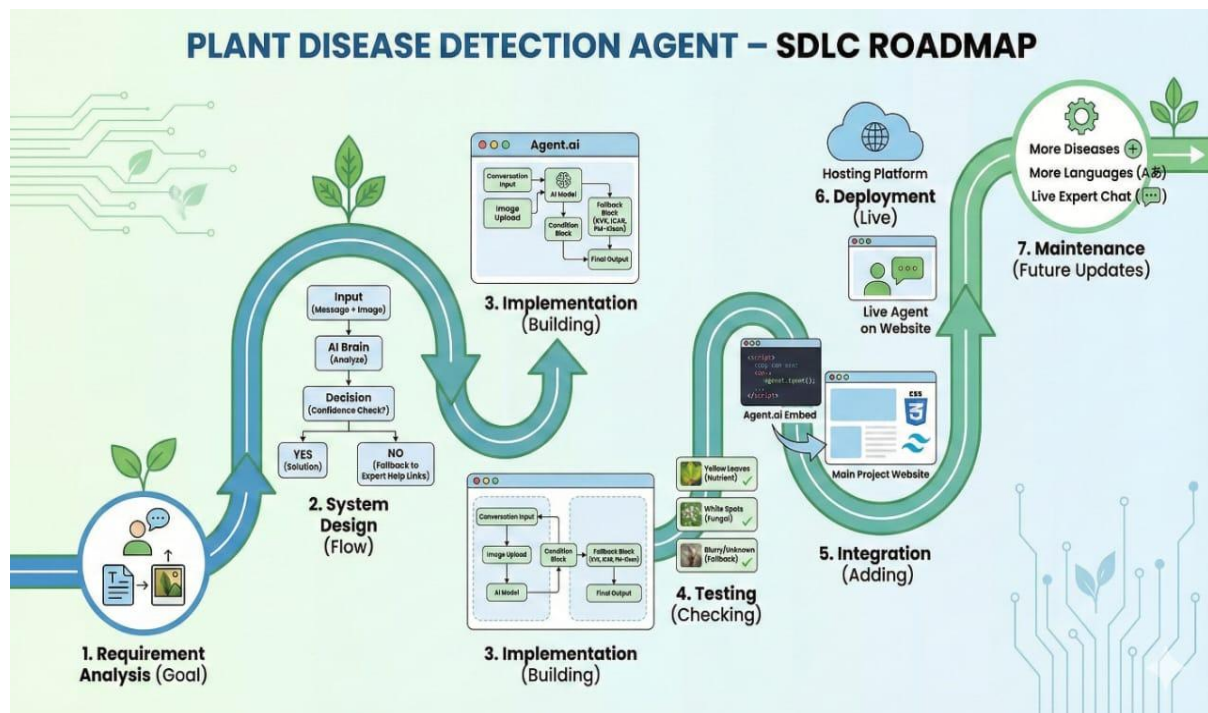


Fig 3 :- Implementation Plan

## ❖ SUSTAINABILITY IMPACT

### ❑ Energy Savings with AgroCare

- ✓ AgroCare helps farmers save energy by providing accurate crop disease detection, irrigation tips, and fertilizer schedules.
- ✓ Because farmers get the right advice at the right time, they avoid unnecessary field visits, reduce motor/pump usage, and minimize repeated spraying, which leads to significant energy savings.

### ❑ Waste Reduction using AgroCare

- ✓ AgroCare provides precise recommendations so farmers use only the required amount of fertilizers, pesticides, and water.
- ✓ This avoids resource wastage, reduces chemical runoff into soil and water, and saves farmers a lot of money.

### ❑ Long-Term Eco-Benefits of AgroCare

Because AgroCare promotes sustainable farming practices, it results in:

- ✓ Improved soil fertility
- ✓ Efficient water usage
- ✓ Fewer chemicals in the environment
- ✓ Increased biodiversity
- ✓ Climate-resilient farming

### ❑ Carbon Reduction through AgroCare

- ✓ By reducing excessive tractor movement, pesticide spraying, and water pumping, AgroCare indirectly cuts down fuel consumption and CO<sub>2</sub> emissions.
- ✓ Healthier crops—supported by AgroCare’s recommendations—also contribute to better carbon absorption from the atmosphere

## ❖ INNOVATION & UNIQUENESS

### 1. AI + Expert Hybrid Support

Most existing solutions rely solely on either an AI model or manual expert consultation. AgroCare integrates both approaches:

- The AI chatbot provides instant preliminary diagnosis and basic remedies.
- In complex cases, the system automatically forwards the query to human agricultural experts.

This hybrid model ensures both speed and accuracy.

### 2. Chatbot-Based Interaction in Multiple Languages

AgroCare offers a multilingual chatbot, allowing farmers to communicate in their preferred local language.

- This increases accessibility for rural farmers who may not be familiar with technical terms.
- The chatbot provides step-by-step guidance, making the system easy to use even for first-time users.

### 3. Image-Based Disease Detection

The platform allows farmers to upload an image of the infected plant.

- The AI model analyzes leaf patterns, color changes, and visible symptoms.
- This reduces guesswork and helps farmers identify diseases more accurately and quickly.

### 4. Direct Connection Between Farmers and Experts

Unlike many applications that only give general information, AgroCare builds a direct communication bridge between farmers and agricultural specialists.

- Farmers can contact experts through call or WhatsApp directly from the app.
- This feature provides confidence and trust, ensuring farmers receive reliable guidance.

### 5. Centralized Query & Solution Database

AgroCare maintains a complete history of all farmer queries, expert answers, and disease records.



- This allows farmers to revisit solutions anytime.
- Over time, the system grows smarter as more data is collected.

## 6. Easy-to-Use Interface for Non-Technical Users

The interface is designed specifically for farmers:

- Simple navigation
- Clear options
- Image-based buttons
- Language support

## 7. Scalable and Future-Ready Design

The system can easily integrate additional features in the future such as:

- Weather-based disease prediction
- Fertilizer and pesticide recommendations
- Voice-based query submission
- Crop health monitoring using sensors (IoT)

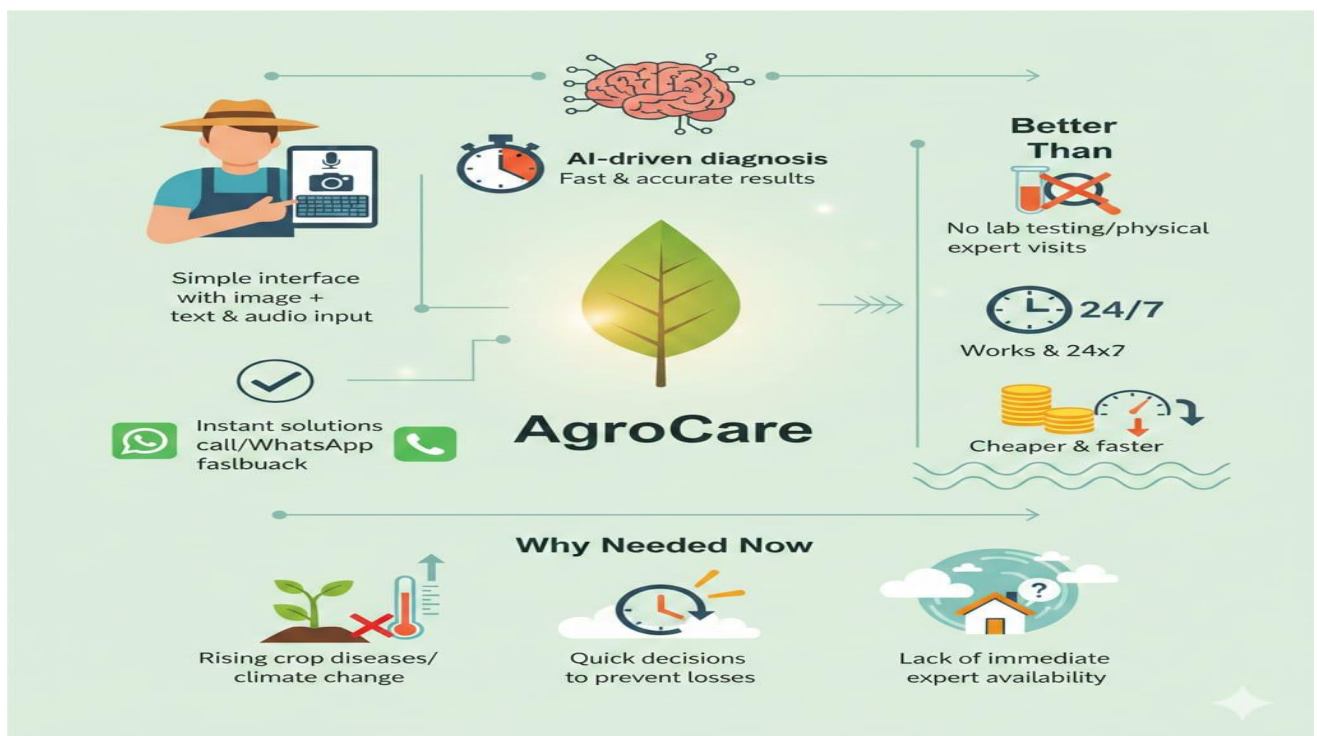


Fig 4:-Nnovation & Uniqueness

## ❖ FEASIBILITY

### ➤ Cost Estimation

- Minimal development cost using open-source AI models
- Cloud hosting + storage (low/medium budget)
- Optional API costs for image processing

### ➤ Risks & Mitigation

- Low-accuracy predictions → continuous model retraining
- Poor internet in rural areas → offline caching + lightweight UI
- User adoption issues → multi-language support + simple UX

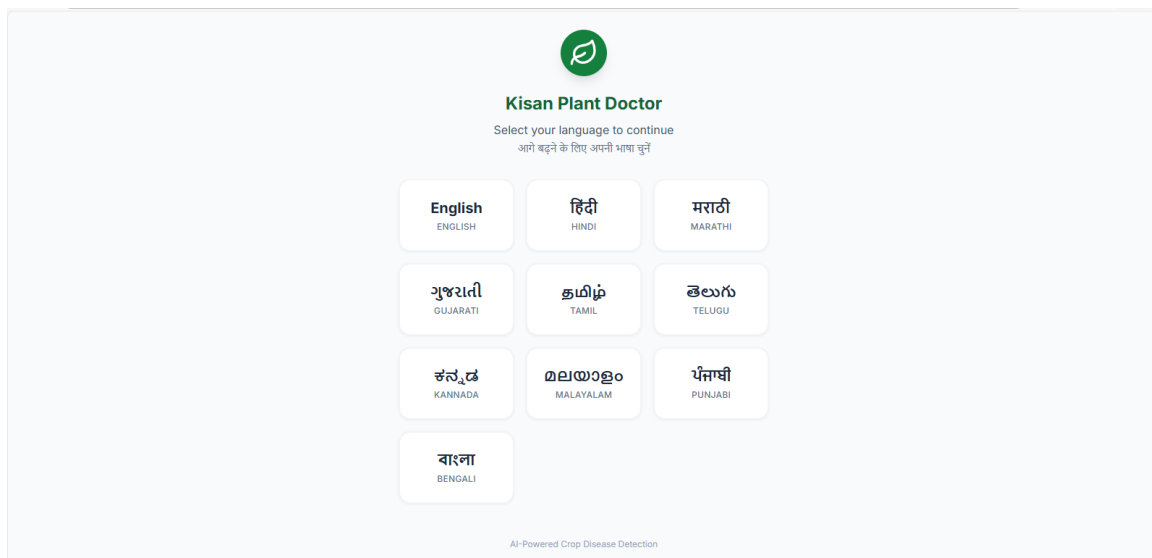
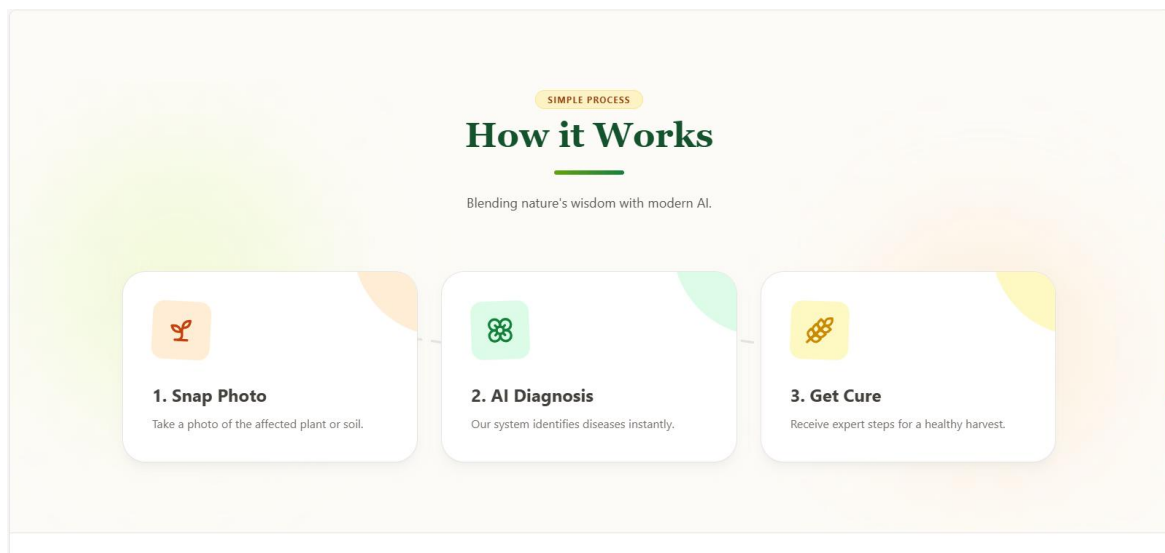
### ➤ Resources Required

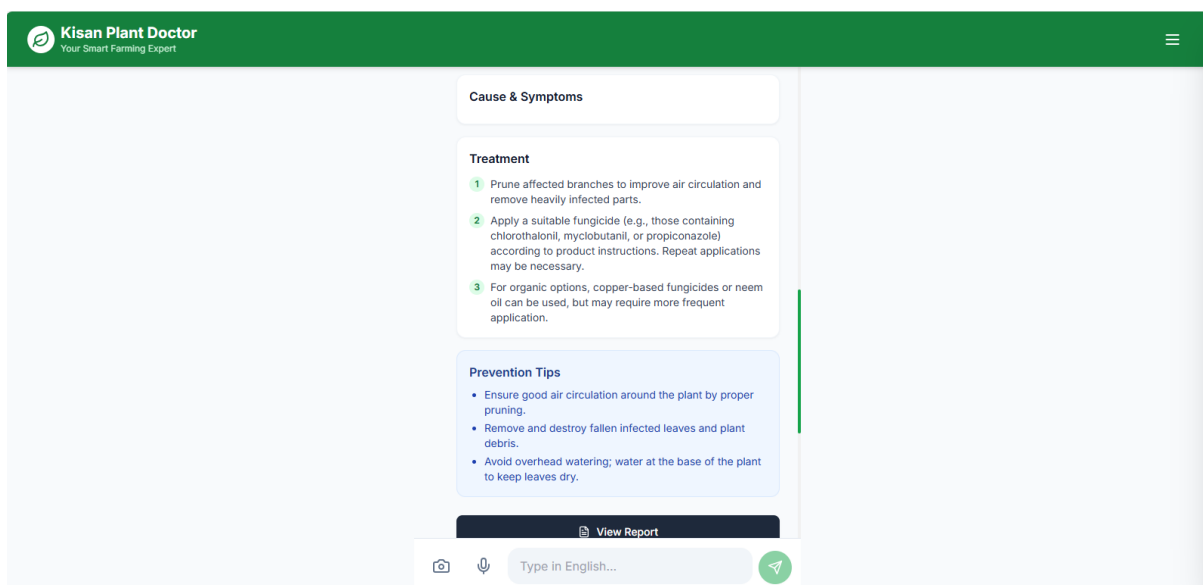
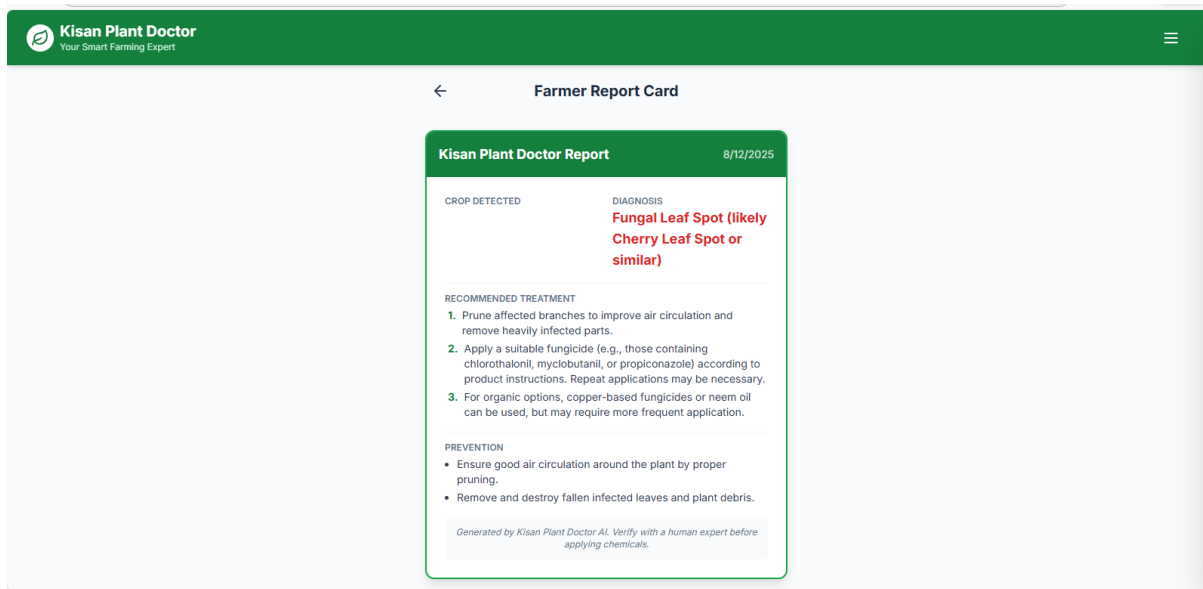
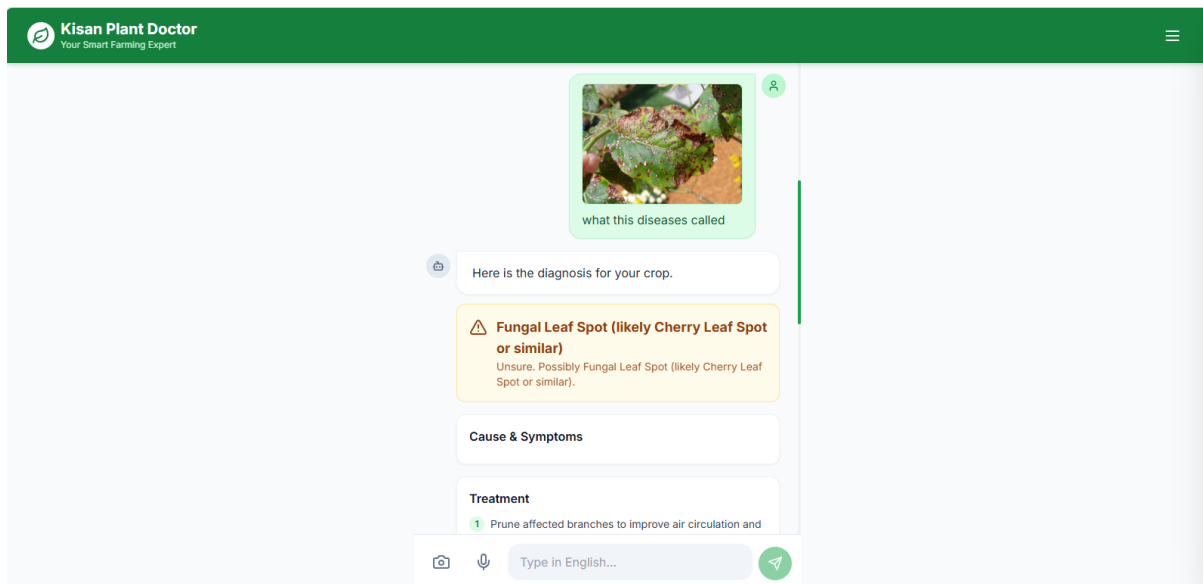
- Team: 1–2 developers, 1 AI/ML engineer, 1 UI/UX designer
- Tech: Model training setup, cloud server, database
- Tools: TensorFlow/PyTorch, Firebase/Node.js, mobile frameworks

### ➤ Technical Feasibility

- AI-based disease detection is proven and widely used
- App can run on low-end phones with cloud processing
- Scalable architecture for adding more crops/diseases

## ❖ PROJECT SCREENSHOT





**Kisan Plant Doctor**  
Your Smart Farming Expert

Thank you for providing Solapur. Could you please also tell me your village name so I can find the most relevant experts for you?

maharashtra village solapur

Here are some experts near Maharashtra Village, Solapur:

**Nearby Experts Found**

<b>Krishi Vigyan Kendra, Solapur</b> AGRICULTURAL SCIENTIST • GOVT	
<b>District Agriculture Office, Solapur</b> AGRICULTURE OFFICER • GOVT	
<b>Dr. Ramesh Patil</b> PRIVATE AGRICULTURAL CONSULTANT • PRIVATE	

**Kisan Plant Doctor**  
Your Smart Farming Expert

Namaste! I am Kisan Plant Doctor. I can help you in Hindi. Send me a photo of your crop or ask a question.

मुझे चावल की किस्मों के बारे में छोटी जानकारी चाहिए

चावल की कई बेहतरीन किस्में हैं, जो अलग-अलग क्षेत्रों और ज़रूरतों के हिसाब से उगाई जाती हैं। कुछ प्रमुख किस्में हैं: पूसा बासमती 1121, पूसा बासमती 1509 (ये सुगंधित और लंबे दाने वाली हैं), स्वर्णा, एमटीयू 1010 (ये अधिक उपज देने वाली और सामान्य चावल की किस्में हैं), और सांबा मसूरी। क्या आप किसी खास तरह की किस्म के बारे में जानना चाहते हैं या आपके क्षेत्र के लिए उपयुक्त किस्मों के बारे में?

**Kisan Plant Doctor**  
Your Smart Farming Expert

Namaste! I am Kisan Plant Doctor. I can help you in Hindi. Send me a photo of your crop or ask a question.

मुझे चावल की किस्मों के बारे में छोटी जानकारी चाहिए

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Please find local agricultural experts near me.

मैं आपकी मदद करने के लिए स्थानीय कृषि विशेषज्ञों को ढूँढ़ सकता हूँ। कृपया मुझे अपना गाँव और जिला बताएं।

waiting for location details...

## ❖ ADVANTAGES

### **1. Quick and Accurate Disease Identification**

The system allows farmers to upload images of affected plants and receive instant guidance from the AI chatbot or experts. This helps in identifying diseases quickly and accurately, reducing delays in treatment.

### **2. Easy Access to Agricultural Experts**

Farmers can directly connect with specialists through call or WhatsApp when needed. This bridges the gap between farmers and experts, ensuring reliable and professional advice.

### **3. User-Friendly and Multilingual Interface**

The application is designed with simple navigation and supports multiple languages. Farmers from rural areas can use the system without technical difficulty, increasing accessibility.

### **4. Reduces Crop Loss and Improves Yield**

By getting timely diagnosis and proper treatment recommendations, farmers can prevent crop damage. This leads to improved crop health and increased agricultural productivity.

### **5. Hybrid AI + Human Support System**

The combination of an AI chatbot for basic assistance and experts for detailed diagnosis increases efficiency. The AI provides immediate suggestions, while experts handle complex cases.

### **6. Saves Time and Effort**

Farmers no longer need to visit agricultural offices or wait for field experts. Solutions are provided instantly through the app, saving time, travel cost, and effort.

### **7. Complete Record and History Management**

All queries, images, expert replies, and disease details are stored in the database. Farmers can view past solutions anytime, helping them learn and make better decisions in the future.

## ❖ CONCLUSION

The AgroCare system provides an effective and innovative solution to one of the major challenges faced by farmers: identifying and managing plant and crop diseases. By combining AI-based analysis with expert consultation, the system ensures both quick responses and accurate guidance. Farmers can easily upload images, describe symptoms, and receive actionable solutions through a simple, multilingual chatbot interface. In cases where the AI cannot provide a precise diagnosis, the system seamlessly connects farmers with agricultural specialists for further support.

This integrated approach helps reduce crop losses, improve yield, and promote healthier farming practices. The centralized database, user-friendly design, and hybrid AI-expert model make the system reliable and accessible for farmers in rural and semi-urban areas. Overall, AgroCare contributes to more efficient, cost-effective, and sustainable agriculture by empowering farmers with timely knowledge and expert assistance.

## ❖ REFERENCES

1. Mohanty, S. P., Hughes, D. P., & Salathé, M. (2016). *Using Deep Learning for Image-Based Plant Disease Detection*. *Frontiers in Plant Science*, 7(1419), 1–10.
2. Brahimi, M., Boukhalfa, K., & Moussaoui, A. (2017). *Deep Learning for Tomato Diseases: Classification and Symptoms Visualization*. *Applied Artificial Intelligence*, 31(4), 299–315.
3. Ferentinos, K. P. (2018). *Deep Learning Models for Plant Disease Detection and Diagnosis*. *Computers and Electronics in Agriculture*, 145, 311–318.
4. Singh, V., & Misra, A. K. (2017). *Detection of Plant Leaf Diseases Using Image Processing Techniques*. *Information Processing in Agriculture*, 4(1), 41–49.
5. Zhang, S., & Zhang, X. (2019). *Crop Disease Identification Using Convolutional Neural Networks*. *IEEE Access*, 7, 43713–43724.
6. Google Cloud Documentation. (2024). *AI and Machine Learning for Image Classification*. Retrieved from Google Developers.
7. TensorFlow Documentation. (2024). *Building Image Classification Models for Agriculture*. Retrieved from TensorFlow.org.
8. FAO (Food and Agriculture Organization). (2020). *Plant Health and Sustainable Agriculture*. FAO Publications.
9. Sharma, N., & Jain, S. (2021). *Chatbot-Based Solutions in Agriculture: A Review*. *International Journal of Computer Applications*, 174(20), 10–15.
10. Kaur, S., Pandey, S., & Goel, S. (2020). *AI-Based Agricultural Expert Systems for Farmers*. *Journal of Agricultural Informatics*, 11(2), 25–35.