Software Requirement Specifications

AgriSense AI: Early Detection & Precision Treatment to Safeguard Global Yields

Submitted by

Syed Ashiq Ali (F22BINFT1M01139)

Submitted to

Mr. Zaman Ali

Department of Information Technology

Faculty of Computing

The Islamia University of Bahawalpur

Meeting Details

Sr No	Details	Date	Supervisor Signature
1	**Project Proposal & Scope Finalization: Discussed and finalized the project scope, objectives, and problem statement: Focusing on early disease detection using image processing/CNN model. Confirmed target crops/diseases and data collection plan.**	**07/11/2025**	
2	**Literature Review & Tool Selection:** **Presented a review of existing AI models (e.g., ResNet, VGG) for plant disease classification.** **Finalized the primary development tools (e.g., Python, TensorFlow/PyTorch, dataset source).** **Action Item: Begin initial dataset collection/curation.**	**10/11/2025**	
	Data Preparation & Pre-processing: Discussed challenges		

3	**in dataset imbalance and image augmentation techniques. Presented the data cleaning process. Supervisor advised on appropriate data split ratio and feature extraction methods.**	**21/11/2025**	
4	**Data Preparation & Pre-processing: Discussed challenges in dataset imbalance and image augmentation techniques. Presented the data cleaning process. Supervisor advised on appropriate data split ratio and feature extraction methods.**	**28/11/2025**	
5	**Transfer Learning Implementation:** **Demonstrated the improved performance after implementing Transfer Learning (e.g., fine-tuning MobileNet or VGG). Discussed the implementation of the precision treatment recommendation algorithm (rule-based or recommendation engine).**	**05/12/2025**	

6	**Prototype & System Integration:** **Presented the end-to-end prototype (e.g., the web or mobile interface for uploading an image and displaying detection/treatment).** **Addressed integration issues between the AI model and the front-end application.**	**16/12/2025**	
7	**Final Testing & Validation: Presented the final model's performance metrics (accuracy, precision, recall) and validation report. Reviewed the project report's Methodology and Results chapters. Action Item: Start writing the Conclusion and Future Work sections.**	**27/12/2025**	
8	**Final Report Draft Review: Submitted the complete draft of the Final Year Project report. Supervisor provided feedback on formatting, referencing, and structure, and cleared the project for final submission.**	**10/01/2026**	

Summary

AgriSence is a web-based agricultural support platform that helps farmers diagnose crop diseases using AI, connect with certified field officers, and access genuine pesticide products and solar irrigation services. The system includes modules for AI crop diagnosis, company product listings, solar installer services, and social media/event promotions. With real-time notifications, ratings, and a secure role-based system, AgroSphere aims to provide fast expert help, improve farmer decisions, and digitally transform agricultural support.

1. Introduction

AgriSence is a comprehensive web-based platform designed to connect farmers with agricultural service providers including pesticide companies, field officers, and solar irrigation installers through AI-powered crop diagnosis and digital service management.

1. Purpose

To provide farmers with fast, reliable agricultural solutions through AI diagnosis, expert assistance, product access, and service connections in a unified digital platform.

1. Scope

The system includes AI crop diagnosis, pesticide product marketplace, solar service booking, event management, and multi-role user management. Excludes payment processing, logistics, and mobile app in initial phase.

1. Product Perspective

A standalone web platform that can integrate with third-party services and may expand to mobile applications.

1. User Characteristics

Farmers (basic tech skills), Pesticide Companies (moderate), Field Officers (moderate), Solar Installers (basic), Admin (advanced).

1. Similar apps and systems/Literature Review

Plantix (AI diagnosis only), AgroStar (product sales only), FarmLogs (data management only). AgriSence integrates all these features.

1. Proposed Technologies

Frontend: HTML5, CSS3, JavaScript(React.js), Tailwind CSS

Backend: PHP, Node.js, Python;

Database: MySQL, MongoDB;

AI: TensorFlow/PyTorch; AI based Integration

Cloud: AWS S3, Firebase

1. Requirements

AgriSence provides several key functionalities:Farmers can sign up, upload crop images, receive AI diagnosis, request expert field officer review, browse pesticide products, contact companies, request solar installation, rate services, and receive notifications. Companies and installers manage products & services. Admin approves users and maintains system integrity.

1. Function Requirements

1. User Registration

- **Name:** FR001
- **Purpose:** Secure registration with role-based access.
- **User(s):** All roles
- **Input:** User details, role selection
- **Output:** User account, dashboard access

1. Crop Disease Diagnosis

- **Name:** FR002
- **Purpose:** Farmers upload crop images for AI diagnosis
- **User(s):** Farmers, Field Officer
- **Input:** Crop image, symptoms, location
- **Output:** Diagnosis, confidence score, recommendations

1. Product Marketplace

- **Name:** FR003
- **Purpose:** Companies list products; farmers compare and contact
- **User(s):** Pesticide Company, Farmer
- **Input:** Product details, pricing, offers
- **Output:** Product catalog, comparison view

1. Solar Service Booking

- **Name:** FR004
- **Purpose:** Farmers Book solar installation/maintenance
- **User(s):** Solar Installer, Farmer
- **Input:** Service type, location, requirements
- **Output:** Service booking, quotations

1. Event Management

- **Name:** FR005
- **Purpose:** Promote agricultural events and training.
- **User(s):** All roles
- **Input:** Event details, registration links
- **Output:** Event calendar, notifications

1. Non-Functional Requirements

1. **Performance:** Page load < 3s, AI response < 10s
2. **Availability:** 99.5% uptime
3. **Security:** SSL, role-based access
4. **Usability:** Responsive, multilingual

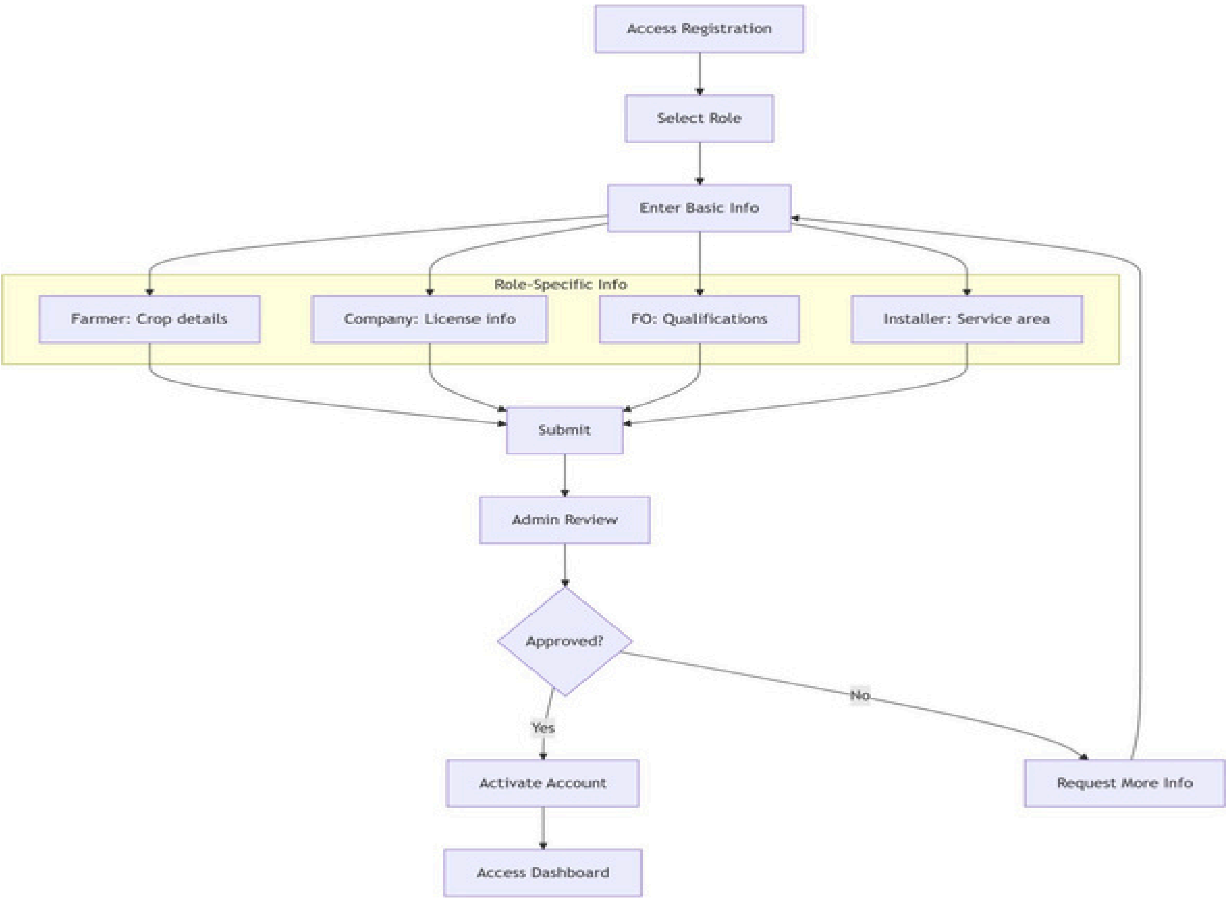
1. Use Cases and Flow of Processes

Use cases are the formal representation of process flow defined by functional requirements. There should be system level use case which is directly influenced to project functions with their user(s) (called actor(s)) which are described in requirements chapters.

a. Use Case 1

ID	UC001
Name	Role-Based Registration
Description	User registers with specific role and permissions
Requirement(s)	FR001
Actor(s)	All roles, Admin
Precondition	New user, valid email
Postcondition	Account created with role permissions
Basic Flow	***Basic Flow*** 1. Select role 2. Enter details 3. Submit for approval 4. Admin reviews 5. Account activated

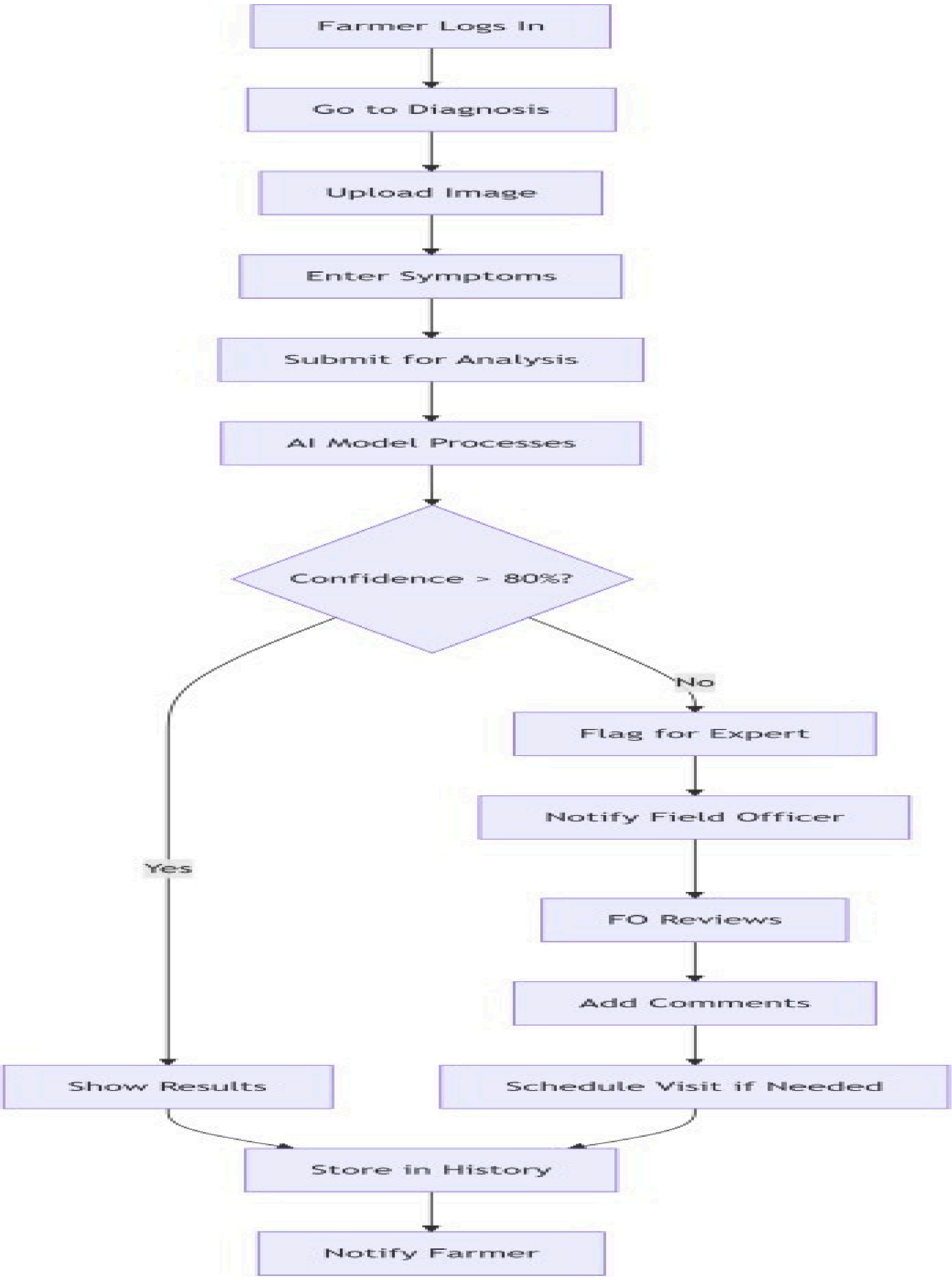
Diagram:


Access Registration
Select Role
Enter Basic Info
Role-Specific Info
Farmer: Crop details
Company: License info
FO: Qualifications
Installer: Service area
Submit
Admin Review
Approved?
Yes
No
Activate Account
Request More Info
Access Dashboard

a. **Use Case 2**

ID	UC002
Name	AI Crop Disease Diagnosis
Description	Farmer uploads crop image for AI diagnosis with expert feedback
Requirement(s)	FR002
Actor(s)	Farmer, Field Officer
Precondition	Farmer logged in, has crop image
Postcondition	Diagnosis stored, notifications sent
Basic Flow	***Basic Flow*** 1. Upload image+symptoms 2. AI analyzes 3. If confidence high, show results 4. Else notify FO 5. FO reviews 6. Notify farmer **Alternative Flow** FO directly diagnoses without AI **Exceptions** Invalid image, AI unavailable

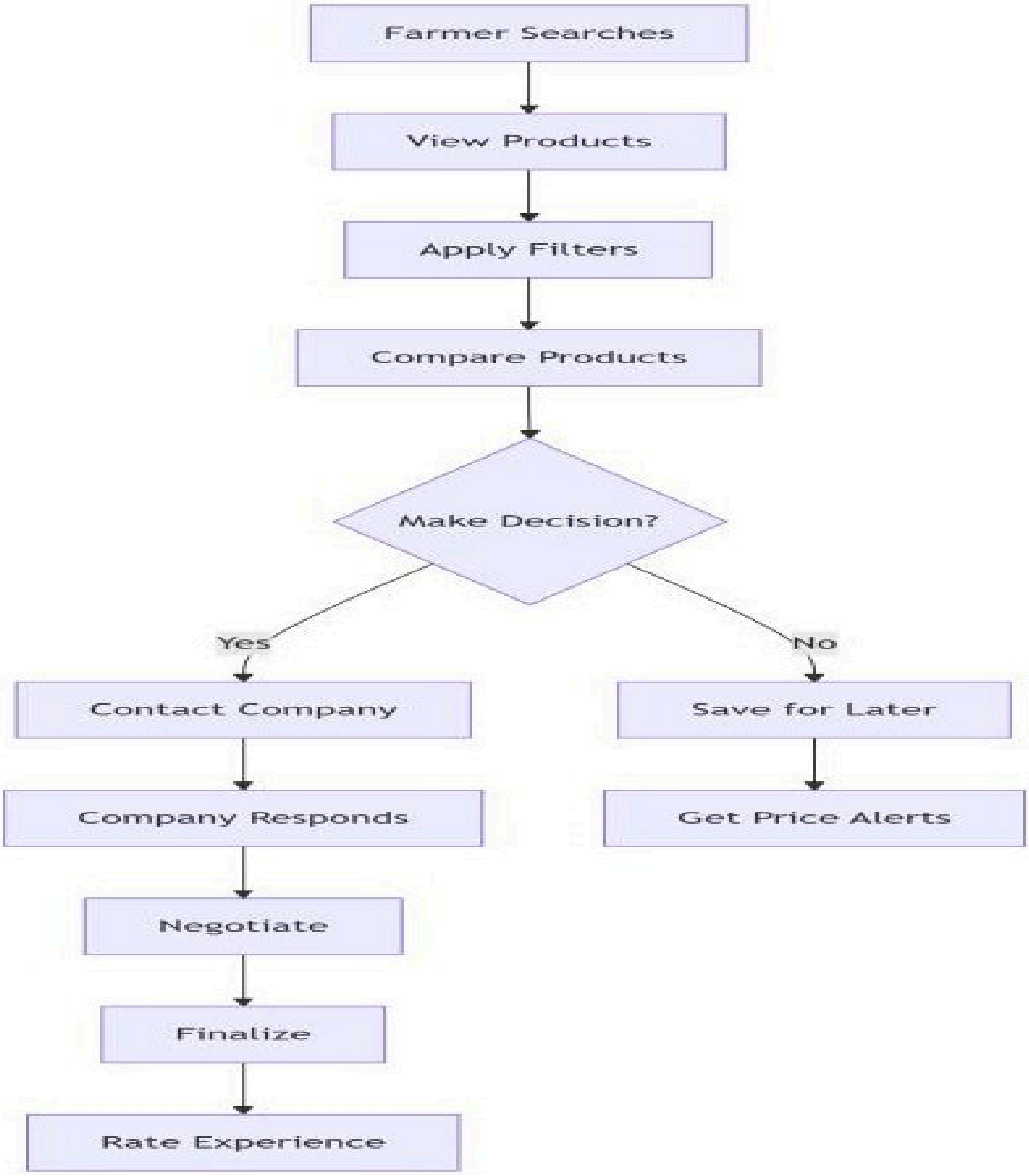
Diagram:


Farmer Logs In
Go to Diagnosis
Upload Image
Enter Symptoms
Submit for Analysis
AI Model Processes
Confidence > 80%?
Yes
No
Flag for Expert
Notify Field Officer
FO Reviews
Add Comments
Show Results
Schedule Visit if Needed
Store in History
Notify Farmer

a. **Use Case 3**

ID	UC003
Name	Product Comparison Purchase
Description	Farmer compares pesticide products and contacts companies
Requirement(s)	FR003
Actor(s)	Farmer, Pesticide Company
Precondition	Products listed, farmer logged in
Postcondition	Contact established, potential sale
Basic Flow	***Basic Flow*** 1. Search products 2. Filter and compare 3. Contact company 4. Negotiate 5. Rate experience

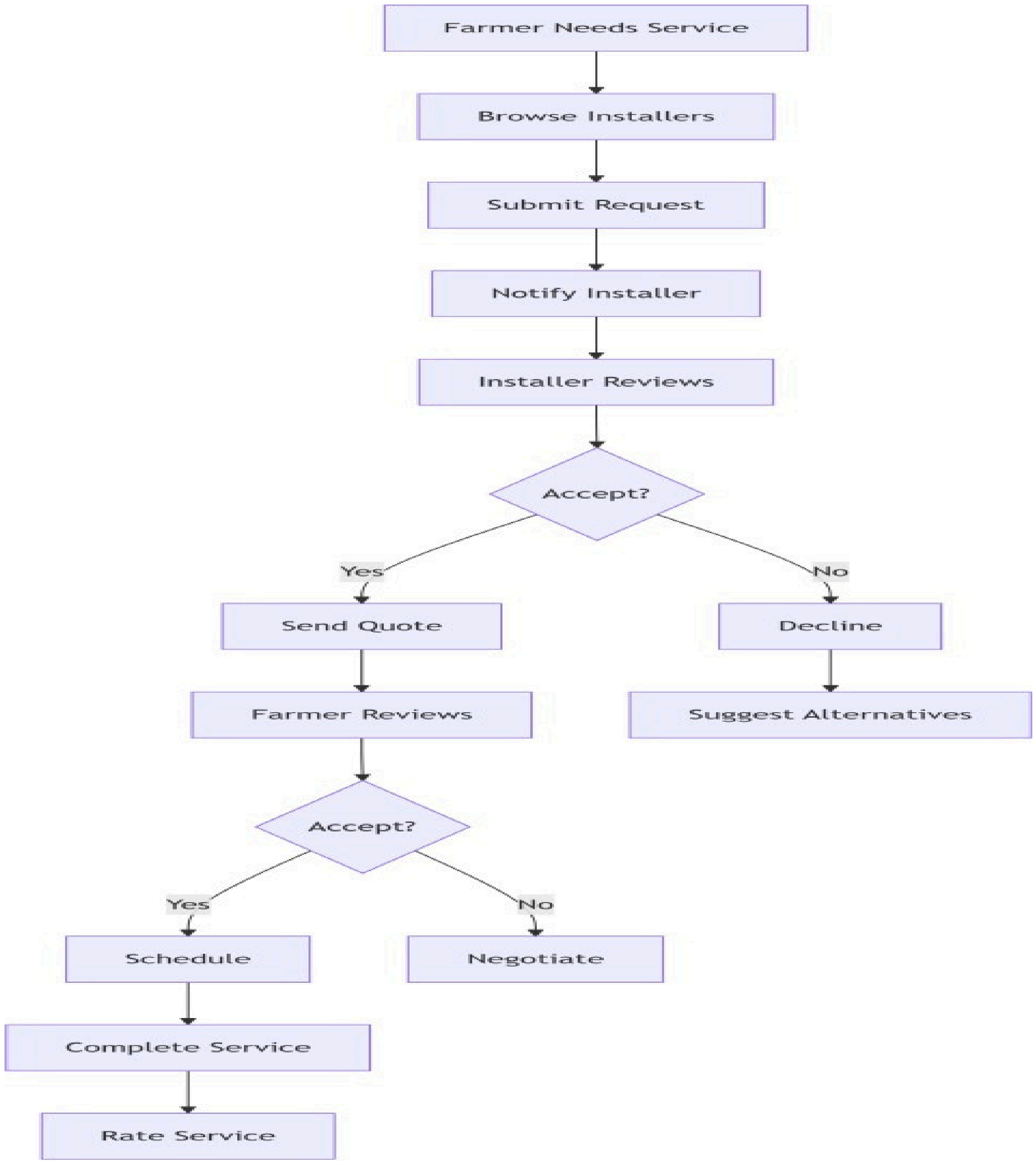
Diagram:


Farmer Searches
View Products
Apply Filters
Compare Products
Make Decision?
Yes
No
Contact Company
Save for Later
Company Responds
Get Price Alerts
Negotiate
Finalize
Rate Experience

a. **Use Case 4**

ID	UC004
Name	Solar Service Booking
Description	Farmer requests solar irrigation services
Requirement(s)	FR004
Actor(s)	Farmer, Solar Installer
Precondition	Installers registered, farmer logged in
Postcondition	Service booked or declined
Basic Flow	***Basic Flow*** 1. Submit request 2. Installer responds 3. Quote negotiation 4. Schedule service 5. Rate service

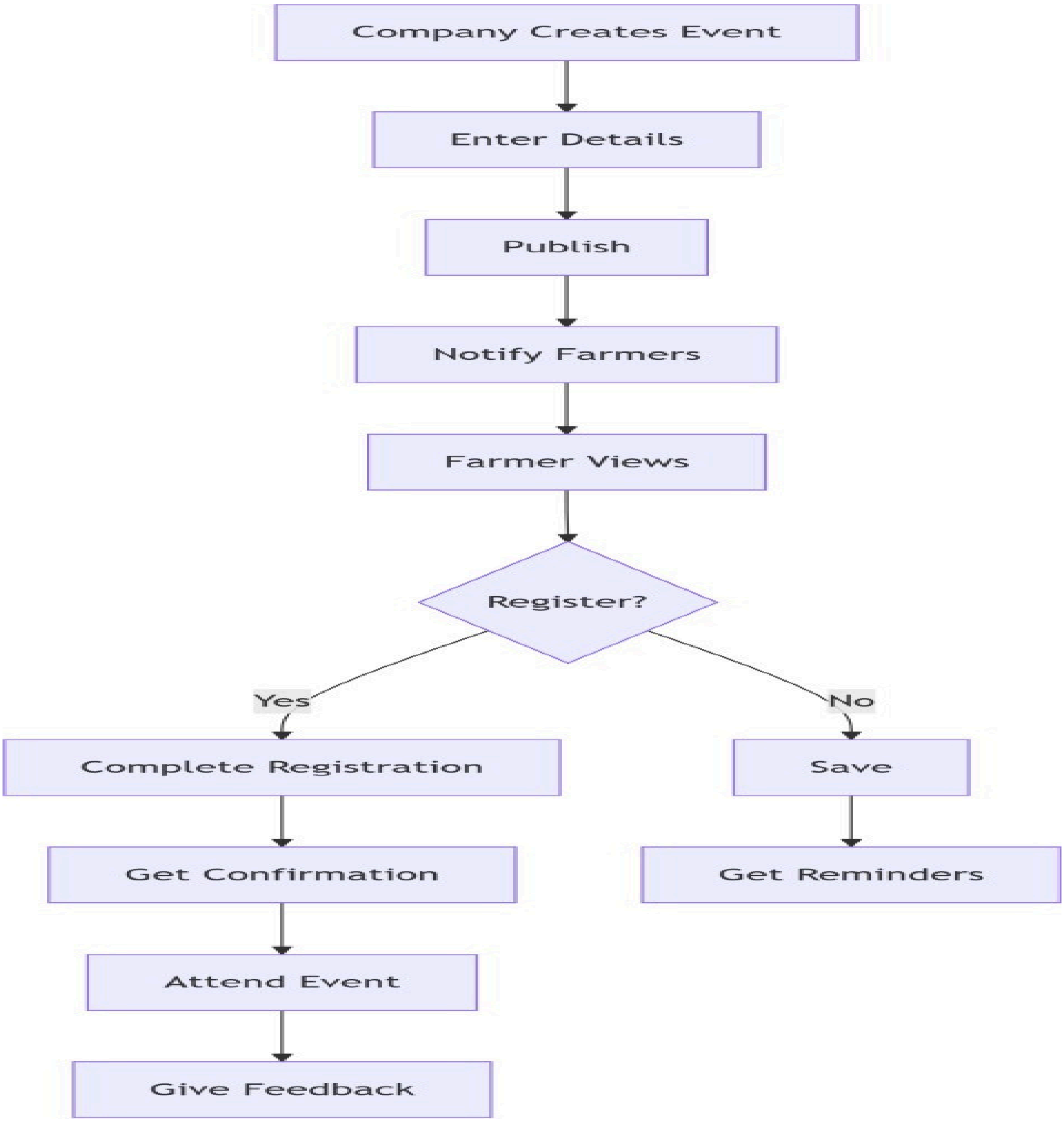
Diagram:


Farmer Needs Service
Browse Installers
Submit Request
Notify Installer
Installer Reviews
Accept?
Yes
No
Send Quote
Decline
Farmer Reviews
Suggest Alternatives
Accept?
Yes
No
Schedule
Negotiate
Complete Service
Rate Service

a. **Use Case 5**

ID	UC005
Name	Event Registration
Description	Farmers register for agricultural events
Requirement(s)	FR005
Actor(s)	Company, Farmer
Precondition	Event created, farmer logged in
Postcondition	Registration completed or saved
Basic Flow	***Basic Flow*** 1. View event 2. Register interest 3. Get confirmation 4. Attend event 5. Provide feedback

Diagram:



1. **References**

2. Project Proposal: "AgriSense AI: Early Detection & Precision Treatment to Safeguard Global Yields"
3. IEEE Std 830-1998, Software Requirements Specifications
4. Plantix App: https://plantix.net
5. React.js Documentation: https://reactjs.org
6. MongoDB Documentation: https://docs.mongodb.com