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KRUSHI CONNECT

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Abstract

Krushi Connect is developed to address the challenges faced by farmers in accessing markets, obtaining fair prices, and receiving timely agricultural guidance. With the increasing dependence on intermediaries and the lack of real-time information, traditional agricultural selling practices have become inefficient and unreliable. The proposed system provides a unified digital platform that enables farmers to directly connect with customers while supporting intelligent decisionmaking through advisory and weather-based services.

The system accepts farmer profiles, product details, customer orders, weather data, and transaction information as inputs and processes them through automated modules to ensure smooth marketplace operations. It supports direct product listing, order management, real-time alerts, and secure digital payments. The platform also provides rule-based farming assistance related to crop care, fertilizer usage, and irrigation planning.

By using a centralized database and automated workflows, Krushi Connect reduces manual dependency, improves transparency, and enhances operational efficiency. The system is suitable for small-scale farmers as well as large agricultural communities and offers a scalable solution for modern digital agriculture.
Keywords: *Digital Agriculture Platform, Smart Farming System, Farmer–Customer Marketplace, Weather-Based Advisory, Secure Digital Payments, Agricultural Analytics.*

1. Introduction

Agriculture is one of the most important sectors of the Indian economy, as a large percentage of the population depends on farming for their livelihood. Even after playing such a critical role, farmers continue to face multiple challenges in selling their produce and accessing modern agricultural support. Traditional farming and selling practices are still widely followed, where farmers depend heavily on middlemen for market access. This often results in low profit margins, lack of price transparency, and delayed payments.

In many rural areas, farmers do not have direct access to consumers or reliable digital platforms to sell their agricultural products. Information related to crop pricing, weather conditions, fertilizer usage, and disease management is either unavailable or reaches farmers very late. As a result, decision-making is mostly based on guesswork or informal advice, which can negatively impact crop yield and income. Additionally, existing agricultural solutions are often scattered across multiple platforms, making them difficult to use, especially for small and marginal farmers.

With the rapid growth of internet connectivity and digital technologies, there is a strong need for an integrated and farmer-friendly digital solution. A centralized platform that connects farmers directly with customers, provides real-time agricultural information, and supports secure digital transactions can significantly improve the current farming ecosystem. Such a system should be simple to use, accessible in local languages, and capable of supporting farmers throughout the agricultural cycle.

This paper presents **Krushi Connect**, a smart digital platform designed to empower farmers by enabling direct farmer-to-customer interaction while reducing dependency on intermediaries. The proposed system provides features such as online product listing, order management, secure payments, weather-based alerts, and an intelligent advisory system. By integrating these services into a single platform, Krushi Connect aims to simplify agricultural selling and improve transparency in transactions.

Another important aspect of Krushi Connect is its focus on decision support for farmers. The system provides crop-specific guidance related to fertilizers, irrigation practices, and seasonal planning using a rule-based advisory mechanism. Weather data integration allows farmers to receive timely alerts regarding rainfall, temperature variations, and extreme conditions, helping them reduce crop losses and improve productivity.

The platform also includes analytical dashboards that help farmers track sales performance, revenue trends, and order history. This enables farmers to make informed decisions based on real data rather than assumptions. Secure digital payment options further ensure timely and transparent financial transactions, increasing trust between farmers and customers.

Scalability:

Krushi Connect is designed to be scalable and adaptable to different regions and farming communities. The modular architecture allows the system to support a growing number of users, products, and transactions without affecting performance. It can be easily extended to include additional features such as mobile applications, image-based disease detection, and advanced AIbased advisory services.

Overall, Krushi Connect demonstrates how digital technology, automation, and intelligent decision support can be applied to modern agriculture. By reducing manual effort, improving market access, and providing real-time guidance, the platform contributes to increased farmer income, better productivity, and sustainable agricultural practices. The following sections of this paper discuss the system architecture, methodology, implementation details, and performance evaluation of the proposed platform.

2. Literature Review

Digital agriculture has emerged as a key solution to address the long-standing challenges faced by farmers, such as limited market access, low profit margins, and delayed information on crop management. Various studies have explored online marketplaces that allow farmers to sell their produce directly to consumers, reducing the reliance on intermediaries and improving price transparency. While these platforms improve market reach, most of them focus primarily on transactional features and lack integrated tools for real-time decision-making, crop advisory, and weather-based guidance.

Organizations like Food and Agriculture Organization (FAO) and research published through IEEE emphasize the significance of unified platforms that combine marketplace functionality with smart farming services. Features such as rule-based advisory systems, weather alerts, and data-driven analytics have been shown to enhance productivity, reduce crop losses, and empower farmers to make informed decisions. Moreover, scalable architectures and centralized databases are recommended to support growing user bases and high transaction volumes without compromising performance.

Despite the progress made by existing systems, a gap remains in offering a fully integrated solution that merges direct farmer–customer interaction, intelligent advisory, secure digital payments, and analytical insights. Krushi Connect is designed to fill this gap by providing a comprehensive digital platform that streamlines agricultural operations, improves transparency, and supports sustainable farming practices. By combining e-commerce, advisory services, and analytics in a single system, the platform not only simplifies farming workflows but also empowers farmers to maximize their income and productivity.

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3. Methodology

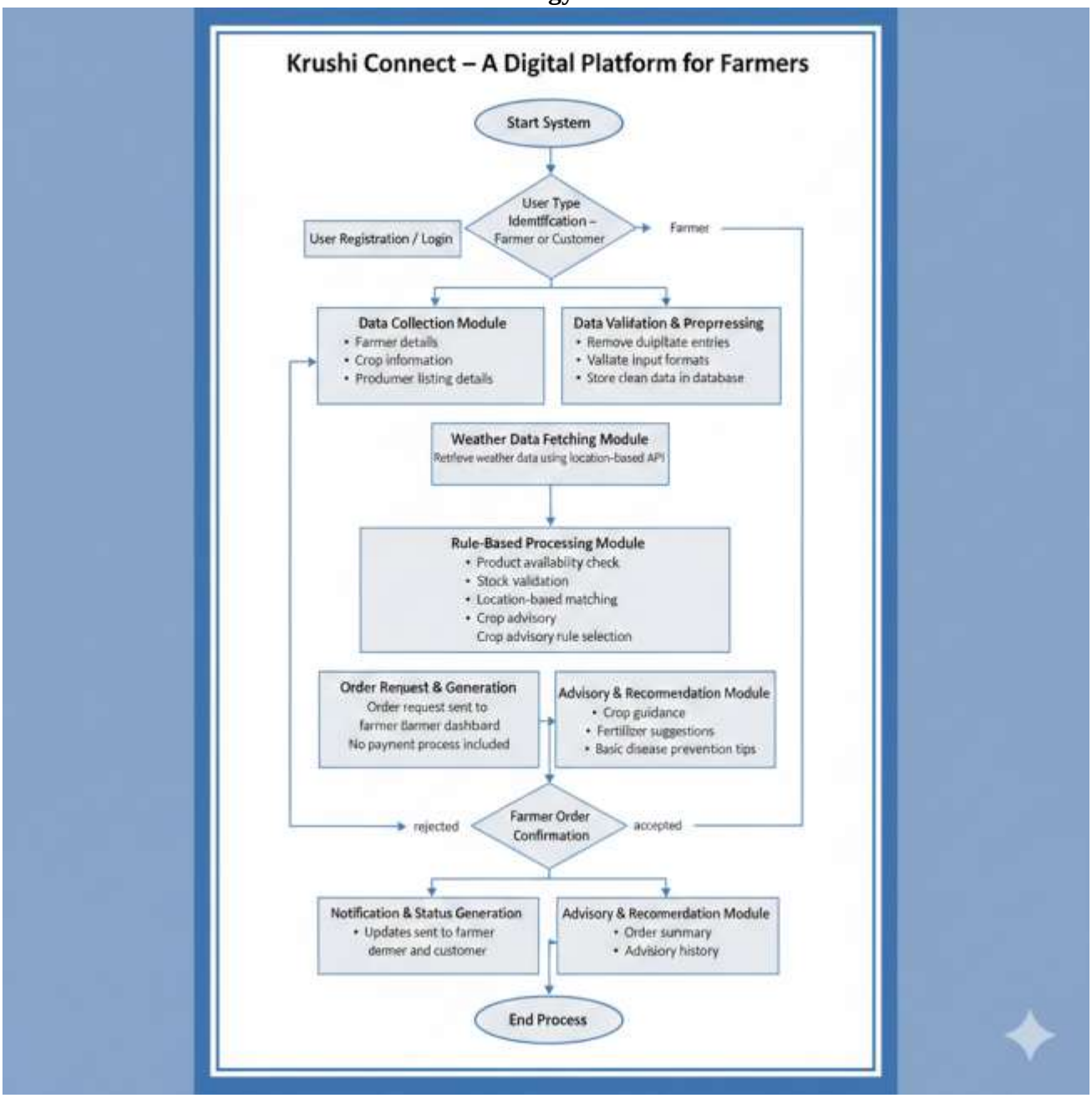

Fig.3.1 Methodology for Krushi-Connect

Krushi Connect – A Digital Platform for Farmers is an integrated agricultural support system designed to enhance farming efficiency through digital automation and intelligent processing. The platform enables secure user registration, structured data collection, and validation of crop and location details. It integrates real-time weather information to support environment-based decision-making and utilizes a rule-based processing engine for stock verification, price evaluation, and location matching. The system provides personalized crop advisory, disease prevention tips, and best farming practices. Additionally, it manages order requests, confirmations, and automated notifications, ensuring

transparency and seamless communication, thereby improving productivity, decision accuracy, and overall agricultural management efficiency.

3.1 System Architecture Design

The overall system is implemented using a centralized client–server architecture. The Presentation Layer provides role-based dashboards for farmers, customers, and administrators. The Application Layer handles business logic, order processing, advisory rules, and weather data integration. The Data Layer manages persistent storage of user profiles, product listings, transaction records, and advisory rules using a relational database management system.

A modular development approach is adopted to ensure scalability and future extensibility. Each module operates independently but communicates through defined interfaces and APIs. This structure enables smooth addition of new features such as AI-based disease detection or mobile application support without affecting existing functionalities.

3.2 Data Collection and Input Processing

The system accepts structured inputs from multiple stakeholders. Farmers register by providing personal details, farm location, crop categories, and bank/payment information. Customers create accounts to browse products and place orders. Product-related inputs include crop name, quantity, price per unit, and availability status.

Additionally, real-time weather information is fetched through external weather APIs based on the farmer's geographic location. All incoming data undergoes validation to prevent duplication, incorrect entries, and security vulnerabilities. Input validation mechanisms ensure data consistency and reliability before storage in the centralized database.

3.3 Marketplace and Order Management Module

The marketplace module enables farmers to upload and manage their product listings. Once a product is listed, it becomes visible to registered customers. When a customer places an order, the system automatically verifies stock availability using rule-based logic. If sufficient stock exists, the order is confirmed and inventory is updated dynamically.

The order processing workflow includes order placement, confirmation, payment verification, and status tracking. Automated notifications are generated to inform both farmers and customers about order updates. This reduces manual coordination and ensures transparent transaction handling.

3.4 Rule-Based Advisory Engine

A core component of Krushi Connect is the rule-based advisory engine. This module provides crop-specific recommendations based on predefined agricultural rules. The advisory system considers factors such as crop type, season, soil requirements, and weather conditions to generate suggestions related to fertilizer application, irrigation scheduling, and pest management.

The rule base is structured using conditional logic (IF–THEN rules), enabling the system to deliver consistent and standardized responses. Although the current implementation is deterministic, the modular design allows integration of machine learning algorithms in future versions for enhanced predictive accuracy.

3.5 Weather Integration and Alert Mechanism

The platform integrates real-time weather data through API services. Location-based weather parameters such as temperature, humidity, rainfall probability, and extreme weather warnings are retrieved periodically. The system processes this information to generate actionable alerts for farmers.

For example, predicted heavy rainfall triggers advisory messages related to drainage management, while high-temperature alerts recommend adjusted irrigation practices. This proactive notification system assists farmers in minimizing crop damage and improving productivity.

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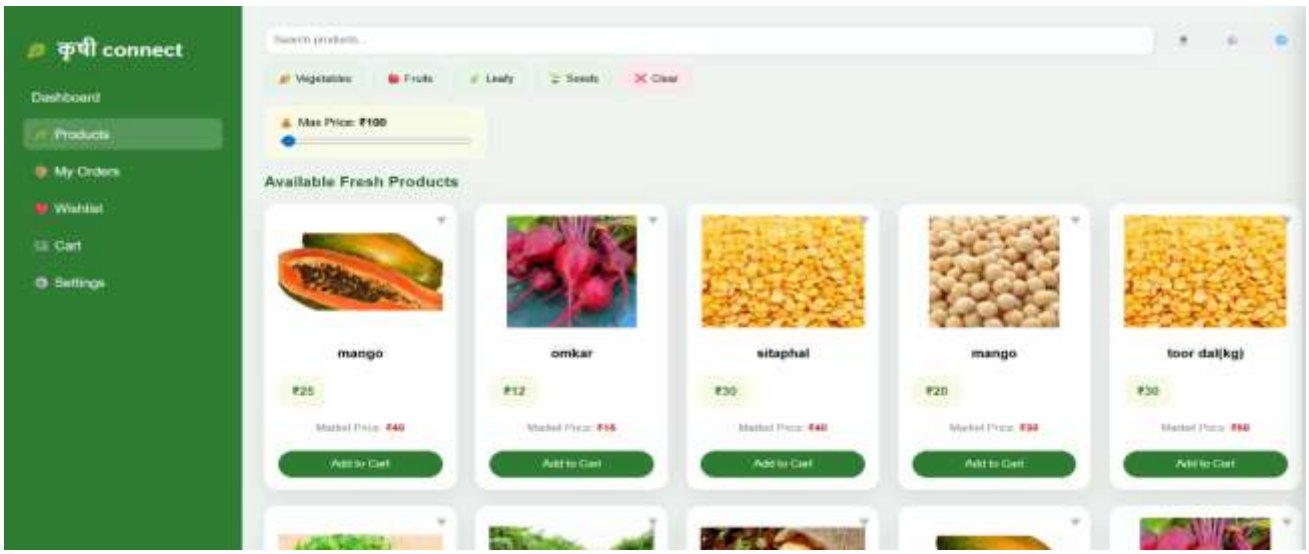
3.6 Performance and Scalability Considerations

The system is developed with scalability in mind. Database indexing, optimized queries, and



modular APIs ensure efficient handling of increasing users and transaction loads. The centralized database design supports concurrent access while maintaining data integrity. 4. RESULTS (Dashboard for Customer, Farmer and Admin)

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The Customer Panel of Krushi Connect provides a simple interface for customers to browse agricultural products, view farmer details, and place orders securely. It supports search, real-time stock validation, order tracking, and digital payments. The panel ensures transparency, efficient transactions, and smooth interaction between farmers and customers.

Fig.4.1 Customer Dashboard

The Farmer Dashboard in Krushi Connect enables farmers to manage product listings, update prices, and monitor stock availability efficiently. It allows order confirmation, status tracking, and revenue monitoring through a centralized interface. The dashboard also displays weather updates and advisory suggestions, helping farmers make informed decisions and improve overall productivity**.**

Fig.4.2 Farmer Dashboard

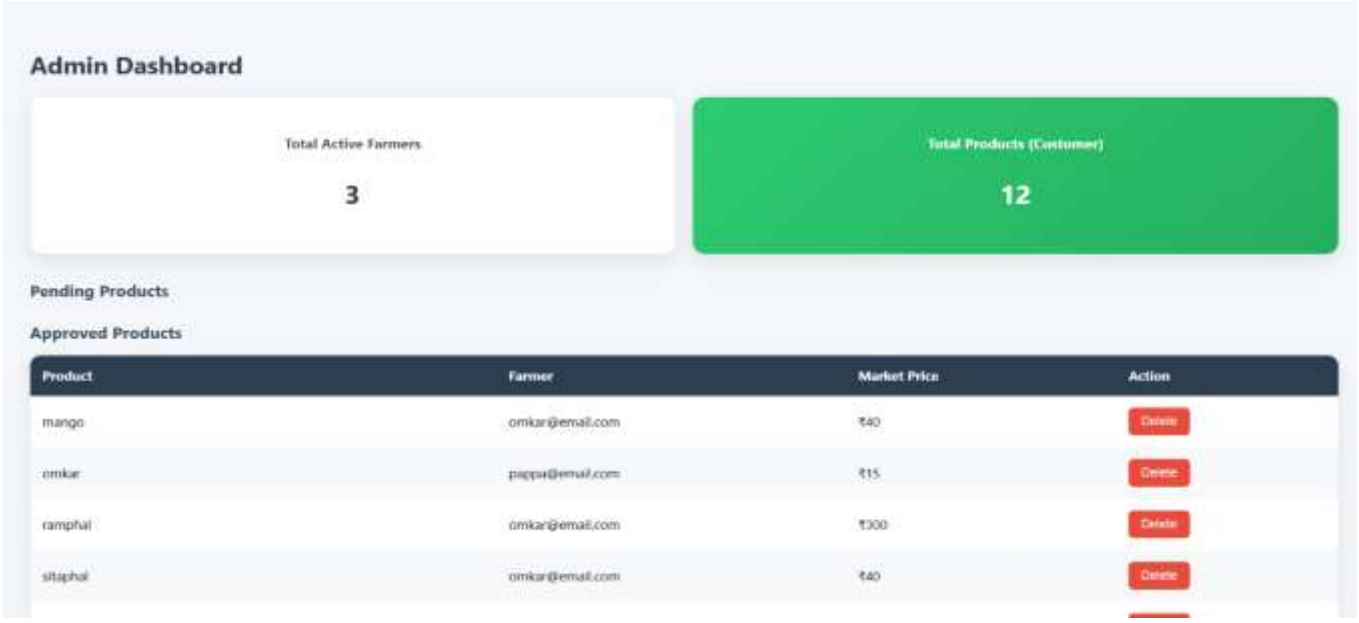

Fig.4.3 Admin Dashboard

The Admin Panel in Krushi Connect provides centralized control over the platform. Administrators can manage farmer and customer accounts, approve product listings, monitor transactions, and resolve disputes. The panel supports analytics dashboards, generates reports, and oversees rule-based advisory and weather alert systems, ensuring smooth operation, transparency, and overall platform governance.

4.1.1 Farmer Product Listing and Order Processing Efficiency

The analysis shows that the system efficiently handled farmer product listings and customer orders without conflicts or data inconsistency. Farmers were able to upload product details such as crop type,

quantity, price, and availability with minimal effort. Customer orders were processed automatically based on product availability, ensuring that no order exceeded the listed stock quantity.
Compared to conventional offline selling methods, the automated order flow reduced dependency on manual coordination and minimized pricing confusion. This resulted in better utilization of farmer resources and faster order confirmation.

4.1.2 Farmer–Customer Interaction

The system allows direct interaction between farmers and customers in a simple and clear way. Farmers can add products, check orders, and update availability without much effort. Customers are able to view products, see farmer details, and place orders easily.
This direct communication reduces confusion related to pricing and removes the need for middlemen. During testing, the interface was found to be easy to use, even for users with basic technical knowledge, which helped in reducing errors and improving overall user experience.
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4.1.3 Advisory System Accuracy and Information Reliability

The rule-based farming advisory module provided relevant and consistent recommendations based on user input. Queries related to crop care, fertilizer usage, and seasonal guidance were handled effectively using predefined logic. The responses generated were aligned with standard agricultural practices and helped farmers make informed decisions.
Although the advisory system is currently rule-based, the observed results indicate that it successfully supports farmers with basic guidance, especially those with limited access to expert consultation.

4.1.4 Weather Alert and Information Support

The integration of real-time weather data enhanced the usefulness of the platform. Farmers received location-based weather updates and alerts, which helped them plan irrigation and harvesting activities more effectively. The weather alerts were timely and matched the external data sources accurately. This feature reduced the risk of crop damage caused by unexpected weather changes and added practical value to daily farming operations.

4.1.5 Overall System Performance Discussion

The experimental results confirm that **Krushi Connect** significantly improves efficiency when compared to traditional agricultural selling and information-sharing practices. By combining digital product listing, automated order management, advisory support, weather updates, and secure payments into a single platform, the system reduces manual effort and increases operational transparency.
The unified structure of the platform allows farmers to manage multiple activities from a single interface, making it suitable for both small-scale farmers and larger agricultural producers. Overall, the system demonstrates strong potential for scalable deployment in real-world agricultural environments.

5.CONLUSION

Krushi Connect is a digital platform developed to create a direct connection between farmers and customers. Through this system, farmers can sell their products online without depending on

middlemen, which helps in improving price transparency and trust. The platform also provides basic weather updates and crop-related guidance that support farmers in planning their daily farming activities. The system is designed in a simple manner so that it can be easily used by farmers from different backgrounds. Overall, Krushi Connect helps in improving agricultural management and encourages farmers to adopt digital technology in their work.

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