KisanKart: A Web-Based Digital Marketplace for Direct Farmer-to-Consumer Trade

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Abstract

Agricultural marketing in developing economies is often constrained by fragmented supply chains, information asymmetry, and the dominance of intermediaries, which collectively reduce the revenue share received by farmers. This paper presents KisanKart, a web-based digital marketplace designed to establish direct commercial interaction between farmers and consumers.. Consumers can browse fresh produce; compare prices, place orders, and track purchase status in real time. The system is implemented using React.js for the client interface, Node.js with Express.js for backend services, and centralized database architecture for persistent data management. Experimental evaluation indicates improved pricing transparency, broader market accessibility, and reduced dependency on traditional middlemen. The proposed solution contributes to the advancement of digital agriculture by strengthening producer-consumer connectivity and improving supply-chain efficiency.

Keywords — Digital Agriculture, E-Commerce Platform, Farmer-to-Consumer Marketplace, Supply Chain Optimization, Web-Based System.

I. INTRODUCTION

Agriculture continues to be the primary source of income for a majority of developing nations. The local farmer's hard work, unfortunately, is often hindered by the many middlemen involved with traditional agricultural supply chains. Middlemen charge higher prices to consumers while taking a lower portion of the revenue generated by farmers. By participating in traditional markets, farmers typically operate under four major constraints: limited availability of price information; limited access to larger markets; reliance on local traders; and a poor supply chain model.

KisanKart is a proposed web-based agricultural marketplace that enables farmers to sell fruits, vegetables, and other produce directly to consumers. Through this platform, farmers can list products, receive orders, and accept payments eliminating unnecessary intermediaries.

II. LITERATURE SURVEY

Several researchers have explored web-based agricultural marketplace systems. Wolfert et al. [1] highlighted the potential of big data in smart farming to improve decision-making and market efficiency. Kamilaris et al. [2] reviewed the use of data analytics in agriculture, demonstrating opportunities for digital platforms to enhance supply chain transparency. Verdouw et al. [3] proposed Internet-of-Food frameworks that connect farms to consumers through digital infrastructure. Studies by Fountas et al. [4] examined farm management information systems and identified the need for end-to-end digital solutions. FAO [5] documented e-agriculture initiatives that improve rural market access. Mittal and Mehar [6] analyzed digital platforms for agricultural marketing in India, demonstrating that centralized online marketplaces can significantly reduce intermediary involvement. Khan and Khan [7] developed a web-based farmer-consumer interaction system with basic product listing and ordering features, though it lacked

real-time inventory and secure payment integration. Sharma and Singh.

III. PROPOSED SYSTEM

KisanKart is structured around three primary user modules: the Farmer Module, the Consumer Module, and the Admin Module. Together these modules handle all aspects of agricultural e-commerce from product listing to order fulfillment.

A. Farmer Module

In the proposed system, farmers are required to register on the platform by providing the necessary details. After successful registration, they can add product information such as crop type, price, quantity, and harvest availability. The module also allows farmers to update, edit, or remove their product listings.

B. Consumer Module

Consumers browse available agricultural products, compare prices across multiple farmers, and place orders directly.

processing.

C. Admin Module

The Admin Module oversees user registrations; product catalogues, and order processes. Administrators ensure platform integrity, resolve disputes, and monitor overall system performance.

D. System Architecture

The KisanKart architecture follows a three-tier model comprising:

(1) a React.js-based frontend for responsive user interfaces; (2) a Node.js/Express.js application server handling business logic, routing, and API management; and (3) a centralized database (MySQL or MongoDB) storing user profiles, product catalogues, and transaction records. Communication is secured via HTTPS. The backend integrates an Auth Service, Inventory Service, Order Service, Payment Gateway, and Delivery/Logistics module. Push notifications and SMS alerts keep farmers and consumers updated on order status in real time.

TABLE I. COMPARISON OF EXISTING SYSTEMS WITH KISANKART

Feature	Trad. Mkt	Existing Platform	Kisan Kart
Price Transparency	✗	Partial	✓
No Intermediaries	✗	Partial	✓
Real-time Inventory	✗	Partial	✓
Secure Auth	✗	Partial	✓
Multi-device Access	✗	✓	✓
Admin Dashboard	✗	Partial	✓
Direct Payment	✗	Partial	✓*

I. SOFTWARE REQUIREMENTS

A. Web Application Server

The platform is developed using Node.js**,** a high-performance JavaScript runtime environment capable of handling multiple concurrent user requests efficiently. Express.js is used as the middleware framework for routing, API development, request handling, user authentication, product management, and order

B. Frontend Technologies

The frontend interface is designed using HTML5, CSS3, JavaScript, and React.js**.** React.js provides a component-based architecture that enables the development of responsive and reusable user interface components. This ensures a smooth and consistent user experience across different screen sizes and devices.

C. Database Management System

KisanKart supports both MySQL (relational, structured data storage) and MongoDB (flexible NoSQL storage). The DBMS, stores user registrations, product descriptions, pricing, and order history.

D. User Authentication Module

Role-based access control restricts system functions to authorized users. Farmers manage product listings; consumers browse and order; administrators oversee the platform. Registration requires name, address, email, and phone number, with credentials stored securely.

E. Communication Protocols

HTTP and HTTPS protocols govern data transmission between client browsers and the server. HTTPS ensures encrypted, secure communication, protecting user credentials and transaction data from unauthorized access.

II. ADVANTAGES AND DISADVANTAGES

A. Advantages

KisanKart facilitates direct farmer-to-consumer trade, eliminating intermediaries and enabling fairer pricing. It provides price and quality transparency, extends rural farmers' market reach, and aids the digital transformation of the agricultural sector. The platform is accessible from any internet-connected device through an intuitive web interface.

B. Disadvantages and Limitations

The system's primary limitation is its dependence

on reliable internet connectivity, which may be unavailable in remote rural areas. Additionally, the current version requires further development in logistics management, large-scale payment gateway integration, and real-time inventory tracking.

IV. Results and Discussion

The KisanKart prototype was implemented and tested under controlled usage scenarios.

A. Functional Testing The system successfully supported user registration and login product listing by farmers browsing and search by consumers order placement admin monitoring

B. Performance testing the backend handled multiple concurrent sessions without noticeable performance degradation. Response times remained within acceptable limits for standard broadband environments.

C. Outcome Analysis Experimental evaluation suggests that the platform significantly improves pricing visibility and reduces the communication gap between farmers and consumers. Farmers gained better control over selling prices, while consumers benefited from fresh produce at comparatively lower costs.

Fig 3.1: Landing Page

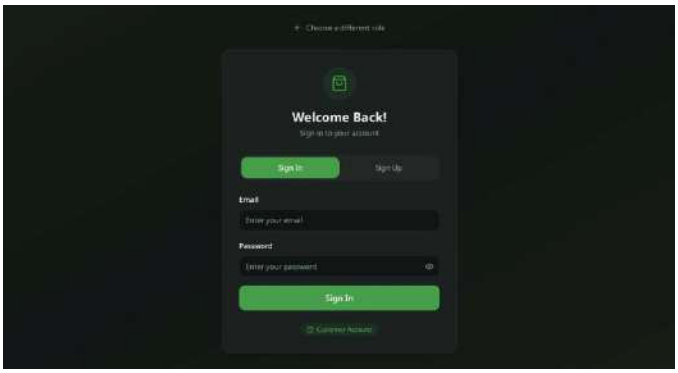

Fig 3.2: Login Page (Customer)

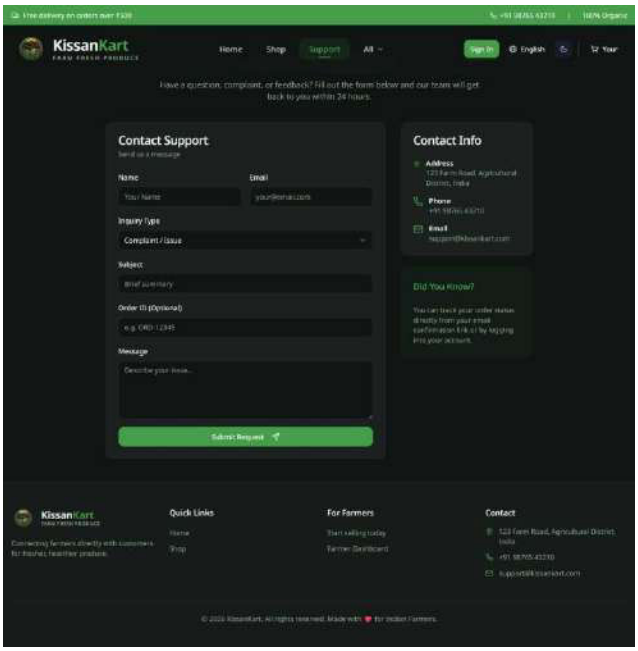

Fig 3.3: Contact Support

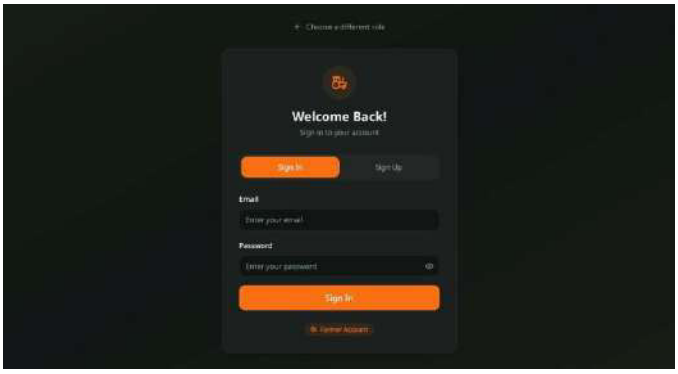

Fig 3.4: Login Page (Farmer)

V. Conclusion

This paper presented KisanKart, a web-based agricultural marketplace developed to enable direct interaction between farmers and consumers. The system effectively addresses key limitations of traditional agricultural supply chains by improving transparency, accessibility, and transaction efficiency. The proposed architecture demonstrates that modern web technologies can be successfully applied to digital agriculture and rural commerce. Future enhancements may include: integrated payment gateway real-time delivery tracking AI-based price prediction multilingual support mobile application deployment government subsidy portal integration these extensions can further strengthen the platform's real-world applicability and scalability

The results obtained from the prototype testing indicate that the platform successfully supports farmer registration, product listing, consumer order placement, and administrative monitoring in a scalable and efficient manner. As future work, the system can be further enhanced by integrating a dedicated mobile application**,** secure online payment gateway**,** real-time delivery tracking**,** AI-based price prediction**,** and multilingual language support to improve usability across diverse user groups. Integration with government agricultural schemes and subsidy programs can also increase the practical impact of the platform.

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