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SMART FARMER-INDUSTRY LINK SYSTEM

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Abstract: Most farmers in india face the problem of not being able to reach industries directly and, therefore, are paid belatedly and inconsistently. The smart farmer-industry link system is a web-based system exclusively aimed at bridging this gap by allowing farmers to upload crop details and industries to directly request and negotiate the produce. It is integrated with real-time notifications, secure authentication, and an admin dashboard for activity monitoring. Further, it will be developed using html, css, and javascript; thus, it has a user-friendly interface that guarantees reliability in communication and further ensures transparency in transactions. This paper presents the system architecture, implementation details, results, and future enhancements toward promoting digital agriculture and efficient farmer-industry collaboration.

Index terms: smart agriculture, farmer-industry linkage, web application, digital marketplace, crop management.

INTRODUCTION

Even today, agriculture is the mainstay of the majority of people in india. The traditional marketing channels contain middlemen, decreasing profits to the farmer and developing an inconsistent supply for industries. A digital solution can connect farmers directly to industries, removing such problems while ensuring fair pricing and increased efficiency along the supply chain.

The smart farmer-industry link system is a web-based portal that allows farmers to register themselves, upload crop details, and check the demand of the industries. Industries can browse the crops, make offers, and close the deal directly with the farmer. An admin module allows monitoring the users, transactions, and health of the platform.

The key objectives are:

To directly create a channel between farmers and industries.
Ensuring transparent pricing and showing the real-time availability of crops.
To provide an admin dashboard for monitoring and analytics.

II. LITERATURE SURVEY

Following are a few of the existing solutions addressing digital agriculture partially:
Patil et al. (2023): web-based crop advisory was the focus, but there were lacking industrial linkages.
Kumar and reddy (2022): designed a mobile farmer-market platform, but with no real-time communication.
Chauhan et al. (2024) utilized blockchain for tracking crops, but its scalability was limited.
The existing systems either target farmers directly or focus on the consumer marketplace. A limited set of platforms provides structured interactions between farmers and industries. This gap will be bridged by the proposed system through direct communication, secured transactions, and an analytics module.

III. SYSTEM DESIGN AND IMPLEMENTATION

The system uses a three-tier web architecture.

A. System architecture
Figure 1: smart farmer-industry link system architecture (frontend, backend, database)
Farmer module: registration, uploading crop details, viewing industry requirements.
Industry module: post crop requirements, browse farmers, negotiate prices.
Admin module: user verification, transaction tracking, analytics.

B. Frontend design: html, css, javascript
Registration & login: secure login for farmers, industries, and admin.

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Crops & dashboard upload: farmers upload the type of crop, quantity, harvest date, and expected price.
Search & filter: industries search for crops based on type, location, and quantity.
Real-time notifications on offers, requests, and messages.

C. Backend (javascript logic)

Authentication: it allows for role-based login to ensure that farmer, industry, and admin pages are correctly accessed.
Data storage: crops, user information, and transaction records will be stored in arrays/json objects in javascript for this project.
Security features: input validation prevents invalid entries; features are only accessible to authorized users.

D. Functional modules

Farmer module: Register/login securely Upload and update crop details View industry requests and offers
Industry module: Login/registration Post crop requirements Buy directly from the farm

Admin module: Monitor users and transactions Verify crop and industry requests Provide overall analytics and reports.

SECURITY AND SCALABILITY

Data security: passwords stored securely; input validation included.
Role-based access provides proper separation of farmer, industry, and admin roles.
Scalability: while it has been implemented as a web-based system, future upgrades can include database integration and server hosting for multiple concurrent users.

V. RESULTS AND DISCUSSION

User interface: simple, intuitive, and responsive in desktop browsers.
Functionality: farmers can successfully upload their crops and receive requests from the industry. Industries can upload their requirements and contact several farmers. Admin can monitor system health and track transactions.
Performance: real-time response to the different actions, such as uploading a crop, searching, and notification, tested on a local system. The users felt that they could easily navigate and that the flow of interaction was clear. The system decreases dependence on intermediaries and increases transparency, thereby simplifying farmer–industry collaboration.

VI. CONCLUSION AND FUTURE WORK

The proposed smart farmer-industry link system will showcase how its web-based platform can link farmers and industries in a digital manner to ensure that trade is conducted fairly and efficiently.

Future enhancements:
Provide a mobile app for on-field access.
Integrate the database backend using mysql/mongodb for persistent storage and multi-user scalability.
Include the analytics module for crop trends, demand prediction, and pricing recommendations.
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