

Blockchain in Agriculture Supply Chain Management

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Abstract: *The rise in the number of brokers has led to price increases in the agricultural goods market. These intermediaries purchase products from farmers at reduced prices and resell them to consumers at a higher rate. This practice disadvantages farmers, while consumers end up paying excessive prices for essential goods. This study proposes the development of an e-commerce mobile and web application called 'e-Farmers' Hut' to enable direct interaction between producers and consumers. The goal of the application is to maximize benefits for both farmers and customers by eliminating the role of middlemen. Both the mobile and web platforms share a common database, with separate profiles for farmers and customers, where they can submit relevant information. Additionally, the platform incorporates an electronic payment system to optimize convenience. Customers can browse lists of available products posted by verified farmers. The application has successfully passed the testing phase, delivering expected results. This technology has the potential to significantly streamline direct sales and purchases of agricultural products between farmers and consumers. it is not practical for farmers to reach all merchants in person due to the significant time and effort involved, especially given the limited time farmers have, traditional methods have restricted their access to a broader range of clients (merchants). This has resulted in fewer opportunities for farmers to sell their crops in the market. By integrating a blockchain-based marketing system, farmers can sell their products at various stages of the supply chain—whether to merchants, markets, or directly to end consumers—while having access to multiple selling options. This new approach ensures transparency, enhances trust, and allows farmers to reach a wider market efficiently without the need for intermediaries.*

Keywords: Databases, Market research, Agricultural products, Electronic commerce, Informatics, Consumer electronics

I. INTRODUCTION

E-commerce is clearly beginning to have a major impact in the agricultural sector. The way people go about purchasing agricultural products is of great concern. Most of the time customers have to travel far distances to get agricultural products and getting the right quality is not ensured. Our project aims to help farmers as well as customers for buying and selling agricultural products across the country using a computerized approach. The website will guide the farmers to access new farming techniques, compare current market rate of different product. New opportunities are shaped by smart phone technology for farmers are capable with a low cost smart phone and the particular software to gain facilities which couldn't available on their hands before. In the bays of financial crises, farming is becoming more and more vigorous and much more important to him completed efficiently during the time period. Several mobile applications have been developed for livestock management, agro mobile, etc. this paper deals with the analysis of available android based applications which are useful for farmers. There are different e-commerce systems both for B2B and for B2C-relations, e.g. for NHPAP. Moreover, tailored applications for customer relationship[1].

Management, supply chain management and business intelligence are available. However, all these systems only Support electronic trading of physical objects that are mostly branded goods, world-wide known and available anytime and anywhere at equal conditions and quality. Only very few experiences are available for electronic sales and marketing of the product "service", in particular, of a unique service as it is in the case of assistances or Services.

Available ecommerce solutions are often restricted to calls for tender based on simple questionnaires. typical characteristics of e-commerce systems for products versus services. Online you have the ability to provide detailed descriptions and photos for each of your products. You can also easily direct consumers to other content on your website that shows how the product can be used (in recipes, displays, plantings, etc.)[2].

Suggestions for additional or complimentary products can also be facilitated through product descriptions, photos and videos, or platform intelligence features. These advantages do come with an associated time requirement which is one of the challenges you'll face. Think about your in-person customers. What percentage of those customers do you estimate to be one-time visitors? Perhaps they stopped at your farm business while taking a long weekend drive or while visiting from out of state. If they really enjoyed their experience and your products, wouldn't you like to capture some portion of their future expenditures by having your products available to them after they return home? Like the previous point on expanded customer base, think of customers (both current and potential) that due to work or home schedules are unable to regularly visit your place of business. E-commerce offers them the convenience to purchase when their ability allows.[3].

II. LITERATURE SURVEY

1] A smart farming system using Arduino based technology

Internet of Things" (IoT) is a technology that permits things to communicate and connect with each other. This is helpful in changing the patterns and processes in both industry and agriculture towards higher efficiency. A system is proposed which describes the smart farming in order to improve the production process in planting. Smart farming consists of two main parts which are a sensor system and a control system. Sensor system consists of a set of tools to obtain the sensed values. Control system involves a blower, watering and roofing system operated on a human interface. Two Arduino boards are programmed for sensing and the controlling system.

Agriculture is one of the important businesses that mainly affects the mankind. From the ancient to the agricultural revolution in Great Britain England, farming is the way that human used to harvest plants and consumed them in their daily life. Farming has been improved by many technologies supporting cropping system. In addition to the technologies in the agricultural revolution era, there have been many technologies that have impacts on agriculture such as harvest machine, seed drill machine, reaper machine, and the others that can reduce manpower and waste time. Recently, there are few research works on smart farming. A wireless sensor network is used in potato fields in Egypt. The proposed system was used to monitor the potato fields such as looking for diseases and harmful fungi and record useful information for improving future planting and managing resources such as water and soil[1].

2] E-FARMING

Farming is the Prime Occupation in India in spite of this, today the people involved in farming belongs to the lower class and is in deep poverty. The Advanced techniques and the Automated machines which are leading the world to new heights, is been lagging when it is concerned to Farming, either the lack of awareness of the advanced facilities or the unavailability leads to the poverty in Farming. Even after all the hard work and the production done by the farmers, in today's market the farmers are cheated by the Agents, leading to the poverty. Agromarketing would make all the things automatic which make easier serving as a best solution to all the problems. E-farming will serve as a way for the farmers to sell their products across the country just with some basic knowledge about how to use the website. The site will guide the farmers in all the aspects, the current market rate of different products, the total sale and the earned profit for the sold products, access to the new farming techniques through elearning and centralized approach to view different government's agriculture schemes including the compensation schemes for farming. Getting availed to the required information related to the markets and different products can be made possible through the SMS facility provided by the system[2].

3] E-trading of Agricultural Products from Farm to Customer Application

In our day to day life we consume food and our survival is based on mainly food. A considerable amount of our food is coming from farms and other means too. These farmers do their hard work for growing and serving many lives across the country, which pays for their source of income. But due to intermediates in the selling of their final products the

farmers are unable to make their profit and mostly live poor. By this project we will be able to connect farmers directly to the customer so that direct dealing of products can be accomplished. This will result in a significant decrease in the prices of the products currently available in the market as well as the profit will directly reach the farmers pocket. We are surrounded by technology but there are many people who are still unaware of the benefits of this technology or its use, by the help of this project and the support for the awareness of the projects many farmers will be able to use as well as will be taught how to use this application with its benefits[3].

III. PURPOSE

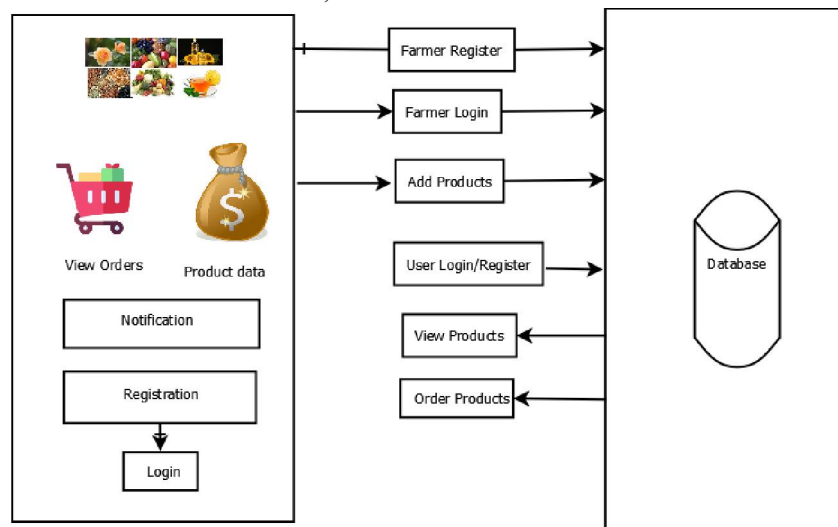
The aim of the present work is therefore to propose and experimentally evaluate an automated system, Now a day is very difficult to farmers to sell their product so our purpose to provide best and secure platform so farmers can sell their product online

IV. OBJECTIVE OF SYSTEM

- Develop and evaluate an automated e-commerce platform for farmers.
- Provide a secure and user-friendly platform for farmers to sell their products online.
- Address the challenges farmers face in reaching broader markets.
- Facilitate direct transactions between farmers and buyers, minimizing the need for intermediaries.
- Enhance farmers' access to more selling opportunities and increase their income potential.
- Ensure the platform offers a reliable and efficient solution for online sales of agricultural products.

V. PROPOSED SYSTEM

The proposed system is an innovative e-commerce platform designed to connect farmers directly with customers using blockchain technology. This system aims to address the challenges faced by farmers in accessing wider markets while ensuring transparency, security, and trust in the entire transaction process. The platform consists of two primary modules, one for farmers and one for customers, each with distinct functionalities.



SYSTEM ARCHITECTURE

Android Farmer Module

- **Registration:** Farmers create a secure account using blockchain-based verification. The blockchain ensures that each farmer's identity is securely recorded and cannot be tampered with.
- **Login:** Farmers log into their account with the assurance that blockchain ensures the security and privacy of their login credentials.

- **Add Products:** When farmers add products, blockchain records each listing as a **smart contract** that is securely stored on the blockchain, making the transaction details immutable and verifiable by anyone.
- **Land on Lease:** Blockchain ensures secure agreements and transparent terms for leasing land. Both the farmer and lessee can use smart contracts to ensure all conditions are met before finalizing the deal.
- **View Products:** Farmers can view their product listings, which are permanently recorded and timestamped on the blockchain, ensuring that no unauthorized changes can be made.
- **View Orders:** Farmers can track orders on the blockchain, which provides a transparent view of the entire transaction history, ensuring the accuracy and trustworthiness of the process.
- **View Notification:** Notifications could include updates on transactions, new orders, or system changes, all verified through blockchain to ensure they are legitimate and secure.

Android User Module

- **Register:** Customers register securely, with their identity being verified and stored on the blockchain, ensuring that all transactions are secure and traceable.
- **Login:** Blockchain secures customer login details, protecting their accounts from hacking or data breaches.
- **View Products:** Customers can browse products with the assurance that all listings are transparent and legitimate, thanks to the blockchain, which verifies product origins and ensures authenticity.
- **Place Order:** When placing orders, smart contracts handle the transaction. These contracts guarantee that the farmer gets paid once the customer receives the product, ensuring trust on both sides. Blockchain records the entire transaction process, making it secure and tamper-proof.

VI. CONCLUSION

The **Farmer-to-Consumer Agriculture System** provides an innovative solution for streamlining the agricultural supply chain by directly connecting farmers with consumers. This system eliminates intermediaries, ensuring more transparency, fair pricing, and greater profitability for farmers while giving consumers access to fresh, locally sourced products.

VII. ACKNOWLEDGMENT

We express our heartfelt gratitude to our esteemed mentors and professors, especially, for their invaluable guidance in our academic and project endeavours. We also extend our thanks to the Computer Department and its staff for their continuous support. Our sincere thanks go to Principal of Loknete Gopinathji Munde institute of engineering education and research, Nashik for his support and permission to complete this project. We appreciate the assistance of our department's support staff, and we're grateful to our parents, friends, and all those who supported us throughout this project.

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