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Supply Chain for Agri-Food Using Blockchain

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ABSTRACT —

The whole blockchain-based supply chain for agriculture and food (agri-food) has been repaired. It uses smart contracts and other fundamental aspects of blockchain technology, both of which are prevalent in blockchain networks. The workings of blockchain technology, its potential applications or effects on present SCM Registry systems, as well as the function of legal experts, are detailed in this article. The growth of blockchain is negative for anyone involved in the trust industry, especially for government entities that are considered reliable enough to handle transactions. For the agri-food supply chain to assure traceability, trust, and distribution mechanisms, a reliable system is required. All transactions in the suggested arrangement are recorded on the blockchain, transferring the data to the Interplanetary File..

Keywords: Accountability, blockchain, reliable, reputation, supply chain, traceability, trust.

1. INTRODUCTION

In managing food quality and safety, traceability is crucial. Current supply chain management practises include tracking items and processes across intricate supply chain networks. Technology based on blocks: A block-chain is a shared database across a number of computers. It is highly challenging to modify a record once it has been added to the chain. The phrase "blockchain technology" often refers to the open, verifiable, and publicly accessible ledger that enables private key encryption and proof of work techniques to securely transfer ownership of units of value. The network is maintained by the technology via decentralized consensus, so a bank, company, or government does not have centralized control over it.

In reality, as a network expands and becomes more decentralized, the more secure it gets. The blockchain networking system is what the control, configuration, and administration are built on. The architecture for distributed computing is fully virtualized and offers possibilities for hierarchical computing. By identifying potential Blockchain use cases in banking transactions, providing a case study that uses Blockchain technology, and assessing design considerations when applying this technology in transactions, this study focuses on the applicability of blockchain technology in banking transactions.

2. SYSTEM ARCHITECTURE

In this section, we have offered a traceability system for tracing agri-food items digitally from the point of origin to the final customer. To enable secure trading between entities of the agri-food supply chain, our system introduces a trading and delivery mechanism. For the confirmation of these entities' credibility, a reputation system is also utilised. The proposed model is divided into three layers and uses a layered architecture. The data layer, which is the top layer, manages interactions within the agri-food supply chains. In these encounters, products are traded accompanied with evidence of an auditable delivery. The blockchain layer, which manages the transactional data for the trade and delivery events, is the second layer. It also monitors the standing of the system's participating entities. The real data is saved on the third tier, known as the storage layer, in order to increase storage capacity. The blockchain layer just retains hashes of the data. Strict access control policies are implemented at the blockchain layer to stop unauthorized reads and writes to the storage layer. The third tier, which is effectively the storage layer, is entirely in charge of storing the blockchain's transactions and events data on IPFS. Given that IPFS is a decentralized storage system, it benefits the suggested system by enhancing its scalability, low latency, and high throughput. The next sections go into further detail on how the proposed system implements traceability. Additionally, they describe the transactions that take place between the participants in the agri-food supply chain and the means of

product delivery that can be verified. Finally, they describe the operation and advantages of the reputation system in relation to the suggested system.

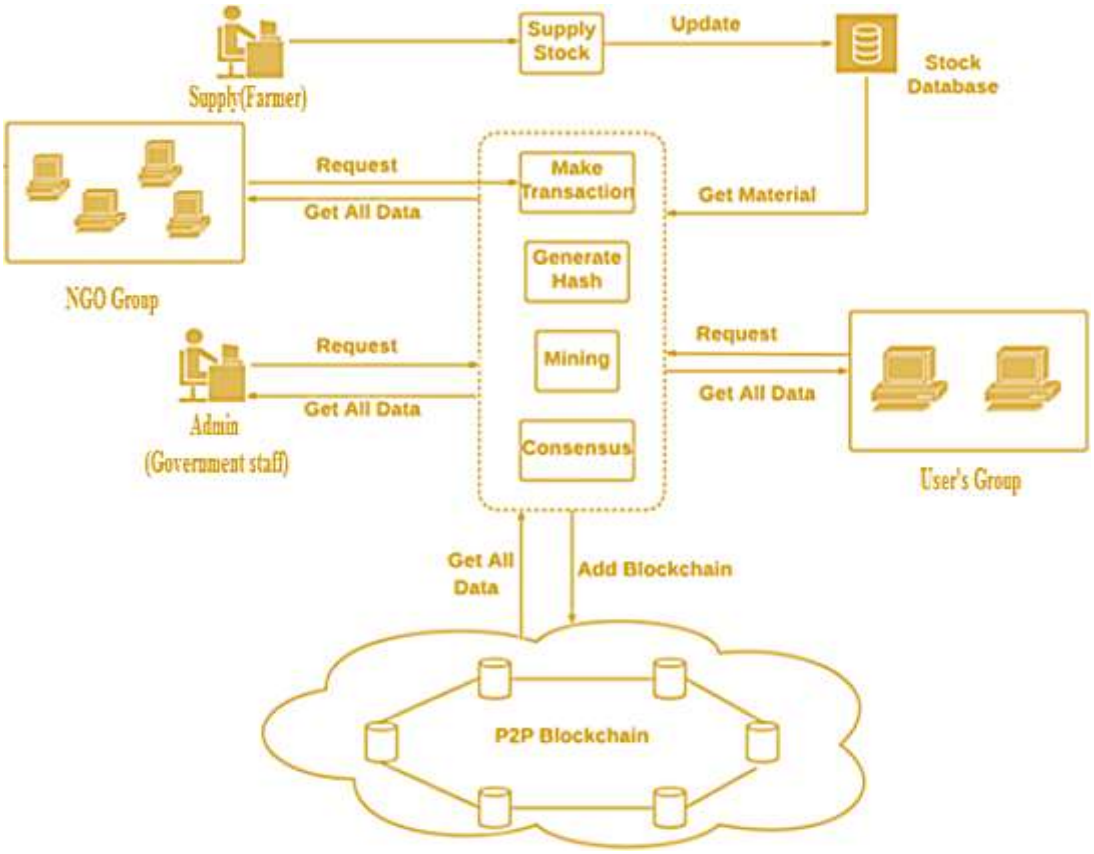

Figure 1. System Architecture

3. SIMULATION AND RESULTS

Login Page: Here we can login according to our roll by selecting the roll (from drop down list). After Selecting Roll enter User Name and Password. Which is created at the time of the registration.

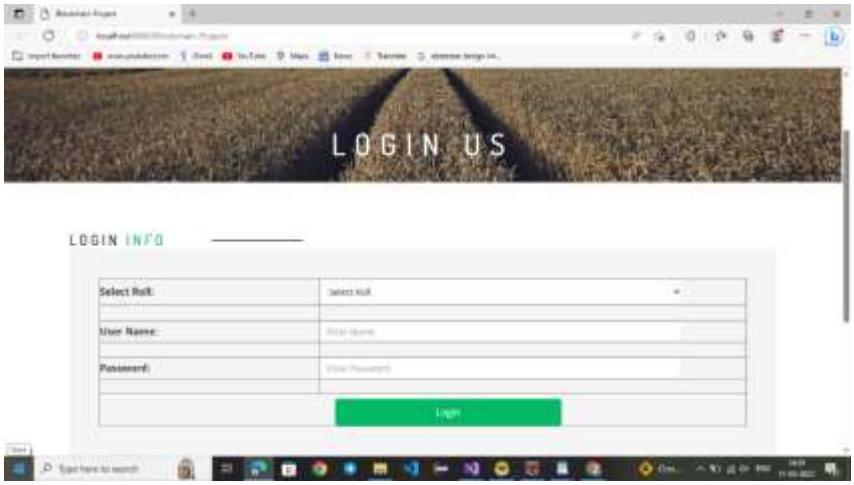

Figure 2: Login Page

Farmer Page: After login as Farmer dashboard will be open as shown in the Figure 3. In the menu bar there is some sections such as-

Add Product: Farmer can add their products like rice, grains etc. with their details. So, the buyers can see the product details and buy.

Show Product: In this section all the product will display in table format.

Show Transaction: Here all the transaction made by distributers and farmer will be display.

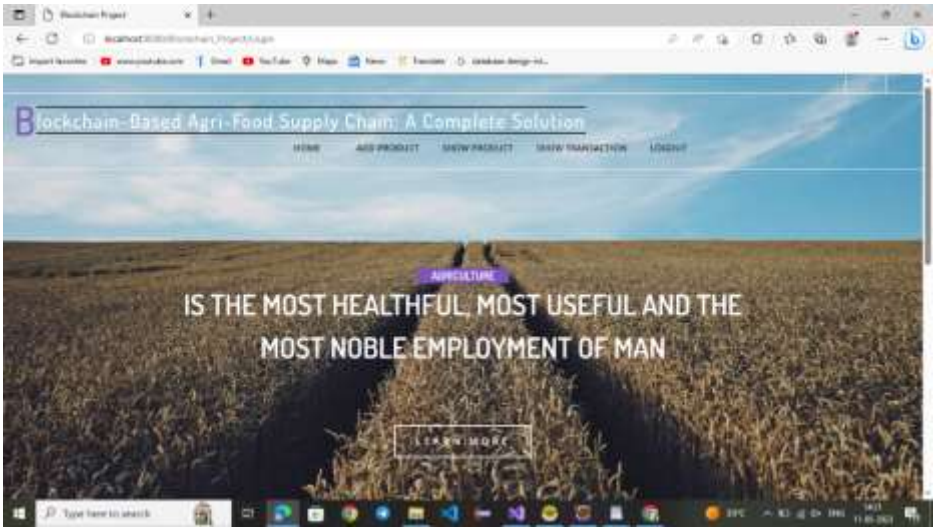

Figure 3. Farmer Page

Farming will be divided into 4 different parts according to that you can distribute and sell the product.

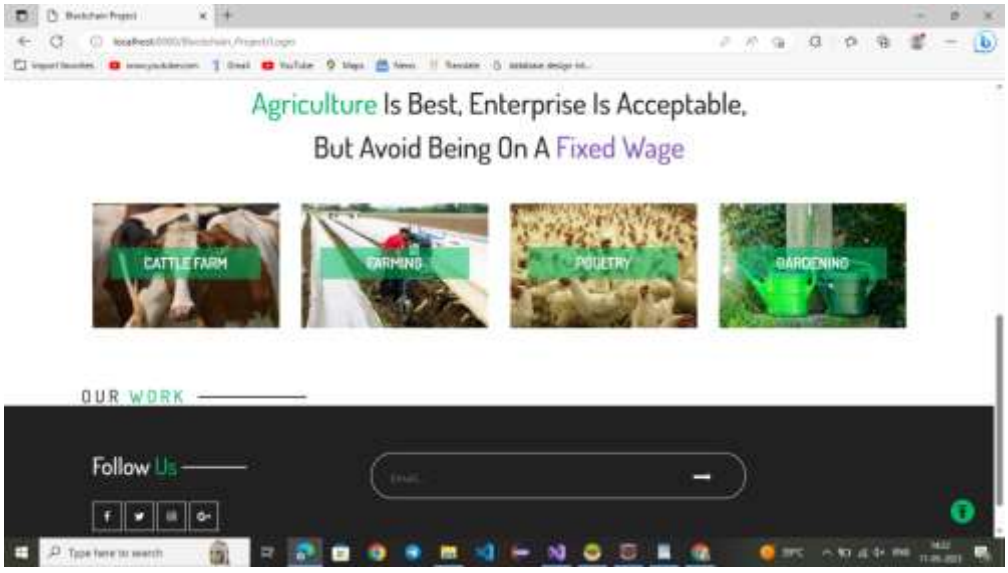

Figure 4. Farmer Page

Distributer Page: After Login as a Distributer dashboard will be open as shown in figure 5. There is sub sections of Distributers to do operations.

1. Add Product: Distributer also can add Products and their details.
2. Search: Distributers can search the product to distribute to customer and see details of the products. If that particular product is available or not and how many quantity will remaining.
3. Update Product: If product is available in more quantity distributer can update the product details according to the use.
4. Show Product: Distributer can also see the product details.

5. Show Transaction: In this section, all transaction done by the farmer-Distributer-customer will be display.

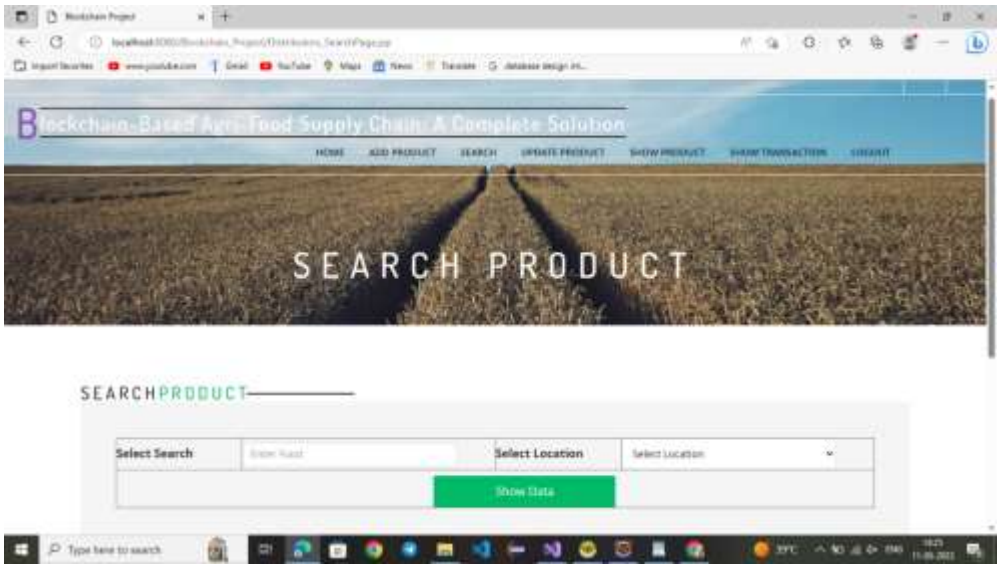

Figure 5. Distributer Page

Customer Page: After selecting roll as customer and login using User Name and password the dashboard will be open as shown in the Figure 6.

1. Search: In the section, Customer can search the product then the product details will be display in table format.
2. Show Product: In this product details will be display as shown in the Figure 7.

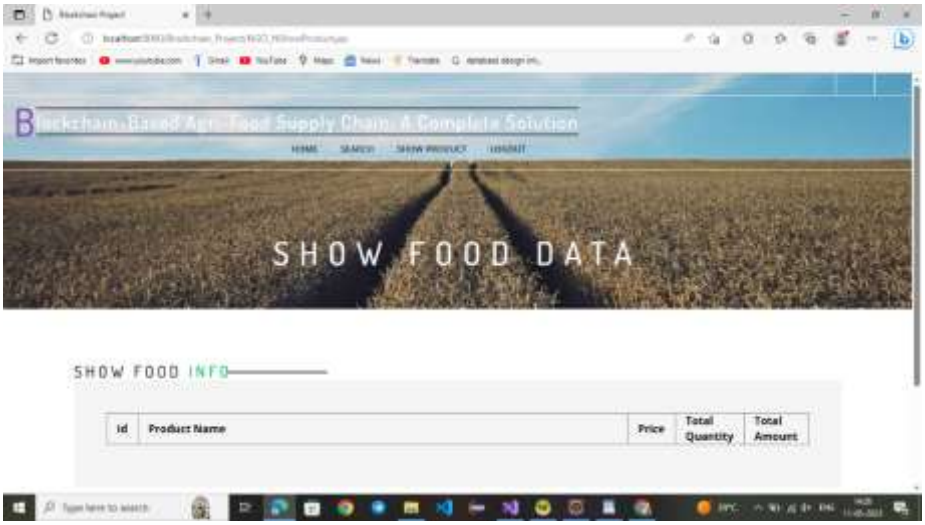

Figure 6. Customer Page

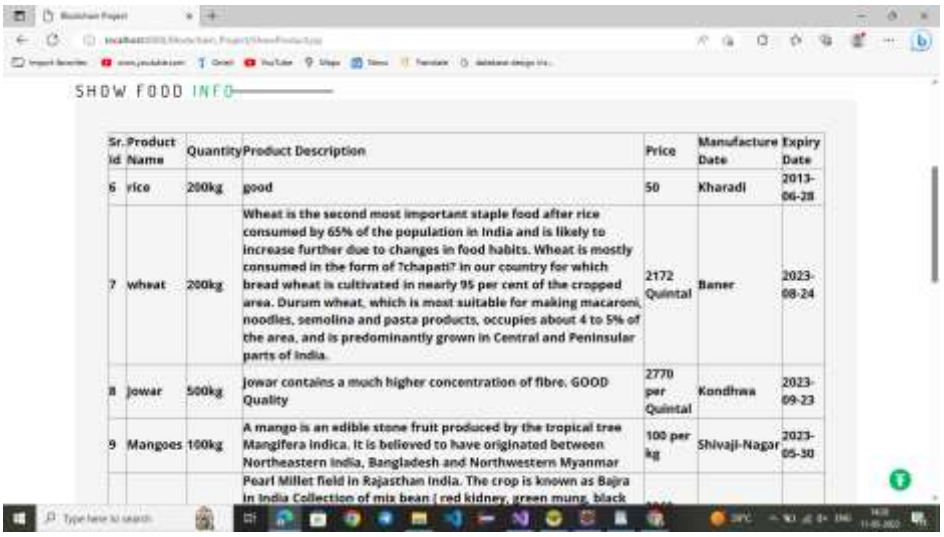

Figure 7. Product Info

4. CONCLUSION AND FUTURE SCOPE

We can implement an online system that would aid in the selling and buy- ing of agricultural products with good cost estimation and safety aspects in mind, as well as good quality processed food for the needy. We can use the required hardware and software to implement an online system that would help in the selling and buying of agricultural products with good cost estimation and safety aspects in mind, as well as good quality processed food for the needy. This system would benefit farmers, consumers, government workers, and non-governmental organizations. Due to the size of this business and the demand for more reliable and efficient information management solutions, there are several research suggestions for using blockchain technology into agri-food supply chain transactions.

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