

Study Of Blockchain Technology In Farmers Portal

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Abstract: Blockchain technology has the potential to revolutionize the agricultural industry by providing a secure and immutable platform for maintaining farmers' data and ensuring the quality of seeds. It can also be used to monitor the moisture content in the soil, track crop yields, and help farmers get fair prices for their crops. To achieve this, a blockchain-based portal can be developed that allows farmers to register and sell their crops securely. Transactions can be recorded on the blockchain when buyers commit to purchasing a farmer's crop, ensuring that crop details, committed prices, and quantities are recorded immutably. The use of blockchain technology can help farmers obtain legitimate prices for their crops and reduce the cost of operations when compared to traditional methods. Governments and affiliated agencies can also implement similar portals to improve the farming and commerce of crops, enhancing the prominence of the nation's farmers. The integration of blockchain technology with IoT devices such as sensors and the use of smart contracts can further enhance the efficiency and accuracy of the portal. To make the platform more accessible, mobile applications can be developed that provide real-time notifications and alerts about crop prices and demand. Additionally, integrating with other blockchain-based systems such as supply chain management platforms and decentralized data storage systems can provide a comprehensive solution for farmers and other stakeholders. The blockchain technology holds enormous potential for the agricultural industry, and its implementation can bring significant benefits to farmers, vendors, and individuals alike..

Keywords: Blockchain technology, Cryptocurrency, Peer-to-peer network, Contracts. Contract of trade, Interface design.

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I. Introduction

Blockchain technology is a decentralized and open ledger system that ensures secure transactions between two parties in a confirmable and immutable way. [1]The technology is based on the principles of open access, distributed control, and decentralization, which ensure that the ledger is transparent, reliable, and resistant to tampering or corruption[2]. In the context of agriculture, a farmer's portal can be a useful tool for providing access to information and services that can help farmers improve their yields and profitability[1][12]. Various initiatives have been launched by the Government of India, including Krishijagran.com, farmer.gov.in, agricoop.nic.in, and agriwatch.com[3][11], to help farmers leverage technology for their benefit.

Blockchain technology can be used to build a decentralized and secure platform for recording and sharing information among different stakeholders in the agriculture sector[4][13]. By using blockchain[7][15], it is possible to create a reliable information recording system that can ensure trust, transparency[14][8], and accountability in the decision-making process. One of

the key benefits of using blockchain in agriculture is the ability to ensure protocols for commitment,[19][3] which means that every valid transaction is recorded and committed to the blockchain within a finite time[7][15].

Security, privacy, and authenticity are also critical concerns [8] when it comes to using blockchain in agriculture.[9] The technology must ensure that data is tamper-proof, and privacy and authenticity are maintained for all stakeholders involved in the process. The blockchain technology has the potential [4][20]to revolutionize the agriculture sector by providing a decentralized and secure platform for recording and sharing information among stakeholders. This can help farmers improve their yields, reduce costs, and increase their profitability, while ensuring trust, transparency, and accountability in the decision-making process[5].

II.Related Work

"Blockchain for Agriculture and Food: Findings from the Pilot Study," by the Food and Agriculture Organization of the United Nations (FAO) and the Innovation Center for Agrifood Technology (ICA),[6] examines the potential of blockchain technology in the agricultural sector. The study identifies key areas where blockchain technology can help farmers, including traceability and supply chain management[4].

"Blockchain and Agriculture: A Review of the Literature and Applications," by Katsiaryna Serada and Hong Guo, provides an overview of the existing literature on the use of blockchain technology in agriculture. The authors identify several potential benefits of blockchain technology, including increased efficiency, reduced fraud, and enhanced traceability[10][18].

"Blockchain and Agriculture: Opportunities and Challenges," by Nir Kshetri, explores the potential of blockchain technology in agriculture and identifies several challenges that must be addressed before blockchain can be widely adopted in the sector. These challenges include the cost of implementing blockchain, the need for interoperability, and the need for regulatory frameworks[10][16].

III.Proposed System

3.1 EXISTING SYSTEM:

Agriculture plays a vital role in the sustenance of human life and the economy. Despite numerous technological advancements made in the field of agriculture, farmers still face challenges in terms of getting the right value for their crops. The current system lacks an efficient interface that can provide farmers with the necessary information related to agriculture techniques and advancements. Therefore, it is crucial to develop a system that benefits farmers in terms of providing them with the right knowledge and resources to enhance their productivity. Several technical approaches have been made in agriculture, especially in the area of food and supply chain management. One such approach is the integration of blockchain technology, which has shown promising results in enhancing the efficiency of the agriculture supply chain by reducing the need for data verification. However, the current implementation of blockchain technology only benefits producers in terms of maintaining the accuracy of data for supply.

3.2 Proposed System:

The proposed Farmer's portal is a comprehensive platform designed to enable e-commerce activities related to crops. The portal is accessible to registered users, who can tailor their experience according to their specific requirements. Users can be either buyers or sellers, and sellers may include farmers or their representatives.

The portal is accessible through a computer or laptop, and users need to sign up and provide correct credentials to log in successfully. Once logged in, users can access the portal's interface, which allows them to view the available crops and seeds along with their respective prices. The portal provides a centralized location for all activities related to the buying and selling of crops, enabling easy access to all necessary information.

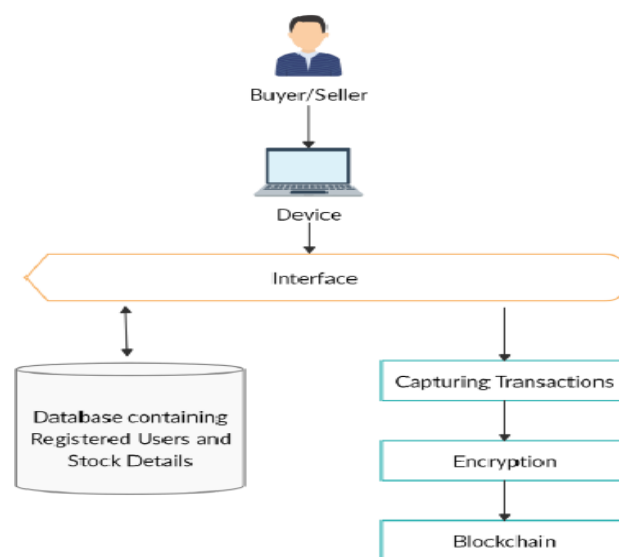


Figure 3.1: Architecture of Proposed System

IV.Steps For Proposed Model

Our system comprises four primary modules: Sellers, Buyers, Admins, and Blockchain. Each module plays a crucial role in facilitating the smooth functioning of the proposed e-commerce platform.

Sellers:

The Seller module allows farmers or their representatives to register by providing their valid email and mobile number. Upon activation by the admin, the seller can log in and add new items, update existing ones, and set prices for their products.

Buyers:

The Buyer module enables users to register by providing their valid email and mobile number. Upon activation by the admin, the buyer can log in and browse through the available products. They can add items to their cart, delete items from the cart, and verify the cart before checking out.

Admin:

The Admin module is responsible for activating the seller and buyer accounts. Once activated, the users can log in to our system. The admin can also view all the transactions that have taken place and track the blockchain's activities.

Blockchain:

Our system uses blockchain technology to add transparency and security to the platform. Every transaction, such as adding new items and purchasing products, is considered a transaction, and is recorded on the blockchain. The blockchain uses unique digital signatures and timestamps to ensure the integrity of the transaction data. Since the blockchain is immutable, transparent, and accessible to all, it ensures that no user can deny their activities.

4.2 Proposed algorithms:

The blockchain consensus algorithm plays a critical role in determining how blocks are added to the chain and how transactions are verified on the network. Different blockchain algorithms have been developed over time, each with their own unique principles and functions. Here are some of the most common blockchain algorithms and how they work:

Proof of Work (PoW): PoW is the first and most widely known blockchain consensus algorithm. The concept of PoW was first introduced in 1993 but was popularized by Satoshi Nakamoto in the Bitcoin ledger in 2008. In PoW, miners compete to solve complex mathematical puzzles, and the first miner to solve the puzzle gets to add the next block to the chain. This algorithm requires a lot of computational power, making it expensive to mine.

Proof of Stake (PoS): PoS is a low-cost, low-energy alternative to PoW that was introduced in 2011. Instead of using computational power to mine, validators lock up their coins as a stake and validate the block by placing a bet. Once a new block is added, validators are rewarded in proportion to their bets. Ethereum uses this algorithm for mining.

Delegated Proof of Stake (DPoS): DPoS was introduced by Daniel Larimer as a variation of PoS. In DPoS, validators vote for their favorite validator to reach consensus for a new block, and the elected validator is responsible for maintaining the network and validating transactions. The validator gets rewarded with transaction fees for the work. EOS, Bitshares, Steem, Tezos, etc use this consensus algorithm for validating transactions.

Proof of Burn (PoB): PoB validators 'burn' coins by sending them to an address where they are not recoverable. The more coins a miner burns, the higher are their chances of being selected to mine the next block. Though PoB wastes resources, it's an alternative to PoW. The only coin that uses PoB is Slimcoin, which combines PoS, PoW, and PoB.

Proof of Capacity (PoC): In PoC, validators invest in their hard drive space instead of burning coins or investing in expensive hardware resources. The more hard drive space validators

allocate, the better their chances of getting selected for mining the next block and earning block rewards.

V.Result and Discussion

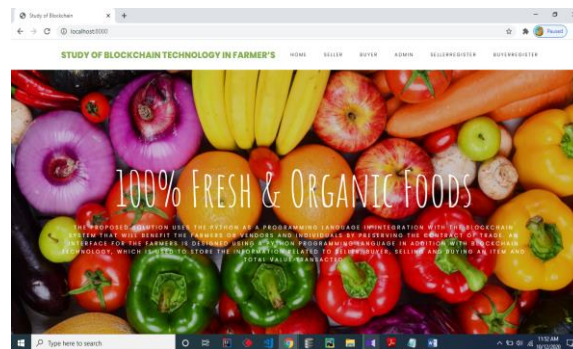


Figure 5.1: Home page

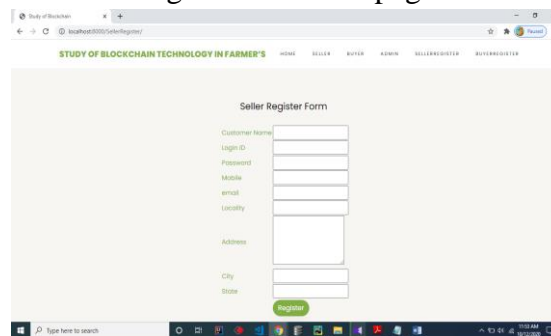


Figure 5.2: Seller Registration

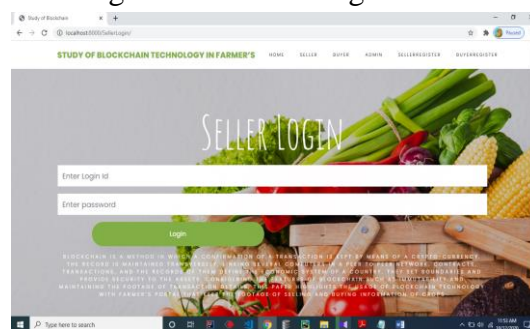


Figure 5.3: Seller Login

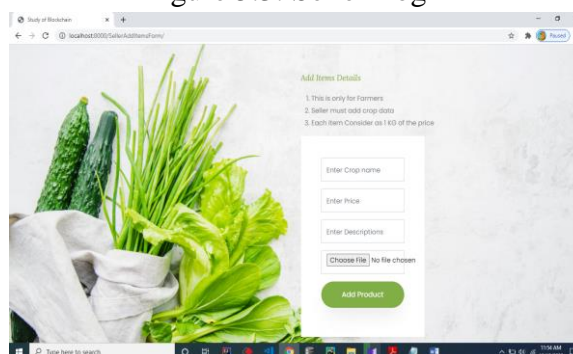


Figure 5.4: Seller Adding crops Details

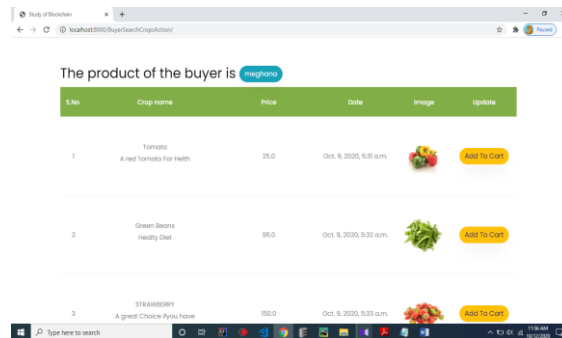


Figure 5.5: Search Results

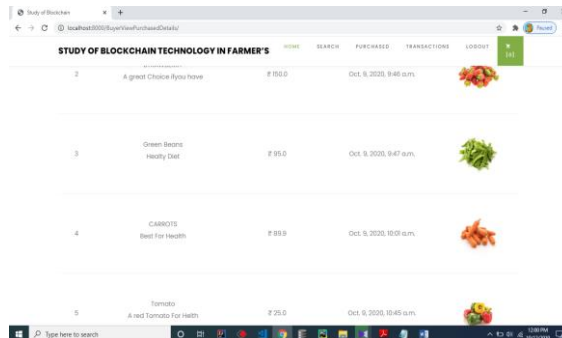


Figure 5.6: Purchased Crops

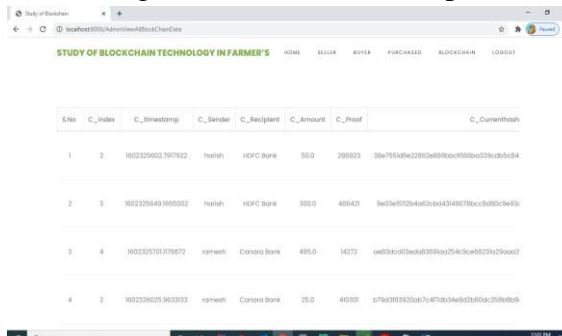


Figure 5.7: Admin View Blockchain Transaction

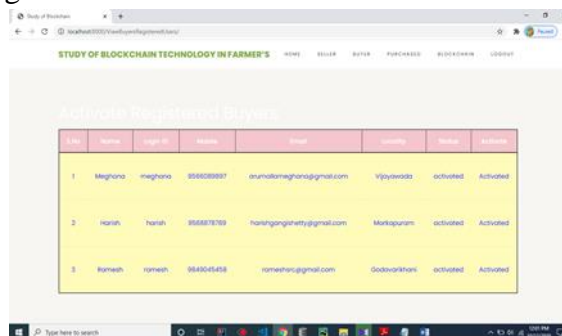


Figure 5.8: Admin Activate Buyers

VI. Conclusion and Future Enhancements

The use of blockchain technology in agriculture can lead to a significant transformation in the way farmers' data is secured and crop quality is ensured. The implementation of a blockchain-based platform can facilitate the monitoring of soil moisture content, crop yield data, seed

quality, and crop demand and sale prices. The proposed portal aims to address the issue of fair crop pricing, providing farmers with a secure and transparent platform to sell their crops.

To ensure information integrity and accuracy, open, secure, and trusted systems must be utilized, assuming that the infrastructure deployment and footage connections are secure and adequately provided. Despite the potential benefits of blockchain technology, it faces several limitations, such as information reliability and confirmation, which may require a central authority or secure confirmation footage to overcome.

Integration with IoT devices: Future enhancements could involve integrating blockchain technology with IoT devices such as sensors for monitoring soil moisture, temperature, and humidity. This would provide real-time data to farmers and other stakeholders, enabling them to make informed decisions about crop management.

Smart contracts: The use of smart contracts could enhance the efficiency of the proposed blockchain-based portal. Smart contracts can automate the entire process of crop sale, from negotiations to payment, ensuring that all parties involved are satisfied with the transaction.

Mobile applications: The development of mobile applications for the proposed blockchain-based portal can enhance the accessibility of the platform for farmers and other stakeholders. Mobile apps can also provide real-time notifications and alerts about crop prices, demand, and other important information.

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