A Study of Blockchain Technology for Farmers Portal Using Machine Learning With Python.

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Abstract

Blockchain be a innovate method that utilizes a cryptocurrency for securely confirming transactions. It maintain a distributed ledger across numerous computers in an peer-to-peer network. Contracts, transactions, and their records be pivotal in defining an country's economic system, establishing boundaries, and safeguard assets. This paper underscore the potential of blockchain technology within an farmer's portal to documenting transactions involving the buying and selling of crops. By leveraging the Python programming language alongside blockchain, an proposed solution aim to enhance transparency and security while preserving trade contracts. An designed interface enable farmers to input essential details such as seller and buyer information, item descriptions, and transaction values, all securely stored within the blockchain network. Ultimately, this integration benefit farmers, vendors, and individuals by providing a reliable platform for managing agricultural transactions!

Keywords: *Blockchain, Digitization, Cryptocurrency, Immutability, Public-ledger, ICT, Farmer's Portal*

I.INTRODUCTION

Blockchain technology is characterized as an open, distributed, and decentralized ledger system that records transactions between two parties in a verifiable and stable manner (Iansiti, Lakhani 2017). The term "open" signifies accessibility to all, "distributed" implies the absence of singleparty control, and "decentralized" indicates the absence of a central third party. Moreover, "capable" refers to its speed and scalability compared to conventional technologies, "confirmable" means anyone can verify the validity of information, and "stable" denotes the near immutability of data, making tampering nearly impossible. Blockchain verifies and validates identities and chronological events, guiding transactions among individuals, communities, organizations, and nations. In the current digital era, there's a need to securely manage and regulate such data, and blockchain emerges as a solution.

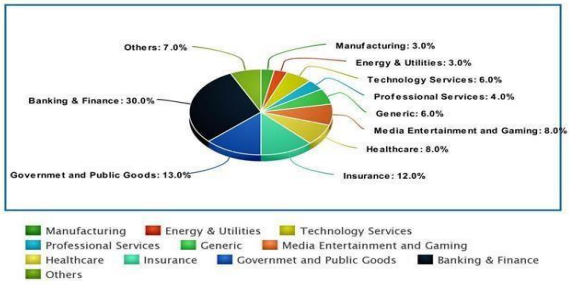

Figure 1 illustrates sectors utilizing blockchain. In the realm of information and communication technology, farmer portals have proven beneficial, offering convenience and information access to farmers. Initiatives by the Government of India, such as Krishijagran.com, farmer.gov.in, agricoop.nic.in, and agriwatch.com, exemplify this support. Additionally, e-commerce platforms like fert.nic.in and enam.gov.in are available. Integrating blockchain technology in this domain

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facilitates a decentralized computation and information-sharing platform, enabling multiple authoritative domains to cooperate and coordinate in decision-making processes. This fosters a reliable information recording system, contributing to agricultural sector development. Blockchain ensures various aspects such as commitment protocols, consensus, security, privacy, and authenticity. Cryptography plays a fundamental role, with public key encryption forming the basis of blockchain wallets and transactions, while cryptographic hash functions ensure immutability, and Merkle trees organize transactions for enhanced competence.

II. LITERATURE SURVEY

Farmers and agriculture serve as the bedrock of society, with numerous efforts focused on enhancing agricultural practices through technological advancements. Despite these efforts, many farmers still struggle to leverage the benefits of Information and Communication Technology (ICT) and often fail to receive fair prices for their crops. Gosh et al. [5] introduced an interface aimed at assisting farmers by providing information on agricultural advancements. This interface allowed farmers to interact using both text and speech inputs, representing a significant step forward in accessibility. Manav et al. [6] developed an Android-based mobile application to keep farmers updated on agricultural products, weather forecasts, and news. While providing instant updates, the application was limited by its availability only in English, thus restricting its reach. Jason [7] explored various technical approaches in agriculture, particularly focusing on food and supply chain management. The integration of blockchain technology has notably enhanced supply chain efficiency by reducing the need for data verification, primarily benefiting producers in maintaining data accuracy for supply. Jing Hua et al. [8] utilized blockchain technology to propose a decentralized agricultural tracing system, collectively maintained to ensure trust and reliability in supply chain management. This system offers producers a means to safeguard immutable production and supply data, promising enhanced transparency and security in agricultural transactions.

III. METHODOLOGY

The proposed Farmer's Portal serves as a unified platform facilitating e-commerce transactions for agricultural produce. It offers a customized user experience tailored to individual needs, accessible through a single login for approved users. The system's architecture, illustrated in

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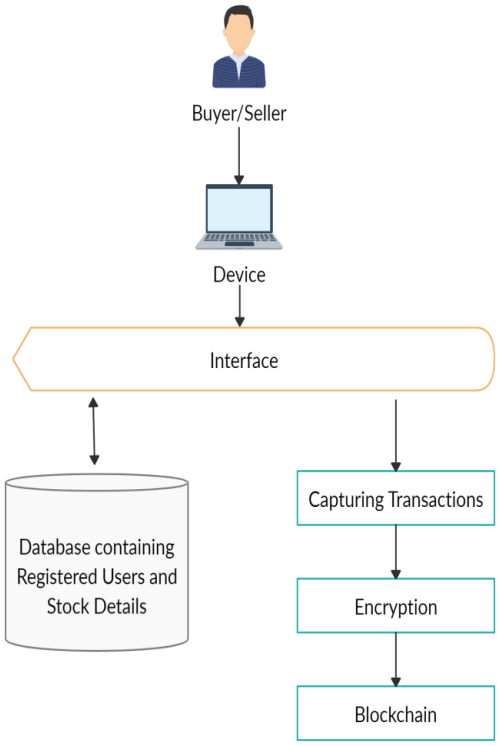

Figure 2, delineates its high-level functionality.

Users, categorized as buyers or sellers, interact with the portal via computers or laptops. Upon registration and successful login, users gain access to the portal's interface. Buyers can browse available crops and seeds, add items to their cart, and proceed to checkout. Conversely, sellers, including farmers or their representatives, can add new items, update existing listings, and manage pricing. Central to the system is a robust database storing user records and item information. Notably, every transaction, whether the addition of a new item or its purchase, is captured, encrypted, and added to a blockchain. This blockchain technology ensures data immutability, transparency, and accessibility, enhancing security and trust throughout the platform.

The proposed system offers several advantages. It fosters greater market participation, reducing intermediary costs and enabling farmers to reach consumers directly. By consolidating information in a single location, it streamlines processes, saving time and effort. Moreover, blockchain integration ensures efficiency, trust, and transparency, benefiting users with expanded options and competitive returns.

Technologically, the system is built using Python for backend development, with Flask as the micro web framework and SQLAlchemy for SQL integration. Additional modules like hashlib, json, and time facilitate cryptographic operations, data interchange, and timestamping. The system's directory structure organizes essential components, while blockchain deployment further fortifies its transactional integrity. Functionality is encapsulated in pseudo-code snippets, detailing processes for adding items to the system and purchasing them. A schematic flow diagram (Figure 3) visualizes the portal's operation, from user registration to session termination. Buyers and sellers navigate distinct pathways, interacting with the portal's features before concluding their session.

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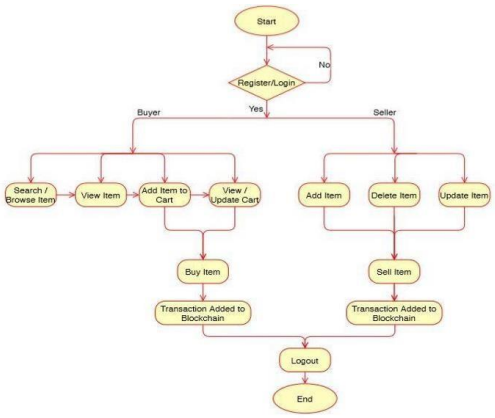
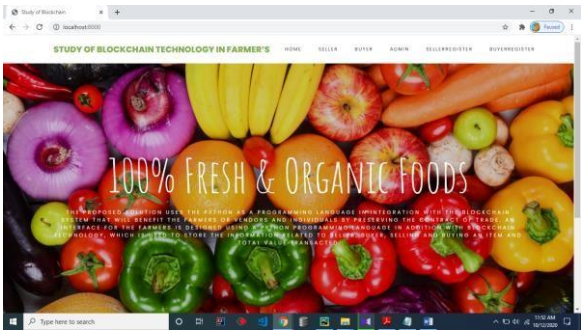
In summary, the proposed Farmer's Portal offers a comprehensive solution for agricultural ecommerce, leveraging technology to enhance efficiency, transparency, and market accessibility.

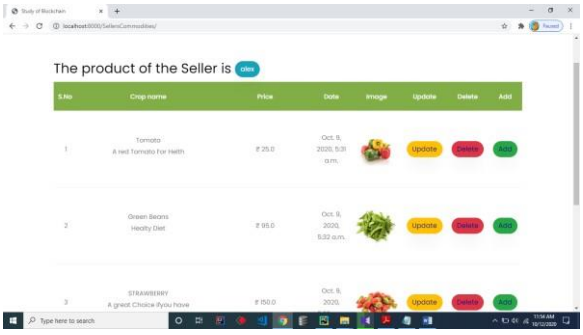


IV.RESULTS AND DISCUSSIONS

Home page:



Seller commodities:



Updating Crops:

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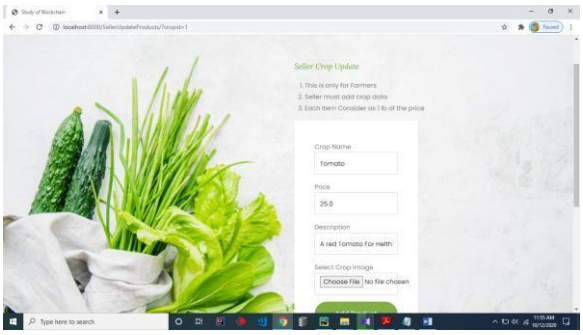
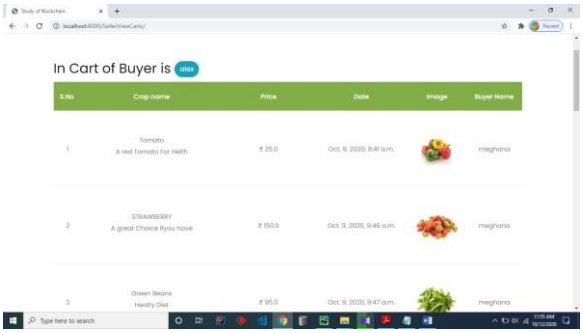
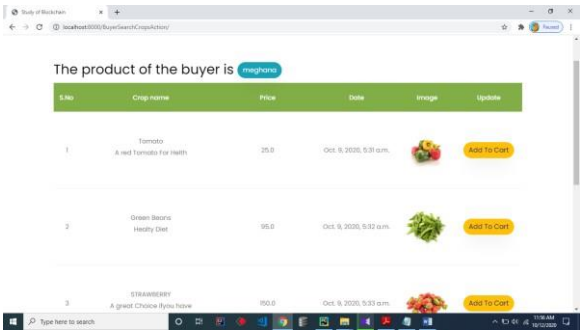


User View In Cart:



Search Result:



Buyer Cart View:

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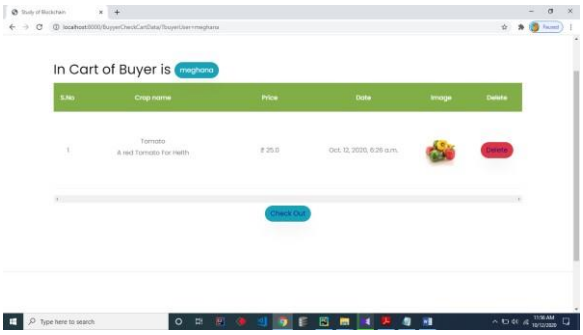
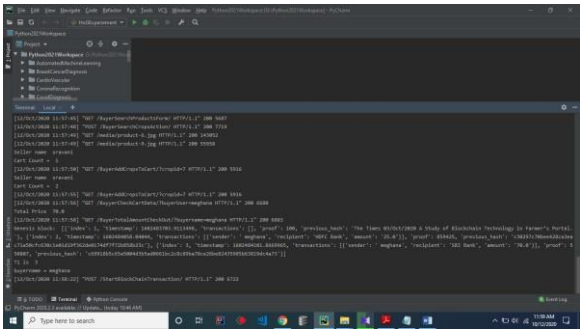
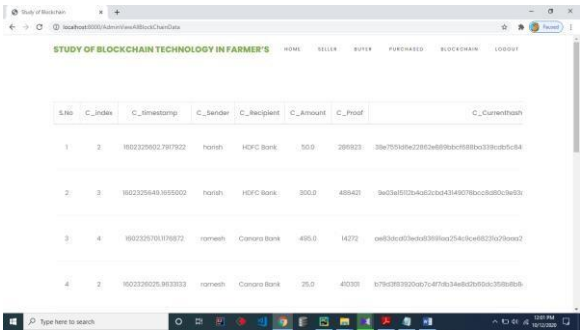


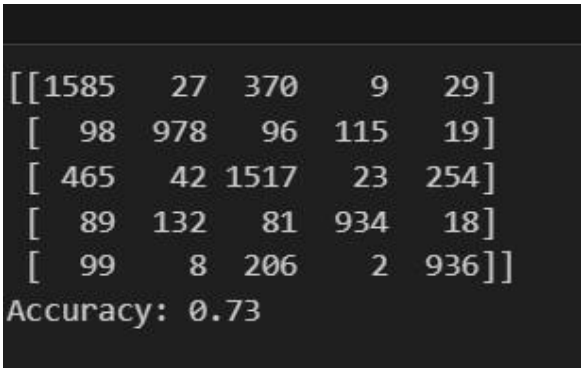
Blockchain Transaction:



Admin View Blockchain Transaction:



Crop Recommendation Accuracy:



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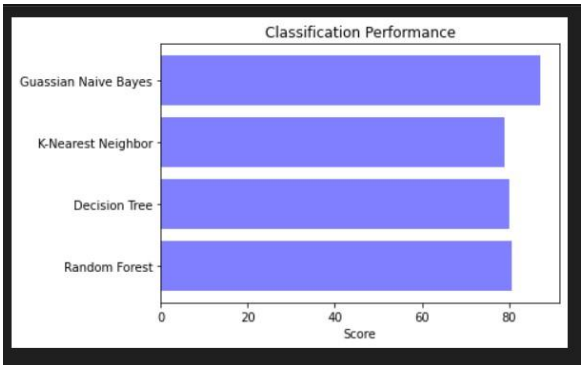
K Neighbours Classifier:



V.CONCLUSION

Blockchain technology has the potential to revolutionize agriculture by securely maintaining farmers' data, ensuring seed quality, monitoring soil moisture content, tracking crop yield, and managing crop demand and sale prices. In this proposed work, a blockchain-based portal is designed to address the issue of crop demand and sale prices, thereby providing farmers with crop security and fair pricing. Through this portal, farmers can register and sell their crops, with each transaction recorded on a blockchain at the point when buyers commit to purchasing the crops. This transaction records crucial details such as crop specifications, committed purchase price, and quantity. The immutable nature of blockchain technology enhances farmers' ability to secure legitimate crop prices while reducing operational costs associated with traditional selling and buying methods. Such portals can be implemented by governments and affiliated agencies to uplift farming practices and crop commerce, thereby elevating the status of the nation's farmers. Further refinement of this application can involve deeper integration of blockchain across various agricultural domains, consolidating them into a single comprehensive portal for farmers. This expansion may include recording farmers' crop details, integrating buyer data, and introducing additional features and services within the portal, thereby providing a comprehensive suite of facilities for farmers nationwide.

VI.REFERENCES

Several academic and industry studies have explored the potential of blockchain technology across various sectors. Lakhani and Iansiti (2017) provided insights into blockchain's capabilities in the Harvard Business Review, while Hileman and Rauchs (2017) conducted a global benchmarking study. Mohanta et al. (2019) surveyed blockchain applications and addressed security and privacy challenges. In the context of agriculture, Yadav and Singh (Year) conducted a systematic literature review, while Ghosh et al. (2014) and Singhal et al. (2011) developed interfaces tailored for Indian farmers. Potts (2019) examined blockchain's role in agriculture, and Hua et al. (2018) proposed a blockchain-based provenance platform for agricultural products. Other studies, such as those by Zhu and Wang (2019) and Tschorsch and Scheuermann (2016), explored blockchain applications in e-commerce, finance, and decentralized digital currencies. Additionally, Suma (2019) discussed security and privacy mechanisms using blockchain, while Gilbert and Handschuh (2003) conducted a security analysis of SHA256 and related algorithms.

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