International Journal of Recent Advances in Multidisciplinary Topics
Volume 4, Issue 2, February 2023
https://www.ijramt.com | ISSN (Online): 2582-7839

Implementation of Block Chain Technology in Agriculture Sector

Kurikyala Premchand[1*], Pendli Yashwanth[2], Pullani Madhu[3], R. Rajasekhar[4]
[1,2,3]Student, Department of Computer Science and Engineering, Vardhaman College of Engineering, Hyderabad, India
[4]Assistant Professor, Department of Computer Science and Engineering, Vardhaman College of Engineering, Hyderabad, India

***Abstract*: The agriculture sector is the backbone of providence. Encyclopedia Speaking, this sector provides not only food and its preface tackle, but also the immense eventuality of the population. Still, it suffers from numerous difficulties, including unfortunate communication means, food impurity and its lack of openness in the chain of power. Thus, the use of digital technology can be a possible outgrowth of these numerous problems. These technologies are still veritably various. Blockchain technology is getting the utmost attention. This advance technology is the Distributed Trade Log, which allows Associates to validate trades in a retrograde data log on the Processor Network. The husbandry and food assiduity can use blockchain to promote food safety, baffle food fraud, and corroborate the legitimacy of products. Also, it can be used for better pricing and payment options, land title enrolment, and transparent subvention payments to directors. The use of blockchain technology depends heavily on its security, decentralization, simplicity, and continuity. Although this technology offers significant implicit benefits to the animal and food sectors, several walls to wider relinquishment by directors and food force chains remain.**

***Keywords*: Blockchain, Smart contract, Agriculture supply chain.**

1. Introduction

Current agriculture sector reforms and developments bear new approaches and inventions to produce a more open and responsible terrain in animal husbandry. Contrary to conventional centralized and private husbandry procedures, the blockchain offers a decentralized data framework for storing and recovering his data relating to untrusted parties. This has the implicit to address numerous crucial issues in moment's systems, including the possibility of hackers attacking centralized systems and compromising data integrity threat of tampering with Bigwig Centralized Database data integrity is compromised. Force Chain Operating Systems exorbitantly reliant on centralized databases and the high costs associated with hiring third parties to validate data. His current agrarian reforms and the need to develop new approaches and inventions for are creating a more open and responsible terrain in the agriculture assiduity. Data used by third parties can be decreased by blockchain's decentralized structure, in discrepancy to traditional centralized and monopolistic husbandry operation styles. By doing so, it may be possible to address a few significant issues with current systems, centralized system vulnerabilities can lead attacks concession data integrity, the threat of bigwig manipulation of the centralized database compromising data integrity, the problem of a force chain operation system being exorbitantly dependent on the centralized database, and the high costs associated with enlisting a third party to corroborate and validate data. The key component for data authentication is the hash function, which is a mathematical technique for creating unique Identities. To protect data integrity, hash values can be incorporated into a format of stored chain to verify whether the data have been altered. To verify the true identity of data senders and recipients in stored deals, digital hands are utilized. Moreover, the agreement medium is made to include all cypher bumps, reducing the inherent risk of data alteration by a few rogue bushwhackers.

2. Literature Survey

Blockchain, the relief behind Bitcoin, has recently gained strong attention. Blockchain is an inflexible census that allows deals to crop in a largely decentralized way. Blockchain predicated operation areas covering different areas including capitalist services, naming systems, web of goods (IoT), etc. While blockchain technology has garnered much attention and investment, it remains an emerging technology with significant hurdles to overcome, including issues related to scalability and security. This paper seeks to provide a detailed analysis of blockchain architecture and examine its different forms and implementations. In addition, the technical challenges and Area Unit current progress are fluently listed. Also, he tends to illuminate his trends for the implicit future of blockchain. This whitepaper presents his comprehensive disquisition on blockchain predicated husbandry operations and recent inventions driving blockchain technology. First, we outline the fundamental principles of blockchain technology, discuss the present data storage environment, and dissect the most widely used platforms where the developed processes are carried out. Next, we give comprehensive studies on various blockchain operations in agricultural systems. After disquisition, we will further bandy arising technology perspectives and how systems can be used to break current challenges. A demonstration of how blockchain can be improved to provide a more trustworthy

*Corresponding author: kurikyalapremchand@gmail.com

and efficient food supply chain in the future is also provided.

3. Existing Work

ICT does not eliminate bias in the gathering and utilization of data. IT employees are constantly driven to use data in ways that further their personal agendas. As an illustration, the associations they represent explosively communicate stakeholder preferences in multicriteria decisions. Non-governmental organizations can focus excessively on the problems they need to solve due to their interests. Making data manipulation difficult or impossible by dispersing the power of data operation among a veritably large number of people is an effective technique to avoid comparable prejudices.

4. Proposed Work

All types of husbandries are supported by the vital knowledge and data about the natural resources that constitute the foundation of the food system. Various actors and stakeholders induce and manage data and information according to their conditions and capacity. Intelligent husbandry is characterized using ICT, sensors, and machine knowledge. A pivotal issue in setting up smart husbandry is the development of a comprehensive security system that facilitates the use and operation of data. Traditional styles centralize data and are vulnerable to inaccurate data, data distortion and abuse, and cyberattacks. For illustration, the majority of the time, central government entities with vested interests handle environmental monitoring data. manipulate views based on data.

A. Architecture diagram

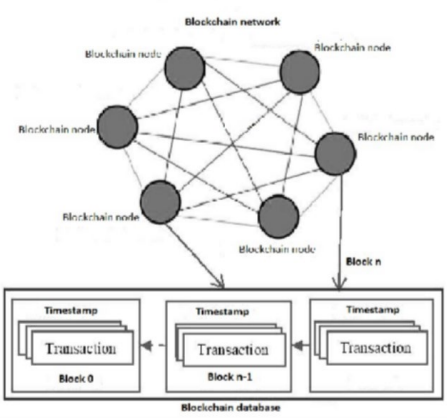

Fig. 1. Architecture

Transactions which are done digitally are grouped together into blocks in blockchain. Blockchain nodes in blockchain network are linked together with their peers cryptographically. Each blockchain node will have the hash of previous blockchain node to ensure the blockchain node is placed in correct order. The first blockchain node in blockchain network is known as genesis block. In the above figure it depicts the overall view of blockchain nodes in blockchain network. Each blockchain node of blockchain network consists of previous hash, current hash, transactions and timestamp in it.

B. Algorithm

As you know, mincing is the process of transubstantiating raw data into another data format (plaintext to ciphertext), so you cannot reproduce it again. You can get hash value by calculation operation. These operations can be performed using certain functions known as hash functions. Section of this document focuses on one of the strongest hash functions available, the SHA- 256 algorithm. 256- bit keys make AES (Advanced Encryption Standard Algorithm) a great mate point. as specified in NIST standard" FIPS 180-4".

C. Advantages

Blockchain offers decentralization, immutability, and Security. The crop details which are entered into the block cannot be changed. This proposed project is easy to use. It enables the traceability of information in the food supply chain. It helps to improve food safety. There will be no misuse of information in the blockchain. It also has smart contracts in it. We can also improve the quality control in it. There will be fairer payments for farmers. It has enhanced security, greater transparency. With blockchain we can have smooth transactions with fraud elimination.

5. Implementation

We have developed a web application that stores transactions/commodity exchanges in a blockchain database. This Portal has three types of logins (Farmer, Mirror, and Consumer).

A. Step-1

Fig. 2. New user signup screen

The user can sign up and select desire user as farmer or distributor or miller. Then we get a screen as block is generated with previous hash and current hash and the block number.

Fig. 3. Hash key generation for each block

B. Step-2

Fig. 4. Farmer login page

The farmer uploads crop details including expected price and quantity. Harvest details can be generated as blocks on the blockchain by computing the previous hash + harvest details data hash. In the above screen click on 'upload crop details' link to upload crop details and can view details of purchaser like crop name, quantity, and their contact details with user type as DRS or miller and then complete the order.

C. Step-3

Fig. 5. Miller login page

Miller can order the harvest and sell it to consumers. This sales information is stored as a block. Miller user can Purchase products from farmers link to get crop screen. In the crop screen select the crop and press button to view crop details. All the crop details can be view by Miller and then click on click here link to purchase. When clicking on sale to customer link we get above screen. Here miller will sale crop to consumer.

D. Step-4

Fig. 5. In distributor login page to browse products

Consumers can purchase products from farmers and millers. Distributor/consumer user can browse products and can select desire crop to purchase.

6. Conclusion

Many problems will be solved by using blockchain in various aspects of India's agricultural supply chain. Data is collected, verified, stored, and transmitted in a transparent and reliable manner. The using of blockchain leads to increased efficiency, reduced waste, and improvements across the industry. We can further improve the project to get insurance for the farmers and we can add many applications in it which benefits the farmers.

References

[1] "State of blockchain q1 2016: Blockchain funding overtakes bitcoin," 2016. Available: http://www.coindesk.com/state-of-blockchain-q1-2016/

[2] S. Nakamoto, "Bitcoin: A peer-to-peer electronic cash system," 2008. Available: https://bitcoin.org/bitcoin.pdf

[3] D. Johnson, A. Menezes, and S. Vanstone, "The elliptic curve digital signature algorithm (ecdsa)," International Journal of Information Security, vol. 1, no. 1, pp. 36–63, 2001.

[4] V. Buterin, "A next-generation smart contract and decentralized application platform," white paper, 2014.

[5] A. Kosba, A. Miller, E. Shi, Z. Wen, and C. Papamanthou, "Hawk: The blockchain model of cryptography and privacy-preserving smart contracts," in Proceedings of IEEE Symposium on Security and Privacy (SP), San Jose, CA, USA, 2016, pp. 839–858.

[6] Sachin K, Angappa G, Himanshu A. Understanding the blockchain technology adoption in supply chains. International Journal of Production Research, 2018: 1–25.

[7] M. M. Aung and Y. S. Chang, ``Traceability in a food supply chain: Safety and quality perspectives," Food Control, vol. 39, pp. 172_184, May 2014.

[8] T. Bosona and G. Gebresenbet, ``Food traceability as an integral part of logistics management in food and agricultural supply chain," Food Control, vol. 33, no. 2, pp. 32-48, 2013.

[9] Mohamed A Awwad, Sohit Reddy Kalluru, Varun Kazhana Airpulli et al "Blockchain implementation for Efficient Management of Supply chain", Proceedings of the International Conference on Industrial Engineering and Operations Management Washington DC, USA, September 27-29, pp. 440-449, 2019.

[10] Sadewo A. B., Putra A. S. I., Priyandari Y., "Design of business process on traceability fresh fruits and vegetables export based on regional regulation," 2015 Joint International Conference on Electric Vehicular Technology and Industrial, Mechanical, Electrical and Chemical Engineering (ICEVT & IMECE), IEEE, 2015.