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Supply Chain Management in Agriculture using Blockchain

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Abstract: *Block chains are now firmly established as a digital technology that combines cryptographic, data management, networking, and incentive mechanisms to support the verification, execution, and recording of transactions between parties. While block chain technologies were originally intended to support new forms of digital currency for easier and secure payments, they now hold great promise as a new foundation for all forms of transactions. Agribusiness stands to become a key beneficiary of this technology as a platform to execute 'smart contracts' for transactions, particularly for high-value produce. First it is important to distinguish between private digital currencies and the distributed ledger and block chain technologies that underlie them. The distributed and cross-border nature of digital currencies like Bitcoin means that regulation of the core protocols of these systems by central banks is unlikely to be effective. Monetary authorities are focused more on understanding 'on-ramps' and 'off-ramps' that constitute the links to the traditional payments system rather than being able to monitor and regulate the currency itself. In contrast to the digital currency feature of block chain, the distributed ledger feature has the potential for widespread use in agribusiness and trade financing, especially where workflows involve many different parties with no trusted central entity*

Keywords: Block-chain, Advanced Encryption Standard(AES).

I. INTRODUCTION

An increasing demand in society for greater information about food reflects the need for more transparency and the lack of trust. At the same time, more and more food products and beverages are branded and accompanied by a variety of certification schemes, with an increasing risk of fraud (selling unqualified product with high-quality labels or claims) and adulteration. In the current situation, much of the compliance data and information is audited by trusted third parties and stored either on paper or in a centralized database and these approaches are known to suffer from many informational problems such as the high cost and inefficiency of paper-based processes and fraud, corruption and error both on paper and in IT systems. These information problems, indicating that current transparency and trust systems have not been able to solve or at times even have exacerbated the problems of low transparency and trust in agrifood chains, pose a severe threat to food safety, food quality,and sustainability. In particular, food integrity has become a major concern. Food integrity refers to the fairness and authenticity of food in food value chains both at the physical layer and the digital layer, where the digital layer should provide reliable and trustworthy information on the origin and provenance of food products in the physical layer. Blockchain technology provides a means to ensure permanence of records and potentially to facilitate the sharing of data between disparate actors in a food value chain. This potential may lead to an exciting paradigm shift facilitating transparency and trust in food chains that ensures food integrity.

II. RELATED WORK

Blockchain-Based Soybean Traceability in Agricultural Supply Chain,Khaled Salah ; Nishara Nizamuddin ; Raja Jayaraman ; Mohammad Omar Published in: IEEE Access (Volume: 7) proposed solution eliminates the need for a trusted centralized authority, intermediaries and provides transactions records, enhancing efficiency and safety with high integrity, reliability, and security. The proposed solution focuses on the utilization of smart contracts to govern and control all interactions and transactions among all the participants involved within the supply chain ecosystem. All transactions are recorded and stored in the blockchain;s immutable ledger with links to a decentralized file system (IPFS) and thus providing

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to all a high level of transparency and traceability into the supply chain ecosystem in a secure, trusted, reliable, and efficient manners.

Blockchain-based traceability in Agri-Food supply chain management: A practical implementation Miguel Pincheira Caro ; Muhammad Salek Ali ; Massimo Vecchio ; Raffaele Giaffreda Published in: 2018 IoT Vertical and Topical Summit on Agriculture - Tuscany (IOT Tuscany)This paper presents Agri BlockET, a fully decentralized, blockchain-based traceability solution for Agri-Food supply chain management, able to seamless integrate IoT devices producing and consuming digital data along the chain. To effectively assess Agri BlockET, first, we defined a classical use-case within the given vertical domain, namely from-farm-to-fork. Then, we developed and deployed such a use-case, achieving traceability using two different blockchain implementations, namely Ethereum and Hyperledger Sawtooth. Finally, we evaluated and compared the performance of both the deployments, in terms of latency, CPU, and network usage, also highlighting their main pros and cons. An agri-food supply chain traceability system for China based on RFID & blockchain technology Feng Tian Published in: 2016 13th International Conference on Service Systems and Service Management (ICSSSM) In this paper, we study the utilization and development situation of RFID (Radio-Frequency IDentification) and blockchain technology first, and then we analyze the advantages and disadvantages of using RFID and blockchain technology in building the agri-food supply chain traceability system; finally, we demonstrate the building process of this system. It can realize the traceability with trusted information in the entire agri-food supply chain, which would effectively guarantee the food safety, by gathering, transferring and sharing the authentic data of agri-food in production, processing, warehousing,distribution and selling links.

Blockchain application in food supply information security Daniel Tse ; Bowen Zhang ; Yuchen Yang ; Chenli Cheng ; Haoran Mu Published in: 2017 IEEE International Conference on Industrial Engineering and Engineering Management (IEEM)This article introduces the concept of Blockchain technology, putting forward the application of Blockchain technology in information security of the food supply chain and comparing it with the traditional supply chain system.

III. Literature Review

Our proposed system is Sign language detection application using CNN. In our system we use CNN i.e. Convolutional Neural Network algorithm for training the dataset and extraction of data through input.In our system we take live input through the camera and the sign is detected and then output is shown as its meaning. Various existing techniques and algorithms are described in following table.

Sr No.	Paper Title	Summary	Author
1	Blockchain-Based Soybean Traceability in Agricultural Supply Chain	proposed solution eliminates the need for a trusted centralized authority, intermediaries and provides transactions records, enhancing efficiency and safety with high integrity, reliability, and security.	Khaled Salah; Nishara Nizamuddin; Raja Jayaraman ; Mohammad Omar
2	Blockchain-based traceability in Agri-Food supply chain management: A practical implementation	This paper presents Agri BlockET, a fully decentralized, blockchain-based traceability solution for Agri-Food supply chain management, able to seamless integrate IoT devices producing and consuming digital data along the chain	Miguel Pincheira Caro ; Muhammad Salek Ali ; Massimo Vecchio ; Raffaele Giaffreda
3	Blockchain Based Provenance for Agricultural Products: A Distributed Platform with Duplicated and Shared Bookkeeping	In this paper, we propose an agricultural provenance system based on techniques of blockchain, which is featured by decentralization, collective maintenance, consensus trust and reliable data, in order to solve the trust crisis in product supply chain	Jing Hua ; Xiujuan Wang ; Mengzhen Kang ; Haoyu Wang ; Fei-Yue Wang
4	An agri-food supply chain traceability system for China based on RFID and blockchain technology	In this paper, we study the utilization and development situation of RFID (Radio-Frequency IDentification) and Blockchain technology	Feng Tian

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5	Blockchain application in food supply information security	This article introduces the concept of Blockchain technology, putting forward the application of Blockchain technology in information security of the food supply chain and comparing it with the traditional supply chain system.	Daniel Tse ; Bowen Zhang ; Yuchen Yang ; Chenli Cheng ; Haoran Mu

Table 1: Literature Review

IV. CONCLUSION

Thus we are going to implement a prototype web based software application in Java for application of BCT in supply chain management We will implement block chain features such as:

1. Decentralization
2. Hash Algorithm
3. Encrypted Database.

Thus it is possible to track the agricultural supply chain and to give a minimum price for agricultural products.

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