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Blockchain based Information Architecture for Medical Product Supply Chain

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Abstract: ***The medical product supply chain is the most complex and fragmented of all supply chains. The production is found all over the world both on land and in water. A lot of the producers and intermediaries are difficult to identify and track. For all the participants in the production chain this creates uncertainty and risk. Mitigating this uncertainty comes at a cost, and the outcome may still be insufficient. Examples of problems that have been difficult or impossible to solve with current technologies include establishing reliable provenance and preventing fraud and counterfeiting. These issues can have knock-on effects on public health and the environment, and reduce financial costs of unnecessary recalls of Medical products. To overcome the above challenges, a Blockchain based Medical Product traceability system (BIMPTS) is proposed in this study, to achieve the following: To integrate blockchain technology for effective and efficient traceability, and To support shelf life adjustment and quality decay evaluation for improving quality assurance. For the sake of better computational load, the blockchain is modified as a lightweight blockchain to be associated with cloud computing to support monitoring, and can be vaporized after the entire life cycle of traceability to release computational resources of the system. By using such a reliable data source, the decision support in product quality can be made by using fuzzy logic to determine adjustment of shelf life, rate, and order of quality decay, according to different situations for each batch of perishable products at processing sites. Therefore, the proposed traceability model is extended to the modern Medical Product supply chain environment, resulting in reliable and intelligent monitoring, product tracking, and quality assurance.***

Keywords: Blockchain For Medical Product Supply Chain, Blockchain Based Information Architecture, Medical Product Supply Chain

I. INTRODUCTION

Blockchain has huge potential to impact global Medical Product supply chain (MPSC) by increasing productivity in terms of supply chain performance. Among many challenges the United States Center for Diseases Control (CDC) estimates that 48 million people get sick from expired medical product usage, 128,000 are seriously hospitalized, and 3,000 die each year in the U.S. alone. Apart from illness, economically and criminally motivated Medical Product adulteration is also a growing concern due to globalization and wide growing supply chain networks.

Real-time monitoring of the medical product quality and visibility of that quality index would prevent outbreak of food-borne illnesses, economically motivated adulteration, contamination, food wastage due to misconception of the labeled expiry dates, and losses due to spoilage, which have broad impacts on the medical product security.

In order to improve safety and prevent wastage, modern Blockchain based technologies are required to monitor the Medical product quality and increase the visibility level of the monitored data.

There are a number of Block Chain based tracking and tracing infrastructures such as Electronic Article Surveillance (EAS), Radio Frequency Identification (RFID), and QR codes which are primarily targeted for automatic package level tracking. However, the role of these technologies is limited in identifying the medical product package and does not provide any information pertaining to the state of the Medical product quality.

This limitation prevents quick removal of a defective product from reaching higher levels of the MPSC. For example, when a quality control lapse is identified along the MPSC, the company is forced to recall all the Medical products within a certain time frame leading to a huge economic loss, which can be mitigated with the availability of individual Medical Product package quality information resulting in targeted recalls. In literature, a number of sensing techniques compatible with existing tracking and tracing infrastructure are proposed for monitoring Medical products.

II. LITERATURE REVIEW

A. Structure for Executing Discernibility Framework in the Mass Grain Gracefully Chain

1) *Creators:* M. Thakur and C. R. Hurburgh
2) *Year:* January 2009.
3) *Aim:* Used to create techniques for executing mass grain flexibly chain recognizability in the United States, that incorporates both inward and chain detectability.
4) *Overview:* Usage of a detectability framework in the mass grain flexibly chain is an intricate undertaking. Grain parcels are frequently blended to meet purchaser particulars and the part personality isn't kept up. In this paper, a frameworks approach is utilized to create techniques for executing mass grain flexibly chain detectability in the United States, that incorporates both interior and chain discernibility. To start with, the utilization prerequisites of a detectability framework are characterized for all the entertainers in the gracefully chain. Second, a model is produced for actualizing inward discernibility framework for a grain lift that handles claim to fame grain. At that point, we build up a model for data trade between the gracefully chain entertainers. The model shows what grain part data must be recorded and afterward gave to the following entertainer. An arrangement outline is created to show the data trade in the grain gracefully chain when a client demands extra data about a presume item. At long last, we talk about some reasonable advances to empower this data trade. A couple of test XML reports are appeared for the exchange and sharing of data in the grain flexibly chain.

B. Displaying Discernibility data in Soybean Esteem Chains

1) *Creators:* M. Thakur and K. A.- M. Donnelly,
2) *Year:* March 2010
3) *Aim:* It very well may be utilized to make a normalized rundown of information components that should be recorded inside or traded with different connections in the chain. at that point the strategy for demonstrating the item, procedure, quality and change data at any connection in the chain.
4) *Overview:* Recognizable proof of the data to be recorded is the most significant necessity for building up a viable recognizability framework. In this paper, we present a soybean esteem chain and model the data catch by three connections in the chain including the cultivating, mass dealing with and handling parts. Inside data catch focuses were distinguished for every segment and the comparing recognizability data to be recorded was resolved. Inside and out examinations were led for a soybean lift and an oil and feast processor to decide the significance of discernibility data from their point of view. A great deal of data is accessible at various connections in the soybean esteem chain. The strategy introduced here can be utilized to make a normalized rundown of information components that should be recorded inside or traded with different connections in the chain. An UML class chart is created to speak to a strategy for displaying the item, procedure, quality and change data at any connection in the chain. At long last, some appropriate advancements for electronic data trade inside the food gracefully chains are introduced

III. PROPOSED SYSTEM

The information gathering and handling hub, that checks a mystery code is named as a 'terminal'. The normal system shared by all the terminals is named as 'shared system'. The output of a mystery ID by a terminal and enrolling the information is named as an 'exchange'. When an exchange is approved dependent on the accord of taking an interest terminals, the exchange is changed over into a 'square' and remembered for the Blockchain. Aside from terminals, there exists another kind of hub, a 'director', that is answerable for strategy making and preparing demands dependent on agreement with different hubs. At long last, there exists a third sort of hub, called 'specialist', that demands data about a mystery ID from the blockchain by giving an appropriate digital location. 'Address crash' is alluded to the presence of at least two indistinguishable digital or physical locations. A run of the mill Medical item based gracefully chain is each bundled food item with an inserted mystery ID goes through various phases of exchanges at various terminals beginning from bundling through transportation, stockpiling lastly to a shopper for procurement. An information square is made containing the data about the bundle at each substantial exchange. When the exchange is checked, the exchange of the mystery ID is changed over into a square of data and affixed to its previous information squares consequently framing a chain of data squares and along these lines a Blockchain.

IV. RELATED WORK

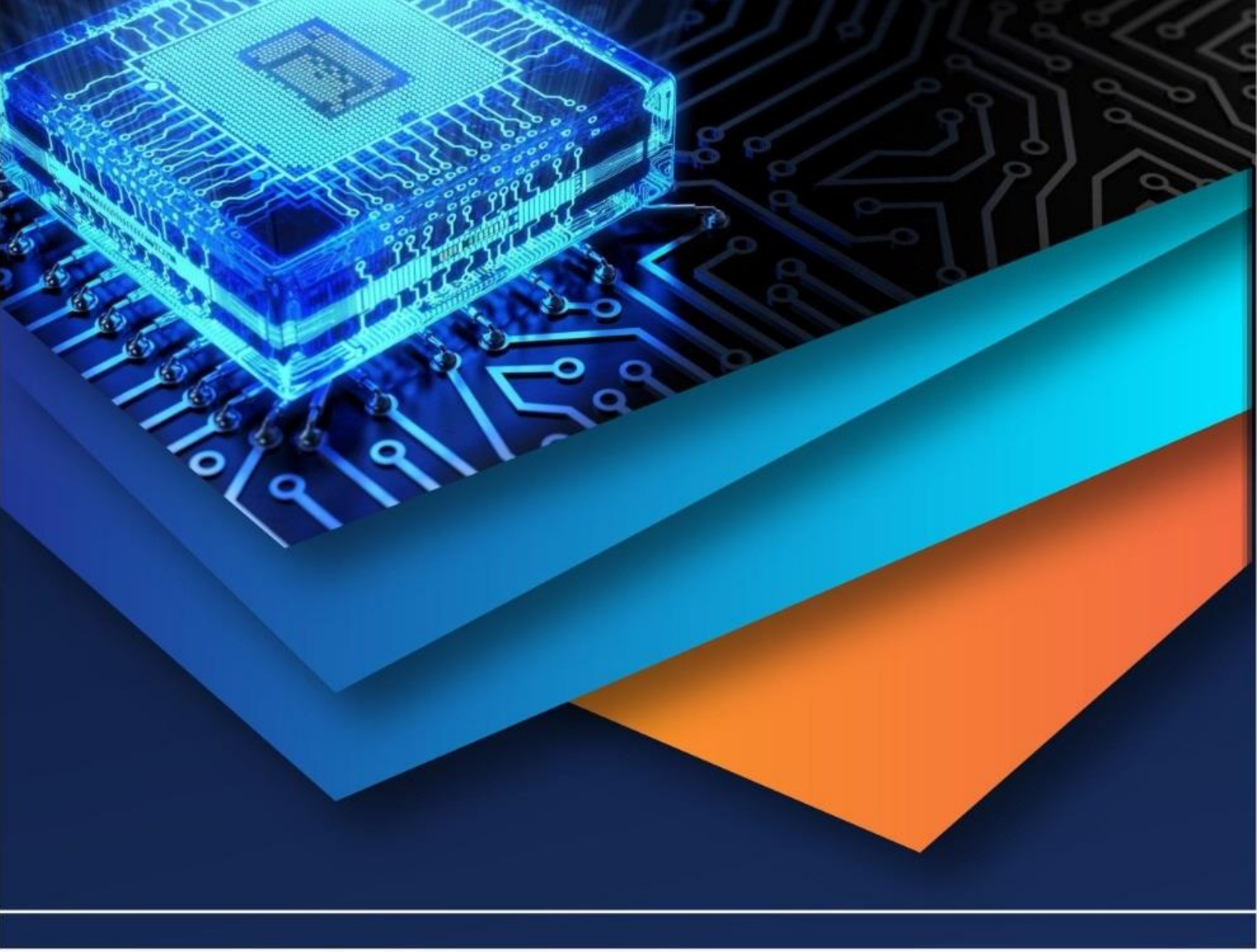
This indicates the potential and opportunities for this emerging technology in various facets of supply-chain-related issues. Blockchain was coined and introduced around 2008, from then on, research has focused on cryptocurrencies, e.g., Bitcoin, along with their security and privacy issues. The development and evolution of such technologies have moved from their original financial applications to other areas in the following years. During the period 2008~2015, due to the technical essence of blockchain, related publications were scattered in the form of technical forums, consulting reports, news reviews, or comments. Since 2016, blockchain and its applications have drawn the attention of engineers, scholars, and practitioners. For example, the special topic conference entitled "The 2018 international conference on blockchain" focused on the discussion of applications of blockchain technology and smart contracts in various sectors, including supply chains. Assorted but fragmented peer-reviewed journals contributed around 89% of the selected articles, while IEEE, ACM and other topic-related conferences accounted for the rest. Fig. 3 presents the popular journals for blockchain-related publications, which include IEEE Access, International Journal of Information Management, Future Generation Computer Systems, Supply Chain Management: An International Journal, International Journal of Production Research, Sustainability, Computers & Industrial Engineering, etc. Originally designed for solving the double spending issue of digital currency, blockchain applications

V. CONCLUSION

An Block chain based MPSC monitoring architecture has been proposed in this work. Sensing modality was integrated with identification with a small footprint for tracking and quality monitoring of the Medical product packages. When the Medical Product packages are scanned at different retailers, logistics or storage stage within the supply chain, the real time sensor data is updated in a block chain providing a tamper-proof digital history. Any consumer or retailer can check the public ledger to obtain information regarding the specific medical product packages. The information helps in updating the shelf life, identifying key bottlenecks in the MPSC, implementing targeted recalls and moreover increasing visibility. A single secret ID integration was demonstrated in this work. The proposed architecture takes consensus from participating terminals in the network before updating the blockchain data. The broader participation of all the nodes helps to keep the network decentralized. The security analysis showed that the validation of a fake block drops with a higher number of node participation in the network and multiple consensus stages.

REFERENCES

[1] 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.
[2] J. Hobbs, "Liability and traceability in agri-food supply chains," in Quan- tifying the Agri-Food Supply Chain. Springer, 2006, pp. 87_102.
[3] D. Mao, Z. Hao, F. Wang, and H. Li, "Novel automatic food trading system using consortium blockchain," Arabian J. Sci. Eng., vol. 44, no. 4, pp. 3439_3455, Apr. 2018.
[4] L. U. Opara and F. Mazaud, "Food traceability from _eld to plate," Outlook Agricult., vol. 30, no. 2, pp. 239_247, 2001.



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