

Pharma Supply Chain Management System Using Blockchain

Rajani Sajjan, Dishant Nitin Raut, Aryan Shrivastava, Kumar Dileep, Ayush Prasad

Department of Computer Science and Engineering

MIT ADT University, Pune, India

rajani.sajjan@mituniversity.edu.in, dishantraut36@gmail.com, shrivastavaaryan4444@gmail.com

kumardileep1969@gmail.com, ayush19.ap@gmail.com

Abstract: *A drug traceability system's objective is to track or trace a drug's movement along the drug supply chain, which is essential for both public drug security and the operations of pharmaceutical companies. Data integrity, privacy, system resilience, and adaptability expectations have not been met by traditional centralized server-client technology solutions. We have presented a whole new blockchain method for drug traceability. Compared to other solutions now on the market, this one is more secure and scalable. The proposed system can also efficiently prune its storage, producing a reliable and practical blockchain storage solution.*

Keywords: drug traceability

I. INTRODUCTION

The pharmaceutical industry plays a pivotal role in ensuring public health and well-being, making the secure and efficient management of its supply chain a matter of paramount importance.

However, this intricate network faces persistent challenges, including counterfeit drugs, a lack of transparency, regulatory complexities, and the need for end-to-end traceability.

In response to these challenges, our major project sets out to revolutionize the pharmaceutical supply chain by leveraging the transformative power of blockchain technology. Blockchain, as a decentralized, tamper-resistant, and transparent ledger, holds the potential to alleviate many of the longstanding issues within the pharmaceutical sector. The project aims to achieve greater transparency, traceability, and security within the pharmaceutical industry. We will delve into the system's architecture, implementation steps, benefits, as well as the challenges and risks associated with integrating blockchain technology into this critical domain.

AI-Powered Chatbots- Implement chatbots to provide real-time customer support. Chatbots can answer queries and assist with order tracking. Geolocation and Route Optimization- Incorporate geolocation services to track the location of products. Use route optimization algorithms to ensure efficient and timely product deliveries

Through this project, we aspire to contribute to a safer, more reliable, and trustworthy pharmaceutical supply chain, ultimately benefiting patients, healthcare providers, and the entire industry.

Our Contribution

In this paper, we have proposed and developed a software which connects Ethereum-based blockchain network with different information systems of enterprises. This system can be able to share information among their partners securely. The blockchain enables the system to provides a different level of data access, data integrity, data visibility and authenticity support to partner companies while sharing the information. The results of this simulation show that the blockchain system is the best instrument for securing the supply chain process and also establish trust between different companies. It can also increase the performance of the system and reduced fraudulent or misconduct occurs in companies. We have proposed an Ethereum-based blockchain network for tracking the shipment of the products. It can manage and track the supply chain of different items while shipping in smart containers. We developed this system based on smart contracts between the product sender and receiver without the involvement of the third party. This paper explains the complete survey and existing developed approaches related to the medicine supply chain. It can also

explain the multiple procedures of how counterfeit drugs enter into the system and how these medicines affect financially to original manufacturers. One of the important reasons for drug counterfeiting is improper supply chain systems. Developed a blockchain-based system for secure end to end (E2E) drug delivery

II. LITERATURE SURVEY

1. Year-2020

Authors - Muhammad Kamran

Publication-Computers & Electrical Engineering

Paper Type-Article

DOI/Site <https://www.sciencedirect.com/science/article/abs/pii/S0045790618333913>

Title- Blockchain and Internet of Things: A bibliometric study

Description-Blockchain is contributing to the Internet of Things. The decision to determine whether Blockchain is required in IoT is based on several factors.

2. Year-2020

Authors - Mohammad Hammoudeh

Publication- ICT Express

Paper Type - Journal Paper

DOI / Site <https://www.sciencedirect.com/science/article/pii/S240595951930181X>

Title-Policy specification and verification for blockchain and smart contracts in 5G networks

Description - In this paper, the security issues of blockchain based transactions in 5G networks, particularly in the mobile edge.

3. Year-2020

Authors - Pankaj Dutta

Publication - Transportation Research Part E: Logistics and Transportation Review

Paper Type-Dissertation

DOI / Site - <https://www.sciencedirect.com/science/article/pii/S136654520307183>

Title - Blockchain technology in supply chain operations: Applications, challenges and research opportunities

Description - This work also adds values by summarizing the recent developments in blockchain and examining its potential applications in various sectors like healthcare, finance, etc;

4. Year-2022

Authors-Salam Abdallah

Publication -Computers & Industrial Engineering

Paper Type-Thesis

DOI / Site - <https://www.sciencedirect.com>

Title - Blockchain-based solution for Pharma Supply Chain Industry

Description- In this paper, we have adopted the design science research model, to propose a solution for the pharma supply chain industry

5. Year-2021

Authors-Wang-Cheol Song

Publication - ScienceDirect

Paper Type-Article

DOI/Site-<https://doi.org/10.1016/j.infof.2021.106700>

Title- A Blockchain and Machine Learning-Based Drug Supply Chain

Management and Recommendation System for Smart Pharmaceutical Industry

Description - The main goals and novelty of our proposed scheme are implementing a blockchain and machine learning-enabled system.

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III. CONCLUSION AND FUTURE WORK

Blockchain technology has changed the traditional supply chain method to a new robust, automated, secure, audible and transparent way. It ensures that the entire supply chain process is foolproof and prevents fake drugs from entering the system completely. The main goals and novelty of our proposed scheme are implementing a blockchain system.

We have developed and evaluated a blockchain-based solution for the pharmaceutical supply chain to track and trace drugs in a decentralized manner. Specifically, our proposed solution leverages cryptographic fundamentals underlying blockchain technology to achieve tamper-proof logs of events within the supply chain and utilizes smart contracts within Ethereum blockchain to achieve automated recording of events that are accessible to all participating stakeholders

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