

Fake Medicine Identification Using Blockchain Technology

Rahul Nisad¹, Pallavi Gaikawad², Rohan Bhosale³, Sumit Borole⁴,
Balasaheb B. Gite⁵

^{1,2,3,4}Student, Department of Computer Engineering, ISBM College of Engineering, Pune, Maharashtra, India

⁵Professor, Department of Computer Engineering, ISBM College of Engineering, Pune, Maharashtra, India

ABSTRACT

Fake medicine costs billions of dollars to the pharmaceutical industry every year, and it's also a huge public health risk. Fake drugs can be fake, ineffective, or even dangerous. Blockchain technology could be the answer to finding and stopping fake medicine. Blockchain is a type of digital ledger that makes transactions safe and secure. It's used to keep track of what's going on in the supply chain, from when it's made to when it's sold. This makes it perfect for tracking down fake medicine that's being smuggled out of the country. There are a few different ways you can use blockchain to spot fake medicine. One way is to store each package's unique digital identifier (UDI) on the blockchain. This will help you trace the medicine's journey through the system. If you don't find a UDI on the blockchain or if the UDI and the data don't match, then it's probably fake.

Keywords:- Fake medicines, Counterfeit pharmaceuticals, Blockchain technology, Blockchain-based authentication.

INTRODUCTION

The prevalence of counterfeit medicines poses a serious threat to public health, both in terms of patient safety and the integrity of the pharmaceutical supply chain. According to the World Health Organization, 10% of all drugs available on the global market are counterfeit, resulting in the loss of millions of lives annually. Traditional methods of identification, such as holographs, barcodes and serial numbers, have been found to be ineffective in containing the spread of counterfeit medicines. The emergence of blockchain technology, which is decentralized and can be tampered with, offers a potential solution to this problem.

The causes of incidents related to medication quality and safety are largely attributed to data record falsification at various points in the medication supply chain, which in turn leads to a lack of transparency in the supply chain and difficulty in proving the origin of medication information. These are major deficiencies in medical supply chain management, making it difficult to establish and maintain responsibility for medication quality and safety. As a result, the core functions of the medication quality and safety administration include preventing the falsification of medication information and maintaining traceability along the supply chain. To meet these needs, traditional medication administration institutions typically rely on a centralized model, which requires all nodes in the supply chain to upload medication information to a central repository, which is managed and controlled by a curator. This type of medication administration arrangement exposes the data to the risks of data alteration/mutation and (unwanted) disclosure. Traditional medication administration institutions are therefore vulnerable to the current medication safety needs.

RELATED WORKS

Traceability is a concept in supply chain management that has been significantly developed by blockchain technology. It involves the provision of raw data, processing processes, and new information derived from product activities, as well as the ability to trace and communicate between participating entities to ensure accessibility throughout the entire supply chain. The purpose of traceability is to identify historic records of a product in order to address food safety and preservation concerns.

Traceability is the monitoring and tracking of an item throughout its entire food supply chain from production to final sale. In order to prevent medication counterfeiting and to address quality issues, traceability is essential for public, pharmaceutical manufacturing, and governmental entities. A dependable traceability system enables patients, regulatory bodies, and stakeholders to track a medication from the source to the destination, thus enhancing public health.

CHARACTERISTICS

The project on “Fake Medicine Identification using Blockchain Technology” necessitates a comprehensive analysis of various parameters to guide the development and implementation of the project.

1. Interdisciplinary Collaboration:

Pharmaceutical experts, blockchain developers, supply chain managers, and regulators may all need to collaborate in order to implement blockchain technology for the detection of fake medicine.

2. Blockchain Integration:

The objective of the project is to implement blockchain technology in the pharmaceutical supply chain to establish a tamper-proof ledger for the monitoring and verification of medicinal products.

3. Supply Chain Transparency:

The objective of the project is to enhance the transparency of the pharmaceutical supply chain by making it simpler to monitor the movement of medicinal products from the manufacturing facility to the consumer.

4. Data Privacy and Security:

Due to the confidential nature of healthcare information, the project must ensure the highest level of data protection and security to protect patient data residing on the blockchain.

5. Regulatory Compliance:

The project must adhere to pharmaceutical protocols and ethical guidelines to ensure that blockchain technology is implemented within the legal and ethical framework.

6. Smart Contracts:

Using smart contracts, blockchain technology can streamline the process of authenticating pharmaceutical products across the entire supply chain.

7. Public Awareness and Education:

The objective of the project is to provide information to the general public, healthcare professionals, and other interested parties regarding the potential benefits of blockchain in verifying the authenticity of medication.

ARCHITECTURE

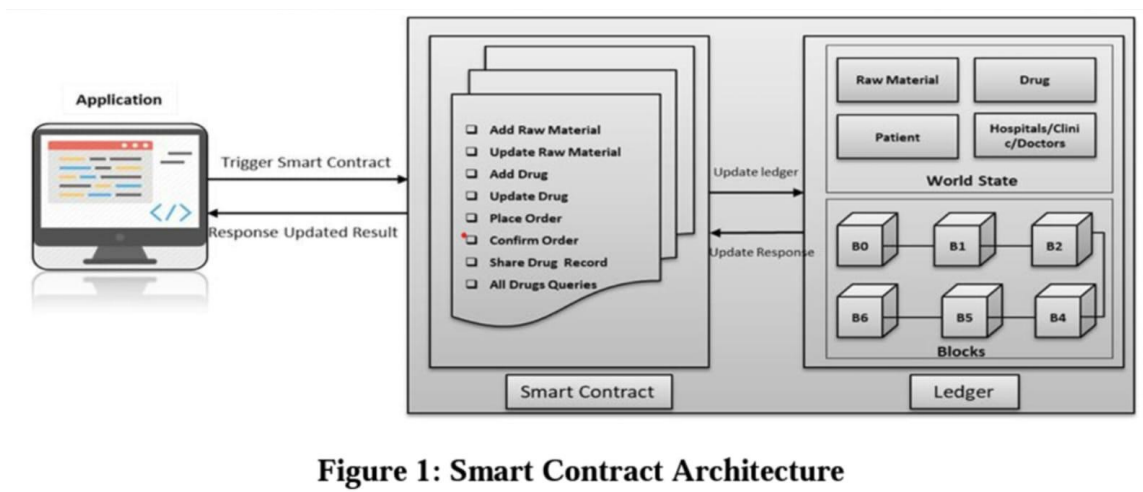


Figure 1: Smart Contract Architecture

CHALLENGES AND CONSIDERATIONS

Integration:

The pharmaceutical industry is a complex and multi-faceted sector that requires collaboration and investment from producers, distributors, pharmacies and regulatory bodies in order to implement blockchain technology.

Data Privacy:

Regulatory compliance and data encryption requirements are essential for safeguarding confidential patient data on the blockchain.

Scalability:

One of the major challenges that blockchain networks face is the increasing scalability of their networks, especially as the number of pharmaceutical transactions continues to grow.

CASE STUDIES

This section examines the efficacy of blockchain in the fight against falsified medicinal products through practical examples and pilot programs.

CONCLUSION

Blockchain technology has the potential to improve the transparency of pharmaceutical supply chains and improve patient safety by decreasing the number of fake drugs through immutable ledger, traceability and smart contract technologies. However, challenges such as integration, data privacy and scalability must be addressed.

FUTURE DIRECTIONS

This section examines the potential opportunities for further research and development into the use of blockchain technology for the identification of fake medicinal products, including international cooperation, regulatory frameworks and technological progress.

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