



Counterfeit Product Detection Using Block Chain

Mrs.Pragathi M^[1], Sharanya C H^[2], Theja K V^[3], Vathsala R S^[4], Yashaswini S^[5]

^[1]Asst Professor, Dept of CS Engg., Sir M. Visvesvaraya Institute of Technology College of Engg., Visvesvaraya Technological Institute, Karnataka, India

^[2]^[3]^[4]^[5]UG Student, Dept. of CS Engg., Sir M. Visvesvaraya Institute of Technology College of Engg., Visvesvaraya Technological Institute, Karnataka, India

Abstract : In recent decades, the importance of spotting fake goods has increased in the industries that produce goods. This ongoing product problem The sales and earnings of a corporation are impacted by counterfeiting. A working block chain technology was put in place to address the aforementioned problem, successfully preventing the product from being copied. Customers are no longer required to rely on third parties to verify the legitimacy of the product being purchased thanks to the use of block chain technology. Blockchain is a distributed database that stores data records across numerous networks in the form of blocks and chains of databases. A QR code scanner is used to detect counterfeit products, and the product's QR code is connected to the block-chain management system. To check whether the product is original, it compares the unique code received from the customer to the unique code that has been stored.

IndexTerms- Block-chain , Ethereum , QR code.

1. INTRODUCTION

A peer-to-peer network that is based on a decentralised network uses a block-chain as a digital ledger to record transactions. Direct access to the network is required to conduct a transaction, and algorithms there determine the legitimacy of the transaction [1]. Blockchain is made to function decentralizedly while often connecting databases. This incredible effect of block chain gives us the influence we need to join the forthcoming innovation era. Since the manufacturer doesn't interact directly with the consumer,

there is a possibility that some individuals could misappropriate and sell fake goods. A working Blockchain technology has been used to solve the aforementioned

problem, thereby preventing the product from being copied. Blockchain has been used in the development of several apps recently as its popularity has increased. In this project, we're using QR codes to spot phoney goods. The customer is then informed through SMS as to whether the goods is genuine or not.

2. RESEARCH OBJECTIVE

The main objective is to investigate the potential of block chain technology as a tool for detecting and preventing counterfeit products in supply chains, and to develop an effective and efficient blockchain-based solution that can be used by companies to ensure the authenticity and traceability of their products.

1. Identify the key challenges and limitations of existing anti-counterfeit technologies and approaches, and evaluate how block chain can address these challenges.
2. Develop a blockchain-based framework that can provide end-to-end traceability of products, from the point of manufacture to the point of sale, while ensuring the security and immutability of the data.
3. Test and validate the effectiveness of the blockchain-based solution in detecting and preventing counterfeit products, using real-world case studies and data.
4. Assess the economic, social, and environmental implications of using block chain for counterfeit product detection,

including the costs and benefits for different stakeholders, such as manufacturers, consumers, and regulators.

5. Provide guidelines and recommendations for companies and policymakers on how to implement blockchain-based solutions for counterfeit product detection, and how to overcome the technical, regulatory, and cultural barriers to adoption.

3. LITERATURE REVIEW

1. Blockchain Technology for Detecting Falsified and Substandard Drugs in Distribution : Pharmaceutical Supply Chain Intervention.

Authors : Paul Fontelo, Alvin Marcelo, Fang Liu, Patrick Sylim .

In this study, the writers developed a software that can detect fraudulent goods using initialised QR codes by combining the RFID method with the series of nodes methodology. The system is built using a number of nodes that are specifically designed for each person involved in the production and purchasing process, such as a manufacturer, seller, and user node. Radiofrequency identification (RFID) tags will be used as an additional data point associated with a specific product in order to identify any unauthorised users.

2. A Survey of Key Bootstrapping Protocols Based on Public Key Cryptography in the Internet of Things.

Authors: Maitreyee dutta , Manishamalik, Jorge granjal.

Using public key cryptography, we successfully protect the data in this study against misuse. Since no one can predict the outcome of this mechanism because the secret is shared by two or more parties, it is resistant to eavesdropping attacks. Only when the three parties are combined can the key be formed.

3 . A Blockchain-Based Application System for Product Anti-Counterfeiting.

Authors: Huaxiong Wang , Hung-Min Sun, Jinhua Ma , Shih-ya Lin, Xin Chen

In this study, the authors talked about how to give small and medium-sized businesses (SMEs) access to low-cost, safe, and unforgeable counterfeit authentication. The server side httpserver suite of web3.js, which is used, acts as a connection between the client and the server, and the system structure were based on Node.js.

4 . Blockchain : Research and Application

Authors: DanZhu, Yuanfeng Ca

The most frequent online purchasing frauds were reviewed in this study. utilisation of block chain technology for fraud detection. Rating scams may rank a product incorrectly so that customers will not purchase it. differentiating between subjective and objective fraud. Subjective frauds can be easily identified using block chain technology.

5 . A Novel RFID Based Anti-Counterfeiting Scheme for Retail Environments.

Authors: Morshed Chowdhury, Robin doss, Ghaith Khali

The development of a system to address the issue of security accuracy and recovery from security attacks employing DOS (Denial of Service) attacks using RFID (2018) were demonstrated in this study. This method involves one party creating or acquiring a secret value, which is then securely transmitted to the other parties. One person produces the secret value and transmits it to the other user in a one-pass key exchange; in a two-pass key exchange, both users construct their own secret values and send them to the appropriate partner.

4. PROPOSED SYSTEM

In the suggested system, block chain-based inventory management is implemented utilising QR codes. Two methods are employed to rank the alternatives and assess the weights of the criteria. Two of these methods are WASPAS (Weighted Aggregated Sum Product Assessment) and SWARA (Step-wise Weight Assessment Ratio Analysis). A medical product is considered to be counterfeit when its identity or source are misrepresented, making this one of the industries where counterfeit goods are most frequently detected. In this instance, there are serious ramifications. By employing block chain technology, which is the primary link between the manufacturer and the consumer, we can stop bogus pharmaceuticals from entering the supply chain. . Each block receiving the crypto id is unique, according to the technology's creator, who claims that digital signatures are predominantly used in this system. All other networks can be compared to the block chain technology, but the main distinction is that no data can be deleted or changed by anyone on the network. This block chain function mainly helps with the identification of fake items. Fake medications have the potential to result in major health issues if they are not discovered. Therefore, our project helps to identify all counterfeit goods. .There are three methods for identifying counterfeit drugs in the medical field that use block chain. In

that case, the first method employs the concept of medical chain data storage (by utilising previous records or transactions, fake products are identified), the second method focuses on the method used to secure the drug, and the third method employs the concept of digital signature and membership that will be provided by the certified authority thus, customers can rely on it. On the one hand, block chain technology effectively protects customers' privacy. To promote their own products or to undermine those of rivals, users may, on the other hand, introduce false information into systems. Rating fraud is more expensive because ratings can only be submitted after transactions are complete. However, sellers are still permitted to reach agreements with raters for rewarded ratings.

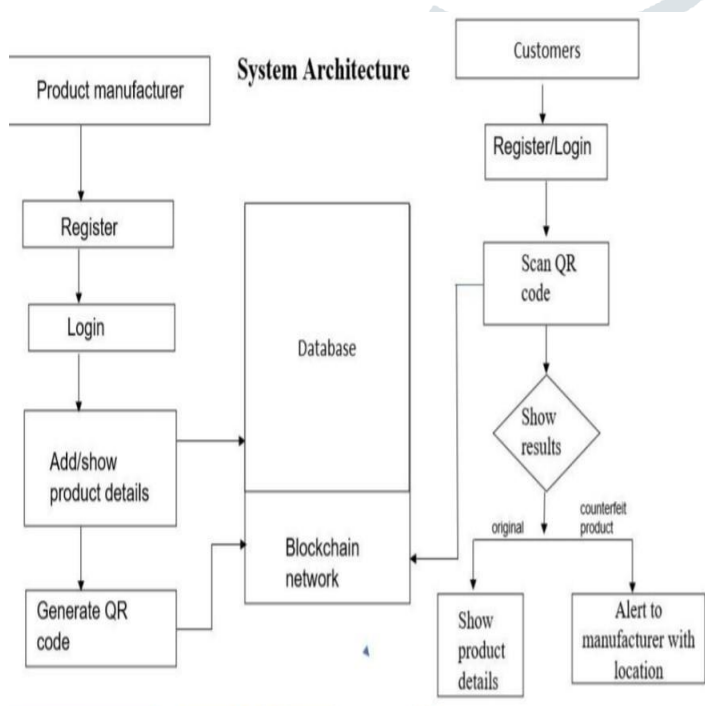


Figure: System Architecture

Hyperledger, and Corda. The choice of platform will depend on the specific requirements of the project, such as scalability, security, and interoperability with other systems.

4 . Develop smart contracts: Smart contracts are self-executing contracts that are stored on the block chain network. They can be used to automate the tracking of drugs and ensure that all transactions are executed in compliance with pre-defined rules and regulations.

5 . Develop a user interface: A user interface can be developed to enable stakeholders to access and interact with the block chain network. This may include a dashboard that provides real-time information about the location and status of drugs in the supply chain.

6 . Implement the system: Once the smart contracts and user interface have been developed, the system can be implemented. This may involve integrating the block chain network with existing systems, such as logistics and inventory management software.

7. Test and refine the system: It is important to test the system thoroughly to ensure that it is functioning as intended. Any issues or bugs that are identified should be addressed promptly. Once the system is fully operational, it can be refined over time to improve its performance and functionality.

8. Monitor and maintain the system: It is important to monitor the block chain network regularly to ensure that it is secure and operating correctly. Any anomalies or suspicious activity should be investigated promptly. The system should also be maintained regularly to ensure that it remains up-to-date and effective.

Algorithm :

1. Identify the key stakeholders: The first step in implementing block chain technology in the pharmaceutical industry is to identify the key stakeholders who will be involved in the project. This may include pharmaceutical companies, drug regulators, logistics providers, and patients.

2 . Define the scope of the project: Once the stakeholders have been identified, it is important to block chain network, which transactions will be recorded, and how the data will be analyzed.

3 .Choose a block chain platform: There are several block chain platforms available, including Ethereum,

1. SHA 256

Utilising block chain technology, the SHA-256 algorithm can be used for product authentication and fraud detection. Each product has a special identification number that is hashed with the SHA-256 technique and added to a block chain ledger with other pertinent data. Consumers can scan a product's unique identification at the point of purchase and contrast the hash value that results with the hash value stored on the block chain. If the two hash values are same, the product is thought to be legitimate; otherwise, it might be a fake or counterfeit. Blockchain technology can assist in preventing fraud and ensuring that consumers receive

authentic products by employing the SHA-256 algorithm to produce a distinctive and unchangeable digital signature for each product.

5. RESULTS AND CONCLUSIONS

In conclusion, a pharmaceutical company can gain a variety of advantages by implementing the detection of counterfeit medications using block chain technology, including greater supply chain transparency and accountability, decreased risk of counterfeiting, and improved regulatory compliance. Pharmaceutical firms may develop a safe and impenetrable system for following medicines from their manufacturing to consumption by utilising the special characteristics of block chain, such as immutability, transparency, and decentralisation. The use of smart contracts can guarantee that all transactions are carried out in accordance with legal requirements and lower the possibility of mistakes or fraud. Additionally, by integrating the block chain network with external systems like logistics and inventory management software, stakeholders will be able to get a comprehensive view of the drug supply chain and make data-driven decisions.

6. REFERENCES

- [1]. Morshed Chowdhury , Ghaith Khalil, Robin Doss, “A Novel RFID-Based Anti-Counterfeiting Scheme for Retail Environments” , 2022 .
- [2]. Xingjie Yu , Huaqun Guo, “Blockchain: Research and Application” , 2022 .
- [3]. Jorge Granjal , Maitreyee Dutta , Manisha Malik, “ A Survey of Key Bootstrapping Protocols Based on Public Key Cryptography in the Internet of Things” , 2019 .
- [4]. Paul Fontelo , Patrick Sylim , Fang Liu , Alvin Marcelo, “Blockchain Technology for Detecting Falsified and Substandard Drugs in Distribution: Pharmaceutical Supply Chain Intervention” , 2018 .
- [5]. Huaxiong Wang , Hung-Min Sun, Jinhua Ma , Shih-ya Lin, Xin Chen , Yen-Cheng Chen, “A Blockchain-Based Application System for Product Anti-Counterfeiting” , 2017 .