IJIRCCE

e-ISSN: 2320-9801 | p-ISSN: 2320-9798

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

Volume 12, Issue 4, April 2024

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

Impact Factor: 8.379

International Journal of Innovative Research in Computer and Communication Engineering

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.379 | Monthly Peer Reviewed & Referred Journal |

|| Volume 12, Issue 4, April 2024 ||

| DOI: 10.15680/IJIRCCE.2024.1204250 |

Fake Products Detection System Using Blockchain

R Kalai Selvi[1], M Nandini[2], R Bhupathi[3], Subramanyam Nagaveni[4], S Mohammed Suhail[5]

Assistant Professor, Department of CSE, Faculty, Kuppam Engineering College, Kuppam, Chittoor, India[1]

Student, Department of CSE, Kuppam Engineering College, Kuppam, Chittoor, India[2, 3,4,5]

ABSTRACT : One of the foremost challenges facing the contemporary retail market is the proliferation of counterfeit products, which are essentially inferior replicas of genuine brands. Over time, various methods have been deployed to combat this issue, including the utilization of RFID tags, artificial intelligence (AI), machine learning (ML), QR code-based systems, among others. However, each of these methods has its drawbacks. For instance, QR codes can be easily replicated from genuine products to counterfeit ones, while AI and ML techniques often necessitate substantial computational resources for effective operation. Despite these efforts, a fully satisfactory solution to the counterfeiting problem has yet to be developed.

In this project, we aim to enhance counterfeit product detection using blockchain technology. Our approach involves meticulously recording the supply chain of products at every stage of their transaction to a new party, facilitated by QR codes. Blockchain serves as the backbone of our system, enabling the storage of product supply chain data in a decentralized manner. One of the key advantages of blockchain technology lies in its immutable nature; once data is recorded on the blockchain, it cannot be altered or tampered with by any third party. This inherent security feature ensures that our data remains safeguarded against unauthorized modifications or manipulations.

KEYWORDS*:* Counterfeit (Fake) product, QRcode, Blockchain, Supply Chain, Transaction history.

I. INTRODUCTION

When developing a product, there are inherent risks such as counterfeiting and duplication, which can severely impact a company's reputation, revenue, and customer satisfaction. The proliferation of counterfeit products in the market is escalating rapidly, posing a significant challenge to businesses. To address this issue and ensure the identification and tracking of counterfeit goods, a robust blockchain system is proposed.

Implementing a blockchain-based system requires minimal effort from companies, yet offers comprehensive protection against counterfeit products. By leveraging blockchain technology, companies can mitigate the risks associated with counterfeit products effectively. Counterfeit products not only tarnish the reputation of the company but also erode brand value. Customers often mistake counterfeit products for genuine ones, leading to negative reviews based on the counterfeit product experience.

A blockchain system operates on a distributed and decentralized network, storing data in blocks that are interconnected to form a chain. Each time new data is added to the blockchain, it is appended to existing data, creating an immutable record. Unlike traditional databases, blockchain does not permit users to update or modify existing data. Instead, new data is added as a new block to the existing chain, ensuring the integrity and security of the stored information.

The inherent properties of blockchain technology, including immutability and transparency, make it an ideal solution for combating counterfeiting. By leveraging blockchain, companies can establish a tamper-proof record of their products' journey throughout the supply chain, enabling seamless identification and tracking of genuine products. This enhances transparency and trust among stakeholders while safeguarding against the proliferation of counterfeit goods.

II. REASERCH METHODS

Literature Review: Conduct a comprehensive review of existing literature on blockchain technology and its applications in combating counterfeiting. This involves studying relevant academic papers, articles, case studies, and reports to gain insights into successful implementations, challenges faced, and best practices.

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.379 | Monthly Peer Reviewed & Referred Journal |

|| Volume 12, Issue 4, April 2024 ||

| DOI: 10.15680/IJIRCCE.2024.1204250 |

Market Analysis: Analyze the current market landscape to understand the extent of the counterfeiting problem and its impact on businesses. Identify key industries and sectors vulnerable to counterfeiting and assess the potential market demand for blockchain-based solutions.

Expert Interviews: Conduct interviews with industry experts, blockchain specialists, and stakeholders involved in supply chain management and product authentication. Gather insights into their experiences, perspectives, and recommendations for implementing blockchain solutions to combat counterfeiting.

Case Studies: Examine real-world case studies of companies or organizations that have successfully implemented blockchain-based systems to address counterfeiting issues. Analyze their strategies, implementation processes, challenges faced, and outcomes achieved.

Prototype Development: Develop a prototype of the proposed blockchain-based system for combating counterfeiting. This involves designing the system architecture, defining data structures, implementing smart contracts, and integrating with existing supply chain management systems.

Pilot Testing: Conduct pilot testing of the prototype in a controlled environment or with a select group of users. Evaluate the system's performance, usability, and effectiveness in detecting and preventing counterfeit products. Gather feedback from users and stakeholders for further refinement.

Quantitative Analysis: Quantify the potential benefits of implementing the blockchain-based system, such as reduction in counterfeit products, cost savings, and improvement in brand reputation. Use data analytics techniques to analyze and interpret the results.

Qualitative Analysis: Gather qualitative feedback from stakeholders through surveys, focus groups, or interviews to understand their perceptions, attitudes, and experiences with the blockchain-based system. Identify areas for improvement and potential challenges to address.

Ethical Considerations: Consider ethical implications related to data privacy, security, and transparency in implementing the blockchain-based system. Ensure compliance with regulatory requirements and ethical standards governing data handling and authentication processes.

Continuous Monitoring and Evaluation: Establish mechanisms for continuous monitoring and evaluation of the blockchain-based system post-implementation. Monitor key performance indicators, track system performance, and address any issues or concerns that arise over time.

III. PROPOSED SYSTEM

- The project eliminates the need for third-party confirmation of product authenticity, instilling trust in the supply chain, specifically Quick Response (QR) codes, as a strategic tool against product counterfeiting. QR codes are generated based on unique Hash Values, assigning distinct identifiers to each product.
- In the context of blockchain, SHA-256 hash values are employed in each block, creating a link between blocks. Each block within the blockchain contains a cryptographic hash value, generated by a hash function, which acts as a unique identifier for that block.

IV. IMPLEMENTATION

To implement a blockchain-based system to combat counterfeiting, the first step is to assess the specific requirements outlined in the abstract, including the need for product identification, tracking, and counterfeit detection. Once the requirements are clarified, an appropriate blockchain framework such as Ethereum or Hyperledger Fabric is selected based on factors like scalability and interoperability. The architecture of the blockchain-based system is then designed, considering the distributed nature of blockchain technology, and the structure of the network, including the number of nodes and consensus mechanism, is defined. Smart contracts are developed to encode the business logic and rules governing product authentication and supply chain transactions. Integration with a QR code system is implemented for product labeling and tracking, linking QR codes to product information stored on the blockchain. Mechanisms for tracking product movements throughout the supply chain are established, recording key information like product origin and transit history on the blockchain ledger. User authentication mechanisms are implemented to ensure secure access

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.379 | Monthly Peer Reviewed & Referred Journal |

|| Volume 12, Issue 4, April 2024 ||

| DOI: 10.15680/IJIRCCE.2024.1204250 |

to the network using cryptographic techniques. Blockchain nodes are deployed to support the network infrastructure, ensuring redundancy and fault tolerance. Thorough testing is conducted to validate the system's functionality, security, and performance, and users are trained on how to effectively use the system. Monitoring and maintenance processes are established to continuously monitor system performance and security, with regular audits and updates to address vulnerabilities. Feedback from users and stakeholders is gathered to identify areas for improvement and optimization, allowing for iterative enhancements to combat counterfeiting effectively over time.

V. RESULTS AND DISCUSSION

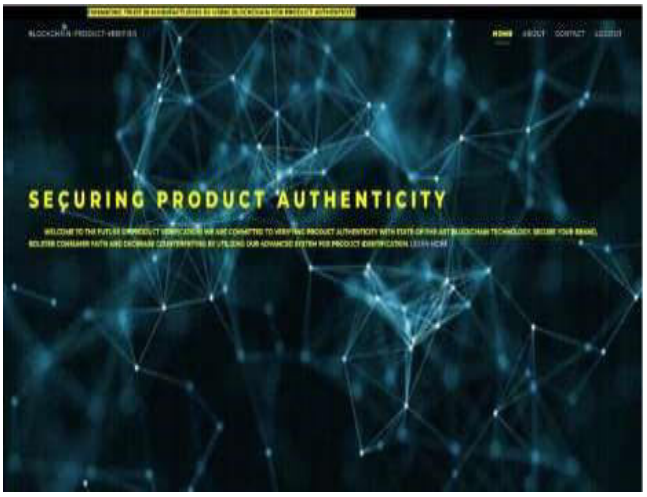

fig 1: security productsecurity authenticity

fig2:how it works

International Journal of Innovative Research in Computer and Communication Engineering

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.379 | Monthly Peer Reviewed & Referred Journal |

|| Volume 12, Issue 4, April 2024 ||

| DOI: 10.15680/IJIRCCE.2024.1204250 |

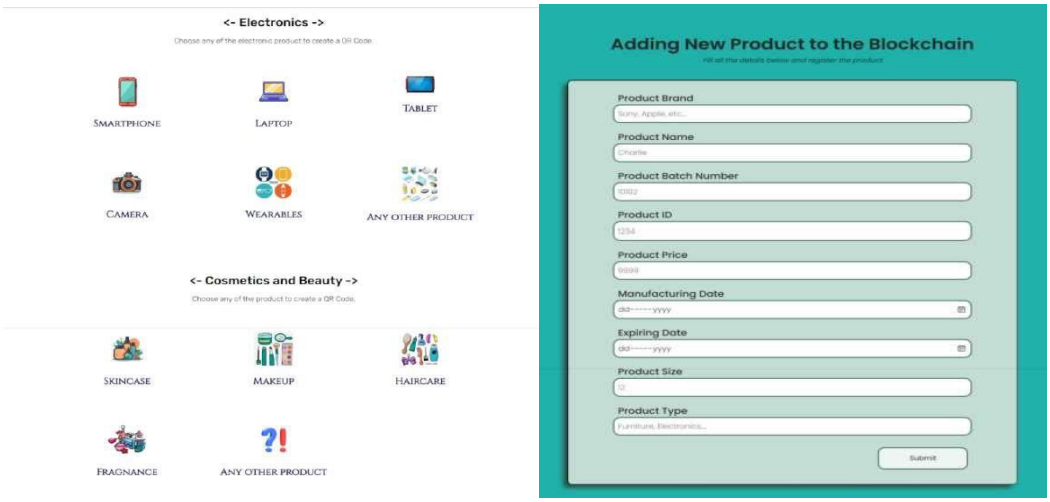

fig3 :adding new product to the block chain

fig4: scanning QR to the block chain

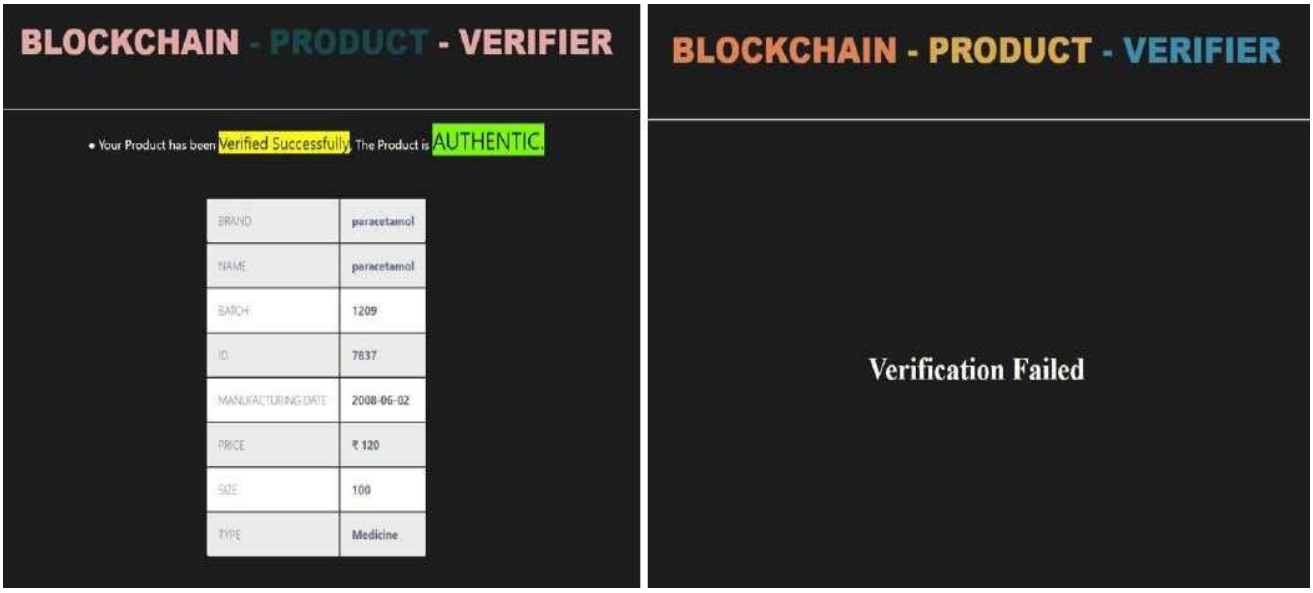

fig4: product verifier

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.379 | Monthly Peer Reviewed & Referred Journal |

|| Volume 12, Issue 4, April 2024 ||

| DOI: 10.15680/IJIRCCE.2024.1204250 |

VI. CONCLUSION

In conclusion, the Fake Product Identification System using Blockchain Technology offers a robust solution to the pervasive issue of counterfeit products in the market. By harnessing the power of blockchain technology and integrating QR codes, we've created a secure and transparent authentication system. Throughout development and implementation, our focus has been on ensuring the reliability, security, and usability of the system. We appreciate your attention and support as we strive to create a safer and more transparent marketplace through the Fake Product Identification System using Blockchain Technology.

REFERENCES

1.Ma, Jinhua; Lin, Shih-Ya; Chen, Xin; Sun, Hung-Min; Chen, Yeh-Cheng; Wang, Huaxiong (2020). A Blockchain-Based Application System for Product Anti-Counterfeiting. IEEE Access, (), 1–1.doi:10.1109/ACCESS.2020.2972026

2.Pallavi Saindane; Yogita Jethani; Puja Mahtani; Chirag Rohra; Piyush Lund; (2020). Blockchain: A Solution for Improved Traceability with Reduced Counterfeits in Supply Chain of Drugs . 2020 International Conference on Electrotechnical Complexes and Systems (ICOECS), doi:10.1109/ICOECS50468.2020.9278412

3.Jiang, Dan; Chong, Cheun Ngen (2008). [IEEE 2008 2nd International Conference on Anticounterfeiting, Security and Identification - Guiyang, China (2008.08.20-2008.08.23)] 2008 2nd International Conference on Anti-counterfeiting, Anti-counterfeiting using phosphor PUF. , (), 59– 62. doi:10.1109/iwasid.2008.4688338

4.Khalil, Ghaith; Doss, Robin; Chowdhury, Morshed (2020). A Novel RFID-Based AntiCounterfeiting Scheme for Retail Environments. IEEE Access, 8(), 47952–47962. doi:10.1109/access.2020.2979264

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

INNO SPACE SJIF Scientific Journal Impact Factor

doi crossref

निस्केयर NISCAIR

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

9940 572 462 6381 907 438 ijircce@gmail.com

www.ijircce.com

Scan to save the contact details