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Research Paper

# FAKE PRODUCT IDENTIFICATION SYSTEM USING BLOCKCHAIN

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## ABSTRACT

The rapid growth of global trade and e-commerce has led to a significant rise in counterfeit products, posing serious threats to consumer safety, brand reputation, and economic stability. Traditional product verification systems rely on centralized databases and manual authentication processes, which are often vulnerable to data tampering, lack transparency, and are inefficient in real-time validation. To address these challenges, this project proposes a **Fake Product Identification System using Blockchain technology**,

which ensures secure, transparent, and tamper-proof product tracking throughout the supply chain.

The proposed system leverages a decentralized blockchain network to record every transaction related to a product, starting from manufacturing to end-user delivery. Each product is assigned a unique digital identity, such as a QR code or hash value, which is stored on the blockchain. Stakeholders including manufacturers, distributors, and retailers can update product information as transactions occur, creating an immutable and traceable record. Consumers can verify the authenticity of a product by scanning the QR code, which retrieves the product history directly from the blockchain, ensuring trust and reliability.

Smart contracts are used to automate verification processes and enforce rules without human intervention, reducing the chances of fraud and manipulation. The system eliminates dependency on intermediaries and minimizes operational costs while improving efficiency.

## INTRODUCTION

In today's rapidly expanding global marketplace, counterfeit products have become a major concern for consumers, manufacturers, and governments alike. The proliferation of fake goods in industries such as pharmaceuticals, electronics, fashion, and food not only causes significant financial losses but also poses serious risks to consumer health and safety. Traditional methods of product authentication, such as barcodes, holograms, and manual verification systems, are increasingly proving inadequate due to their vulnerability to duplication, tampering, and lack of transparency. As counterfeiters adopt more sophisticated techniques, there is a growing need for a more secure and reliable system to ensure product authenticity.

The existing centralized systems used for tracking and verifying products often suffer from issues such as data manipulation, lack of real-time updates, and dependency on intermediaries. These systems do not provide end-to-end visibility across the supply chain, making it difficult to trace the origin and movement of products. Furthermore, consumers typically have limited access to verification mechanisms, which reduces trust in the authenticity of purchased goods. This gap highlights the necessity for a decentralized, transparent, and tamper-proof solution.

## LITERATURE REVIEW

The problem of counterfeit products has been widely studied in recent years due to

its growing impact on global supply chains and consumer trust. Early research primarily focused on traditional anti-counterfeiting methods such as barcodes, RFID tags, and centralized databases. However, these systems were found to be vulnerable to duplication, tampering, and single-point failures, making them ineffective in preventing sophisticated counterfeit activities. Researchers have therefore shifted towards decentralized technologies, particularly blockchain, as a more secure alternative.

Several studies highlight the effectiveness of blockchain in ensuring product authenticity and traceability. Wasnik (2022) proposed a blockchain-based system that tracks the entire supply chain history of products to detect counterfeit goods, emphasizing transparency and immutability as key advantages . Similarly, other research shows that blockchain enables secure storage of product information, making it nearly impossible to alter or manipulate records once they are added to the ledger . This property significantly enhances trust among stakeholders, including manufacturers, distributors, and consumers.

The rapid increase in counterfeit products across global markets has created a critical challenge for manufacturers, consumers, and regulatory authorities. Fake goods are often indistinguishable from genuine products, making it difficult for consumers to verify authenticity. This not only leads to financial losses for companies but also poses serious health and safety risks, especially in sectors such as pharmaceuticals, food, and electronics. The absence of a reliable and transparent verification mechanism allows counterfeit products to circulate freely within supply chains.

Existing product identification systems are primarily based on centralized databases, barcodes, or manual verification techniques. These approaches suffer from several limitations, including lack of transparency, vulnerability to data manipulation, duplication of identification codes, and dependence on intermediaries. Since centralized systems are controlled by a single authority, they are prone to single-point failures, cyber-attacks, and unauthorized modifications. Additionally, these systems do not provide real-time tracking or end-to-end visibility of product movement, making it difficult to trace the origin and journey of a product.

## PROBLEM DEFINITION

Another major issue is the lack of consumer involvement in the verification process. Most current systems do not provide easy-to-use tools for customers to check product authenticity before purchase. Even when verification mechanisms exist, they are often complex, time-consuming, or unreliable. This reduces consumer trust and increases the likelihood of purchasing counterfeit goods unknowingly.

## PROPOSED SYSTEM

The proposed system introduces a **Blockchain-based Fake Product Identification System** designed to provide a secure, transparent, and tamper-proof method for verifying product authenticity across the supply chain. The main objective of this system is to prevent counterfeit products from entering the market by creating a decentralized platform where every product transaction is permanently recorded and can be verified by all authorized participants.

In this system, each product is assigned a **unique identification code**, such as a QR code, barcode, or cryptographic hash, at the time of manufacturing. This unique ID is linked to essential product details such as product name, manufacturer information, manufacturing date, batch number, and other relevant attributes. Once generated, this information is stored as a transaction on the blockchain, creating an immutable digital record for the product.

The proposed system involves multiple stakeholders including **manufacturers, distributors, retailers, and consumers**. The manufacturer first registers the product on the blockchain. As the product moves through different stages of the supply chain, each stakeholder updates the product status by adding new transactions to the blockchain. These updates may include shipment details, ownership transfer, warehouse information, and retail availability. Since blockchain records are immutable and time-stamped, any attempt to alter or fake product information becomes extremely difficult.

## SYSTEM ARCHITECTURE

The system architecture of the **Fake Product Identification System using Blockchain** is designed to provide secure product registration, transparent tracking, and easy authenticity verification. The architecture consists of multiple layers and components that work together to ensure that product information is stored safely and can be accessed reliably by authorized users and consumers.

At the first level, the **User Layer** includes all the participants who interact with the system, such as the **manufacturer, distributor, retailer, and consumer**. The manufacturer is responsible for registering new products into the system. The distributor and retailer update the product movement and transaction details whenever the product changes hands. The consumer acts as the final verifier by scanning the QR code and checking whether the product is genuine or fake.

The second layer is the **Application Layer**, which provides the interface through which all users access the system. This layer may include a **web application or mobile application**. Through this interface, manufacturers can add product details, distributors and retailers can update transportation and sale information, and consumers can verify the authenticity of the product. The application layer processes user requests and sends them to the blockchain network for validation and storage.

## SYSTEM ARCHITECTURE


## IMPLEMENTATION

The implementation of the Fake Product Identification System using Blockchain is carried out by combining blockchain technology, a web-based application, QR code generation, and user authentication modules. The main purpose of implementation is to develop a secure platform where product details can be registered, tracked, and verified at every stage of the supply chain. The system is designed to be practical, transparent, and easy to use for manufacturers, distributors, retailers, and consumers.

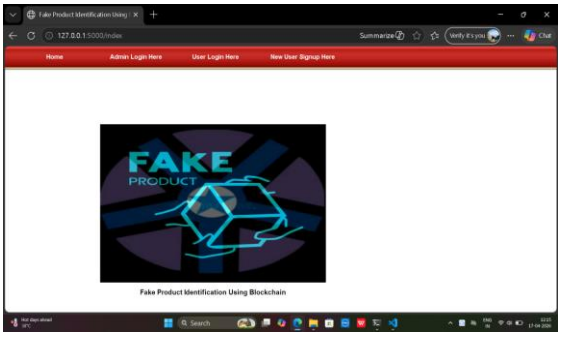
The implementation process begins with the manufacturer module. In this module, the manufacturer creates an account and logs into the system to register a new product. While adding the product, details such as product ID, product name, manufacturer name, manufacturing date, category, and description are entered into the application. Once the product details are submitted, the system generates a unique identification code for that product. This code is then converted into a QR code, which is attached to the product packaging. At the same time, the product information is stored as a transaction in the blockchain,

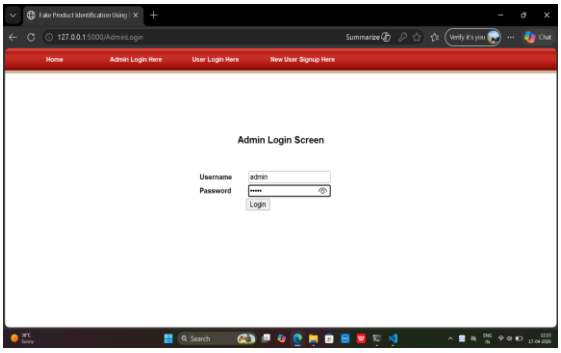
creating a permanent and tamper-proof digital record.

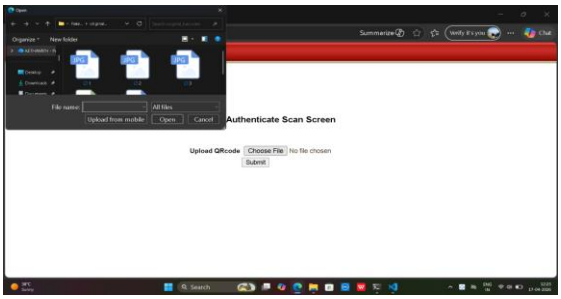
## RESULTS AND DISCUSSION

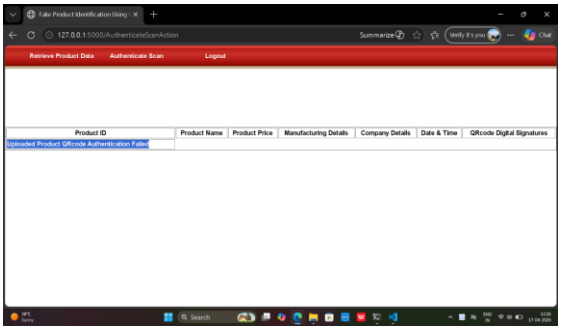
The implementation of the Fake Product Identification System using Blockchain was evaluated based on key parameters such as security, transparency, traceability, efficiency, and accuracy in detecting counterfeit products. The system was tested using multiple scenarios involving product registration, supply chain updates, and consumer verification to analyze its overall performance and effectiveness.

The results show that the system successfully provides end-to-end traceability of products. Each product registered by the manufacturer was assigned a unique QR code and recorded on the blockchain. As the product moved through distributors and retailers, all updates were accurately stored as blockchain transactions.




## CONCLUSION

The Fake Product Identification System using Blockchain provides an effective and modern solution to the growing problem of counterfeit products in the global market. By leveraging blockchain technology, the system ensures secure, transparent, and tamper-proof storage of product information, enabling reliable tracking and

verification throughout the supply chain. The use of decentralized architecture eliminates the risks associated with centralized systems, such as data manipulation, single-point failures, and lack of trust among stakeholders.

Through the implementation of unique product identification using QR codes and blockchain-based transaction records, the system enables end-to-end traceability from manufacturer to consumer. Each participant in the supply chain can update product information securely, while consumers can easily verify authenticity in real time using a simple scanning process. This not only enhances consumer confidence but also protects brand integrity and reduces financial losses caused by counterfeit goods.

The integration of smart contracts and cryptographic security mechanisms further strengthens the system by automating verification processes and preventing unauthorized access or modifications. The results of the system demonstrate improved efficiency, transparency, and accuracy in detecting fake products compared to traditional methods.

However, certain challenges such as scalability, implementation cost, and adoption barriers need to be addressed for large-scale deployment. Despite these limitations, the proposed system lays a strong foundation for a secure and trustworthy product authentication framework.

## REFERENCE


- S. Nakamoto, *"Bitcoin: A Peer-to-Peer Electronic Cash System,"* 2008.
- M. Swan, *"Blockchain: Blueprint for a New Economy,"* O'Reilly Media, 2015.
- K. Christidis and M. Devetsikiotis, *"Blockchains and Smart Contracts for the Internet of Things,"* IEEE Access, vol. 4, pp. 2292–2303, 2016.
- A. Reyna, C. Martín, J. Chen, E. Soler, and M. Díaz, *"On Blockchain and Its Integration with IoT: Challenges and Opportunities,"* Future Generation Computer Systems, 2018.
- T. Bocek, B. B. Rodrigues, T. Strasser, and B. Stiller, *"Blockchains Everywhere – A Use-Case of Blockchains in the Pharma Supply Chain,"* IFIP/IEEE Symposium, 2017.
- H. Treiblmaier, *"The Impact of the Blockchain on the Supply Chain: A Theory-Based Research Framework,"* Supply Chain Management Journal, 2018.

- S. Saberi, M. Kouhizadeh, J. Sarkis, and L. Shen, *"Blockchain Technology and Its Relationships to Sustainable Supply Chain Management,"* International Journal of Production Research, 2019.

- F. Tian, *"An Agri-Food Supply Chain Traceability System for China Based on RFID & Blockchain Technology,"* IEEE International Conference, 2016.

- Z. Zheng, S. Xie, H. Dai, X. Chen, and H. Wang, *"An Overview of Blockchain Technology: Architecture, Consensus, and Future Trends,"* IEEE BigData Congress, 2017.

- K. Biswas and V. Muthukkumarasamy, *"Securing Smart Cities Using Blockchain Technology,"* IEEE Conference on Smart Cities, 2016.