

Fake Product Detection with QR Code Using Blockchain

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Abstract - Fake products are a big problem in many industries, causing losses for businesses and risks for customers. This project aims to detect fake products using QR codes and blockchain technology. Each genuine product will have a unique QR code linked to a blockchain ledger. When scanned, the QR code will show the product's details, including its origin, manufacturing date, and authenticity. Blockchain ensures that the information is secure and cannot be changed or faked. Customers and businesses can verify products instantly by scanning the QR code. If a fake product is detected, it will be reported in the system. This method reduces fraud and increases trust in the market. It also helps brands protect their reputation and customers avoid counterfeit goods. The project will create a simple, secure, and reliable solution for product verification.

Key Words: Fake Product Detection, QR Code, Blockchain, Product Authentication, Counterfeit Prevention

1. INTRODUCTION

Fake products are a growing problem in various industries, including pharmaceuticals, electronics, and fashion. These counterfeit goods can cause financial losses for businesses and pose serious risks to consumers. Traditional methods of detecting fake products are often unreliable and difficult to manage. This project focuses on using QR codes and blockchain technology to identify and prevent fake products. Each original product will have a unique QR code linked to a blockchain ledger. When scanned, the QR code will display important details such as product origin, manufacturer, and authenticity. Blockchain ensures that this information is secure, transparent, and cannot be altered. Customers and businesses can verify the authenticity of a product in real time. If a fake product is detected, it can be reported and tracked in the system. This solution helps companies protect their brand reputation and ensures consumer safety. It also simplifies supply chain management by providing a reliable tracking system. Using QR codes makes the verification process easy and accessible to everyone. Blockchain technology adds an extra layer of security by preventing data tampering. The system creates a trusted environment for manufacturers, sellers, and buyers. This project aims to reduce the circulation of counterfeit goods and increase trust in the market. By implementing this technology, we can create a safer and more transparent marketplace.

2. LITERATURE REVIEW

i. Holograms and Security Labels: Many companies use holograms, special ink, or security labels to prove a product's authenticity. However, counterfeiters have found ways to copy these features, making them less effective.

ii. Barcodes and Serial Numbers: Products often come with unique serial numbers or barcodes. While useful, these numbers can be copied and printed on fake products.

iii. RFID and NFC Technology: Some companies use Radio-Frequency Identification (RFID) or Near Field Communication (NFC) tags to track products. These technologies provide better security but are expensive to implement on a large scale.

iv. Chemical and DNA Tagging: High-end security measures, such as chemical markers or DNA-based tags, can be used for authentication. However, they require specialized scanning devices, making them impractical for everyday consumers.

3. SCOPE OF THE STUDY

The scope of this study focuses on developing a system to detect fake products using QR codes and blockchain technology. It covers various industries such as pharmaceuticals, electronics, fashion, and consumer goods. The study includes designing a secure method for assigning unique QR codes to genuine products. When scanned, these QR codes will provide product details stored on a blockchain, ensuring security and transparency. The system will allow manufacturers, sellers, and customers to verify product authenticity instantly. It will also help in tracking fake products and reporting counterfeit cases. The study aims to reduce fraud, protect brand reputation, and enhance consumer trust. It will also explore the benefits of blockchain, such as data security and tamper-proof records. The project will focus on creating a user-friendly and cost-effective solution for businesses and consumers. Limitations such as internet dependency and implementation challenges will also be considered.

4. OBJECTIVES

- i. To develop a system that uses QR codes and blockchain technology to detect fake products.
- ii. To assign unique QR codes to genuine products for easy verification.
- iii. To store product details securely on a blockchain to prevent tampering.
- iv. To enable real-time product verification for manufacturers, sellers, and consumers.
- v. To reduce counterfeit products in various industries such as pharmaceuticals, electronics, and fashion.

5. PROBLEM STATEMENT

Counterfeit products are a major problem in various industries, including pharmaceuticals, electronics, fashion, and consumer goods. Fake products not only cause financial losses to businesses but also pose serious risks to consumers, such as health hazards and poor-quality goods. Traditional methods of product authentication, such as holograms and barcodes, can be easily duplicated or tampered with, making them unreliable in preventing counterfeit goods. There is a need for a more secure and efficient system to verify product authenticity. QR codes offer a simple way for users to check product details, but without a secure backend, they can also be faked. Blockchain technology provides a solution by ensuring that product information is securely stored, transparent, and tamper-proof. By combining QR codes with blockchain, a reliable system can be developed where every product has a unique and verifiable identity. This study aims to address the issue of fake products by developing a system that allows manufacturers, sellers, and consumers to verify product authenticity instantly. It will help businesses protect their brand reputation, ensure customer safety, and enhance trust in the market.

6. PROPOSED SYSTEM

- i. **QR Code Generation:** Every genuine product will be assigned a unique QR code at the time of manufacturing. This QR code will contain product details such as the manufacturer's name, production date, and serial number..
- ii. **Blockchain Storage:** The product information will be securely stored on a blockchain network. Since blockchain is decentralized and tamper-proof, no one can modify or fake the stored data.
- iii. **Scanning for Verification:** Customers and retailers can scan the QR code using a smartphone or a verification app. The scanned code will retrieve product details from the blockchain and display them.
- iv. **Authenticity Check:** If the QR code is valid and matches the blockchain record, the product is confirmed as genuine. If the code is missing or does not match, it indicates a fake product.

7. IMPLEMENTATION

Step 1: QR Code Generation

Step 2: Storing Product Data on Blockchain

Step 3: QR Code Scanning and Verification

Step 4: Authentication Check

Step 5: Reporting and Tracking Fake Products

8. METHODOLOGY

- i. QR Code Technology
- ii. Blockchain Technology
- iii. Mobile/Web Application
- iv. Database Management

9. ADVANTAGES OF THE SYSTEM

- i. **Enhanced security against fake products:** The system uses blockchain technology to store product details in a tamper-proof and decentralized manner, making it impossible for counterfeiters to modify or fake product information. This ensures that only genuine products are verified and sold in the market.
- ii. **Easy and instant product verification:** Consumers and retailers can scan the QR code using a smartphone to instantly check product authenticity. This quick and simple process helps in immediate decision-making, reducing the chances of purchasing counterfeit goods.
- iii. **Protection of brand reputation and consumer safety:** By preventing fake products from entering the market, brands can maintain their reputation and trust among customers. Consumers are also protected from harmful or poor-quality counterfeit goods, ensuring their safety and satisfaction.
- iv. **Increased transparency in the supply chain:** Every step of the product's journey, from manufacturing to delivery, is securely recorded on the blockchain. This allows businesses and consumers to track product history, ensuring authenticity and preventing fraud in the supply chain.

10. CHALLENGES

- i. **Internet dependency for QR code scanning:** The system requires an active internet connection to fetch product details from the blockchain, which may be a challenge in areas with poor network connectivity or limited access to mobile data.
- ii. **Cost and complexity of blockchain implementation:** Setting up a blockchain-based authentication system requires technical expertise and infrastructure, which can be costly for small businesses. Maintaining a secure and scalable blockchain network also involves additional resources.
- iii. **Adoption challenges for businesses and consumers:** Some businesses may be hesitant to adopt new technology due to the costs and effort involved in integrating blockchain with their supply chain. Consumers may also lack awareness or technical knowledge about scanning QR codes and verifying product authenticity.

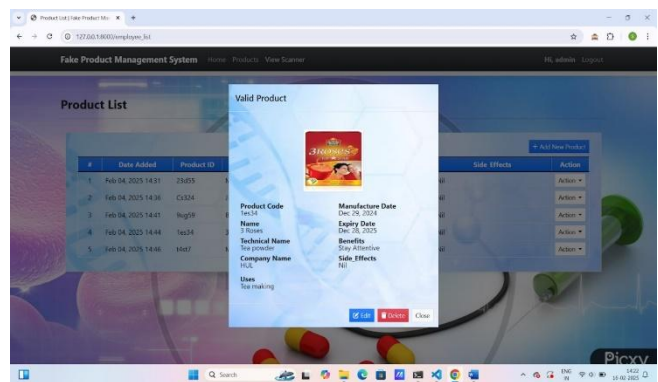
11. FUTURE SCOPE

The system can be improved by integrating Artificial Intelligence (AI) and Machine Learning (ML) to detect counterfeit patterns and provide smarter fraud prevention. Expanding this technology to industries like pharmaceuticals, electronics, and luxury goods can further reduce the impact of fake products worldwide. Future developments can include offline QR code verification, allowing users to check product authenticity without needing an internet connection. Enhancing the blockchain network for faster and more cost-effective transactions will also help in wider adoption. Additionally, governments and regulatory bodies can implement this system for legal enforcement, making it mandatory for manufacturers to register products on the blockchain. Increased user

awareness programs and simplified mobile apps will encourage more consumers and businesses to use the system effectively.

12. SCREEN LAYOUT

Product list



13. CONCLUSION

Counterfeit products are a growing problem that affects businesses and consumers worldwide. This project provides a secure and efficient solution by integrating QR codes with blockchain technology to ensure product authenticity. The system allows instant verification, prevents data tampering, and increases transparency in the supply chain. By using blockchain, product details remain secure and unchangeable, reducing the risk of fake goods entering the market. Consumers can easily verify products, and businesses can protect their brand reputation. While challenges like cost and internet dependency exist, future improvements can make the system more accessible and scalable. Overall, this project helps in reducing counterfeit goods, ensuring consumer safety, and building trust in the market, making it a valuable solution for the future.

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