



Fake Product Identification By QR Code Using Blockchain

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Abstract: Our current supply chains struggle with hidden inefficiencies and vulnerabilities due to limited transparency. This opacity fuels the rampant issue of counterfeiting, often undetectable by sight. Existing methods like RFID tags and AI offer some solutions, but they're hampered by limitations like replicability and high computational demands. This project proposes a novel approach: harnessing the power of blockchain technology. By creating a decentralized, tamper-proof ledger that tracks every step of a product's journey, this system guarantees transparency and traceability throughout the supply chain. Blockchain based system, makes everything decentralized that may be accessed by several parties at the same time. One of its main advantages is that the recorded data is difficult to change without the consent of all parties concerned which makes the data extremely secure and protect from all vulnerabilities. This paper presents system designed using blockchain technology for detection of counterfeit products.

Keywords: "Blockchain", "Counterfeit, RFID", "Artificial Intelligence", "QR code".

I. INTRODUCTION

Each day brings more technological progress. Today's company market is competitive, and everyone strives to give customers the best options. Some people sell unlicensed things to get rich quickly. The Organisation for Economic Co-operation and Development (OECD) and the European Union Intellectual Property Office (2019) define counterfeit goods as products that copy the appearance of genuine goods without permission [1]. Recent years have seen a boom in counterfeit goods, and the spectrum of products in danger has grown. With almost half of US Customs and Border Protection's counterfeit items being clothes and accessories, copyright violations have increased. While international trade has remained flat, counterfeit goods have grown to 3.3% [1]. Over the past decade, counterfeit products have flooded Bangladesh's market. The National Consumers' Rights Protection Directorate identified counterfeit powdered milk and cosmetics in large stores in Banani, Gulshan, and other affluent areas during enforcement operations [2]. During the raid, officers found that several facilities were making counterfeit consumer products without MRP, importer names, or addresses. Even during the COVID-19 pandemic, dishonest businessmen created fake masks, gloves, and sanitisers. A group of dishonest merchants has started selling phoney and low-quality goods during the coronavirus crisis. Famous national and international brands are being forged alarmingly. This includes food, medicine, and life-saving items.

II. UNDERSTANDING BLOCKCHAIN TECHNOLOGY

Blockchain technology is commonly linked with digital currencies like Bitcoin. It operates as a decentralized database recording transactions, upheld and verified by a network of computers globally. Unlike traditional systems overseen by a central authority, such as a bank, Blockchain relies on a vast community to validate records. This distributed nature ensures no single entity holds control, and once recorded, transaction histories cannot be altered or removed. As compared to a conventional centralized database the information cannot be manipulated due to blockchain's built in distributed nature of structure and confirmed guarantees by the peers.[2].

Working of Blockchain:

When a new transaction is initiated, it is subsequently propagated across a network of decentralized computers distributed globally. These computers collaborate to solve complex equations, a process that verifies the legitimacy of the transaction. They are called miners. Once confirmed to be legitimate transactions, they are clustered together into blocks. After successfully validating a transaction, the miner is rewarded with a proof of work. These validated



transactions are then linked together sequentially, forming an unbroken chain that records the entire transaction history permanently.

III. LITERATURE REVIEW

1. Title: A comparative study: Blockchain technology utilization benefits, challenges, and functionalities”

Author: Ali, Omar, et al

Year: 2021

Publisher: IEEE Access 9

Description: It gives us a through explanation of blockchain technology. It provides comprehensive details regarding the blockchain's history, advantages, disadvantages, architecture, and security. Blockchain is a powerful toolbox — not a universal hammer. When multiple, partially mistrusting parties need shared, auditable records or when new token-driven business models are required, blockchain can deliver substantial value. However, it carries trade-offs (performance, privacy, governance complexity) that make traditional databases or hybrid approaches preferable in many cases. Effective adoption depends on carefully matching architecture to the use-case, managing off-chain/on-chain boundaries, and planning governance and compliance from day one.

2. Title: “Identifying Fake Product Through a QR Code Based Blockchain System”

Author: P.LokeshReddy, A.MuniKarthik, M.Pavitra, Mrs.M.S.Soundarya,M.E.,

Year: 2022

Publisher: IRJET

Description: - The production and marketing of counterfeit or counterfeit items and products exposes consumers to financial, health and safety risks. It also affects the business growth of companies and businesses through loss of revenue, bad products, losses and price changes, many names are forced to use the money for legal protection. Use camera scanners to identify counterfeit products and link the product's QR code or barcode to blockchain blocks. If the numbers on the work match the numbers in the library, a notification is sent to the customer informing them about the originality of the work. If the customer accepts the offer, a notification will also be sent to the manufacturer stating where the customer purchased the product, if the number on the product does not match the number in the information. This approach aims to reduce counterfeiting by ensuring that consumers do not rely on retailers to decide whether the product is genuine or not. Product tracking using blockchain technology involves creating tamper-proof and immutable information about products from production to delivery.

3. Title: “QR based Fake Product Detection using Blockchain”

Author: Rivaa Vadher, Rishith Vadher

Year: 2024

Publisher: IJIRT

Description: The proliferation of counterfeit products poses a significant challenge to consumers and brand owners alike. Current software solutions for counterfeit detection lack the robustness and transparency needed to combat this pervasive issue. This project proposes a novel approach to address this problem by leveraging blockchain technology in conjunction with QR codes. Our software solution combines blockchain technology and QR codes to create a secure and transparent anti counterfeiting system. Each authentic product is assigned a unique QR code linked to a blockchain-based ledger. When consumers scan the QR code, they can instantly verify the product's authenticity and access detailed information about its origin, manufacturing, and distribution history. The immutable nature of blockchain ensures data integrity, making it nearly impossible for counterfeiters to manipulate or replicate. By integrating blockchain with QR codes, this software enhances consumer confidence and empowers them to make informed purchasing decisions. Furthermore, brand owners gain real-time insights into their supply chains, enabling them to identify and mitigate counterfeit production more effectively.

IV. PROPOSED SYSTEM

Counterfeiting poses a global threat, impacting organizations, manufacturers, and consumers on a massive scale. Its ramifications extend to the reputation of organizations and the welfare of consumers, with India being no exception. The proposed system focuses on consumer goods, facilitating product tracking and maintaining supply chain integrity through the utilization of Blockchain technology. System Model: The proposed system will function as a decentralized application (Dapp), utilizing the Ethereum Network as its primary blockchain infrastructure. It will manage and store all records related to product transactions for the companies listed on the Dapp.

Flow of Proposed System:

The main aim of this proposed system is to maintain the Genuity of the product by helping the customer track the supply chain history of the product. System gives customers the power to track the history of an entire product from manufacturer



to customer using blockchain. The anticounterfeiting system built upon Blockchain technology comprises three distinct roles: Manufacturer, Seller, and Consumer. These roles are elaborated upon and depicted in the figure.1.1

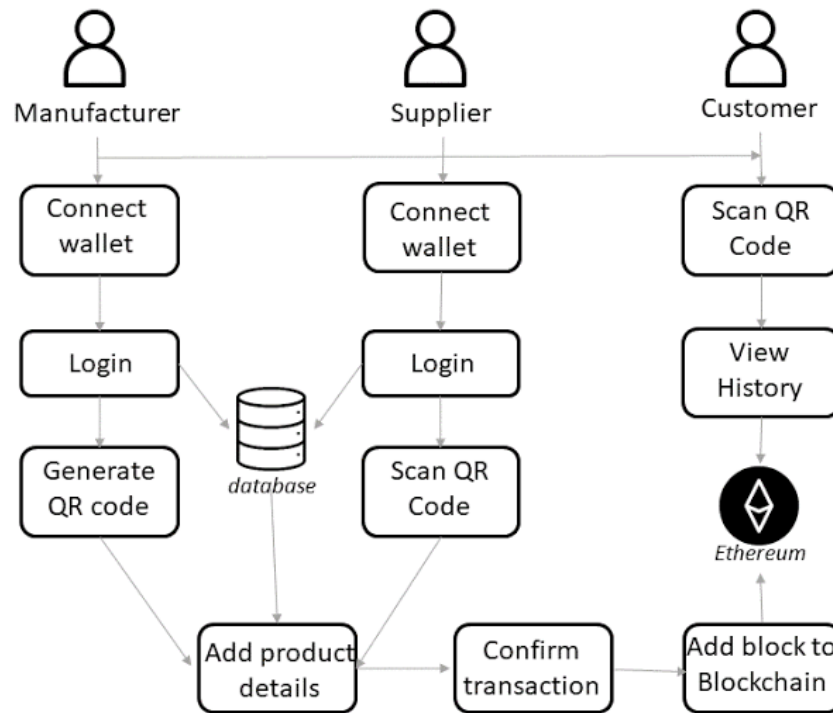


Figure 1.1

1. Manufacturer: The Manufacturer accesses their account and generates a QR code for the product while inputting necessary product details. Using their Ethereum wallet, the manufacturer adds a block to the Ethereum blockchain. A linkage is established between the user ID in our local database and the entity's wallet address. Only when a manufacturer logs in from their own account and utilizes their own wallet will the block be appended to the digital ledger.

2. Supplier: The supplier accesses their account and scans the product's QR code. Subsequently, the seller gains access to the manufacturer's product information entered into the system. The seller then supplements this information with additional details such as the destination shop and uploads it onto the Blockchain. These updated details are then accessible to the buyer for viewing.

3. Customer: Customers can check the integrity of the product by scanning QR code which will list the history of transactions and thus verifying the genuinity of the product. At the time of customer purchasing the product after the QR scan in supply chain history, if the last location is not matched with the purchase location, the customer will know that the product is not genuine. It concludes that the QR code was copied and the customer becomes aware of counterfeiting.

V. CONCLUSION

Blockchain is a decentralized system, therefore the local suppliers cannot interfere with the checking or counterfeiting of the product in the proposed system. Manufacturers suppliers have the option to utilize the system for storing product information on the Blockchain. This technology provides inherent features like resistance to tampering, consistent data, and confidentiality, ensuring the security and privacy of the stored data. Customers can access and review the entire supply chain history of a product, thus verifying its authenticity. This transparency allows customers to have confidence in the integrity of the goods they intend to purchase. The proposed system can effectively lower the rate of counterfeiting of branded goods and provide the companies with an easier approach to provide consumers with the confidence that they will not purchase counterfeit goods. This system will help to build trust and good bonding between manufacturer and customer and in deed it will help in improving economy and reducing corruption. Further system can be extended to avoid frauds done in banking, healthcare, voting system, online shopping and so on.

**REFERENCES**

- [1] Hunhevicz, Jens J., and Daniel M. Hall. "Do you need a blockchain in construction? Use case categories and decision framework for DLT design options." *Advanced Engineering Informatics* 45 (2020): 101094.
- [2] Ali, Omar, et al. "A comparative study: Blockchain technology utilization benefits, challenges, and functionalities." *IEEE Access* 9 (2021): 12730-12749.
- [3] Bhutta, Muhammad Nasir Mumtaz, et al. "A survey on blockchain technology: evolution, architecture, and security." *IEEE Access* 9 (2021): 61048-61073.
- [4] Jambhulkar, Swaroop, et al. "Blockchain-based fake product identification system." *International Research Journal of Modernization in Engineering Technology and Science* (2021): 2582-5208.
- [5] Dursun, Taner, et al. "Blockchain Technology for Supply Chain Management." *Global Joint Conference on Industrial Engineering and Its Application Areas*. Springer, Cham, 2020.