

Counterfeit Product Detection Through Blockchain Integration.

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Abstract— This paper proposes a system for detecting counterfeit products using blockchain technology. The system would involve two types of users: the official company responsible for registering products and the customers who want to ensure their purchases are genuine. The official company would register its products on the application, assigning them unique QR codes. When customers buy a product, they can simply scan the QR code using the application. The application would then verify the product's authenticity through the blockchain. The blockchain would store a record of all product registrations and transactions. This would make it very difficult for counterfeiters to create fake products or tamper with the data on the blockchain.

Keywords—Blockchain, QR, Customer, Product, Authenticity

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I. INTRODUCTION

Counterfeit goods pose serious risks to the global economy, including health hazards, brand reputation damage, and financial losses for businesses. Blockchain technology offers a solution by providing a secure and transparent way to track product authenticity throughout supply chains. This project aims to create an application using blockchain to detect counterfeit products. It involves authorized companies registering products and customers verifying their authenticity. The system focuses on transparency, cost control, pre-audit methods, and strong supplier relationships to effectively combat counterfeit threats. Its goal is to empower stakeholders to verify product integrity and combat brand counterfeiting.

II. LITERATURE SURVEY

The survey examined counterfeiting sources and their impact on society. It discussed various fake product detection systems using Artificial Intelligence, QR codes, Machine Learning, and Blockchain. Shaik proposed using public and private keys for QR codes, and a cryptographic app for scanning. Manufacturers should run servers to accept requests and match buyer names and item codes.[3].

Khalil and Doss and others propose RFID-based systems to reduce counterfeiting in retail settings. This small, inexpensive system uses Tran and Hong's anti-counterfeiting protocols and is immune to DOS attacks, enabling customers to verify the legitimacy of products in-store. This small solution is suitable for consumption great role.[6].

Benatia and Baudry et. Al. Advise a traceability- CPS- based structure for deliver chain management, together with a couple of layers that have interaction to beautify product protection and nice. The set of rules computes the maximum common item sets in the product transaction database, detecting extraordinary product behaviour.[4]

Habib and Sardar et. Al. Talk SCM developments, highlighting executives' difficulties and transaction problems. They advocate an answer using blockchain generation, that specialize in structuring new fashions on the plan stage to cope with those problems.[5]

Chen and Shi et. Al. Gift a framework for blockchain-primarily based SCQI, which allows smart deliver chain exceptional control using RFID generation for best and transaction information recording, and clever contracts for supply chain manage.[7]

The proposed blockchain era for records sharing is managed by means of the proprietor, stopping 0.33-birthday celebration interference. Users are usually privy to the accrued data and its usage. The blockchain blocks comprise sender, quantity, receiver, transaction ID, product ID, and metadata. [8].

Ethereum is a public- source Blockchain.

Ethereum is a technology that's territory to digital plutocrat, global remittments and operations. The procedure is simple as to learn into the portal, gather a portmanteau that lets you interconnect to Ehereum and manage your resources, Get the ETH, usage operations powered by Ethereum, start erecting [9].

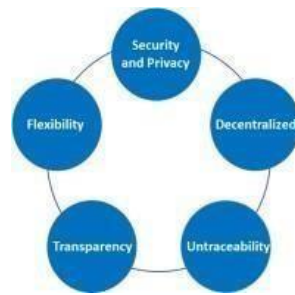
The obstacles within the current structures are that manufacturers used QR codes on merchandise to show the validity of the product. But the QR code can be copied and used to label counterfeit merchandise [3]. In the RFID based gadget that low Cost RFID tags can be used for vehicle identity of merchandise, but due to cloning of RFID tags, this approach is no longer appropriate. [7]

III. Problem Statement

Counterfeit products are a significant issue, with estimates suggesting they make up to 7% of global trade, resulting in billions lost annually. They pose risks for consumers, as they might lack safety standards or contain harmful substances. Businesses also suffer from damaged reputations and lost sales due to counterfeiting. Governments face revenue losses due to counterfeit goods evading taxes.

IV. Existing System

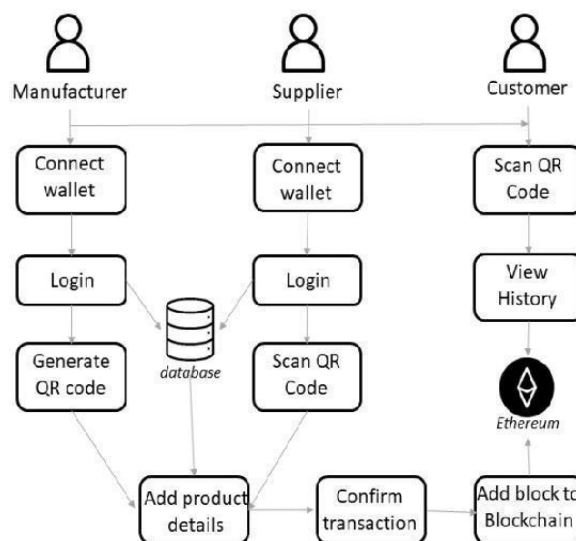
There are a number of existing systems for detecting counterfeit products. These systems typically use barcodes, RFID tags, or other physical identifiers. However, these systems can be easily bypassed by counterfeiters.



V. Proposed system

Counterfeit has broadcast worldwide and has huge things on associations, manufacturers, and consumers. It affects the credit of the association and the good of the consumers. India is not barred. The posed network is cast at consumer products, and it helps trace the products by preserving the product and the force chain truthfulness by using Blockchain. This gives the guests the power to track the history of the entire product from manufacturer to client using blockchain and QR law.

VI. System Architecture



1. Manufacturer

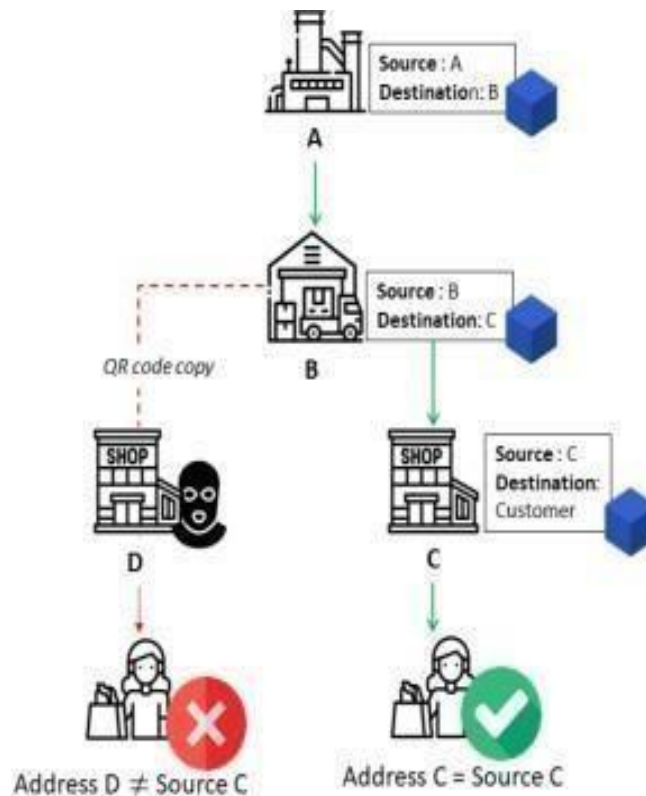
A manufacturer creates a QR code for a product, adds product details, and adds a block to the Ethereum blockchain using their Ethereum wallet. The local database's user ID and the entity's wallet address are mapped together. If both are present, only the block is added to the digital ledger.

2. Suppliers

A manufacturer creates a QR code for a product, adds product details, and adds a block to the Ethereum blockchain using their Ethereum wallet. The local database's user ID and the entity's wallet address are mapped together. If both are present, only the block is added to the digital ledger.

3. Customers

Guests can corroborate product actuality by surveying a QR law, which displays sale history. However, the product is supposed fake, indicating that the QR law was duplicated and the client is apprehensive of the conclusion, If the last position isn't paralleled with the clinch position. The process of detecting a fake product by the client while copping.



VI Advantages and Limitations: Advantages:

1. Enhanced Product Authenticity: The integration of blockchain technology ensures a robust and trustworthy method for verifying the authenticity of products, instilling greater confidence in consumers.
2. Consumer Trust: The system fosters trust between official companies and consumers, encouraging more informed purchasing decisions and brand loyalty.
3. Reduction in Counterfeits: The circulation of counterfeit products significantly diminishes, safeguarding consumers and legitimate companies from financial harm and potential safety hazards.
4. Transparency: Blockchain's transparent and immutable ledger provides visibility into the entire supply chain, reducing fraud, enhancing accountability, and offering opportunities for supply chain optimization.

Limitations:

1. Initial Setup: Implementing the system and convincing companies to adopt it may pose significant challenges, including technical integration and resource allocation.
2. Technological Barriers: The success of this system relies on consumers having access to smartphones and the application, which may exclude certain demographics or regions with limited access to technology.
3. Privacy Concerns: Storing product-related data on the blockchain raises important questions about data privacy and security, particularly regarding sensitive information related to products and consumers.

VIII Conclusion:

The "Counterfeit Product Detection Through Blockchain Integration" project aims to combat counterfeit products by integrating blockchain technology with a user-friendly mobile application. This project aims to create a safer, more trustworthy, and resilient marketplace, enhancing product authenticity, consumer trust, counterfeit reduction, and supply chain transparency. The project aims to restore faith in products, ensure a secure, informed consumer experience, and address privacy and accessibility concerns.

Blockchain technology has the potential to be a powerful tool for detecting counterfeit products.

However, there are some challenges that need to be addressed before it can be widely adopted.

These challenges include the cost, complexity, and regulatory environment.

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