DEVELOPING A BLOCKCHAIN-BASED SYSTEM FOR IDENTIFYING COUNTERFEIT PRODUCTS

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Abstract

Counterfeit items have become more prevalent in the industrial industry in recent years. This has an effect on the company's name, sales, and profit. Block chain technology is used to authenticate and identify counterfeit items. Using block chain technology, transactions are recorded in the form of blocks in a distributed, decentralized, and digital ledger. A block cannot be changed or hacked since block chain technology is secure. Block chain technology eliminates the need for customers or users to rely on third parties to verify the product's safety. In light of current advancements in mobile and wireless technologies, quick response (QR) codes provide a promising technique for addressing the practice of counterfeiting in this project. This is done by scanning a QR code, which is linked to a Block chain, to identify counterfeit goods. As a consequence, this method may be used to record product information and generate a unique identifier for each product in a database. It looks up the user's unique code in the Blockchain database and sees if there are any matches. When a code matches, the client will be notified; otherwise, the consumer will be notified that the product is counterfeit

I INTRODUCTION

The company's brand, revenue, and consumer health might be at jeopardy if a product or technology is made available to a global audience. The supply chain contains an endless number of things. In order to assess whether or not a product is authentic or a fake. As manufacturers are experiencing a major challenge so we can utilize blockchain technology to verify the authenticity of a product [1-3]. Changing, hacking, or defrauding the system is difficult or impossible using Blockchain's data recording technique. In a blockchain, transactions are duplicated and propagated to all of the network's PC computers in the form of a record of transactions.

Decentralized databases are known as Distributed Ledger Technology (DLT) and are maintained by huge groups of people (DLT). Blockchain is a distributed ledger system that uses an immutable cryptographic signature known as a hash to record transactions [4-5]. The blockchain will keep all transaction data in the form of blocks. A QR code generated for a particular product may be scanned by the end user to get further information about that product. We can tell if a thing is genuine or not by scanning its QR code [6].

II LITERATURE SURVEY

A Survey on Counterfeit Product Detection. Counterfeit items are exploding in popularity, thanks to the vast internet and black-market marketplaces. As a result, there is an urgent need to solve the difficulties associated with identifying counterfeit items and to develop suitable technologies to increase detection accuracy. This is an active field of study in the modern world. This article explores numerous approaches for determining whether or not a product is counterfeit [9-10]. A framework for supply chain quality management based on the block chain. In this work, we suggest a blockchain-based system. The theoretical basis for block chain-based supply chain quality management will be laid forth in this framework [11]. Additionally, it serves as a basis for the development of ideas regarding the management of information resources in dispersed, virtual companies [12-15].

III EXISTING SYSTEM

Several initiatives and projects around the world have explored or implemented block chain-based solutions for supply chain management and anti-counterfeiting. These systems often involve a combination of block chain, QR codes, and databases to provide transparency and traceability in the supply chain. Companies, particularly in industries where counterfeiting is a significant concern (such as pharmaceuticals, luxury goods, and electronics), have been exploring the use of block chain to enhance product authentication. For the most accurate and up-to-date information on existing systems, I recommend checking recent academic publications, industry news, and official project websites. Additionally, contacting experts in the field of blockchain technology and supply chain management could provide valuable insights.

Limitations

Adoption Challenges:

One major limitation is the challenge of widespread adoption. For the system to be effective, manufacturers, distributors, and retailers all need to participate. If key players in the supply chain do not adopt the technology, it becomes challenging to create a comprehensive and reliable record on the block chain.

Data Accuracy and Trust:

The system's effectiveness heavily relies on the accuracy of the data entered into the block chain.

If inaccurate information is recorded at any point in the supply chain, it can compromise the integrity of the entire system. Building trust in the data recorded is crucial for the success of the anti-counterfeiting measures.

***Technology Integration*:**

Integrating block chain technology into existing supply chain systems can be complex and may require significant changes. Some businesses may face challenges in adapting their current processes and technologies to seamlessly work with the block chain-based system.

***Privacy Concerns*:**

While block chain is known for its security, there are still privacy concerns related to the information stored on the block chain. Ensuring that sensitive information is appropriately protected while maintaining transparency is a delicate balance. Striking the right balance between transparency and privacy is crucial.

Scalability:

Scalability can be a concern as the volume of transactions and participants in the supply chain grows. Block chain networks may face challenges in handling a large number of transactions simultaneously, leading to potential delays and increased costs.

IV PROBLEM STATEMENT

The growth in counterfeit goods sparked the idea for this project. Following are the project's goals: 1. An anti-counterfeit system based on block chain technology is being developed. 2. To use a QR code to encrypt product information. 3. Customers' security is ensured by supplying them with their own data.

V PROPOSED SYSTEM

The proposed system aims to revolutionize the battle against counterfeit products by leveraging the security and transparency features of block chain technology. In our system, each product is assigned a unique identifier linked to a block chain, creating an immutable and decentralized ledger of transactions. The heart of our solution lies in the integration of Quick Response (QR) codes, providing a user-friendly interface for consumers to easily interact with the block chain. Upon scanning the QR code, users can access the block chain database to verify the authenticity of the product. This process involves a lookup of the unique identifier, cross-referencing it with the information stored in the block chain. In the context of the ever-evolving mobile and wireless technologies, QR codes present a promising tool for combating counterfeiting. The system not only records essential product information but also generates a distinct code for each item, enhancing traceability and accountability throughout the supply chain.

One of the notable advantages of our proposed system is the elimination of reliance on third-party verification. By directly connecting consumers with the block chain, we empower them to independently verify the safety and authenticity of a product. This approach not only enhances consumer trust but also streamlines the verification process, reducing the need for

intermediaries. Furthermore, the immutability of block chain ensures that once a transaction is recorded, it remains incorruptible, providing a robust defense against tampering or hacking attempts.

Advantages

***Enhanced Security and Immutability*:**

Block chain's inherent security features ensure that once a transaction is recorded, it cannot be altered or tampered with. This immutability provides a robust defense against counterfeiting activities, offering a secure and transparent record of product transactions.

***Direct Consumer Empowerment*:**

The system empowers consumers by enabling them to independently verify the authenticity of a product. Through the use of QR codes and blockchain technology, consumers can directly access information, eliminating the need for third-party verification. This fosters trust and confidence among consumers in the products they purchase.

***Streamlined Supply Chain Transparency*:**

By integrating blockchain into the supply chain, the proposed system enhances transparency and traceability. Each product is assigned a unique identifier, and its journey through the supply chain is recorded on the blockchain. This streamlined transparency reduces the likelihood of counterfeit products entering the market and allows for quick identification of any irregularities.

Reduction in Counterfeiting and Fraud:

The system acts as a deterrent to counterfeiters by creating a secure and traceable record of genuine products. The immutability of block chain makes it difficult for counterfeiters to replicate or manipulate product information, reducing the prevalence of counterfeit goods in the market.

VI IMPLEMENTATION

Product Registration and Block chainIntegratio

nIn this module, manufacturers or authorized entities register genuine products on the system. Each product is assigned a unique identifier, and relevant information, such as production details, is recorded on the blockchain. Integration with the blockchain ensures the secure and transparent storage of product-related transactions.

QR Code Generation and Linking:

This module involves the generation and linking of QR codes to each registered product. A QR code is a visual representation of the unique identifier associated with a specific product. These QR codes serve as a bridge between the physical product and the blockchain, enabling consumers to easily access product information by scanning the code.

Consumer Interaction and Verification:

This module facilitates consumer interaction with the system. Consumers use their smartphones or dedicated scanning devices to

scan the QR code on a product. The system then initiates a verification process by querying the blockchain database using the unique identifier. If a match is found, the product is deemed authentic; otherwise, it is flagged as potentially counterfeit.

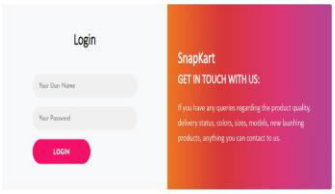
Blockchain Database Management:

The blockchain database management module is responsible for maintaining and updating the distributed ledger. It ensures the integrity of recorded transactions and manages access permissions to safeguard sensitive information. This module plays a critical role in maintaining the security and transparency of the system.

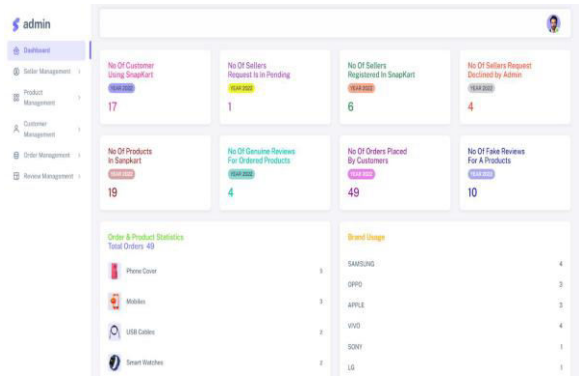
Notification and Reporting:

This module handles the communication aspect of the system. When a consumer scans a product, the system generates real-time notifications based on the verification results. If the product is authentic, the consumer is notified of its legitimacy. In the case of a potential counterfeit, the system alerts the consumer and may trigger further reporting mechanisms to track and address the issue.

VII RESULTS

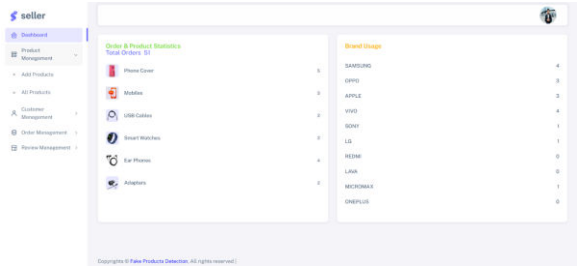


Admin page

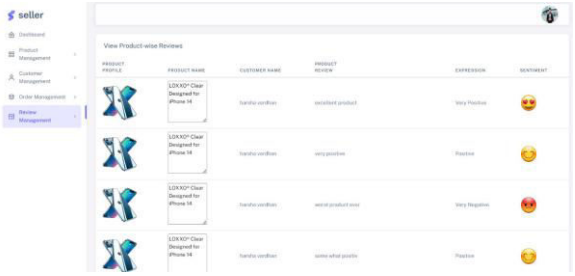


Admin dashboard

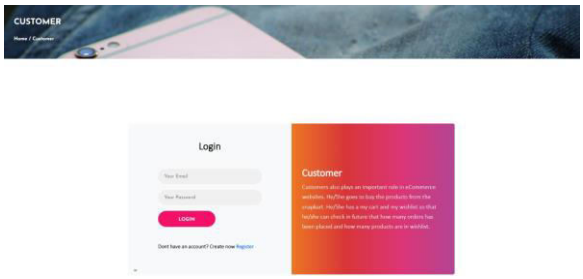
Seller login page



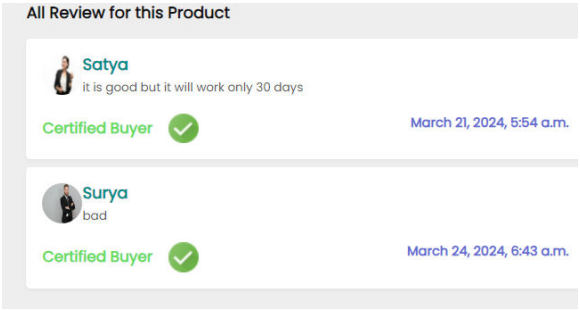
Seller dashboard



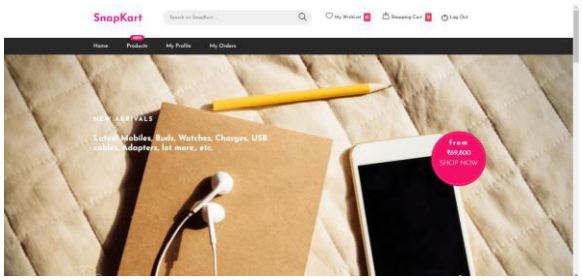
Review management page



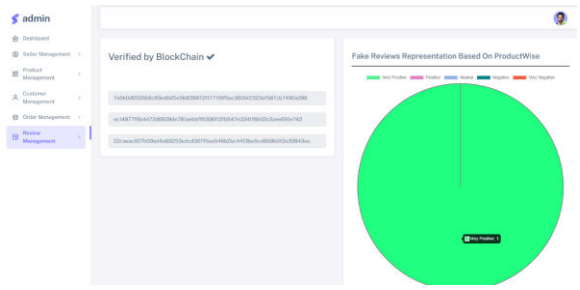
Customer login



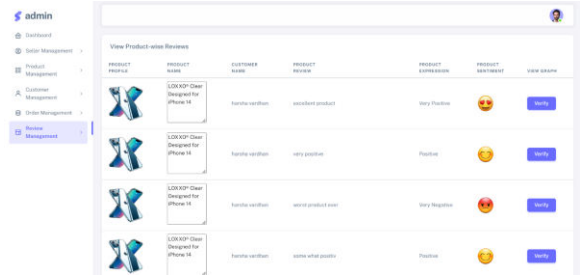
Certified review by user



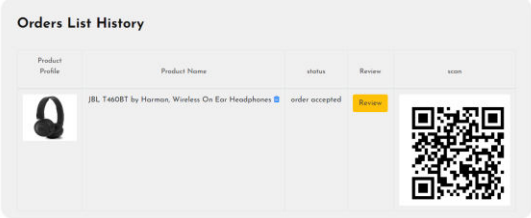
Customer interface



After verify QR code will generate



Product review by admin



QR code generate for verified product

VIII CONCLUSION

With the large volume of counterfeit items available online, counterfeit products are expanding quickly. There is a pressing need to detect counterfeit goods, and blockchain technology is being used to accomplish this goal. Additionally, the data is encoded as a QR code. Customers or consumers may discover counterfeit products by scanning the QR code.

In block chain technology, digital information on items may be kept in the form of blocks. Firebase cloud storage may be used to store the data. Thus, the suggested approach benefits the client by detecting counterfeit items across the supply chain. It is possible to access information about the product's history and present owner by scanning the QR codes that have been affixed to it.

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