Fake Product Identification using Block-Chain

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Abstract: Counterfeit products are a major problem that affects businesses and consumers worldwide. They pose a threat to public safety, harm legitimate manufacturers, and result in significant economic losses. Authentifi is a decentralised platform that proposes a solution to this challenge by utilising blockchain technology to create a secure and transparent system for verifying product authenticity. The Authentifi platform enables manufacturers, retailers, and consumers to verify the authenticity of products, thereby reducing the prevalence of counterfeit goods. This research paper discusses the technical aspects of the Authentifi platform, including design and implementation. The paper evaluates the feasibility, efficiency, and security of the platform through a series of experiments and simulations. The platform's use of blockchain technology ensures that the information stored on the system is immutable, tamper-proof, and transparent, providing a high level of security. Authentifi's decentralisation also ensures that the system is resistant to single points of failure and malicious attacks. The experiments and simulations conducted demonstrate that Authentifi is an effective solution for counterfeit product identification. The platform's performance is compared with traditional methods of product identification, such as barcodes and QR codes. The simulations assess the platform's resilience to various attacks, including data breaches and denial of service attacks. Authentifi's benefits for manufacturers, retailers, and consumers include an increase in consumer confidence in the products they purchase, protection of legitimate manufacturers from losses due to counterfeiting, and improved public safety. The research suggests that Authentifi has the potential to significantly reduce the negative impact of counterfeit products on the global economy.

In conclusion, Authentifi is a promising solution for counterfeit product identification that provides benefits for all stakeholders. The platform's use of blockchain technology ensures a secure and transparent system that can reduce the prevalence of counterfeit goods. The research suggests that Authentifi has the potential to significantly reduce the negative impact of counterfeit products on the global economy.

Keywords: blockchain technology, counterfeit products, product identification, decentralised platform, Authentifi.

I. INTRODUCTION

Counterfeit products have become a major issue for businesses and consumers in today s global market the proliferation of fake products has not only caused significant economic losses for legitimate manufacturers but also poses a serious threat to public safety traditional methods of product identification such as barcodes and qr codes are no longer effective in identifying fake products the emergence of blockchain technology provides a promising solution to tackle this challenge authentifi is a blockchain based solution for identifying fake products using qr code technology the platform utilizes blockchain technology to provide a secure and transparent system for verifying the authenticity of products enabling consumers to scan a product s qr code and verify its authenticity on the blockchain the authentifi platform assigns a unique qr code to each product which is linked to a specific blockchain address that contains all the information related to the product such as its origin manufacturing date and supply chain history this research paper aims to provide an in depth analysis of the authentifi platform discussing the technical aspects of the platform s design and implementation the paper will also evaluate the feasibility efficiency and security of the platform through a series of experiments and simulations the use of blockchain technology in the authentifi platform provides several advantages over traditional methods of product identification firstly blockchain technology provides a high level of security and transparency ensuring that the information stored on the blockchain is tamper proof and immutable secondly the decentralized nature

of the platform ensures that the system is resistant to single points of failure and malicious attacks this provides a high level of resilience to the platform making it suitable for use in a wide range of industries in conclusion the authentifi platform is a promising solution for identifying fake products using blockchain technology and qr code technology the platform provides benefits for manufacturers retailers and consumers by providing a secure and transparent system for tracking products throughout the supply chain preventing counterfeit products from entering the market and ensuring that consumers receive genuine products the research paper will provide a comprehensive analysis of the authentifi platform including its technical design and implementation feasibility efficiency and security.

II. OBJECTIVES

The main objectives of this system are designing an anti counterfeit system that utilises blockchain technology to enhance product security implementing a secure product identification mechanism using qr codes providing clients with secure access to product information through a transparent system leveraging the immutability of the blockchain to increase the security and transparency of transactions within the proposed system preventing the proliferation of counterfeit products by providing consumers with increased transparency about the products available in the marketplace enhancing the performance of the system in identifying fake products and preventing their entry into the marketplace.

III. MOTIVATION

The occurrence of faux merchandise in the present delivery chain technology has created an urgent need for a device which can provide customers with accurate and reliable records about the products they intend to purchase. The presence of counterfeit merchandise now not only tarnishes a corporation's popularity but additionally leads to revenue loss. Therefore, it's imperative that anti-counterfeiting measures be put in place to ensure the integrity of the supply chain control method. To thrive inside the E-commerce market, corporations need to offer customers complete data about their merchandise and provide a platform for purchasers to inquire approximately the product's authenticity. It is vital that consumers agree with the whole device and recognize the product's adventure from production to delivery. These records need to be made available to clients through a web platform. While small and medium-sized businesses may find it hard to enforce this sort of device, larger corporations can cope with it financially. However, conventional methods of preventing counterfeiting were ineffective, as clients often do not consider the device. Mobile technologies, consisting of RFID, have also not prevented counterfeit products from getting into the market. Encrypted QR code techniques are a potential strategy to this problem, however their success implementation depends on stable coping with and law by supply chain authorities. Low transaction charges and purchaser acceptance as true within the device are also essential to disposing of counterfeit merchandise. One of the number one issues of each purchaser and companies is the opportunity of a man-in-the-centre attack. To prevent such assaults and make sure that most effective legal individuals can access the facts, a secure blockchain-based total gadget needs to be put in place. Successful blockchain system control in any organisation hinges on stable dealing with and proper law.

IV. LITERATURE SURVEY

Counterfeit products have come to be a big problem in numerous industries, which includes prescription drugs, luxurious goods, and electronics. Counterfeit products no longer most effectively cause revenue losses for legitimate producers however also can pose sizable health and safety risks to consumers. Blockchain generation has emerged as a promising solution for authenticating merchandise and making sure their integrity. This literature survey aims to offer an overview of the studies on using blockchain technology for inventory management, anti-counterfeiting, and traceability of counterfeit products, with a particular attention on QR codes and OpenCV.

Blockchain-Based Inventory Management via QR Code Using OpenCV [1] A study through Goyal et al. (2020) proposed a blockchain-based inventory management device the use of QR codes and OpenCV. Take a look at the blockchain era to create an obvious and immutable ledger for tracking stock items. The examiner discovered that the machine became effective in decreasing stock errors and enhancing supply chain efficiency.

Detecting Fake Drugs Using Blockchain [2] A study by using Zeeb et al. (2019) proposed a blockchain-primarily based machine for detecting fake tablets. They have a look at used blockchain generation to create a secure and obvious ledger for monitoring drug shipments. The examiner found that the device changed into powerful in detecting counterfeit pills and preventing them from entering the market.

A Blockchain-Based Application System for Product Anti-Counterfeiting [3] A look at by Zeng et al. (2020) proposed a blockchain-based application system for product anti-counterfeiting. The device used blockchain generation to create a completely unique digital identification for every product, which can be accessed and proven the usage of a smartphone. The examiner determined that the system was powerful in stopping the move of counterfeit merchandise and improving client trust.

Blockchain Adoption for Combating Deceptive Counterfeits [4] A examine through Yadav et al. (2021) examined the adoption of blockchain era for preventing misleading counterfeits. They have a look at a proposed blockchain-based gadget that uses a combination of QR codes and blockchain technology to make certain the authenticity of products. The study found that the device became effective in reducing the move of faux products and improving client trust.

Traceability of Counterfeit Medicine Supply Chain Through Blockchain [5] A look at by way of Qin et al. (2020) proposed a blockchain-based system for tracing the counterfeit medicine supply chain. The system used the blockchain era to create a secure and transparent ledger for tracking the movement of counterfeit drugs. They have a look at where the gadget becomes effective in detecting counterfeit medicines and stopping them from entering the market.

V. PROBLEM SOLUTION

Counterfeit products not only cause revenue losses for valid producers however also can be hazardous to customer health. To fight this problem, a proposed device makes use of precise barcodes or QR codes to scan and authenticate merchandise, providing stop-customers with facts about the product's possession and transaction history. The use of blockchain technology has come to be popular in recent times due to its capability to create a steady and transparent delivery chain that avoids product counterfeiting. Information recorded inside the blockchain community is everlasting and can not be altered, ensuring traceability and readability. This generation can beautify the buying and selling environment and make it more sincere for businesses and product-based groups in the supply chain. Blockchain's transparency guarantees that the authenticity of products may be established without delay with the aid of stores, making it a powerful solution for many delivery-chain demanding situations. As the generation keeps growing, it can become more qualitative and efficient in destiny.

VI. REQUIREMENT SPECIFICATIONS

a. ETHEREUM
Ethereum is a decentralized blockchain platform that permits builders to construct and set up decentralized packages (dApps). It makes use of clever contracts, that are self-executing contracts with the phrases of the settlement among customer and vendor being immediately written into code. These smart contracts provide a high level of safety, transparency, and immutability. Ethereum also uses a cryptocurrency called Ether (ETH) as a method of change for these smart contracts. The Ethereum blockchain is exceedingly scalable and might guide a massive number of transactions consistent with second, making it a super platform for building a blockchain-primarily based product identification gadget like Authentifi. The use of Ethereum guarantees that the product identification system is secure, obvious, and tamper-proof, presenting a reliable way to authenticate products and protect against counterfeits.

b. GANACHE
Ganache is a private blockchain for Ethereum development that allows developers to check their dApps earlier than deploying them to the primary Ethereum community. It provides a neighbourhood blockchain environment that is straightforward to install and is derived with a number of useful features, which include an integrated Ethereum wallet, block explorer, and agreement debugger. Ganache is rather configurable and can be used to simulate various network situations, which include network latency and mining trouble. This makes it an ideal tool for testing the overall performance and scalability of a blockchain-based totally product identification gadget like Authentifi. By the use of Ganache to simulate a real-world Ethereum community, builders can pick out and remedy any capability problems with their dApp before deploying it to the principle network, making sure a smooth and steady product launch.

c. SOLIDITY
For developing smart contracts that can run on the Ethereum blockchain, Solidity is a high-level programming language. It is an object-oriented programming language which was influenced by JavaScript, Python, and C++. Complex distributed apps are built with Solidity, and business logic is encoded in smart contracts.Self-executing programmes referred to as smart contracts automatically carry out a contract's terms and conditions. Developers can create these contracts using Solidity in a manner that is both machine- and human-readable. The language is a potent tool for creating decentralised programmes since it allows multiple inheritance, libraries, and intricate user-defined types.In short, Solidity is a powerful programming language that gives programmers the ability to create complex smart contracts for the Ethereum network. Because of its syntax's similarity to other programming languages, it is simple for developers with prior programming experience to learn. Through the use of decentralised apps, Solidity has the potential to revolutionise a number of sectors as it continues to grow and get stronger.

d. NODEJS

A strong open-source server environment called Node.js has made it simple for developers to develop scalable, high-performance applications. It was created to be cross-platform, which means that it may function on a number of different operating systems, including Windows, Linux, Unix, and macOS. Developers can use the same language for both the front-end and back-end of their applications by using Node.js as a back-end JavaScript runtime environment, which executes JavaScript code outside of a web browser.The V8 JavaScript engine is one of the main characteristics of Node.js. Google has developed the high-performance JavaScript engine V8, which is intended to run JavaScript code quickly and efficiently. Node.js could provide developers a quick, dependable environment for creating server-side applications by utilising V8.
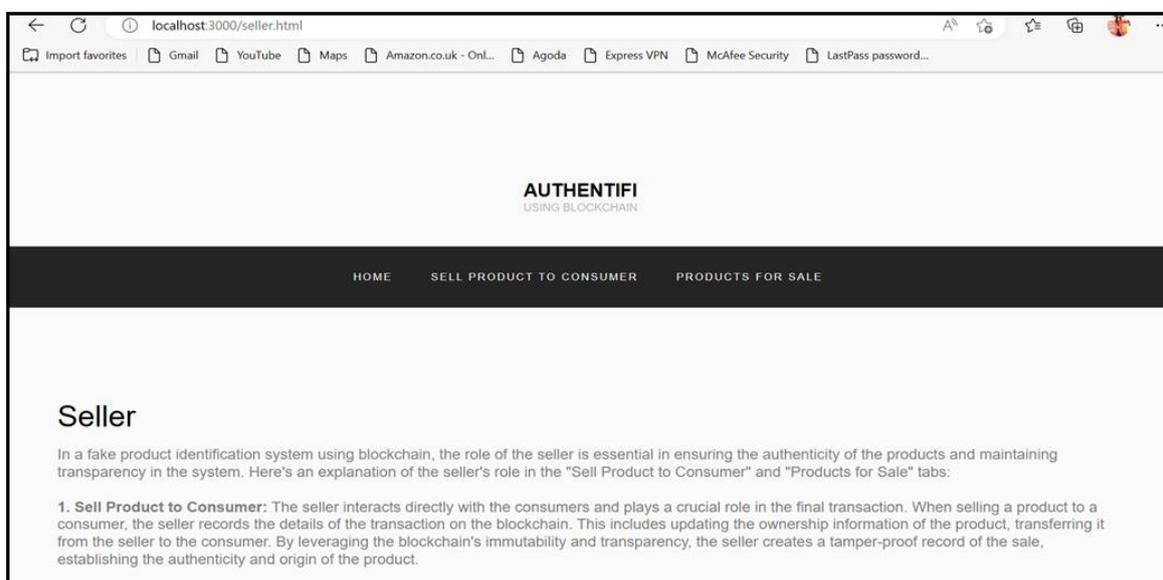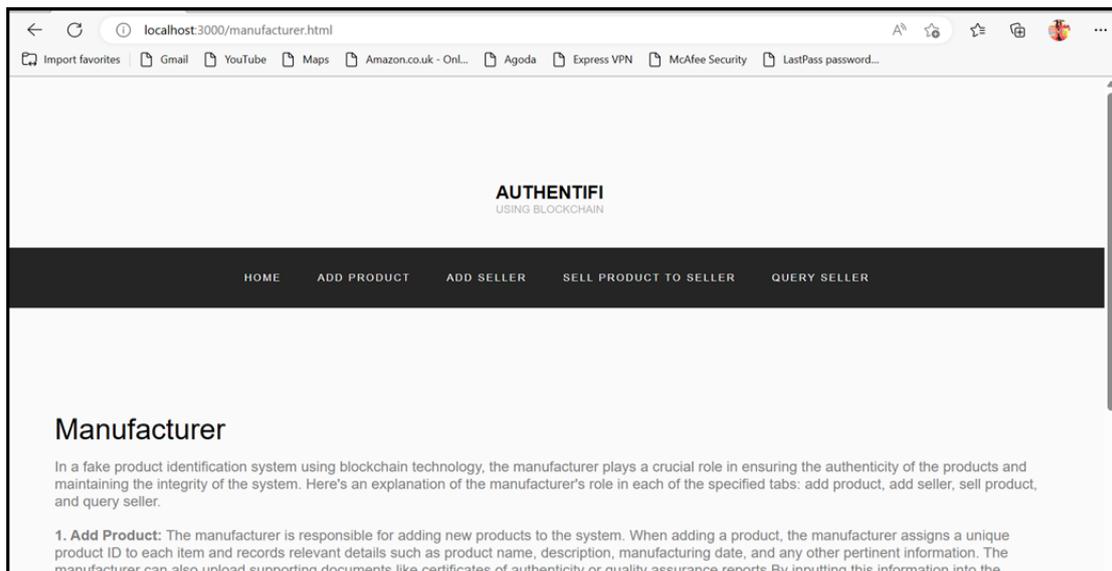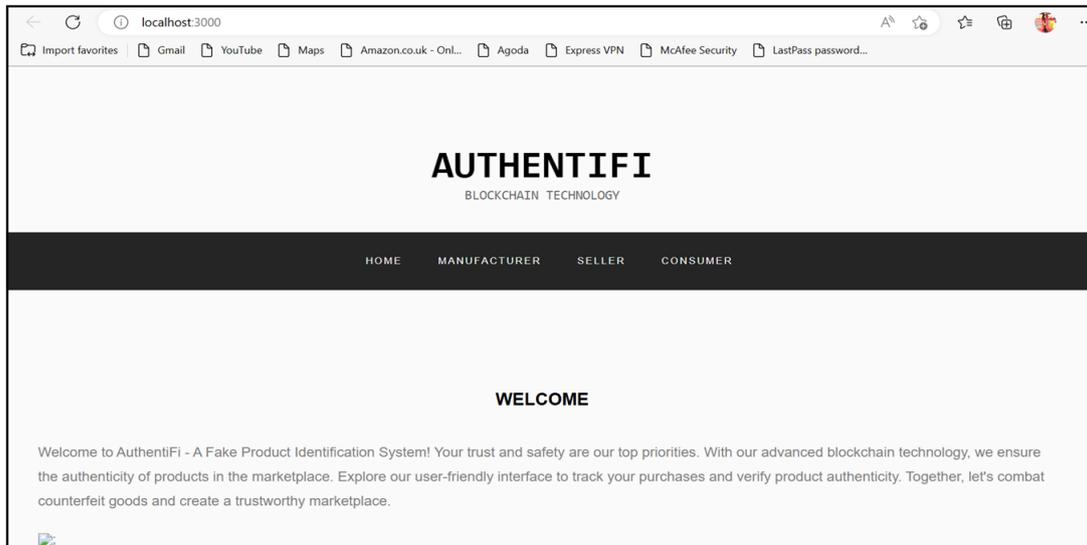
e. MYSQL

SQL (Structured Query Language) queries are the foundation of the widely used open-source relational database management system known as MySQL. It is one of the most widely used languages for manipulating and modifying data within databases and is frequently used to handle data and information in a variety of applications.The detection of fake goods is one situation in which MySQL can be quite helpful. Companies need to be able to effectively detect fake products in order to stop them from entering the supply chain given the growing issue of counterfeit goods on the market.

VII. METHODOLOGY

The suggested method uses QR codes that are connected to specific products and smart contracts to identify counterfeit goods. Companies register their products and generate a special QR code to begin the process. The QR code will be preserved in a decentralised block using blockchain technology, and the product specifics, including brand and product name, manufacturing year, price, quantity, quality, and manufacturer details, will be stored in a database.Because each QR code is unique, the manufacturer cannot use it multiple times for different products. Before scanning the product's QR or barcode, users must register or log in to the system. After authentication, the one-of-a-kind scanned code will be compared to the manufacturer-generated code kept in the smart contract blocks. The user will be informed if the product is original and given all of its details as well as an authentic certificate from the database if the code matches. The user will be alerted that the product is false if the code does not match, preventing the purchase of a fake product that could cause serious health or financial losses.In addition, the method has advantages for the manufacturer. If a forged product turns up, the user's location will be retrieved with their authorization, and the manufacturer will be notified so they can take legal action against the store, distributor, and black-market manufacturer.Using this approach, customers are more likely to have faith in merchants, user satisfaction rises, and manufacturers may spend less time and money fighting defamation and sales triggered by fake manufacturers. It is advised to properly cite any materials used in the creation of this system in order to prevent plagiarism.

VIII. RESULT

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IX. CONCLUSION

This research investigation suggests a blockchain-based smart contract system which provides a thorough anti-counterfeiting solution to companies involved in supply chain management. The method provides consumers with an inexpensive transaction fee to quickly recognise and authorise products, removing the possibility of buying fake goods. The solution enables the producers to store product information in the blockchain, making it available to anyone on the network. The serialised QR code gives producers access into product sales and inventory.To make sure they buy from reputable sellers and manufacturers, customers can utilise the system to perform manufacturer-side verification. Identity verification is made possible by the digitalized QR code, which eliminates the requirement for third-party authentication. Because the private key of the key owner cannot be decrypted unless it is disclosed, the system is secure.Overall, for businesses with limited financial resources, this fully functional programme lowers their barriers to anti-counterfeiting. It provides consumers a more secure and easier-to-use method for trading, marking, and buying. This blockchain-based application is a useful tool for boosting confidence and trust in the accuracy of items.

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