

Development of Anti-counterfeit System for Product Identification

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Abstract: The global improvement of a product or innovation is typically accompanied with risk considerations like forging and duplication. Forging might have an impact on both the client's wellbeing and the company's reputation. These days, spotting phoney goods is the toughest challenge. It is essential to have a system in place that allows customers to verify all the information about the product they are purchasing in order to determine whether or not it is authentic. False items have a detrimental impact on the organisation and the welfare of the customers. As a result, manufacturers of goods are having a terrible time. Such fake and counterfeit items are something that India and other nations are battling against. Blockchains can be used to locate real goods and spot imitations. Blockchain technology is a decentralised, distributed digital ledger that stores transactional data in blocks across a network of nodes. Blockchain technology is secure since no block can be altered or compromised because the data is immutable once it has been saved in the chain. Customers or users do not have to rely on other customers to vouch for the reliability and safety of the product. In our project, the system uses Blockchain technology to produce QR(QuickResponse)codes. In this innovation, trade records are stored in blocks. These squares' data storage is difficult to access or modify.Using a QR code scanner, which connects a product's QR code to Blockchain, you may spot a fake product. Because of this, the system can be used to store product information and specially generated unique codes as database blocks.It captures the user's unique code and compares it with records in the Blockchain database. If the code matches, the product is true and authentic, and all of the information about it can be displayed; if not, the product is fraudulent or counterfeit.

Keywords: Blockchain, Bogus, Counterfeit, blocks, QR code, genuine

I. INTRODUCTION

Risk considerations like counterfeiting and duplication, which can impair the company's brand, revenue, and consumer health, are always present when a technology or product is being developed globally. There are various ways to determine whether a product is real or fake in the supply chain. Due to fake or fraudulent goods, manufacturers are facing a significant problem and suffering significant losses. A product's validity can be checked using blockchain technology. The main idea behind our initiative is to establish whether the consumer has acquired authentic or counterfeit goods. In contrast to blockchain, we still use traditional supply chains. Traditional supply chains provide a centralized network in which the data is in the hands of the firm that delivers the service or product in the market, and they possess the data, which they are free to modify whatever they see fit, rendering them insecure. Counterfeit items are created to capitalize on the better value of the mimicked products. As previously stated, traditional supply chains use a centralized network, but Blockchain uses a decentralized data base, with each transaction including the data value for the goods [9]. This is accomplished by creating a record whose legality can be verified by the entire community because blockchain is a peer- to-peer network.As a result, manufacturers may utilize this method to supply authentic items to customers. Client confidence will be maintained as a result, and the brand value of the product will increase. Every block in blockchain consists of data, hash, and preceding block hash. Data is the pertinent data, and hash is the distinctive code. Since the individual altering the data must control the bulk of the network, it is challenging to alter the data of any block.If we try to update the information of any block, the hash will be modified. As a result, blockchain has a significant benefit over traditional centralized architecture in that the data in blockchain is irreversible, ensuring that the buyer who purchases the goods receives accurate product information[9].

A transaction record, the owner of the commodities, public access to the data, and the capability to edit the data are the system's four primary components. A hash for the product is generated as its data is modified on the network, making it possible to track its recent transactions and ownership. Blocks are created as products flow from the producer to the distributor, then from the distributor to the client. When the product is created from the hash address, the QR code is appended to it. The facts about the product and whether it is genuine or counterfeit are provided to the consumer when they scan the QR code. The properties of a block in the Blockchain system are shown in Figure 1[10].9

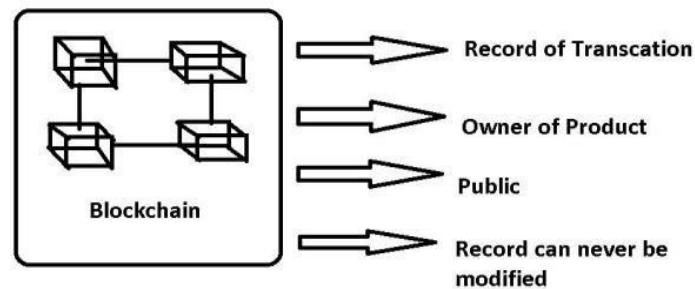


Fig. 1: Block in blockchain

II. MOTIVATION

There In recent years, the global distribution of counterfeit goods has increased. There are many fake products in the current supply chain. According to the poll, the prevalence of fake goods has grown recently. In order for customers or users to identify whether a product is genuine or not, it is critical to have a system in place that enables them to confirm all the product's specs. India presently lacks a framework for identifying bogus goods. In order to help the end-user or consumers scan and confirm the product's legitimacy using a smartphone, the solution calls for a simple QR code-based identification [3].

Product anti-counterfeiting is essential to Supply Chain management. Businesses that want to succeed in the e-commerce market should provide customers with product information and a place to ask questions about the products. The consumer must have confidence in the overall system architecture and be aware of how the product is given to the customer at the cycle's conclusion. Customers must have access to all of this via a website. Small and medium-sized businesses may be destroyed, while large organisations will likely be financially safe. Because consumers have little faith in the system, traditional methods of combating counterfeiting have failed and may yet fail. Paying modest transaction fees and having faith in the system may completely eradicate product counterfeiting. Businesses and consumers are worried about Attacks by a man-in-the-middle. Contraband continued to occur despite the adoption of RFID and other mobile technology. It will be necessary to develop encrypted QR code techniques to thwart different assaults and product fraud. Only authorised users will be able to access this, and their access will be controlled by the permissions of the supply chain network. Successful Blockchain system administration will come from secure system operation in any business [10].

III. OBJECTIVE

The surge in fake goods is where the idea for this project came from.

The project's objectives include the creation of an anti-counterfeit system.

to protect product information using a QR code. You might provide security to your clients by making data accessible to them.

Manufacturers may use the system to record information about the items that will be sold and purchased on a public blockchain.

IV. LITERATURE REVIEW

This report [1] provides a survey on the detection of counterfeit products. Customers frequently look for counterfeit products for a number of reasons, such as a lower price or as a replacement for the authentic, with the internet market quickly emerging as the primary location for purchasing counterfeit products. An exponential increase in fake goods is being seen both online and on the black market. Therefore, it is crucial to address the problem of identifying fake goods and create the necessary technologies to improve detection precision. This is one of the current research areas being investigated. This study addresses numerous strategies for detecting counterfeit items which includes QR code-based

Product Authentication, Watermarking algorithm, RFID method for detecting counterfeit products, Holographic counterfeit items, computer-generated holograms for barcodes, etc. Using technology-based data analytics, including real-time analytics, predictive analytics, security analytics, and trust analytics [1], these various approaches are examined and contrasted.

A framework for supply chain quality management based on blockchain has been developed in this study by [2] authors. It explains how the typical cloud storage method is centralised, which increases the risk of a single point of failure leading to a system failure. The technology integrates attribute-based encryption, the Ethereum blockchain, and the IPFS decentralised storage system. The decentralised solution, which is built on the Ethereum blockchain, provides a keyword search feature on the encrypted text, which fixes the issue with standard storage systems where cloud servers give false positives. In this study, a blockchain-based system was suggested. Using blockchain This theoretical framework will give the basis for intelligent supply chain quality monitoring using technology. It also acts as a foundation for the creation of theories on the management of information resources in decentralised, virtual companies [2].

In this article, they use blockchain technology to develop a method for identifying bogus products based on QR codes. In the system's implementation, they employed Android Studio and Firebase Cloud. The hashing process uses the SHA-256 algorithm. A 256-bit value is produced using the patented cryptographic hash algorithm SHA-256. The suggested system is made up of three primary components: an Android application for the consumer or user, an Android application for the manufacturer or business, and a database. The manufacturer creates a distinct QR code for each product and enters the product information into the database. All of the product-related data, including manufacturer information, the product id, the date of manufacturing, the price, etc., is saved in blocks. A hash code for the product is created after a product order is saved on the network, and A goods transaction might continue. For each product in the suggested system, a QR code is generated. Customers can use a customer application that has a QR code scanner or the QR code reader app on their smartphone to scan the QR code on the product or packaging. After scanning, we can determine if the product is real or fake. Finally, we can monitor the product along the supply chain thanks to the Blockchain system, which maintains these product details together with a history of transactions. All of the product information, hash value, and block name are stored in the firebase cloud database [3].

The Smart Tags for Brand Protection and Anti-Counterfeiting in the Wine Industry research [4] serves as its foundation. Based on smart tags and Cloud-enabled technologies, this paper suggests a trademark protection and anti-counterfeiting solution for the wine industry. Smart tags' primary tenet is the use of quick response codes, functional inks supported by a Cloud system, and two-way communication between the winery and the end user [4].

The research's authors describe the idea of Blockchain technology in terms of information security for the food supply chain and contrast it with the previous supply chain structure. The proposed approach emphasises the negative aspects while promoting blockchain for tracking, monitoring, and auditing the food supply chain and supporting producers in accurately recording transactions. They didn't actually put the recommended method into practise; they only offered a theoretical idea [5].

The author of the study uses HACCP to describe how blockchain functions in the food supply chain. The system examined the problems with scaling block-chains generally and provided a novel decentralised traceability system based on the internet of things and blockchain technology. All participants in the supply chain will receive real-time information using this technology on the safety of food products. The technology also has the ability to significantly enhance the efficiency and transparency of the food supply chain, which would undoubtedly improve food safety and reestablish public confidence in the food industry. The other publications are mentioned and can assist in a number of ways with the implementation of the proposed system [6].

The tracking of medications from the company to the consumer or patient is made easier by this article. The entire concept is mostly implemented using the Hyperledger fabric. In this setup, the manufacturer must submit the details of a medicine to a website, where they are subsequently submitted for government clearance. Pharmacists may utilise blockchain technology to order drugs once the government has approved them. Additionally, a request is made to the blockchain network if a patient needs medicine or other pharmaceuticals. A doctor or medical authority will next decide whether to accept or reject the request. Because the whole approach is based on a blockchain network, we can stop medicine fraud and keep an eye on the flow of medications from the manufacturer to the patient. Most of this post is

informative To certify the product in this sector, our recommended approach may incorporate Hyperledger as well as the characteristics of numerous genres[7].

In this study, QR codes were created using Python and blockchain technology. They then used this technology to create a website or app that allows users to manage their inventories. To create an accurate and open inventory management system, they are using blockchain and QR code technology. They may use Python to create QR codes that are specific to particular products. The P2P network then disseminates the information on the sold goods. By obtaining product details from the blockchain database—EVM is a Python-based implementation of the Ethereum protocol—a manufacturer may quickly calculate inventory. It supports interoperability with the upcoming Ethereum 2.0 protocol as well as low-level primitives for the existing Ethereum 1.0 chain. With Py-EVM, they created the Ethereum blockchain to a database for sold-out item information. They are using Python and Ethereum blockchain technology to create QR codes, which can be enhanced by using a blockchain algorithm. They employed this technology for inventory management at this location, and we used it to detect a fake product. We improved the information by creating a website.

Any industry has challenges with effective supply chain management, but the healthcare sector faces greater complexity and risk due to the direct impact that supply chain disruptions may have on patient safety and health outcomes. One possible method for enhancing the safety, accuracy, authenticity, and utility of the health supply chain is blockchain technology. In this study [11], with a focus on pharmaceutical supply, medical equipment and supplies, the Internet of Healthy Things (IoHT), and public health, we provide an overview of the potential and challenges associated with the adoption and deployment of blockchain in the health supply chain. A serious and well-known hazard to the health of the population is the infiltration of the combined category of substandard and falsified (SF) medications, often referred to as counterfeit medicines but frequently with a distinct legal definition. medical industry supply chain. These various types of tainted and fake medicines can appear as a result of importing inferior products without receiving local approval, using subpar manufacturing techniques or storing them improperly, stealing and diverting drugs, and penetrating grey markets (industry conducted outside of the law) with subpar or fake goods. By developing use cases, simulation models, and blockchain prototypes, a number of organisations are now researching the potential of blockchain for pharmaceutical supply chain management. The basic thinking underpinning this development is being led by the Centre for Supply Chain Studies [11].

In China, food safety has recently become a significant problem. Creating an agri-food supply chain traceability system is crucial since existing agri-food logistics patterns can no longer satisfy market demands. In this paper, we first look at the usage and development of RFID (Radio-Frequency IDentification) and blockchain technology, then we assess the advantages and disadvantages of using these technologies to build an agri-food supply chain traceability system, and finally we show how to build the system. By collecting, transmitting, and exchanging true agri-food data throughout production, processing, distribution, and warehousing, it may be possible to establish traceability with reliable information along the whole agri-food supply chain, thereby assuring food safety. In this work [12], a traceability system for the agri-food supply chain is established. based on blockchain and RFID technology. The complete data collecting and information management process for every link in the agri- food supply chain is covered by this system, allowing for the monitoring, tracing, and traceability management of agri-food quality and safety "from farm to fork." With the fast advancement of blockchain, future study will focus on the logistics sector's growth trend, which is to create a decentralised system where the data can be completely trusted. Furthermore, if application costs can be significantly reduced, RFTD technology will be employed more frequently in the logistics industry [12].

V. PROPOSED SYSTEM

To differentiate fake goods from real goods, there was previously no suitable answer. Blockchain technology could be helpful in resolving these problems. This project's main goal is to make it easier for people to tell if a product is real or fake. We suggest a blockchain-based false product detection system that might be an Android app or a website for the identification of counterfeit goods. The suggested method guarantees the identification of fake goods in daily life. The manufacturer, end user, and blockchain/database are the three main components of the proposed system[3].

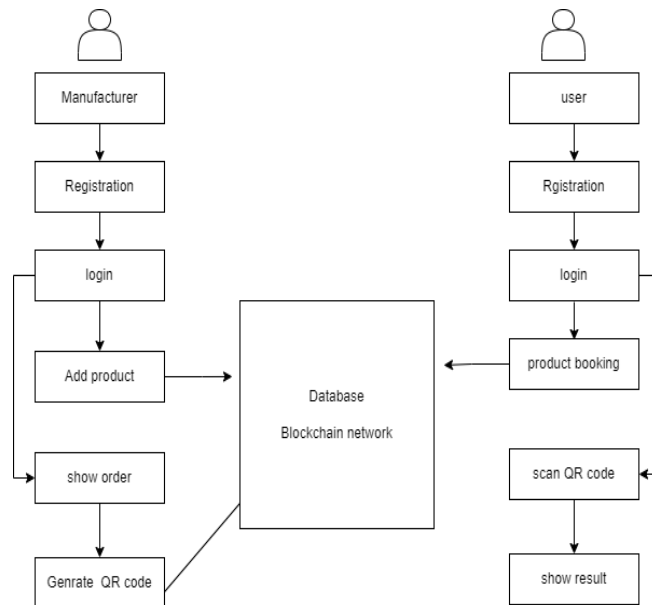


Fig. 2: Workflow of proposed system

used by the Bitcoin protocol is called SHA 256; it is a cryptographic hash function that yields a 256-bit value. The creation and maintenance of addresses are overseen, and transactions are verified. Because the hash values may be retained and compared to the user entry to determine whether it is accurate, it is also used for password verification, which eliminates the need to maintain precise passwords [10].

Using Blockchain technology to prevent product counterfeiting could benefit both e-commerce enterprises and customers. The manufacturer, distributor, and customer will all have access to the product's information from the time it is made until it reaches the client, and it is nearly hard for a third party or a hacker to change the details of the product between any of the blockchain linkages. The blockchain technology is governed by smart contract codes. A QR code generated for a product is validated as the goods is delivered to the customer and the QR code is matched. Because of the simplicity of the coding, the consumer can have faith in this Blockchain-based application. The code could be simplified in the future. Customers will be unaware of Blockchain-based E- Commerce websites, thus in order to persuade them to purchase a product from this website, they must understand how this website differs from other shopping websites and the benefits that this website offers. It will be difficult to promote this website.

VI. CONCLUSION

With the large volume of counterfeit products available online, the counterfeiting industry is increasing at an exponential rate. As a result, there is a great demand to detect counterfeit products, and blockchain technology is utilised to detect counterfeit products. Furthermore, the data is encoded into a QR code. Customers or users can detect bogus products after scanning the QR code. In blockchain technology, digital product information can be kept in the form of blocks.

In this essay, we've reviewed a few papers and projects that are comparable to our subject and looked at the systems they employed. This data will be used to help us build our system for spotting counterfeit goods. We have also spoken about ways to stop the fraudulent forging of items. The recommended approach can thus help buyers identify fake goods in the supply chain. Users may read information from QR codes attached to products, such as transaction history and the current owner, enabling the end-user to decide if the goods are authentic or not.

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