

Detection of Fake Product using Blockchain Technology

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Abstract - Counterfeit products plays a vital role in manufacturing industries. This duplication of products spoils the company's reputation and causes a major downturn in the market. Identifying the original product is the biggest challenge nowadays. To overcome the problem of counterfeit products, We provide the best method for product authenticity. The reliability of the product can be identified using a barcode and QR code. This QR code is linked to a Blockchain. This proposed system stores the product information and generates the unique code as blocks in the database. It compares that code with the previously stored entries in the Blockchain Database. If the match is unfound, notify the customer that the product is fake. This ensures that the product is reliable. This will be helpful for the customers to buy original products.

Index Terms - Duplicate Product, QR code, Blockchain.

I. INTRODUCTION

Modern technology helps us solve our risk factors such as counterfeit products and duplications. Recently, these are the major problems that are faced by consumers. This may also lead to a huge loss for the product manufacturers. Finding out the original and duplicate products is very important in the current modern world. Because fake products lead to many problems for the consumers. So we have to find the genuineness of the product. For this, we can use blockchain technology to overcome this problem.

Blockchain is a modern technology that consists of an organized recording of information that is difficult to change. This contains the computerized information that is duplicated and distributed across the entire network on blockchain. Each block in the blockchain database chain contains multiple transactions, and every time a new transaction occurs, that is added to the blockchain database record. This technology helps to solve the problem of duplication of products. All the records will be stored in the form of blocks in the blockchain database. This proposed system generates a unique QR code for the products and customers can scan that QR code to get the details of the product. After scanning that code, we can identify whether the product is original or duplicate.

In recent years, fake product issues have risen and created more issues for the customers. For this, we can propose a system for the detection of fake products using blockchain technology. The feature of this proposed system is flexibility, transparency, security, and privacy. By using smartphones, Consumers can scan the QR code and identify the genuineness of the product. This is the main motive of this proposed system. The main objective of the proposed system is to design a non-counterfeit system using blockchain technology and to secure the product details using QR codes.

II. LITERATURE SURVEY

A Blockchain-based Supply Chain Quality Management Framework by Si Chen, Rui Shi. In this paper, we propose a blockchain-based framework. This framework will provide a theoretical basis for intelligent quality management of the supply chain based on blockchain technology. Furthermore, it provides a foundation to develop theories about information resource management in distributed, virtual organizations. Smart Tags for Brand protection and anti-counterfeiting in the wine industry by steven, Marko. This paper describes a brand protection and anticounterfeiting solution for the wine industry based on smart tags and Cloud-enabled technologies. The main idea behind smart tags is to utilize quick response codes and functional inks supported by the Cloud system and two-way communication between the winemaker and end-user. A Survey of Counterfeit Product Detection by Prabhu Shankar, R. Jayavadeivel. Counterfeit products are growing exponentially with the enormous amount of online and black markets. So, there is a strong need to address the challenges of detecting counterfeit products and designing appropriate technology to improve detection accuracy. This is one of the active research areas to be explored in the current world. This paper discusses various techniques for identifying counterfeit products. Product Authentication using QR codes by Arpit Dugar. The encrypted unique user identification is verified at the server using QR codes. Our proposed approach uses QR codes based on 2- dimensional codes to authenticate the product. Fake Product Identification using Blockchain Technology by Tarannum J. Sayyad, Adil Tofiq Mulla. This research paper proposes a prototype for identifying counterfeit products using blockchain technology. It discusses the software implementation process in which the product code is scanned using this application and then verifies if the given product is counterfeit or not. Fake Product Detection using AI-Based Technology by Eduard Daoud, Dang Vu Nguyen Hai. The goal of this paper is to create easy-to-use applications in which the end-user identifies the counterfeit product and contributes to the fight against product piracy. The paper entitled "Improving Fake Product Detection using AI-Based Technology" describes how an ai based system can be used to reduce fake products where we do not require any special device to verify the authenticity of the product. Machine learning uses the data set and training data provided to generate the outcome of whether the product is genuine. It analyses the logos or the information captured by the end-user through their device and verifies it with the data available. After detection, the server returns the result to the end-user to make further decisions. The paper entitled 'RFID

Anti-Counterfeiting for Retailing Systems' describes how we can use RFID counterfeit system. In this system, the author proposes a system consisting of two protocols. The first one is the tag authentication protocol which allows users to authenticate the product without revealing their important information and the other one is the data correction protocol which ensures the correctness of the tag status. The paper entitled 'Research on Anti-counterfeiting Technology Based on QR Code image Watermarking Algorithm' explains how we can embed the carrier image to the QR code to enable image watermarking in the QR code. It is a more robust DWT and SVD-based watermarking algorithm. n. The experiment proved that this method can resist compressive attacks, rotation attacks, noise attacks, and so on.

III. METHODOLOGY

The worldwide improvement of an item or innovation consistently accompanies hazard factors, for example, forging and duplication. Forging items can influence the organization's name and the client's wellbeing. Presently days discovery of phony items is the greatest test. Fake items are causing a significant impact on the organization and the client's wellbeing. Hence, item creators are confronting enormous misfortune. India and different nations are battling such fake and fake items. In the proposed framework, the framework produces QR codes utilizing Blockchain innovation. This innovation stores exchange records in blocks. These squares are secure and difficult to access and change the data from it. By utilizing a QR code we can recognize the fake item.

Wix is a free, user-friendly, website-building platform. Our intuitive technology and powerful built-in features give our users the freedom to design professional websites with ease that look amazing on any device. This web application is well responsive and adjustable on any screen size. Wix can help web designers acquire new business and satisfy their clients speedily and professionally. Web designers cater to a diverse clientele and work under intense time constraints. This website editor can be a terrific solution for many web design projects.

We proposed a fake product detection system using blockchain technology as an android application for the detection of counterfeit products. The proposed system ensures the detection of fake products in day-to-day life. The proposed system consists of three main parts, customer or user android application, Manufacturer's or company's android application, and Cloud/ Database. The first application is the Manufacturer or company side application in which we have to first register ourselves. After registration login into the application, we have some options. One option is to add a product in which the manufacturer can add the product details. Another option is to show the order in which they can see customers' order details and after that, they can decide the accept or reject the order. The manufacturer also can see whether the product is delivered or not. A second application is the Customer application in which we have to first register

in-app after that we can log in to the application using our id and password. In this application, there is an option to show products where customers can see the product details like name, total quantity, price of a product, and details of the manufacturer. In that, we can product book the product by inserting the quantity of product. In this application, we can see orders using show my order where we can see the product details, name, quantity, date, time, price, and status of the product which is produced is delivered or not. In this app we have a QR code scanner in which we scan the QR code of the product then it shows whether the product is fake or real. There is another option which is a blockchain in which it displays the name of generated block product quantity, generated Hash Value, and whether the product is corrupted or not. In this project customer login, the in into the application. After login, he fills in the details for ordering the product and booking the product. The order of the product can be shown to the manufacturer. Manufacturer deciding whether the product request is acceptable or not. After the manufacturer accepts the order of the product it generates the unique QR code of a product. Once an order of product is stored on the network hash code is generated for that product and it is possible to maintain the transaction of the product. In the proposed system QR code is generated for a particular product. Customers scan the QR code on the product or package using the smartphone's QR code reader application or the customer application has the option of a QR code scanner. After scanning, we get the result of whether the product is real or fake. In the end, the Blockchain system holds these product details along with a history of transactions to enable the tracking of the product along the distribution chain. All the product details, block name, a hash value is stored in the firebase cloud database. The architecture diagram is shown below in Fig 3.1.

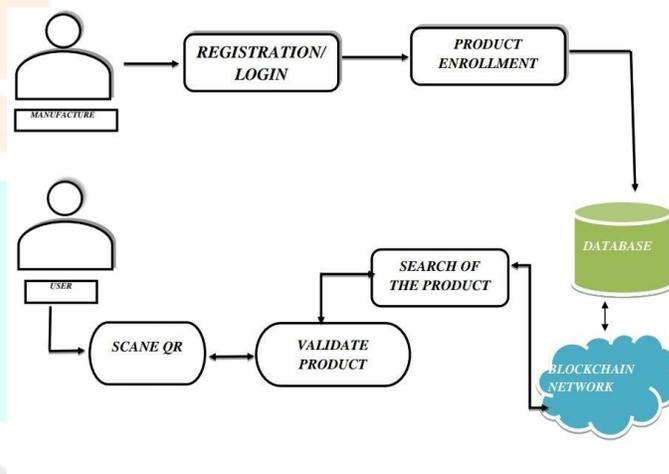


Fig 3.1 Workflow diagram

ALGORITHM

The SHA-256 algorithm is one flavor of SHA-2 (Secure Hash Algorithm 2), which was created by the National Security Agency in 2001 as a successor to SHA-1. SHA-256 is a

patented cryptographic hash function that outputs a value that is 256 bits long.

1] Sha-256 algorithm is used in blockchain to get a constant hash of 256 bits every time. This algorithm is also part of encryption technology. So, now let's see how this algorithm works:

2] In the figure you can see the prototype of the algorithm. In this, there is some data called IV which is 256 bits. Now the input we get will be very large. So, break it into sizes of 512 bits.

3] As the input will always be not a perfect multiple of 512 bits, So, some part of the input will be left.

4] To this left input we do padding concatenate the input with 10 bits before it. Now our input is perfect multiple, so we can proceed further.

5] Now 512-bit input is added with 256 bits IV to get a total of 768 bits. These 768 bits is passed through compression function 'c' to get an output of 256 bit only.

6] This output of 256 bits is again merged with 512 bits input from block B2.

7] Again, the total is passed through the compression function to yield a 256-bit output. This loop goes on fill the last block (block n).

8] Again, a compressing function starts and gives the final 256-bits output, which we call a hash of input data.

IV. CONCLUSION

Blockchain technology is known for its security and privacy with the easy access of great information through its data handling through distributed networks. Blockchain has gained immense popularity in the world of finance and comes under the category of fintech which is Finance and Technology. Companies have started to adopt it at a very fast pace due to its useful features. Blockchain has been found as a great tool for the purpose of fake product identification and elimination from the supply chain or the retail market. The proposed system will allow users to easily identify and gather information about the product that they want to check. This will help users to make a better choice in the market and also allow them to trust the seller and the manufacturer. They don't have to rely on a third party to verify the authenticity of the product which will help in a smooth and risk-free experience for them. Also, it will help the manufacturing companies to worry less about the counterfeit products in the market and they can work better on the customer feedback to improve their services. It will also prevent their economic losses and allow them to easily keep track of the product that they have released in the market. If blockchain is able to bring stability and develop trust among customers in the market then it can give a huge boost to the economic growth of a country and prevent them from big losses which happen due to fraud. Overall, blockchain technology can emerge as a lifesaver for

companies and provide a new system for trade that is more secure and user-friendly.

V. RESULT

This real-time system can be implemented to check whether the received product is a counterfeit product or an original product. The manufacturer uses the SHA-256 algorithm to generate a QR code in blockchain technology. The generated QR code is scanned by the user to check given product is fake or real. As of now, we implemented this site - <https://akshops101.wixsite.com/mysite>.

The sample image for the implementation of the proposed system is shown below.

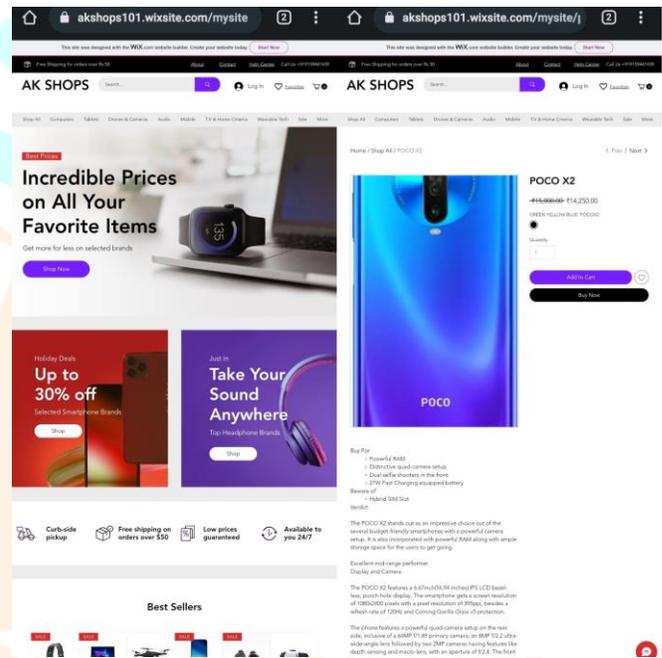


Fig 5.1 Fake Product Detection - Sample Website



Fig 5.2 Detection of Fake Product

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