

Fake Product Detection Using Blockchain Technology

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Abstract

In recent years, Counterfeit products play an important role in product manufacturing industries. This affects the companies name, sales, and profit of the companies. Blockchain technology is used to identification of real products and detects fake products.

Blockchain technology is the distributed, decentralized, and digital ledger that stores transactional information in the form of blocks in many databases which is connected with the chains. Blockchain technology is secure technology therefore any block cannot be changed or hacked. By using Blockchain technology, customers or users do not need to rely on third-party users for confirmation of product safety.

In this project, with emerging trends in mobile and wireless technology, Quick Response (QR) codes provide a robust technique to fight the practice of counterfeiting the products. counterfeit products are detected using a QR code scanner, where a QR code of the product is linked to a Blockchain. So this system may be used to store product details and generated unique code of that product as blocks in the database. It collects the unique code from the user and compares the code against entries in the Blockchain database. If the code matches, it will give a notification to the customer, otherwise it will give the notification to the customer that the product is fake.

Keywords: Counterfeit product, QR code, Blockchain.

1. INTRODUCTION

The global development of a product or technology always comes with risk factors such as counterfeiting and duplication, which can affect the company's name, company revenue, and customer health. There are so many products that exist in the supply chain. To ensure that the product is real or fake. Because of counterfeit or fake products manufacturers facing the biggest problem and huge losses. To find the genuineness of the product we can use blockchain technology.

Blockchain is an arrangement of recording information that makes it troublesome or hard to change, hack, or cheat the framework. A blockchain is essentially a computerized record of transactions that is duplicated and distributed across the entire network of PC systems on the blockchain. Each block in the chain contains multiple transactions, and every time a new transaction occurs on the blockchain, a record of that transaction is added to every participant's record. The decentralized database managed by the number of participants is known as Distributed Ledger Technology (DLT). Blockchain is a type of DLT in which transactions are recorded with an immutable cryptographic signature called a hash.

Blockchain technology helps to solve the problem of counterfeiting a product. Blockchain technology is more secure. Once the product is stored on the network hash code is generated of that product and it is possible to maintain all transaction records of the product and its current owner as a chain will be created for that product transactions. All the transaction records will be stored in the form of blocks in the blockchain. In the proposed system we are assigning a generated QR code to a particular product and the end customer can scan

that QR code to get all information about that product. After scanning the QR code we can identify that the product is real or fake.

1.1 MOTIVATION

There In recent years, the spread of counterfeit goods has become global. There are many fake products in the current supply chain. According to the report, fake product incidents have risen in the last few years. It is necessary to have a system for customers or users to check the all details of the product so that users can decide that the product is real or fake. In India currently, there is no such system to detect counterfeit products. So, the solution involves a simple QR code-based identification that can help the end-user or customers to scan and identify the genuineness of the product by using a smartphone.

1.2 OBJECTIVE

The idea of this project came into existence because of the increase in the counterfeit products. The objectives of this project are:

- 1.To Design Anti Counterfeit System using Blockchain.
- 2.To secure product details using a QR code.
3. Provide security to the clients by offering data to client.

2.LITERATURE SURVEY

- 1] A Survey of Counterfeit Product Detection by Prabhu Shankar, R. Jayavadivel. Counterfeit products are growing exponentially with the enormous amount of online and black-market. 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.
- 2] 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.
- 3] 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.

3. PROBLEM STATEMENT

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 item 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.

4.REQUIREMENT SPECIFICATION

4.1.1 ANDROID STUDIO

Android Studio is the official integrated development environment (IDE) for Google's Android operating system, built on IntelliJ IDEA software and designed especially for Android development. It is available for download on Windows, macOS and Linux based operating systems. It is placement for the Eclipse Android Development Tools (ADT) as primary IDE for native Android application development. The following features are provided in the current stable version:

- A flexible Gradle-based build system.
- A fast and feature-rich emulator.
- Template-based wizards to create common Android designs and components.
- A rich layout editor that allows users to drag and drop UI components



Figure 4.1: Android Studio

4.1.2 FIREBASE CLOUD

Firebase is a platform developed by Google for creating mobile and web applications. It was originally an independent company founded in 2011. In 2014, Google acquired the platform and it is now their flagship offering for app development.

Firebase is a mobile app platform with integrated, unified client libraries in various mobile programming languages. Firebase's different backend-as-a-service (BaaS) features help you develop high-quality apps, grow your user base, and earn more money. Each feature works independently, and they work even better together.



Figure 4.2: Firebase Cloud

5. SYSTEM ARCHITECTURE

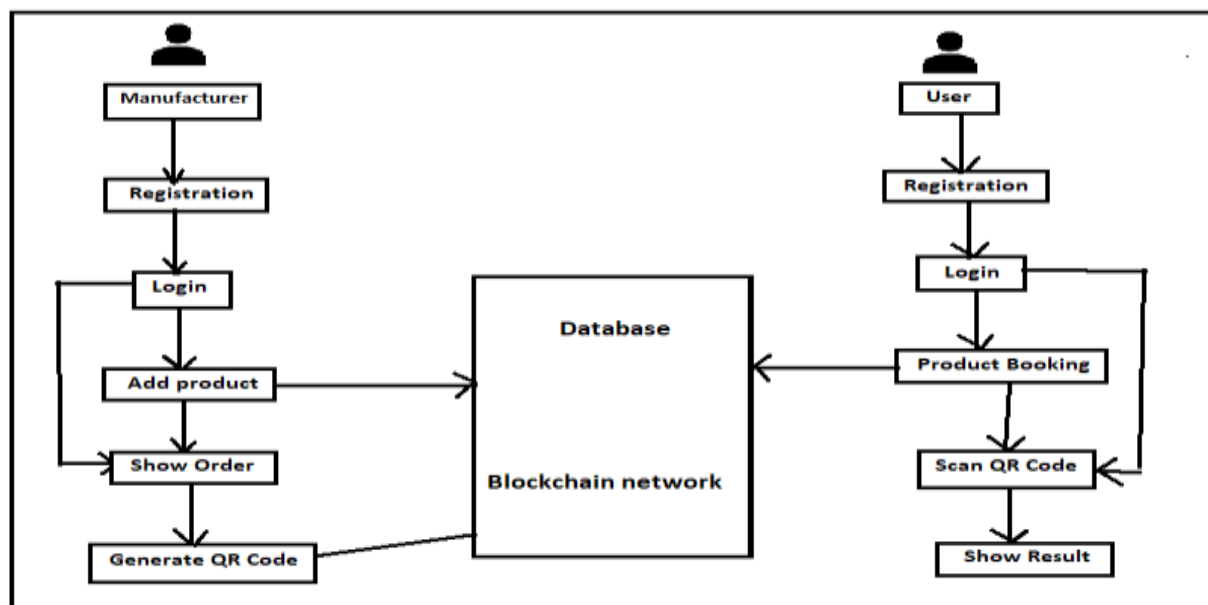


Figure 5.1 System Architecture

6. RELATED WORK

There is no good solution before to differentiate fake products from original products. Blockchain technology can be helpful to tackle such problems. The project's main goal is to help people to identify the product is an original product or a fake product.

We proposed a fake product detection system using blockchain technology as an android application for the detection of counterfeit products. The proposed system ensures that 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 Manufacturers 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 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 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, 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 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 that 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 the product is corrupted or not.

In this project customer login, the in the application. After login, he fills in the details for ordering the product and book 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 accepting 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 of 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 customer application have the option of QR code scanner. After scanning, we get the result of 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.

7. ALGORITHM

SHA-256 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 algorithm. In this there is some data called IV which is of 256 bits. Now the input we get will be in the very large. So, be break it in size of 512 bits.

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

4] To this left input we do a 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 total of 768 bit. These 768 bits is passed through compression function 'c' to get an output of 256 bit only.

6] This output 256 bit 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 final 256-bits output, what we call it as hash of input data.

8. RESULT

This real-time system can be implemented to check the received product is a counterfeit product or 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.



Figure 8.1: Fake Product Detection



Figure 8.2: Received Product

9. CONCLUSION

Counterfeit products are growing exponentially with the enormous amount online. So, there is a strong need to detecting counterfeit products and blockchain technology is used to detect fake products. Furthermore, the information is encoded into a QR code. Customers or users scan the QR code and then they can detect the fake product. Digital information of products can be stored in the form of blocks in blockchain technology. The data can be stored in the firebase cloud.

Thus, the proposed system is useful for the customer to detect fake products in the supply chain. Customers can scan QR codes assigned to a product and can get all the information like transaction history, current owner based on which end-user can check whether the product is genuine or not.

10. REFERENCE

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