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System for Identifying Fake Product using Blockchain Technology

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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. Blockchain technology is used to authenticate and identify counterfeit items.**

Using blockchain technology, transactions are recorded in the form of blocks in a distributed, decentralized, and digital ledger. A block cannot be changed or hacked since blockchain technology is secure. Blockchain 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 Blockchain, 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.

Keywords: Counterfeit product, QR code, Blockchain, consumer, wireless technology

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 utilise 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].

A. MOTIVATION

There The distribution of counterfeit products has grown widespread in recent years. There are several counterfeit items in today's supply chain. According to the research, occurrences involving bogus products have increased in recent years. It is vital to have a system in place for consumers or users to verify all product facts in order for users to determine if the product is genuine or not. Currently, India lacks such a mechanism for detecting counterfeit items [7-8].

B. OBJECTIVE

The growth in counterfeit goods sparked the idea for this project. Following are the project's goals:

1. An anti-counterfeit system based on blockchain 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.

II. LITERATURE REVIEW

Prabhu Shankar, R. Jayavadivel, 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].

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Si Chen, Rui Shi. A framework for supply chain quality management based on the blockchain. In this work, we suggest a blockchain-based system. The theoretical basis for blockchain-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. PROBLEM STATEMENT

Global expansion of a product or invention is always fraught with danger elements such as forgery and duplication. Forging things may have a negative impact on the organization's reputation and the client's well-being. Nowadays, the biggest test is the detection of a fraudulent item. Fake goods have a huge negative influence on both the business and the client's well-being. As a result, item makers face immense hardship [16-18].

India and other countries are combatting such forgeries and counterfeit goods. The suggested system generates QR codes with the use of Blockchain technology. This invention utilises blocks to store exchange records [19-20].

IV. REQUIREMENT SPECIFICATION

A. ANDROID STUDIO

Based on IntelliJ's IDEA framework, Android Studio has been made by Google as their official integrated development environment (IDE) [21]. Figure 1 shows the android studio.

Fig. 1. Android Studio

On Windows, macOS, and Linux, you may download it. Because of this, ADT, the Eclipse-based Android development tools, is now the IDE of choice for Android app developers [22-23]. The current stable version includes the following features:

- Build system based on Gradle that is quite customizable.
- An emulator with a lot of functionality and good performance.
- For the creation of popular Android designs and components, there are wizards that use predefined templates as a starting point.
- User interface components may be dragged and dropped into place with this layout designer.

B. FIREBASE CLOUD

Firebase is Google's platform for building mobile and web applications. When it first started in 2011, it was a standalone company. As of 2014, the platform has become Google's main offering for app development [24-25].

Fig. 2. Cloud of Firebase

Firebase is a platform for mobile applications that includes a common client library for a variety of mobile programming languages. The many backend-as-a-service (BaaS) options available on Firebase enable you to build high-quality applications, expand your user base, and generate more money. Each feature functions separately, and they perform significantly better when combined [26-28]. Figure 2 shows the cloud of firebase.

V. SYSTEM ARCHITECTURE

There has never been a satisfactory technique for distinguishing counterfeit from genuine items. Blockchain technology may be beneficial in resolving such issues. The project's primary objective is to assist individuals in determining if a product is genuine or counterfeit [29-30].

We presented a solution for detecting counterfeit items based on blockchain technology as an Android application. The suggested approach guarantees that counterfeit items are detected in everyday life. The suggested system is composed of three major components: an Android application for the consumer or user, an Android application for the manufacturer or corporation, and a cloud/database [31].

Manufacturers and enterprises are the first to apply, and we must first register with them. After registering and login into the application, we have a few options. One option is to provide a product that can be customised by the manufacturer. They can examine the customer's order details and then determine whether or not to accept or reject the transaction if they want to show the order. Additional monitoring may be done by the manufacturer to see whether or not the items are delivered [32-33].

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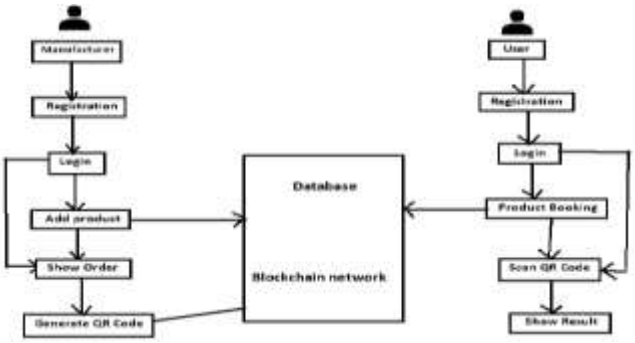

Fig. 3. System Architecture

A second programme is the Customer application, which requires us to first register in-app before logging in with our id and password. This programme has a feature that allows users to see product data such as the product's name, total amount, price, and manufacturer information. In that, we may create a product book by entering the product's amount. In this application, we may see orders using the display my order feature. This feature allows us to view product data such as name, amount, date, time, price, and the status of a product that has been manufactured, whether it has been delivered or not. This programme has a QR code scanner that allows us to scan the QR code of a product and determine if it is genuine or not. System architecture is shown in figure 3.

Customer login is required for this project, as well as application login. After logging in, he enters the necessary information to order and book the product. The maker might be displayed the product's order. Whether or whether a product request is approved is up to the manufacturer. The product's unique QR code is generated by the manufacturer when the order has been accepted by the manufacturer. It's possible to keep track of a product's transaction by creating a hash code for it once an order has been placed. In the proposed system, each product is assigned a unique QR code. Customers may use their smartphone's QR code reader app or the QR code scanner in the customer app to read the QR code on the product or packaging. We can tell whether a product is genuine or a fake based on the results of the scan. Last but not least, the Blockchain system records these product attributes and a history of transactions, making it possible to monitor the product's supply chain. The firebase cloud database stores all of the product's information, including the block name and hash value.

A. SHA-256 ALGORITHM

National Security Agency created SHA-2 (Secure Hash Algorithm 2) as a successor for SHA-1 in 2001, and SHA-256 is a variation of that algorithm. A method known as SHA-256 creates a 256-bit long hash value.

1] The Sha-256 method is employed in the blockchain to generate a consistent 256-bit hash each time. Additionally, this technique is a component of encryption technology. Now, let's have a look at how this algorithm works:

2] The graphic depicts the algorithm's prototype. This contains some data termed IV, which is 256 bits in length. Now, the feedback we get will be massive. As a result, divide it into 512-bit chunks.

3] A part of the input will be preserved since there will be no input that is exactly 512 bits.

Adding a 10-bit padding concatenation to the left input completes the operation. We may proceed now that our input has been converted to a perfect multiple.

5] The 768-bit result is obtained by multiplying the 512-bit input by the 256-bit IV. The function 'c' is used to compress these 768 bits into a 256-bit output.

6] This 256-bit output is blended once again with the 512-bit input from block B2.

7] Once again, the sum is compressed to provide a 256-bit output. This cycle continues until the last block is filled (block n).

VI. RESULTS

Real-time technology may be utilised to assess whether the product is authentic or not. The SHA-256 method is used by the manufacturer to produce a QR code in blockchain technology. The user scans the QR code to see whether the product is real or a fake. Fig. 4. shows Detection of Fake Product with Received Product

Fig. 4. Detection of Fake Product with Received Product

VII. CONCULSION

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 blockchain 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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