

Detect Counterfeited Products Using Blockchain

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ABSTRACT

There are several fake products in the existing supply chain markets. It is necessary to have a system for end users to check all details about the product they are buying so that the customer can check if the product is genuine. In recent years, faking products play an important role in product manufacturing industries. Faking products affects the company name, sales, and profit of the companies. Block technology is used for the identification of real products and the detecting of fake products. Blockchain technology is generally a tally system that stores all the data of the deals that take place in it. The unique thing about this technology is that the tally we mentioned is a distributed tally in a peer-to-peer network. Blockchain technology is secure as the data stored once in the chain is immutable 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 authenticity and safety. Our System provides the emerging technology of web use cases, and Quick Response (QR) codes provide a unique yet affectable technique to overcome these faking of products. Counterfeited products can be detected using a QR code scanner, where the QR code of the product is linked to the Blockchain. So, this system may be used to store product details and generate unique code of that product as blocks in the database. It collects the unique code from the user and compares the code against entities in the Blockchain database. If the code matches, it will give all the information about the product otherwise no information will be outputted to the customer which shows that the product is fake or counterfeited.

Keywords: Blockchain Technology, Counterfeited Products, Quick Response (QR) codes

INTRODUCTION

Global product development or ingrained product always comes with threat factors like counterfeiting and product duplication which in turn can affect the company's name, character, profit, and client satisfaction. Trading and marketing of fake products are growing at a high rate. This negatively affects deals, character, and gains of companies and poses fatal trouble to society's unknowing buyers. To ensure the identification and traceability of fake goods or products throughout the force chain and how to overcome it a completely functional blockchain system is designed. Companies they've to pay veritably low sale freight and do not have to worry about the possibility of supplying fake products to end druggies. Due to the generation of fake products, original manufacturers face the biggest problems and huge losses in terms of brand damage and lost profit. To find the originality of the product we can carry it out using functional blockchain technology. A blockchain is a chained arrangement of the recorded information that makes it up by modifying or if playing the frame is delicate or insolvable. Once the product is stored on the network, a hash law is generated for that product and it's suitable to store all sale records of the product and its current proprietor as a string created for deals with that product. It'll save all sale records as blocks in the blockchain. In the proposed system, we assign a QR law for a specific product-created manufacturer along with all product details. End stoner you can overlook this QR law to get all information about this product. After surveying the product's QR law or barcode, the stoner can determine whether the product is genuine or fake. Product counterfeiting occurs when a product is vented under the rationale of another product being fake.

This is consumer fraud, astronomically defined as deceptive business practices that affect fiscal or other major losses to consumers. The Association of Authentication Solution Providers informs about it going the Indian frugality INR 1 trillion every time. Fake incidents will increase by a normal of 20 times in 2018- 20. Fake goods include fake handbags, apparel, cosmetics, and electronics. Not that it has negative effects not only on money but also on citizens. For illustration, bad cosmetics can affect the skin and beget skin conditions and result in rashes, fake electronic factors can beget malfunction in widgets and can lead to adverse situations and accidents. Poor quality clothes and shoes may beget discomfort when worn. So, this problem requires searching for any results for dealing fake products. Another consequence of counterfeiting is a company's character. Because numerous guests are affected, little do they know that the item he/she is holding is the original or fake, if the knock product doesn't work duly, comes snappily piecemeal or fails to meet their prospects. client demand compensation, either in the form of a refund or a new product and is seeking

this directly from a licit company. Numerous affected businesses may find themselves in a script where they're dealing with an unfortunate client who complains about the poor quality of goods, the client care representative isn't apprehensive that this is a fake item. Companies are caught between a delicate situation and are trying to avoid wasting time and trouble with poor quality carbons of their goods while trying to keep their customers happy.

Damage caused by counterfeiters extends beyond client relations. Due to the increase of counterfeiters, distributors, retailers, and other businesses mates frequently lose confidence in licit businesses. The most successful mitigating measures to overcome the threat of counterfeiting introduced on a global scale include network translucency, cost control and pre-stocking approaches to assessing and managing supplier connections. Thus, the end is to present a system intended for use in the fight against counterfeiting. Blockchain technology gives traceability to the end user and supplier and forces the product chain into a secure terrain. In the overview, the proposed system is aimed at working on the problem of brand counterfeiting and supplying the client, merchandisers and suppliers with an occasion to review the integrity of the product. Fake products produce a huge negative impact on the request of both buyers and merchandisers. merchandisers don't deliver goods according to consumers' prospects and consumers begin to question the quality and norms of the company, which eventually leads to negative marketing of the company brand whose fakes are retailed. The utmost critical part of fake products is that they can be dangerous to drug consumers. Because fake products aren't limited to any on the request, we need to uncover those products and find a way to keep them off the request.

These products can be dangerous considering the veritably dominant sectors of the requested medicinal and food inventories. To break similar problems, we must maintain data that is readily available to consumers where they can corroborate product details and make a position of confidence when it comes to product authenticity. As we all know, no product is safe from counterfeiting due to the constant increase in fake products via Supply Chain. It's also depreciating to the name of the company and its profit affects the client, for example if this counterfeiting is done in the pharmaceutical field, also it'll directly affect the health of customers. An exploration paper has been proposed against this problem but has not yet been perfected. In this design, we will use blockchain technology to find 11 authenticities of the product. Blockchain technology is generally a tally system that stores all the data of the deals that take place in it. The unique thing about this technology is that the tally we mentioned is a distributed tally in a peer-to-peer network. In this design, we design a system where we store product details and its power state on the armature handed by Ethereum and for this, we use a smart contract to update the product proprietor when the product is vended.

Also, you can tell if the product is fake or original. The main idea of this design is to check whether the product bought by the client is fake or original. Compared to the blockchain, others have a traditional force chain. Traditional force chains are insecure because they give a centralized network where the data is in the hands of the companies that vend the service or product, and since they enjoy the data, they can manipulate it as they want. Product counterfeiting is done to take advantage of the superior value of fakes. As mentioned above, traditional force chains give a centralized network, while blockchain provides a decentralized database where each sale carries the value of product data. This is done by creating a record that can be vindicated by the entire community as the blockchain is governed by a peer-to-peer network. In this way, manufacturers can use this system to give authentic products to their guests. This will help you maintain client trust and increase the brand value of your product in the request.

SYSTEM REQUIREMENTS

Database Requirements

Blockchain: Blockchain is a decentralized system where there is no central database. So, there is no central point of failure. The database is stored and distributed in various nodes over a peer-to-peer network in blocks. A node can be any electronic device that has a copy of BC on it. The blocks are connected in a chain. Any transactions with the product is stored on all copies of the distributed nodes in the network; these actions that occur are immutable, irreversible and time-stamped, and visible to all entities in the chain. The blocks contain the data like- product data, transaction records, the hash of the previous block, the hash of itself, timestamp, etc. which is securely encrypted through hashing algorithms.

Even a slight change in any part of information changes the hash code completely causing a mismatch of hash codes in the chain. Thus, it is an efficient way to keep track of every action taking place and avoid hacking of data. Only limited access can be provided to the nodes depending on the sharing contract between them. Thus, customers will have access to the information about the product they bought and nothing else. Any wholesaler will have access to information in the previous block only. If an item travels from one entity to another its data will be stored in BC(Blockchain) and thus it will be easy to track it. The Smart contracts between each node can be predefined and replace the involvement of third-party members and enable automatic reinforcement.

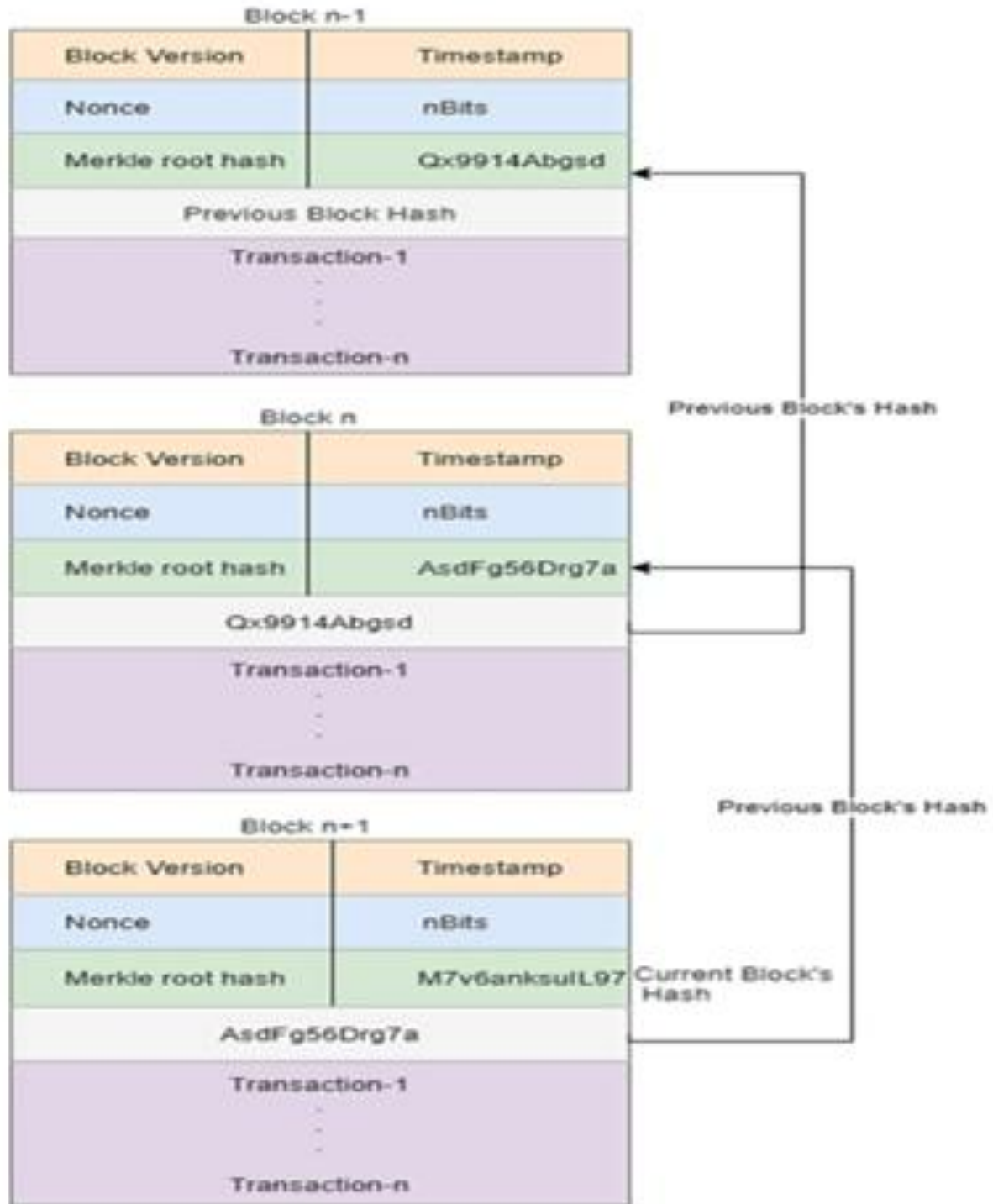


Fig.1 Chain of Blocks

The working of blockchain can be explained with the help of an example, suppose if a person has to send money to his friend, that simple transaction can be put on the block. The same block also contains other transactions, and it has a fixed size. It is distributed on the network with each and every node. As soon as the transaction takes place, all the participating nodes in the network confirm the transaction using the consensus algorithm decided between the participant nodes in the blockchain network. This algorithm in Bitcoin is called Pow (Proof of Work) and in Ethereum, it is referred to as Pos (Proof of Stake). The calculation of Pos in Ethereum takes few minutes. Each block contains the hash of the previous block and the data of the transactions which then creates a chain of blocks, and the algorithm like Pow, Pos, or some other is calculated for each modification in the blocks thus maintaining the integrity of the system and making it impossible to be changed by the third party.

SYSTEM ARCHITECTURE

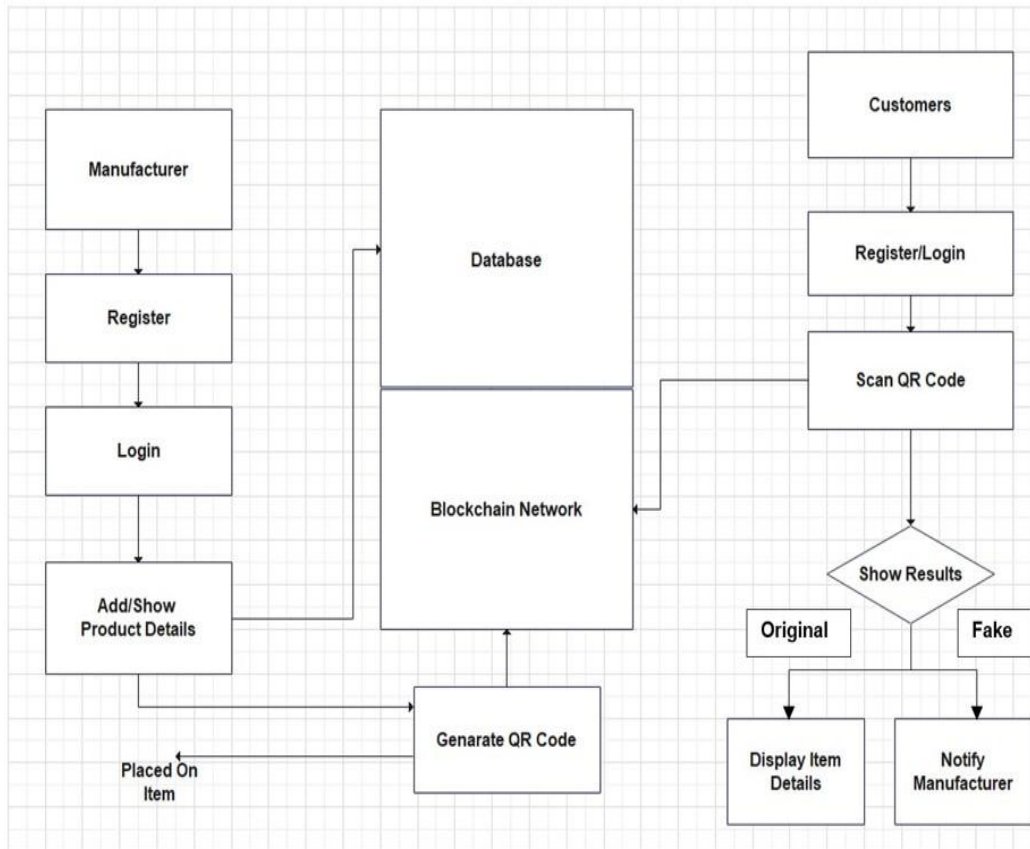


Fig.2 System Architecture

The main thing of developing the system is to overcome negative marketing and ameliorate business frugality.

- a) To cover brand value and duplication pitfalls by developing fake product discovery system using blockchain technology.
- b) To secure and authenticate the product details which helps in identification and traceability of the specific product throughout the chain.
- c) All product details are secured and stored in QR code or product ID which helps in identification which is stored in inflexible blocks of blockchain for farther security.
- d) Manufacturer can add product details and the system generates QR which can be used by retailers and distributors for tracing and indeed by consumers to insure purchasing of original products.

Currently, with the rise of technology and requests the problem of separating original and duplicate has also incurred a lot of damage to consumers, distributors, retailers and manufacturers. Thus, to combat this a blockchain grounded operation fake product sensor is proposed. In this chapter, the mission is to design the system including a fully functioning and easy user interface of the system. The thing is used to use the blockchain features to give an accessible, accurate and low- cost product Anti-counterfeiting result. The system is a blockchain grounded android operation used to describe fake products on diurnal base. The system consists of manufacturer and consumer part operation.

MODULES

Manufacturer end: - The company after verification of correspondence mail Id for enrollment and authentication purpose. They can login to the system and add new products/ items, upload the product details with system generated QR which stores all the details of the products. Reissuing the QR law is also advised for further security and to keep track of the product. The product details will be stored in a database and the QR is made tamper- free thus making it more secure which makes the QR dupe sensitive that's when copied it loses information is and published irreversibly.

Customer end: - Customer has to register/login with his/her email ID and password. After the completion of user authentication, the product initiates with scan button to scan QR code of the product. Here the user is a customer who wants to confirm whether the product is legit or not. The unique scanned code from the customer will be compared with the code produced by the manufacturer in blocks. Then the user will be notified with authenticity of the product. There is an option for customers to check product details like name, manufacturing year, price, total quality, quality of the product and the details of manufacturer. For developing the application, we used Language: Dart, Solidity, Database: Firebase with Android studio, VS code, Ethereum remix, Meta mask wallet. Firebase is a platform developed by Google for creating mobile and web applications. Firebase is a mobile app platform with integrated, unified client libraries in various mobile programming languages. Firebase's (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.

METHODOLOGY

The system will determine fake products using QR(Quick response) code, where QR code is enchainned to a specific product and associated to smart contracts to overlook the code using smart phones or any scanner bias. This will notify us whether the products are original or fake.

- A company after verification of correspondence Id and enrollment process will be given access to upload the product details with system generated QR code.
- The product details include the brand and product name, as well as the manufacturing time, price, total volume, product quality, and manufacturer information. This will be saved in a database (Firebase), and a QR code will be generated.
- Each sale of block will contain a unique QR code which cannot be reused by the manufacturer for different products.
- Manufacturer can make the tracking and identification process more secure and sure by making use of reissued QR code with can show product information, engage clients and increase trades.
- client must register login to the system before checking the QR or barcode of the product.
- After the completion of user authentication, the unique examined code from the client will be compared with the code produced by the manufacturer stored in blocks of smart contracts.
- If code matches, also user will be notified that product is original with all its details and authentic document from database.
- If code doesn't match, the user will be notified that product is fake which can help purchasing of falsified product and that may affect in significant health or financial losses.
- Indeed, manufacturer can be advantaged if product is fake also the position of the user will be entered with authorization and alert will be transferred to manufacturer who can take farther legal conduct on distributor, retailer and black- request manufacturer.
- This ensures clients trust on merchandisers and increases the user's satisfaction and can save manufacturer time and money in fighting the Vilification and trades because of forged manufacturers.

FUTURE SCOPE

The Future work of the system can be proof of code simplicity which can indirectly increase consumer's trust because of distributed Applications. The manufacturer may find it challenging to include all of the information about the products they produce, therefore data can be extracted via the company's API to boost productivity and be more helpful to the manufacturer. Although a QR code cannot be hacked, the information inside can be copied, used to create another QR code, or printed out. Works well to scan and retrieve information so to overcome this secure graphic QR code can be used that if when QR code Is photocopied then it will lose information due to the ink smearing. These copy detection pattern or secure graphic is a digital Image with optimal design to lose information when copied and it is printed irreversibly. Customer when finds the product is Counterfeited the system should be able to show the same products but original from different sites with price differences to improve Usability, efficiency and effectiveness of the system.

CONCLUSION

Blockchain technology is known for its security and privacy protection with easy access to large information through data processing over a distributed network. Blockchain has gained immense popularity in the financial world and falls under the fintech category, meaning finance and technology. Companies have started adopting it at a very fast pace due to its useful features. Blockchain has proven to be a great tool for identifying and eliminating counterfeit products in the supply chain or retail sector. The proposed system will allow users to easily identify and collect information about the product they want to check. This will help users to make a better choice in the market and they can trust the seller and the manufacturer. They no longer need to rely on third parties to verify the authenticity of the product, which will give them a smooth and risk-free experience. In addition, manufacturers have less to worry about counterfeit products in the market and can better use their customers' feedback to improve their service. It also allows them to avoid economic losses and

easily track the product they have launched. If the blockchain can create stability and increase customer confidence in the market, it can boost a country's economic growth tremendously and protect it from large losses due to fraud. Overall, blockchain technology can prove to be a lifesaver for businesses, providing a new system for commerce that is more secure and user-friendly

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