

## IDENTIFYING FAKE PRODUCTS USING HYPERLEDGER FABRIC BLOCKCHAIN

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**Abstract.** However, nothing has been done to effectively apply vehicle-identifying technologies, such as bar codes, near-field communication (NFC), or transmitter identification, to these issues. Product fraud and forgeries are ongoing issues in both vending and manacles environments. This investigation identifies counterfeit items using a bar code that a Block Chain Based Management (BCBM) device uses to identify an object. As a result, the recommended device can be used to store database blocks for the product's unique code and information about it. It is possible to retrieve the buyer's precise code, which is checked against data in the blockchain database. The products are probably checked at each step of the distribution chain to achieve this. Before adding a new product to the database, the administrator generates a unique QR code for it using the SHA256 QR Code technology set of rules.

**Keywords:** *QR code, Counterfeit, Blockchain, Supply Chain, Transmitter Identification.*

### 1 Introduction

One of the biggest issues that retailing systems are face globally is product counterfeiting [1]. The imitation business was estimated to have cost US businesses only \$200 billion over the previous 20 years. The consequences of losses brought on by the sale of counterfeit goods have the potential to limit the growth of the industry and cost businesses market share. A blockchain era is a digital ledger of transactional documents that is primarily based on a decentralized peer-to-peer network around the globe. Online transactions and distributed digital ledger systems are now more frequently the focus of blockchain technology. Blocks or statistics make up blockchains, each block is connected to the one before it in an unbreakable chain. The term "blockchain" refers to a group of transactions that have aggregated into a block [2]. Because of the distributed nature of block chains and their ability to demonstrate guarantees through friends, they cannot be evaluated with a traditional centralised database. If someone wants to make a transaction, their miles immediately go to the community, and algorithms find out whether the transaction is real. The most recent transaction is connected with the one that

came before it to create a succession of transactions after it has been joined up. The term "blockchain" refers to this network [2].

A clever agreement is a compromise reached by people that takes the form of computer code. They can be saved in a public database and cannot be changed because they run on the blockchain [2]. The combination of blockchain technology and intelligent contracts allows for greater flexibility in terms of how they may be designed, expanded, and put into effect with the least amount of cost.

Smart contracts built on the blockchain have various advantages, such as quick and real-time refurbishment, low cost and low execution risk, no intermediaries, and high accuracy. Banking, the Internet of Things (IoT), and other more sensitive corporate industries are deployed as authorization smart contracts.

The firms' advertising and income are negatively impacted by the expanding market for counterfeit goods. Interestingly, research presented the defense for a completely utilitarian blockchain framework to stop item duplicating and approve the personality and recognizability of certified things all through the inventory network. For each item the administrator sells, a unique QR code is generated and stored within the system [10]. The system is based on a Blockchain, and companies using it will only need to invest the necessary sums of money to create and alter their contracts. Using absolutely discovered smart contract data, anyone may easily verify the legitimacy of a company and a customer's purchase of items. With the help of anti-counterfeit Blockchain technology, businesses can prove that the goods they sell are authentic, doing away with the need to compete with subpar copies [10].

The term "counterfeit" refers to the imitation of a few real objects with the aim of robbing, damaging, or altering the real, for use in evil actions, or in some other way to convince others to accept as genuine granted that the faux has an equal or higher price than the real object. Imitations of authentic products created unlawfully or dishonestly are known as counterfeit goods. Frequently, products that are likely to be fraudulent are created with the goal of raising the real worth of the mimicked goods [10].

The growth of the fake products market has an effect on the sales and profits of the harmed companies. This study is quick to propose a completely utilitarian blockchain based framework that forestalls brand extortion and guarantees the distinguishing proof and straightforwardness of actual products along the entire store network. Organizations just have to pay extremely negligible exchange expenses and are protected from the gamble of buying fake merchandise [3]. note that the first paragraph of a section or subsection is not indented. The first paragraphs that follows a table, figure, equation etc. does not have an indent, either.

Subsequent paragraphs, however, are indented.

## 2 Literature Survey

We provide some basic information on a handful of the published studies' journal papers in this section. It has to do with who the researchers are focusing on in order to stop unfair testing. We took a look at their processes and talked about some of the difficulties.

Using inexpensive passive tags, the portable method presented by G. Khalil et al. [1] is well suited for placement in substantial retail spaces. We also evaluate Tran and Hong's latest

proposal in order to draw attention to some of its flaws. The system only supports the system that installs RFID tags.

M. C. Jayaprasanna et al. recommendation's [2] states that product records and their unique coding can be saved as database blocks. It obtains the client's special code and then evaluates it against entries in the blockchain database. The client is told if the code matches; otherwise, the user is asked for the location of purchase so that the manufacturer of any counterfeit goods can be found.

According to J. Ma et al. [3] using decentralized Blockchain technology could help shoppers stop relying solely on retailers to determine whether or not products are authentic. We frame a decentralized Blockchain framework with brand hostile to duplicating so makers can use it to offer certifiable merchandise without practicing command over beforehand claimed outlets, which can definitely bring down the expense of item top notch guarantee.

The world economy loses hundreds of billions of dollars every year due to fraudulent goods, according to Y. Yilmaz, V et al. [4]. Radio frequency identification (RFID) technology clarifies this problem by using tags that are simple to fake and are connected to every object. With RFID technology, there could be important security flaws, nevertheless. To give an example, if the statement route flanked by Mark and Bookworm is actually abused, a cunning adversary may be able to get the sensitive information saved on the tool. The discovery that tag clone assaults are also possible has seriously harmed the ability of RFID technology to fight counterfeiting. One technique of fixing the problem is to use an authentication system.

By consolidating the identity based encryption (IBE), PUFs, and keyed hash highlights, U. Chatterjee et al. [5], proposed confirmation and key trade convention shows the way that this collection can assist with eliminating this need. The privateers of the thought are in fact laid out under the key arrangement balance and the normal Compensability System. An Intel Edison board and a Digilent Nexys-4 FPGA barricade made of an Artix-7 FPGA, which on the whole go about as the IoT hub, have been consolidated to build a safeguarded video reconnaissance camera utilizing a model of the convention.

The goal of this essay is to investigate potential future effects of blockchain technology on supply chain practices and laws, as suggested by Wang and others [6]. Thorough reviews of the scholarly and professional literature were conducted. Numerous accounts of the use of blockchain in business were consulted to learn more. Findings Even though blockchain technology is still in its infancy, supply chains are starting to adopt it, with trust acting as the main motivator.

According to S Sarmah [7], this page provides background information on blockchain technology, covering its history, architecture, operation, advantages, and applications in numerous industries.

The many components and the fundamental idea of how smart contracts operate are described in B K Mohanta et al. [8] proposal. Next, determine and look at the many uses for smart contracts, including how they help with blockchain applications. The paper's conclusion discusses challenges involved in implementing payment systems in the actual world in the future. We offer a thorough examination of ledger digital currencies from a technological and practical standpoint. To do this, we classify the research articles that are included and provide taxonomy of current blockchain-enabled smart contract systems. We also review the most recent research on smart contracts. In light of the overview's discoveries, we distinguish

various difficulties and annoying issues that request consideration in additional exploration. At last, we track down likely patterns.

According to E Tijan et al. [9], there are a tonne of logistical issues that can be solved by using the blockchain era, including order delays, damage to goods, inaccuracies, and multiple fact entries, even though the economic sector has attracted the most research regarding the benefits of the blockchain era. This paper gives a radical evaluation of the present and future trends in shipping chain management and logistics in light of the application of blockchain technology. This article has provided a summary of D. Mukhopadhyay's [10] proposal regarding PUF's capabilities to provide badly needed security in IoTs. We've brought up a security opening in the verification of a completely IoT-based modern light framework and declared that involving PUFs as an equipment security crude can give a helpful however reasonable arrangement. In this article, a rundown of PUFs' capacities to give the seriously required security in IoTs is given. It has been contended that the utilization of PUFs as an equipment security crude can give a minimal expense yet safe method for forestalling such attacks. We've drawn attention to a security hole in the IoT-based business light authentication process.

The development and construction of a new SHA family is welcomed by S. binti Suhaili et al. [11], the standard for the cryptographic set of rules. Therefore, Verilog code was effectively used to make SHA-256 and SHA-256 unfurling format in light of reconfigurable equipment. These thoughts have been tried out and reenacted utilizing ModelSim. The results affirmed that the proposed SHA-256 unfurling configuration empowered progressed transfer speed use on the Arria II GX. With a records conveyance speed of 2429.52 Mbps, the high throughput of the SHA-256 spread design was made conceivable.

The blockchain mechanism that underpins crypto currencies and many other forms of digital currency, according to Wenzheng Li et al. [12], has rapidly grown in relevance in the current world. After the white paper and actual launch of Facebook's cryptocurrency project Libra, there was a huge amount of discussion all around the world. The introduction of Libra has significantly altered how people view open financing and has a negative effect on the conventional banking sector. Standard application and overall performance conditions. We look into Libra, Bitcoin, and Ethereum. We conclude with an educational tool that draws attention to the various challenges that Libra will face.

Modern delivery systems rely on a centralized authority, according to N Alzahrani et al. [13] to stop bogus goods. This shape has problems with single-aspect processing, failure, and storage. These problems have a solution thanks to the present blockchain generation's development. We support the block-convey chain in this work, another decentralized product offering that utilizes advanced money and Near Field Communication (NFC) innovation to impede duplicating endeavors.

A thorough technical and logical examination of blockchain-enabled clever contracts was proposed by Khan SN et al. in their paper [14]. To accomplish this, we order the packaged examination articles, cross-reference the different review procedures in light of cunning agreements, and give a scientific classification of present day blockchain-empowered savvy understanding arrangements. According on the results of the poll, we highlight a number of areas that still need to be researched in the future. In the end, we identify possible patterns.

Commercials-B signals are not secured in any manner, and conventional receivers cannot verify their authenticity, putting flight safety at risk. This is how H Shen1 et al. A four station

passive multilateration advertisements-B anti-counterfeiting system based on TDOA is suggested by this study in light of the advertisements-lack B's of security. To solve TDOA formulas, the Chan set of rules is used, and each station's clock is synchronized using a comparison station. With a number of flights close to Beijing Capital International Airport, we developed the system and put it to the test in the real world.

The system is able to track aircraft direction in real-time and contrast it with advertised coordinates. B Localization of bogus indications and anti-counterfeiting B messaging to pinpoint the source of ads.

### 3 Research Methodology

#### 3.1 QR Code algorithm

The greatest and simplest to use library for creating QR Codes is what this project wants to be. My main objectives are complete honesty and flexibility of choice. Small implementation sizes and clear documentation are other objectives. This work is a free execution in light of perusing the authority ISO particular papers. I accept my library offers an additional easy to understand Programming interface and less by and large code in contrast with contending libraries. The library is at first written in Java prior to being changed over into TypeScript, Python, Rust, C++, and C. It has an open source MIT Permit. Every language's code base is around 1000 lines in length and solely utilizes that language's standard library [21].

#### Procedure:

1. Choose between decoding words (a Unicode string) and binary data (a byte sequence).
2. Picking among the accessible four Error Correction Levels is (ECL). A standardized tag with a higher ECC level can fix various harmed parts and completely recreate the information bundle. Higher ECC does, in any case, will quite often bring about a higher variant number.
3. Take the text and turn it into a chain of zero-n parts. Any data can be encoded using a phase in byte mode, but if the text fits into one of these units, using both mathematical and alphabetical form is far more concise.
4. In view of the sections that will be perused and the ECL, pick a fitting QR Code variation, ideally the littlest one.
5. Subsequent to joining the sections, which each have a header and a payload, add an eliminator. The outcome is an assortment of pieces.
6. Padding bits and bytes ought to be added to the extra information space (in view of the adaptation and ECL).
7. The bit stream can be thought of as a series of bytes after being divided into blocks. Then, error-correction bytes should be included in each block. The final string of 8-bit code words that will be drawn should be created by splicing together bytes from each block.
8. Using the version number as a guide, make a fresh square grid.
9. Add action trend items and mark the necessary circuits (finders, alignment, timing, version info, etc.). This decoration is only necessary to comply with the QR Code standard; no client information is kept.

10. In order, begin drawing the (data + error correction) code words in the bottom right corner of the barcode symbol. Using two columns at once, the scanning process zigzags uphill and downhill.
11. To apply a mask either manually or automatically to the perceived, choose a mask design. If masking is updated automatically, the option with the worst penalties point out of the eight is chosen. Nowadays, the algorithmic parts of creating QR codes are complete. An image of the recently made standardized barcode image should be shown on the PC screen or saved as a picture document on a plate.

### 3.2 SHA 256 algorithm

The National Institute of Standards and Technology (NIST) have a long list of safe hash algorithms that it requires. These include SHA-1, SHA-224, SHA-256, SHA-384, and SHA-512 (NIST). Hash function approaches are utilized to supply the hash code throughout the information transfer. As a result, it becomes a crucial tool for incorporating security into services like online banking and email. An enter message of arbitrary duration is transformed into an output message of a specific duration Hash Computation

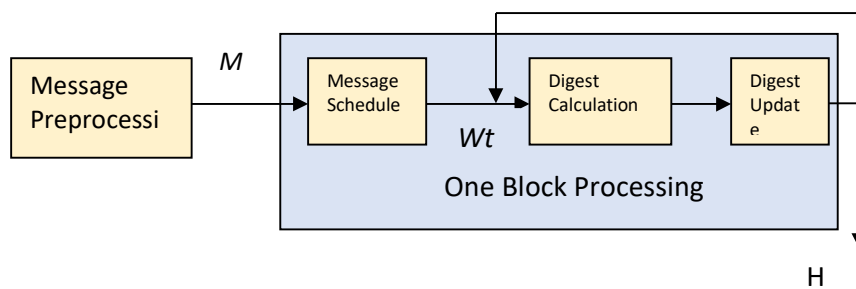


Figure 3.2 SHA-256 algorithm flow diagrams

It is challenging to make an interpretation of a hash cost to a message enters since hash highlights are one-way. Besides, it is computationally challenging to recover a message that delivers indistinguishable hash esteem. When ensuring that a hash characteristic can function properly, those characteristics become crucial [11].

Radio Frequency Identification (RFID) solutions can offer excellent secrecy and protection by utilizing cryptographic hash capabilities. Two application-oriented, optimized SHA-256 hardware options for inexpensive RFID are shown in this image. These are utilized in UMC's chosen 0.13-mm CMOS cellular technology [17].

### 3.3 System Architecture

The form, behavior, and distinguishing outward characteristics of a device are described by a conceptual framework called the device shape. It is obvious from this design that the framework will recognize fake products utilizing a barcode reader. The standardized identification of the item is associated with a block chain gadget, permitting you to filter it with a telephone and get a message demonstrating in the event that the thing is genuine or not [2].

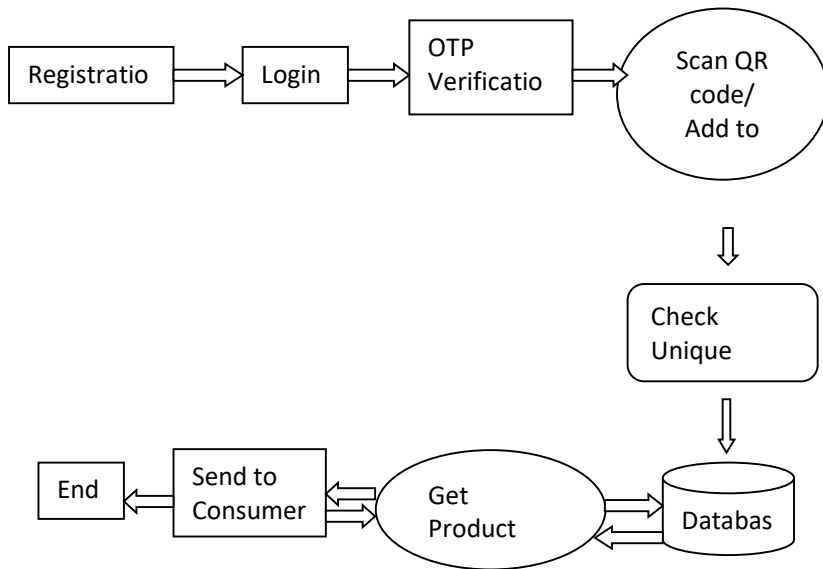


Figure 3.3 System architecture of proposed work

Customers need to sign up or log in order to access their website. Following finishing of the confirmation cycle, a special code provided by the client is utilized to contrast the code with sections in the block chain data set. When they do, the consumer is notified that the goods are real if they match.

**3.5 MODULE DESCRIPTION:**

**Consumer Module:**

To review their item, customer ought to visit the associated website. A client may be confirmed assuming they sign in to that site. The gadget gathers the purchaser's confidential code and thinks about it to data in the block chain data set in the event that the client consents to filter the item's QR code. When a customer's code matches, the system alerts them; if not, it asks them where they bought the item in an effort to track down the manufacturer of any fake items. The QR code contains information about the product that is manufactured by the manufacturer. A secure and unbreakable alternative exists between the producer and the consumer [2].

**Admin Module:**

By supplying a username and password, the admin can log in to the blockchain community using the admin login module. Admin credentials are automatically provided, and admin acts as its own producer. The administrator may include recently made items or those that are on hand in their shop. Administrators have access to both sets of customer lists and sets of all the items that are accessible over the network [18].

**Test strategy and approach**

The manual area test will be completed, and thorough intentional checks may be prepared.

Check goals

- To avoid the verification, all topic entries must be valid.
- To prompt the pages, the exact link must be used.
- There are no appropriate delays for messages, responses, or entering the display.

- Check the capabilities and ensure that the entries are in the correct format.
- No entries may be made more than once.
- Users must be directed to the correct page by all hyperlinks.

The process of “software programme integration is testing,” which involves continuously evaluating two or more integrated software components on a single platform, is done to prevent disasters exacerbated by interface problems.

The goal of an integration analysis is to make sure that software or components, such as those found in a software device or, at a higher level, software packages utilized by an entire business, operate flawlessly together. Look at the results: every one of the aforementioned check instances was successful. There were no issues discovered.

Engaging quality acquired from clients every improvement's assessment segment is critical and requests dynamic investment from the end client. It likewise guarantees that the machine consents to the practical prerequisites.

**Test results:** All of the aforementioned test cases had shown positive results. There are no errors that have been found.

#### 4 Result

##### Database Connection:

Statistics are stored in a MySQL database. A relaxed database with adequate security measures is mysql. Using the phpMyadmin tool with predefined credentials, we can interactively upload a few clients. Perl, Python, and PHP scripting languages can all be easily connected to MySQL. For our task, we are storing and retrieving the records using Mysql and Python. Most Linux variants come with MySQL preloaded, and installing it on other operating systems is fairly simple. For database maintenance, MySQL provides a clear question format and command line interface. Mysql.connect(), a Python library, provides simple access to the database for adding, gaining access to, managing, and deleting information.

##### Admin Login:

The admin login feature validates the login information and enables the manufacturer to showcase new products and view delivered goods. Administrators have the ability to view people on the block chain network and have the authority to remove anyone who isn't always needed.

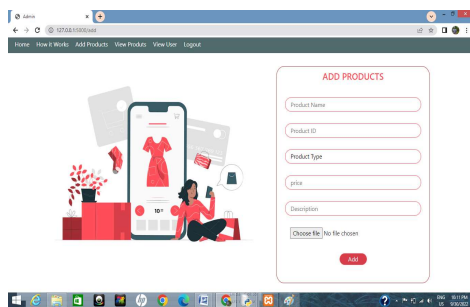


Figure 4.a Add products

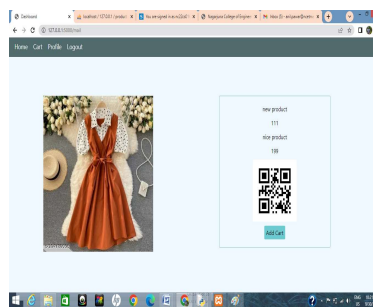


Figure 4.b Product with QR code



#	Product Name	Product ID	Hash ID	Remove
1	Product-1	105	1253e9373e781b7500266caa55150e08e210bc8cd8cc70d89985e3600155e860	Delete
6	product-5	78	349c41201b62db851192665c504b350f98c6b45fb62a8a2161f78b6534d8de9	Delete
7	product-6	23	535fa30d7e25d88a49f1536779734ec8286108d115da5045d77f3b4185d8f790	Delete
8	new product	111	f6e0a1e2ac41945a9aa7ff8a8aaa0ccbc12a3bcc981a929ad5cf810a090e11ae	Delete

Figure 4.c Hash code of each products

**OTP Verification:**

Through the method of providing an OTP security code upon access, skip code confirmation that verifies email debts and speaks to range for the customer. Additionally, the OTP certifications plug-in checks to see if the character's email address or mobile number has ever been used [18].

**QR Code:**

Alongside error revision (so a damaged code can in any case be perused appropriately) and various varieties, QR codes likewise offer high information storage limit, quick examining, Omni-directional comprehensibility, and numerous different benefits. Customers can confirm this by scanning their smartphones' barcodes into the blockchain database to confirm if the goods is a copy or the real deal. An increasing number of people are becoming aware of this technology and using it properly every day. [22].

**9 Conclusion**

The introduction of account trading which encourages responsibility in the extensive data flow between dishonest consumers and guarantees accurate bookkeeping is a key component of this endeavor. Clients who engage in dishonest behavior in the transaction records are held accountable for the account trade. Manufacturers can make use of the technology to store critical sales data for their goods in an easily accessible blockchain. The variety of goods still available for sale by the seller as well as her maximum practicable revenue both openly declared. The unpredictability of the system's code will immediately have an influence on the overall cost of switching the distributed device to the Ethereum or blockchain. The ultimate use of this machine may also demonstrate how simple the programming is. Due to its straightforward architecture and lack of extraneous code, the distributed programming won't raise consumption, which gives the customer peace of mind [18].

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