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# A NEW QR CODE AND BLOCK-CHAIN-BASED PRODUCT VERIFICATION AND COUNTERFEIT PREVENTION

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**Abstract**

Blockchain applied sciences have won activity over the remaining years. While the most explored use case is economic transactions, it has the functionality to agitate different markets. Blockchain gets rid of the want for relied on intermediaries, can facilitate quicker transactions and add greater transparency. This paper explores the opportunity to deflate counterfeit the use of blockchain technology. This paper affords an overview of specific options in the anti-counterfeit area, specific blockchain applied sciences and what traits make blockchain mainly fascinating for the use case. We have developed three distinctive standards and the growth of an current device thought is pursued further. It is proven that lowering counterfeits can't be carried out with the aid of the usage of technological potential only. Increasing awareness, combat counterfeiters on a felony level, a proper alert system, and having tamper-proof packaging are all vital aspects. These elements blended with blockchain technological know-how can lead to an environment friendly and complete method to minimize counterfeiting.

**Keywords:** Authentication, Blockchain,Counterfeit,Economic Transactions.

## 1. INTRODUCTION

Although it may seem like a far-off idea, we are surrounded by a lot of counterfeits. From fashion and retail products to software, digital media, electronics, piracy, and intellectual property, reports put the cost of counterfeiting somewhere around $600bn a year in the US alone. In fact, the International Chamber of Commerce predicts that the ―negative impacts of counterfeiting and piracy are projected to drain US$4.2 trillion from the global economy and put 5.4 million legitimate jobs at risk by 2022. In Pharmaceuticals, the counterfeit medicine market is now responsible for around 1 million deaths per year, in an industry estimated to be worth $75bn annually. In fact, the counterfeit medicine industry is estimated to be growing at twice the rate of legitimate pharmaceuticals, making it up to 25 times more lucrative than the global narcotics trade. Trust is a central element in all transactions. No matter if sending money or exchanging goods, it becomes difficult if there is no trust between the entities involved. It becomes even more difficult, as with many transactions, third parties are involved, such as banks. Often, not only one third-party is involved in a transaction, but multiple. An international money transfer does not only include the bank of the sender, the bank of the receiver, but also multiple intermediary entities such as clearing houses.

The entities involved in the transaction do not only have to trust each other, but also the third parties. Removing these third parties can decrease transaction cost, facilitate faster transactions and add more transparency. Bitcoin has successfully shown that removing such third-parties is possible. The cryptocurrency permits direct sending coins to a transaction partner, without the need to use banks and clearing houses. The assets are directly transferred from one account to another. There are no intermediaries and thereby no need to trust third parties. In addition, the question if a transaction is valid is not answered by an institution, but by algorithms used. Therefore, it completely removes the need to trust any third party. The technology behind Bitcoin, the blockchain, can however not only be used for financial transactions and crypto currencies in general. The technology has potential to ―redefine the digital economy‖ [10], because it allows immutable transactions, which can be checked at all times from everyone. This is because the information is publicly available and distributed globally. It is ―chronologically updated and cryptographically sealed‖ [11]. The full range of applicable use cases for this technology has to be seen, but tracking ownership and history of a product is surely one of them [12]. This paper explores the possibility to reduce counterfeit using blockchain technology.

Authentication, the act of establishing or conforming something as genuine. Authentication is of utmost importance because the use of counterfeit medicines can be harmful to the health and wellbeing of the patients. Their use may result in treatment failure or even death. Authentication is generally done through the overt or covert features upon the product We now have more fakes than real drugs in the market.‖ — Christophe Zimmermann, the anti-counterfeiting and piracy coordinator of the World Customs Organization [6]. Current anti-counterfeiting supply chains rely on a centralized authority to combat counterfeit products. This architecture results in issues such as single point processing, storage, and failure. Blockchain technology has emerged to provide a promising solution for such issues. In this paper, we propose the block-supply chain, a new decentralized supply chain that detects counterfeiting attacks using blockchain and Near Field Communication (NFC) technologies. Block-supply chain replaces the centralized supply chain design and utilizes a new proposed consensus protocol that is, unlike existing protocols, fully decentralized and balances between efficiency and security. Our simulations show that the proposed protocol offers remarkable performance with a satisfactory level of security compared to the state of the art consensus protocol Tendermint.

## PROBLEM DEFINITION

Anti-counterfeiting solutions should protect organizations from financial and reputation losses, and, especially in the case of pharmaceutical products, customer safety. [15] argues that good anti-counterfeiting techniques should generally be simple to apply, but difficult to imitate and have four main features: They should be difficult to duplicate, it should be possible to identify them without special equipment, it should be difficult to re-use them, and it should be visible if they were tampered with. From a product perspective, there are three general technologies to reduce counterfeits.

## PROJECT SCOPE

Features expected to assist the users to confirm the genuineness of a pack. Such features will be significantly visible, and complex or expensive to reproduce.

This includes holograms, color shifting inks, security threads, water marks etc. The advantage of overt technologies is that they can be checked by the end consumer.

## 2. PROPOSED SYSTEM

To avoid this problem author using Blockchain technology which does not require any third party and verification will be done by software algorithm itself without involvement of any third party. In this to avoid forge counterfeit we are converting all products details/barcode into digital signatures and this digital signature will be stored in Blockchain server as this Blockchain server support tamper proof data storage and nobody can hack or alter its data and if by an chance if its data alter then verification get failed at next block storage and user may get intimation about data alter.

**Advantages**

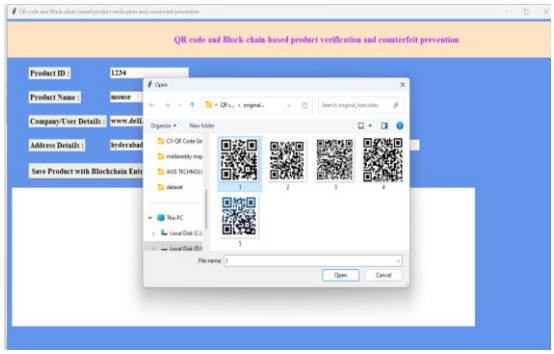
In supply chain also all products barcode digital Blockchain signatures will be stored and if any third-party distributor make clone of barcode then its signature will be mismatch and counterfeit will be detected.

### 3. RESULTS

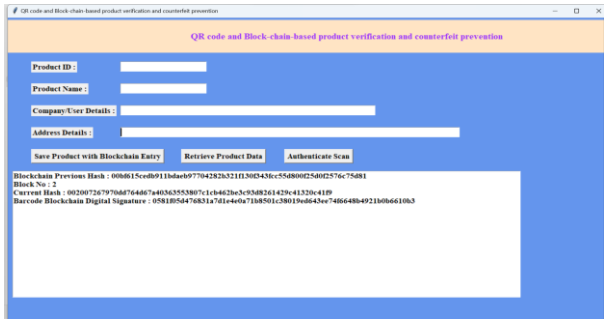
All the test cases mentioned above passed successfully. No defects encountered.

To run project double click on 'run.bat' file to get below screen


In above screen enter product details and then click on 'Save Products with Blockchain Entry' button to store product details in Blockchain

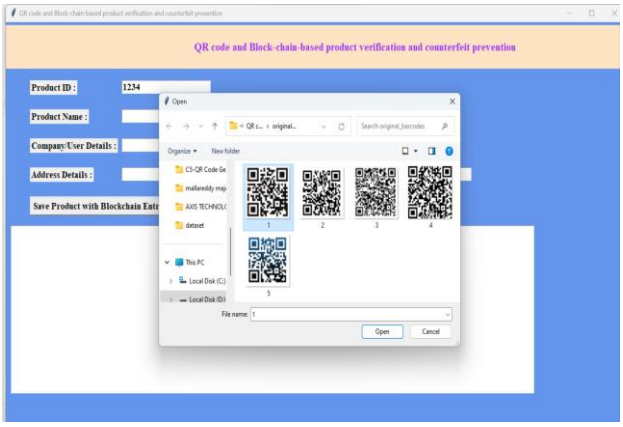



In above screen I entered product details and then selecting and uploading associated BARCODE image and then click on 'Open' button to get below result

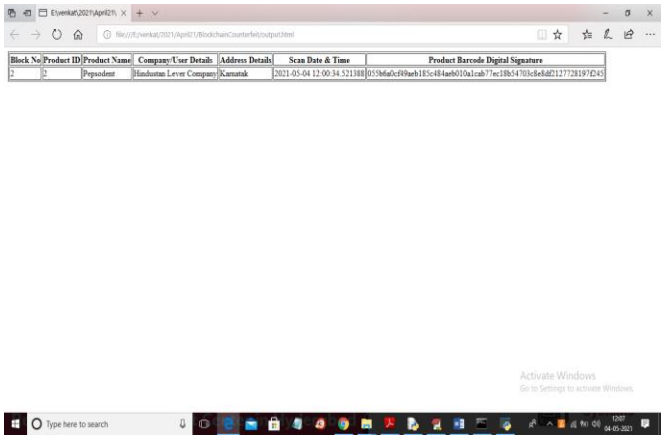



In above screen Blockchain generated new Block with id 2 and we can see Blockchain hash code of old and new transaction with uploaded bar code digital signature and all this details will saved inside Blockchain and now to search product details click on 'Retrieve Product Data' button to get below details


In above screen I entered product id as 2 and then click on 'Retrieve Product Data' button to get above details. Now click on 'Authenticate Scan' button to upload product Barcode and then Blockchain will match this uploaded Barcode signature with available stored signatures and if match found then authentication will be successful else failed




In above screen I am selecting and uploading '2.jpg' file and then click on 'Open' button to get below result




In above screen in browser author can see all authentication details uploaded product bar code. Now check with fake barcode by uploading from 'fake bar code' folder


In above screen uploading barcode from fake folder and below is the result In above screen in text area we can see uploaded bar code authentication failed.

## 4. CONCLUSION

With this system, the products journey from manufacturing to customer can be recorded, and the customer is assured that the scans weren't faked. Manufacture is able to prove their product is authentic and is also able to track their product's pathway. The setup is easy to implement and requires less operation cost. Manufacturer can also adopt RFID or NFC tokens instead of QR codes to further strengthen their system.

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