BLOCKCHAIN BASED TRUST SYSTEM FOR COUNTERFEIT PRODUCT DETECTION

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Abstract: With increase in new products, there is always a problem of counterfeits in almost every industry. It is essential to have a system which can check details of product and identify whether the product is genuine or counterfeit. Counterfeit plays vital role in today's world as it can affect many industries resulting in loss of sales, reputation, profits, ideas. In order to fight these counterfeit products, we have used blockchain technology. Blockchain technology is a decentralized, distributed ledger that stores transactions in the form of blocks in many databases that are interlinked to each other via chains. Blockchain is stable and secure as it has immutable property due to which the data once stored in blockchain nodes cannot be modified. By using blockchain technology, there is no need for customers to rely on third party for confirming product originality. Our project uses QR (Quick Response) codes to combat the problem of counterfeit. QR code scanner will be used by the buyer to scan the product for genuineness, as the QR code of each product is connected to our blockchain. System will check product's unique code with the entries in our blockchain database. If code matches, the notification will pop out to customer stating product is genuine. If not, customer will receive notification that product is counterfeit. [1] [2]

Keywords: Blockchain, Counterfeit, Supply chain, QR codes.

I.   INTRODUCTION

The global expansion of a technology or product is always involved with risks in rapidly developing world of technology. Counterfeits and forgery can harm a company's reputation, performance, sales & client well-being. Primary goal of our project is to verify whether the purchased item or sold item is counterfeit or genuine. In modern world, we have more usage of traditional supply chain rather than blockchain. Traditional supply chain offers us with a centralized network system where the party providing the service or the product holds the data of end-user, thereby controlling the whole market as well as data, so that they can manipulate it anyway they like. Blockchain technology follows decentralized approach where every data value of product is stored in decentralized database. Blockchain runs on peer-to- peer distributed environment, so the product genuineness can be verified by entire community rather than a single individual. This approach will help us get customer's trust as well as increase reputation our company and product in the market. In blockchain every block consists of data, hash and hash of previous block. Data has relevant information and hash consists of unique code. It is impossible to change details of any block since individual modifying should own majority of network viz not possible. If we try to modify the block then hash will change, Thus, in this way blockchain becomes more practical than traditional centralized architecture as data in blockchain is immutable which makes way for the customers to identify whether the product is genuine. [2] [3]

II.   METHODOLOGY

TECHNOLOGIES INVOLVED:

1.   **Database:** Details of all entities involved is stored in SQL database.

2.   **User:** Registration on the System for QR code scan is done. We have created a friendly environment   using web technology (JSP, HTML, CSS).

3.   **System:** In System, blockchain technology is used to identify products original and counterfeits for the same, we have used JAVA as our system programming language.

PROPOSED METHODOLOGY:

Our system is a type of function. QR code, information on product's status, like its manufactured details, present owner, previous owners as well as time stamp indicating when it was uploaded are stored in blockchain.

The manufacturer will be the product's initial owner. A QR code will be issued after the manufacturer asks the administrator to add the product to the network. The administrator will add product to the network and QR code will be generated. [1]

The producer will then send the product to the distributor in a certain way. When a distributor receives a product, he will scan the QR code and update the information on the network, including the date, time, and owner of the product.

Product is then scanned by the end-user while buying the product, where the user scans the product's QR code, which checks product details on company's network. If the product details did not match then product is termed as counterfeit, if available then product is termed as genuine.

III. ALGORITHMS

Four consensus algorithms used for our system viz,

Input:
1. Product Creation (Name, Price)
2. Product Distribution (Product ID)
3. Seller Registration (Product, Name of Seller)
4. Product Buying (QR Code, Product ID, Name, Amount to buy)

Output:
The QR code is scanned in each of the above steps, if any of the conditions in the above algorithm's steps is not valid then product is termed as counterfeit.

IV. WORKFLOW

Three Entities involved in our System, viz

Manufacturer: Manufacturer functions include adding company to blockchain by providing company name and setting registration fee to become a seller or retailer for the company. The manufacturer has control over the company's distribution status of products and transferring ownership of the product after the seller has product the product stock. Two main functions of manufacturer include adding the product and distributing the product are performed by the manufacturer.

Seller: A seller can pay minimum fee set by the manufacturer and register for the company, after register once the seller can buy any product as well as track its distribution.

Consumer: A consumer scan the QR code provided with each product and verify the transfer of ownership of the product from the manufacturer to seller. The consumer can also verify the name of current owner of the product and check its distribution status.

In this way our system works for counterfeit product detection.

V. RESULTS AND DISCUSSION

The results of the shows us about working of the system. Our system uses QR code for checking originality of the product, if the scanned QR code matches the details of product as stored in the database of manufacturer then we assumed that our product is genuine.

If by scanning the QR code the details are not matched for the given product on out database then we assumed that product is counterfeit. Thereby, we can say that the product is fake. [2]
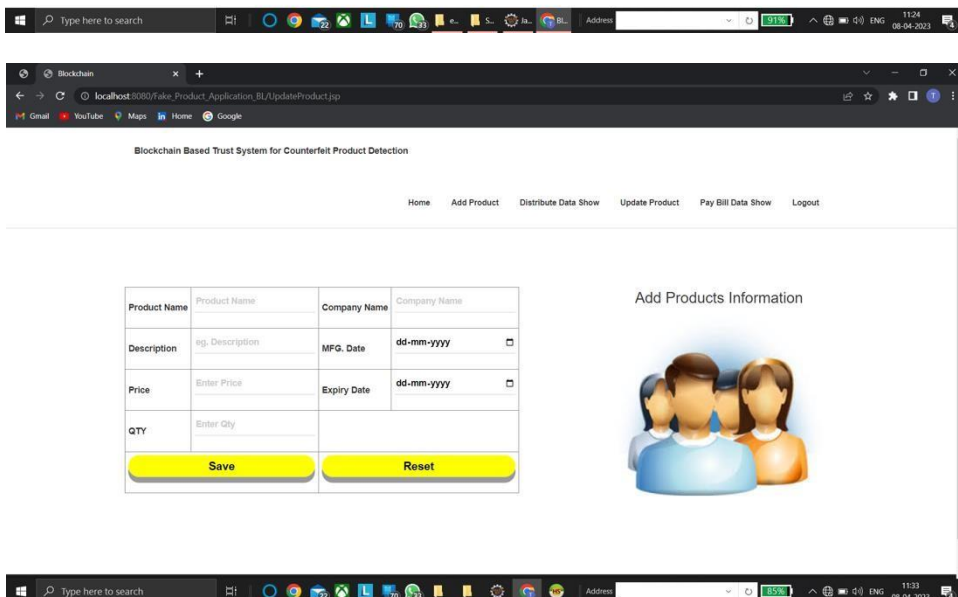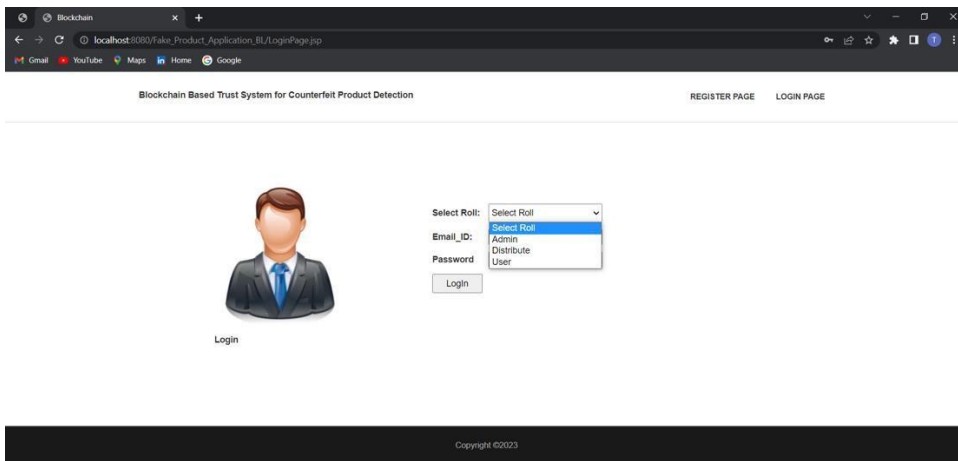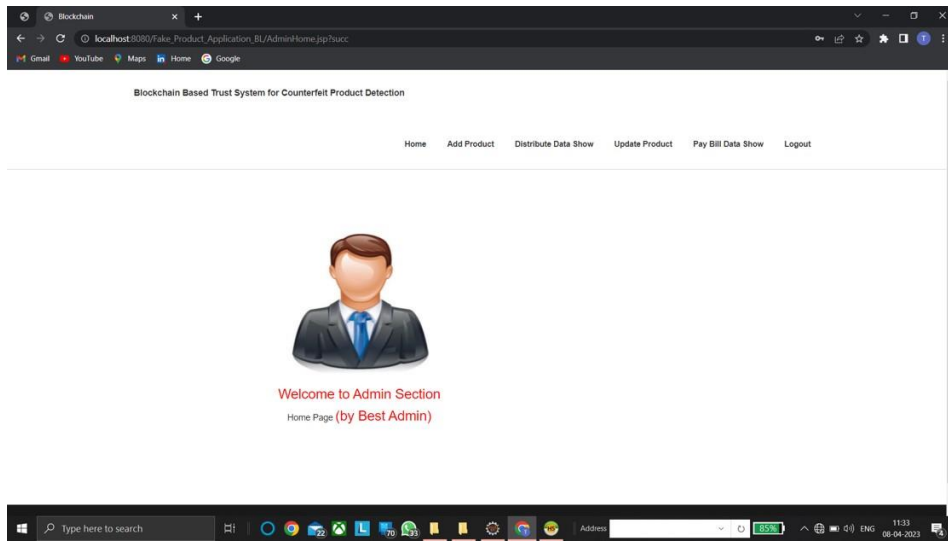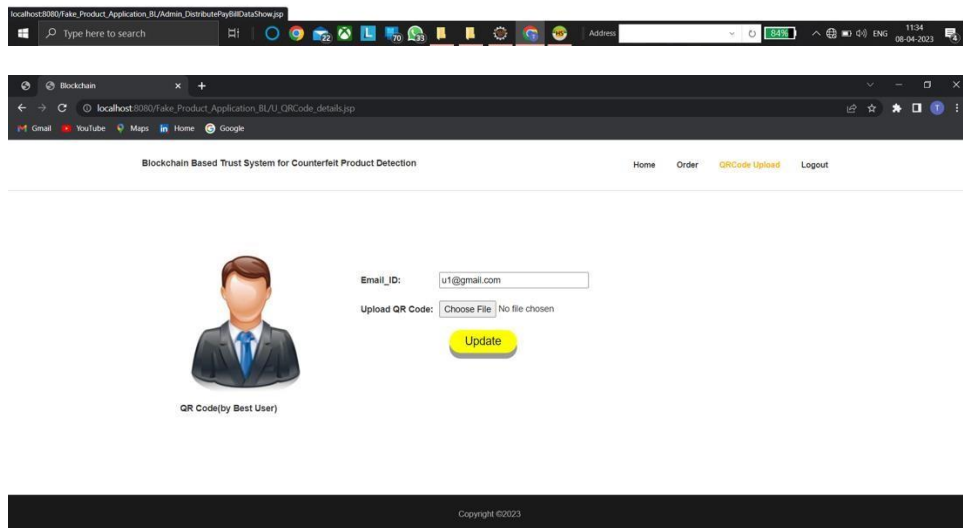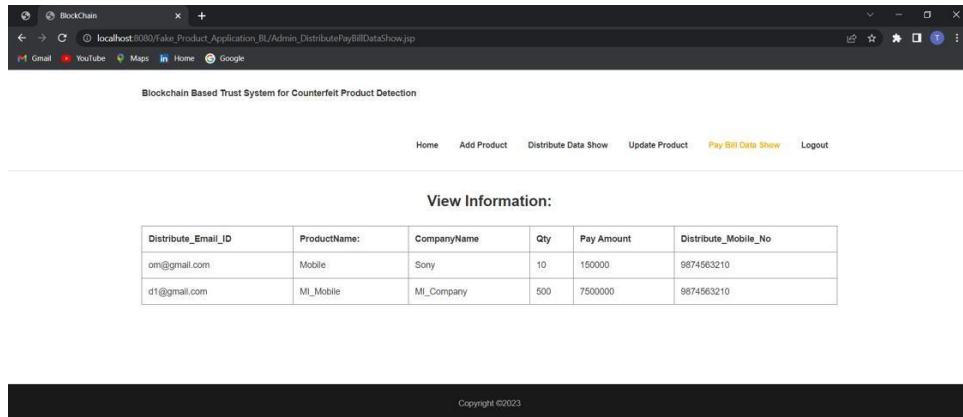
VI. CONCLUSION

With the vast range of products available online, fake items are expanding tremendously. Therefore, there is a critical need to identify phoney goods, and blockchain technology is employed to do so. Additionally, a QR code with the information has been created. Customers or consumers can identify a phoney product after scanning the QR code. So, in this article, we talked about a system that helps consumers determine whether a product is real or not by looking at its entire supply chain history. End users can scan QR codes assigned to products to access all the data that has been posted across the chain in the blockchain, allowing them to determine whether or not a product is genuine or not. [5]

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