

Counterfeit Product Identification System by Using Blockchain

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Abstract:- India and different nations are battling with fake items. The worldwide improvement of an item or innovation consistently accompanies hazard factors, for example, forging and duplication. Forging items can influence the organization's name and the client's wellbeing. Fake items are causing a significant impact on the organization and the client's wellbeing. Hence, item creators are confronting enormous misfortune. So this project will be helpful in avoiding these situations by using this application. In the proposed framework, the framework produces Barcode utilizing Blockchain innovation. This innovation stores exchange records in blocks. These squares are secure and difficult to access and change the data from it. By utilizing a Barcode we can recognize the fake item and we get the details of the product too. So this project will be helpful in avoiding these situations by using this application. This approach to cut down counterfeit ensures that consumers won't completely rely on merchants to determine if products are original or forged. Here B2B concept will be used which means the retailers, wholesalers and customers will be involved. Price negotiation will also be taken place for buying the product using AI chat bot system.

Keywords:- Blockchain, Barcode, AI Chat Bot, Price Negotiation, B2B.

I. INTRODUCTION

The development of a product or any technology involves risk factors like **counterfeiting** of that product; this could well lead to affecting company's name, fame and the overall growth. In today's market, the challenging thing is to identify fake product from real ones. It could be life threatening if the counterfeiting takes place in medicinal field. Counterfeiting the products in the industries like clothing, electronic equipment's can have a negative impact on company's brand value. Rise in counterfeit product could affect the economic growth. After conducting few surveys, the data reveals the increase in counterfeit product [1]. Because of this many companies are getting negative remarks and losing their status from the brand list. Counterfeiting leads to huge loss to the manufacturers as well as the customers. We can use the **Blockchain technology** to find genuineness of the product. It is very difficult to change or alter the framework where the information is recorded. A

blockchain is a computerized record of all the transactions that is distributed across the entire network of systems on the blockchain. Every participant's record will have the information about all the transactions and if a new transaction occurs every time the details about that transaction is added to the blockchain network [3]. In this the retailers and the manufactures can negotiate for buying the product using the chatbot system. The **price negotiation** is used for negotiating the price of goods in a simpler manner without any interaction with person. This is done with a help of chat bot where the manufacture will already have set the price for the product and he will also mention the minimum price upto which he would sell it. So while negotiating I will go until the minimum price and will stop negotiating [10]. Here we have involved both fields, B2B and B2C. **Business-to-business (B2B)**, also called B-to-B, is a form of transaction between businesses, such as one involving a manufacturer and wholesaler, or a wholesaler and a retailer. Company websites allow interested parties to learn about a business's products and services and initiate contact. Online product and supply exchange websites allow businesses to search for products and services and initiate procurement through e-procurement interfaces. The term **Business-to-Consumer (B2C)**, refers to the process of selling products and services directly between a business and consumers who are the end-users of its products or services. B2C typically refers to online retailers who sell products and services to consumers through the internet. Online B2C became a threat to traditional retailers, who profited from adding a markup to the price [9].

II. BLOCKCHAIN TECHNOLOGY

Blockchain technology is an advanced database mechanism that allows transparent information sharing within a business network. A blockchain database stores data in blocks that are linked together in a chain [4]. The data is chronologically consistent because you cannot delete or modify the chain without consensus from the network. As a result, you can use blockchain technology to create an unalterable or immutable ledger for tracking orders, payments, accounts, and other transactions. To avoid potential legal issues, a trusted third party has to supervise and validate transactions. The presence of this central authority not only complicates the transaction but also creates a single point of vulnerability. If the central database was compromised, both parties could suffer [3]. Blockchain mitigates such issues by

creating a decentralized, tamper-proof system to record transactions. In the property transaction scenario, blockchain creates one ledger each for the buyer and the seller [7].

III. TRUFFLE FRAMEWORK

Truffle is a world-class development environment, testing framework and asset pipeline for blockchain using the **Ethereum Virtual Machine (EVM)**. Truffle supports developers across the full lifecycle of their projects, whether they are looking to build on **Ethereum, Hyperledger, Quorum**, or one of an ever-growing list of other supported platforms. Paired with Ganache, a personal blockchain, and Drizzle, a front-end dApp development kit, the full Truffle suite of tools promises to be an end-to-end dApp development platform [3]. **Ganache** is a personal blockchain that allows developers to create smart

contracts, dApps, and test software that is available as a desktop application and command-line tool for [Windows](#), [Mac](#), and [Linux](#). Drizzle is a custom built front-end development library based around the [JavaScript](#) library [Redux](#) that is capable of automatically synchronizing contract data, [Transaction data](#), and other data [4].

IV. FLOW OF PROPOSED SYSTEM

The main of the proposed work is to give the product at cheaper price and to maintain the brand loyalty for the customers. The application enables the feature of viewing the product details and shipping details using barcode which is secured using blockchain technology. This product anti-counterfeiting system based on Blockchain is composed of three roles, the Manufacturer role, the Retailer role, and the Customer role.

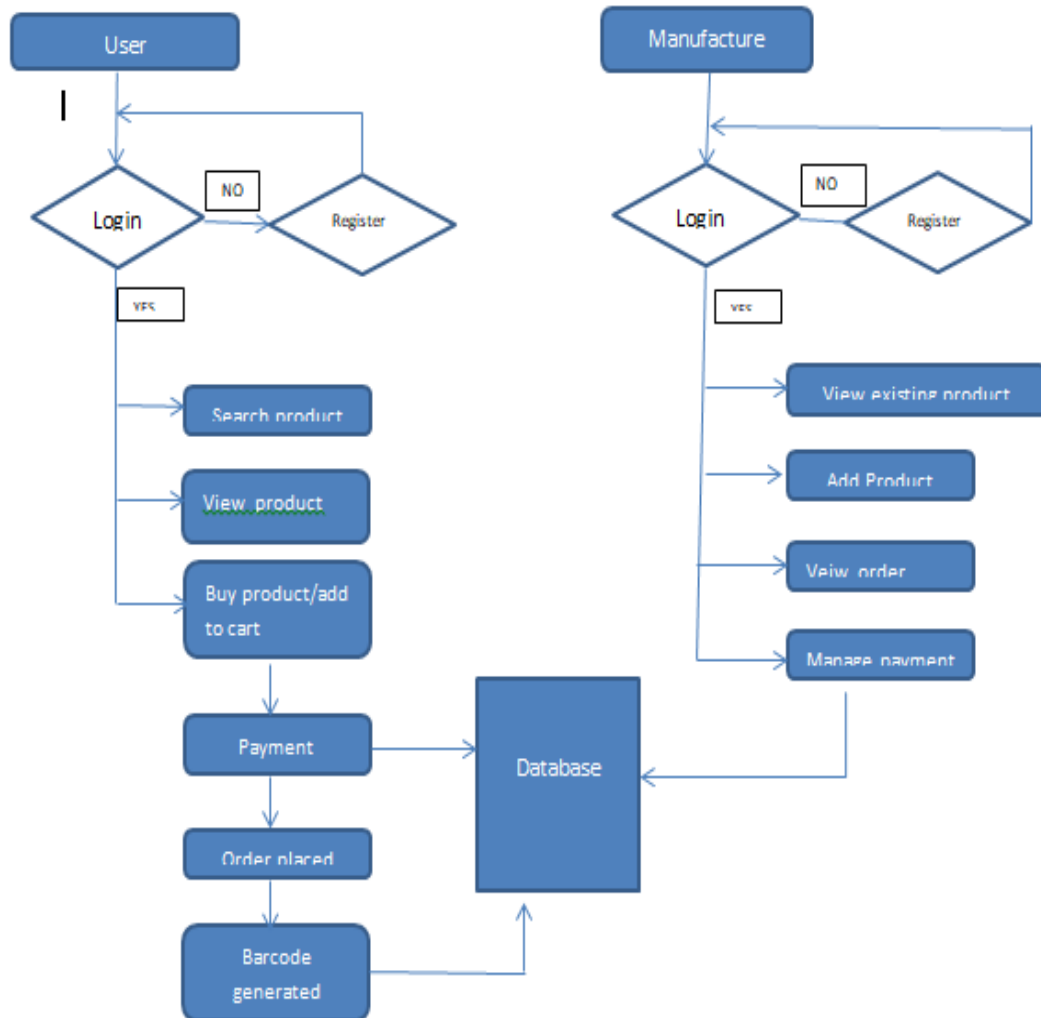


Fig 1:- Flow of Proposed System

➤ **Manufacturer:**

Manufacture at the beginning should register at our portal with the essential details like company name, symbol, product,

product details, existing product and the certification of the product through which we can find if that product is fake or not and the company is authorized by the government. After the

customer has placed the product, the manufacture will receive the details and will send a barcode where it consists of the product and the customer details in it. The manufacturer can login/register into the application. The manufacturer can add new products, view the existing product list and view customer order and view product order history. Once the order is placed, the manufacturer will provide the product details along with the product certification to the customer.

➤ *Retailers:*

Retailer should login through the web portal first and should click on the products which are needed to be purchased. The retailer can negotiate using the chatbot which will be available at our portal for buying the product. After placing the order they will receive a confirmation mail regarding the purchase of the products. This retailer concept is involved because the products should even the lower middle class whom

will not be able to purchase their daily products and who don't have the knowledge.

➤ *Customer:*

Customer should also login into the portal or register as the new user. After that the customer will choose the product which needs to be purchased. After the ordered has been placed the customer will receive a barcode regarding the product and their personal details in it so that they can compare it will the barcode which they receive it during the delivery of the product. User will register if he/she is a new Customer. After registering the user can view the list of Product. The user can order the products. Confirmation details will be sent from the Manufacturer. The barcode will be received by the customer once the product is delivered. The user has to verify the product by using barcode. And then the user can get the payment details i.e.UPI/COD

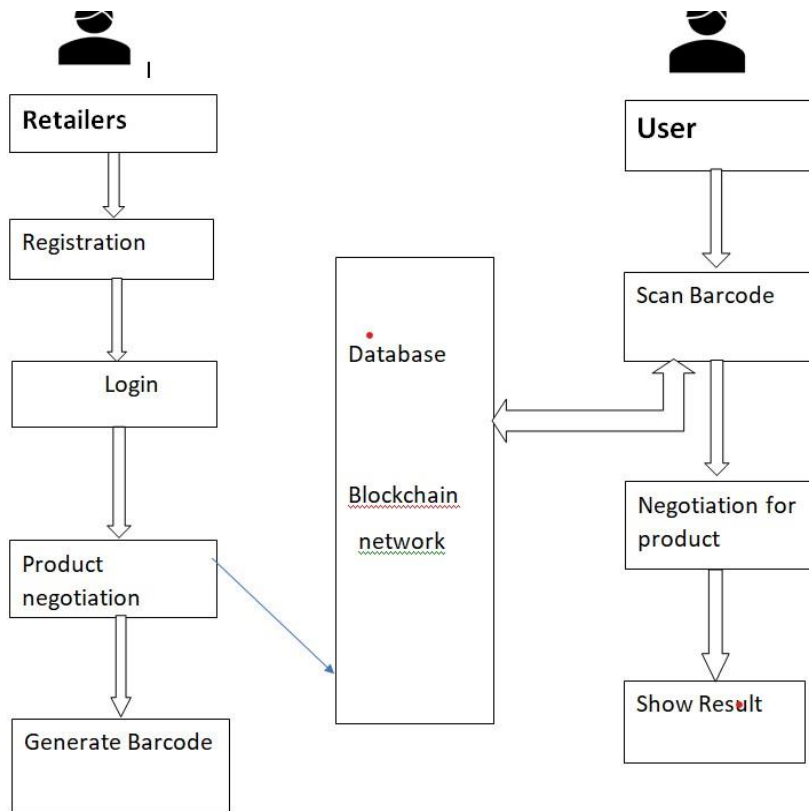


Fig 2:- Database Blockchain Network

➤ *Payment details:*

Transparency and security. Removes intermediaries. After the order confirmation barcode will be generated. The details of the product will be displayed on the barcode when it is scanned. The barcode will display in hardcopy as well as a softcopy.

V. ALGORITHM

Algorithm used in blockchain to get a constant hash of 256

bits every time. This algorithm is also part of encryption technology. In this there is some data called IV which is of 256 bits. Now the input we get will be in the very large. So, be breaking it in size of 512 bits. As the input will always be not a perfect multiple of 512 bits, so, some part of input will be left [4]. To this left input we do padding concatenate the input with 10 bits before it. Now our input is perfect multiple, so we can proceed further. This output 256 bit is again merged with 512 bits input from block B2. Again, the total is passed through the compression function to yield a 256-bit output. This loop goes

on fill the last block (block n). Again, a compressing function starts and gives final 256-bits output, what we call it as hash of input data. Message Length: The length of the clear text should be less than 264 bits. The size needs to be in the comparison area to keep the digest as random as possible [1]. Digest Length: The length of the hash digest should be 256 bits in SHA 256 algorithm, 512 bits in SHA-512, and so on. Bigger digests usually suggest significantly more calculations at the cost of speed and space. Irreversible: By design, all hash functions such as the SHA 256 are irreversible. You should neither get a plaintext when you have the digest beforehand nor should the digest provide its original value when you pass it through the hash function again [8].

VI. FIREBASE AUTHENTICATION

Firebase Authentication provides all the server-side stuff for authenticating the user. Firebase Authentication becomes easy with SDK. It makes API easy to use. Firebase Authentication provides all the server-side stuff for authenticating the user. Firebase Authentication becomes easy with SDK. It makes API easy to use. Firebase Authentication also provides some user interface libraries which enable screens for us when we are logging it. Firebase authentication supports authentication using a password, phone numbers, popular identity provider like Google, Facebook, and Twitter, etc. We can sign in users to our app by using the FirebaseUI [2]. In the present era, user authentication is one of the most important requirements for Android apps. It is essential to authenticate users, and it is much harder if we have to write all this code on our own. This is done very easily with the help of Firebase.

- Being able to authenticate our users securely, it offers a customized experience to them based on their interests and preferences.
- We can ensure that they have no problems accessing their private data while using our app from multiple devices.
- Firebase Authentication provides all the server-side stuff for authenticating the user. Firebase Authentication becomes easy with SDK. It makes API easy to use.
- Firebase Authentication also provides some user interface libraries which enable screens for us when we are logging it.
- Firebase authentication supports authentication using a password, phone numbers, popular identity provider like Google, Facebook, and Twitter, etc.
- We can sign in users to our app by using the FirebaseUI.
- It handles the UI flows for signing in user with an email address and password, phone numbers, and popular providers, including Google sign-In and Facebook Login.
- It can also handle cases like account recovery.
- It is not required to design a UI since it is already provided for us. It means we don't have to write the activities.
- We can also sign-in users using the Firebase Authentication SDK to integrate one or several sign-in methods into our app manually [5].

VII. DATA MATRIX BARCODE

A Data Matrix is a 2D barcode that encodes data in black and white or contrasting dark and light, cells arranged in a grid. Unlike 1D barcodes, Data Matrix codes are omnidirectional, meaning that they can be read from any angle. Codes are usually square, or sometimes rectangular in shape, and are made up of multiple light and dark square dots, or 'cells', arranged in a grid or 'matrix'. Though typically printed in black and white, Data Matrix codes can be printed in different color combinations provided there is sufficient contrast between dark and light cells to ensure readability. Data Matrix codes are defined by an L-shaped pattern at one side of the code, creating two solid adjacent borders. We have used data matrix barcode instead QR code because its enables scanning process easier even when the image is in low quality and it has alphanumeric values of about 2335 which is smaller size than QR code but it is more efficient because its security is more [6].

VIII. PRICE NEGOTIATION CHATBOT

ChatBot System project would help to automate the online selling and negotiate based on price of product, where a human and chatbot would interact. Thus an automated agent for negotiating has been designed in order to maintain a flexible and considerable price instead of fixed price and compared with marginal profit. This Automated agent will help the organization or shops to have their selling in online as automatic [10]. It also helps the customers to negotiate the AI Bot based on price of every product. Once after the negotiation of price, the link for payment will be sent to mail in order to take the cc payments. Finally "payment success" will be intimated through mail. Still this mechanism involves various steps it will have many advantages over price haggling [8]. The special feature about this is it's going to be a web applications as well as mobile application too. If they think the product price is higher, then the customer can bargain for a lower price with a chatbot and if the margin profit of the product from the seller is applicable then the chatbot precedes the customer to buy that product as per the price proposed by a customer.

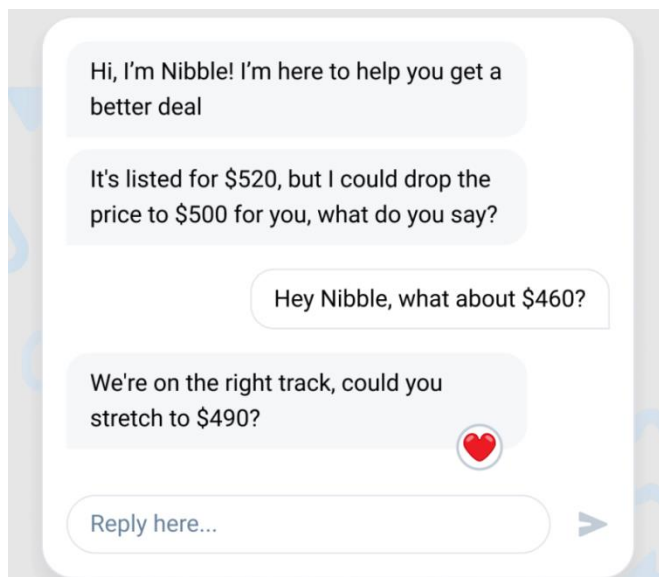


Fig 3:- Price Negotiation chatbot

IX. CONCLUSION

Using Blockchain technology to stop counterfeiting of the product could benefit the e-commerce companies as well as the customers. The manufacturers, retailers and customers will have the information of the product all the way from the time it gets manufactured to the time it reaches the customer and it is almost impossible for a third party or a hacker to change the information of the product between any of the links in blockchain. Smart contracts codes govern the system in blockchain. A barcode code generated for a product is being verified as the product reaches the customer and barcode code is matched. The customer can trust that this Blockchain based application because of the simplicity of the code. Future works could be to simplify the code. Customers will not be aware of Blockchain based E-Commerce websites. The price negotiation can be done by the retailers and the customers for buying their product with the help of the chatbot system instead of interacting directly. So, the B2C concept where the product will be sold directly from the manufacturer to the customer who helps to reduce the price of product and thus there will be no third party involved.

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