



# COUNTERFEIT PRODUCT IDENTIFICATION SYSTEM USING BLOCKCHAIN TECHNOLOGY

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**ABSTRACT:** In today's economy, blockchain technology is highly sought after. Over the past few years, it has attracted a lot of interest. Blockchain technology quickly became established in the banking sector. The blockchain lacks a reliable middleman. Blockchain technology is gaining popularity because it makes developing different apps simple. It is renowned for enhancing transparency and speeding up transactions. Financial transactional records make use of it. Because of this, the data's contents are unchangeable before being added to the blockchain. Before making a purchase, the customer considers the product a thousand times. His concerns centre around whether the item he is buying is real or not. Therefore, it's critical to avoid producing phony goods to raise consumers' attention to the products' transparency. The reason for the predicament is the growing prevalence of dangerous and fraudulent goods worldwide, and blockchain technology has taken the next step toward completely dismantling them. This method is employed to monitor the market's supply chain. Therefore, in this work, we develop a system that not only provides the consumer with the original goods but also assists them in determining if the product is genuine or fraudulent. This suggested strategy raises awareness of the issue while also putting an end to the production of counterfeit goods. Each of these goods must have a unique digital code for the proper items to be created and packaged. This study suggests a way to identify counterfeit goods using blockchain technology. explains the software implementation procedure that uses this application to scan the product code and determine whether or not the given product is counterfeit.

**INDEX TERMS:** Counterfeit products, Traceability, Blockchain, Decentralization.

## I. INTRODUCTION:

Blockchain is a set of recorded details that make it difficult or impossible to modify, hack, or deceive the system. The blockchain is a digital transaction system that distributes duplicates across computers on a blockchain network. Each record is stored in the form of a block in the blockchain, and each block in the series has several activities. Each time a new transaction occurs on a blockchain, it is added to the chain. After conducting various market research, it was discovered that fake products are increasing day by day, and it can hurt development and economic growth. Many high-brand companies have faced significant losses due to this issue.

Blockchain is a type of distributed ledger designed to prevent interference. Depending on the distributed algorithm, blockchain uses both smart contracts and encrypted algorithms. Blockchain technology can help solve the problem of fake products. In this paper, we design a system that can share data about products from manufacturers to customers. We have created software that works on smartphones, to offer all of the information of the goods to the consumer who buys that product. This software will assist customers in determining if the product is original or fake [4].

## II LITERATURE SURVEY:

From the literature reviewed it is observed that the researchers have focused that Due to a lack of transparency, supply chain management frequently experienced problems like service redundancy, inadequate departmental coordination, and a lack of standardization. These days, product counterfeiting is a very common occurrence, and it is nearly impossible to identify a counterfeit product by its appearance alone. For reputable businesses, counterfeiters pose serious problems, but far too many People are unaware of the complete impact that counterfeit goods have on brands. The issue of product counterfeiting has been addressed in the past through several strategies. The best-liked techniques are utilizing QR code-based systems, RFID tags, artificial intelligence, etc. However, there were a few drawbacks to each of them, like the fact that a legitimate QR code can be copied [1].

From the literature reviewed it is observed that the researchers have focused that this is the first blockchain system that suggests an anti-counterfeiting mechanism that is completely operational. By paying a very tiny transaction fee, users of our system can put an end to their concerns regarding the possibility of purchasing a counterfeit product. The technology allows manufacturers to keep pertinent data regarding product sales in blockchain for public viewing. The total number of sales that the vendor can make and it is clear how many things the merchant currently has available. The person can Utilize our system's features to perform manufacturer verification. right away. The technique uses digital signatures to verify identity. There exists no other way to unlock the private key of the key owner unless the key owner mistakenly misplaces their key [2].

From the literature reviewed it is observed that the researchers have focused that in this project, Quick Response (QR) codes offer a strong method to combat the practice of product counterfeiting, given the rising trends in mobile and wireless technologies. A QR code scanner is used to identify counterfeit goods by connecting the product's QR code to a Blockchain. Thus, this system might be applied to create a unique code for each product and record its details as database blocks. It gathers the user's unique code, which is then compared against records in the Blockchain database. If the code matches the consumer will receive a notification; if not, they will receive a notification stating the item is phony [3].

From the literature reviewed it is observed that the researchers have focused that in this study, different methods for spotting counterfeit goods are covered. This is a summary of techniques for detecting counterfeit goods, along with their benefits and drawbacks. The report summarizes some current issues in detecting counterfeit products that warrant consideration. The volume of counterfeit goods available on the internet and in the black market is increasing quickly. Therefore, it is imperative to solve the difficulties in identifying counterfeit goods and to design suitable technologies to increase detection accuracy. In the modern world, this is one of the active research topics that is being investigated [4].

From the literature reviewed it is observed that the researchers have focused that it ensures that customers do not solely rely on the merchants to ascertain the authenticity of products by utilizing the decentralized Blockchain technology approach. they present a decentralized Blockchain system that includes anti-counterfeiting features for items, enabling manufacturers to utilize it to offer authentic products without having to oversee directly run retail locations, which can drastically lower the price of product quality confidence [5]

From the literature reviewed it is observed that the researchers have focused in this paper, propose a product traceability system based on blockchain technology, in which all product transferring histories are perpetually recorded in a distributed ledger by using smart contracts, and a chain is formed that can trace back to the source of the products. In particular, they design an event response mechanism to verify the identities of both parties of the transaction, so that the validity of the transaction can be guaranteed. All events are permanently stored in the form of logs as a basis for handling disputes and tracking responsible entities. Furthermore, a system prototype is constructed based on the testing framework of Truffle. The contract code is deployed on a test network Test RPC that runs in local memory, and a decentralized web page interface is implemented based on the prototype. Finally, the system security analysis and experimental results show that their solution is feasible [6].

From the literature reviewed it is observed that the researchers have focused that this article explores the potential of integrating RFID and Blockchain technology to enhance the efficacy of product or raw material counterfeiting, as well as to address production, logistics, and storage-related issues. Connecting these technologies can result in more effective planning by raising the traceability and openness of logistical or industrial processes, or the effective identification of important chain locations [7].

### III SYSTEM REVIEW:

#### 3.1 EXISTING SYSTEM

The current system, "A Comparison Survey Study on RFID Based Anti-Counterfeiting Systems," discusses a frequency identification tag that has been taken into consideration in recent years to detect fraudulent products. Using Radio Frequency Identification tags in products, we depict a review based on a test topic for duplicate items in this system. While RFID tags, like an actuator, require a control signal and a power source, remote sensor networks and radio frequency identification (RFID) are the most commonly utilized technologies in this system for remote development and offer a multitude of future possibilities. RFID uses low-frequency radio waves to gather and store data instead of using laser light from certified tags, which makes it unable to identify regions or tangible evidence of tagged things. Within a cell or distribution centre, this technology automates the information assortment. The RFID tag receives radio waves that are scanned by the transceiver. Next, distinct data is sent from a tiny microchip that has been linked to the RFID reader.

### 3.1.1 CONS

1. This system has the disadvantages of restoring complex cryptography techniques and time-consuming transmission of the tag IDs.
2. This system has a high cost and is not adaptable to every industry and it is impossible to clone.
3. The Cryptography-based RFID anti-counterfeiting method is very low in resources, has a high complexity, good security, high adaptation, and low limitation, and was covered fairly in the research.

### 3.2 OBJECTIVES

The main objectives of this system are:

1. To use a QR code to secure product details.
2. The suggested system's transactions are more transparent and secure due to the blockchain's immutable feature.
3. To stop the production of phony goods by bringing product transparency to consumers' attention.
4. To improve this performance and become aware of counterfeit products that differ from the main product that is sold in the market.

### 3.3 PROPOSED SYSTEM

The principal objective of the project was to enhance transparency in consumer transactions, offer support for consumer purchases, and assist customers in ascertaining the authenticity of the things they are buying. The recommended approach makes use of blockchain technology to detect counterfeit goods. Getting all of the manufacturers onto the blockchain network and compiling their primary product data is the first stage. The process of validating a product involves registering and giving them the relevant ID and password.

The manufacturer will be the item's primary owner. The maker will ask the manager to add the product to the network when it has been given a QR code. The regulator will register the product and the manufacturer if the application is from the actual manufacturer on the network. After the product's network recording, a smart contract containing the encrypted text form containing the product's data will be generated using the product's unique QR code. To avoid being duplicated, a Copy Sensitive digital picture is included in the QR code. The product's ownership won't change until both parties' requests for the purchase and sale of the item are approved; at this time, the status is shipping. The producer will then send the item to the distributor. As soon as both sides approve and money is received, a joint venture will immediately transfer ownership in the blockchain network in the form of a smart contract. utilize to read the item's QR code. The scanner chooses whether or not to purchase the goods after the items are scanned and the encrypted text has been extracted using the method provided. It then gathers information about the product's producer and present owner.

#### 3.3.1 PROS

1. Distributed computers across the globe gather the data needed for this suggested system. Every distributed computer demonstrates its computing capacity to create safe, unchangeable information.
2. The whole blockchain system uses local data management, delivery, and authentication through functions and power allocations. Blockchain technology is independent, has no internal controls, and doesn't require any further external oversight.
3. Making the switch to the blockchain is simple and fully portable. They are open to visitors from all over the world.
4. We implant these unique identifiers in the blockchains by using cryptography methods to add them to the individual information.
5. Since we are unable to replicate the material using any identifier, make use of hashes, or single-direction cryptography functions.
6. By enabling P2P cross-border transfers using digital currency, blockchain speeds up transactions.

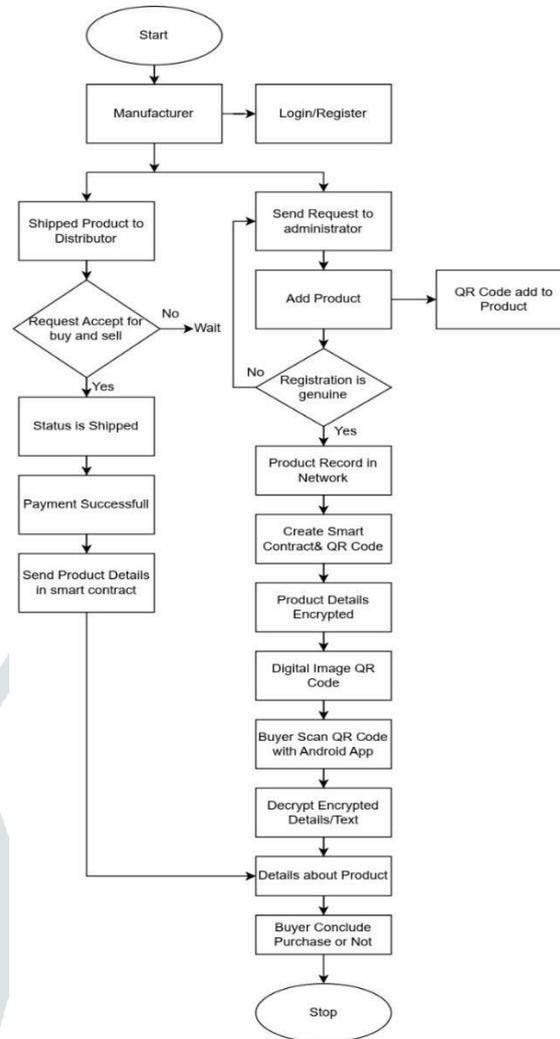


Fig.3.3.1 Flowchart of the proposed system.

### 3.3.2 USER CASE DIAGRAM

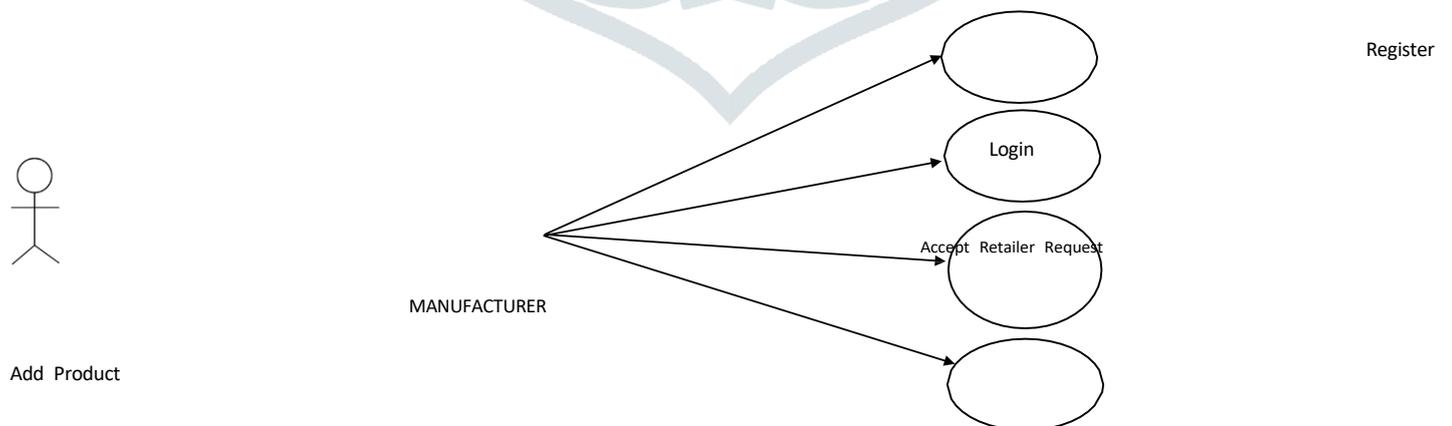


Fig 3.3.2.1 User case diagram of manufacturer.

The Manufacturer can Register, Login then add the Product and accept the Retailer request for the Product

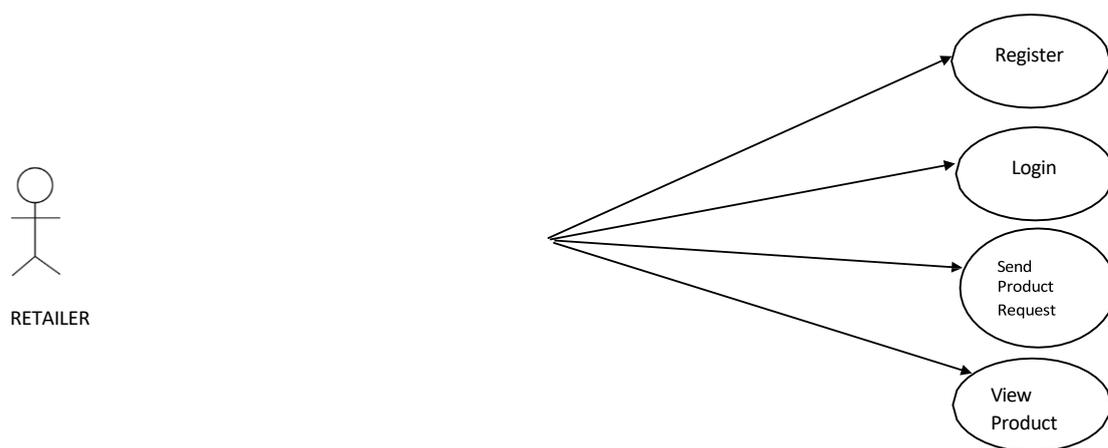


Fig 3.3.2.2 User case diagram of Retailer.

The Retailer can Register, Login then View the Product and send the Product Request

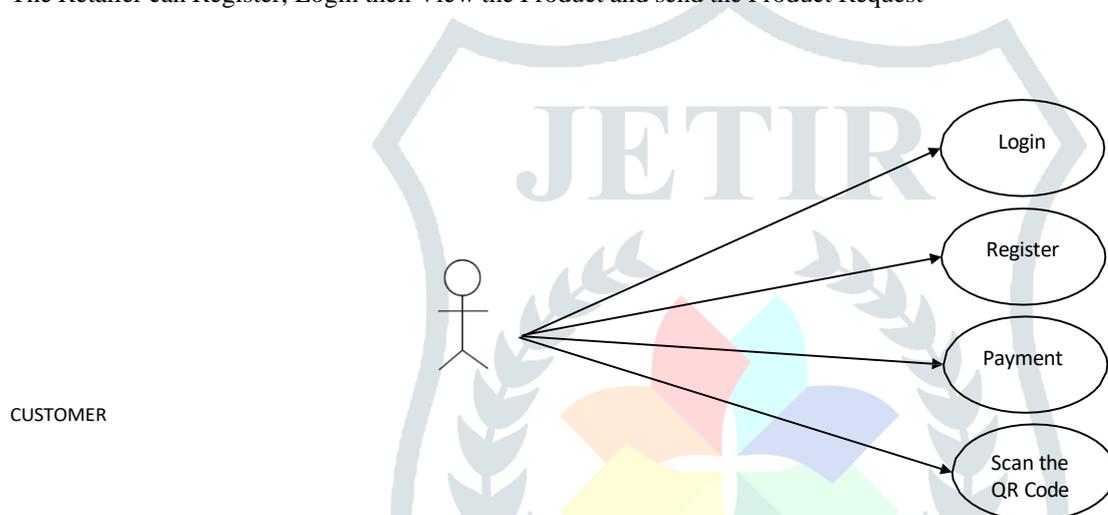


Fig 3.3.2.3 User case diagram of customer.

The Customer can Register, Login, Scan the QR Code and Do the Payment after checking the integrity of the Product.

## IV SYSTEM REQUIREMENTS

### 4.1 Hardware and Software Requirements Hardware:

1. Processor: Intel Core i3 or more.
2. RAM: 4GB or more.
3. Hard disk: 250 GB or more

### Software:

1. Operating System: Windows 10, 7, 8.
2. Python, JAVA
3. Anaconda.
4. Spyder, Web3.0, IPFS.
5. J Query.
6. Android Studio, Flask.
7. Ganache

## 4.2 Technologies Used:

### RSA:

The RSA algorithm is a type of asymmetric AES, which effectively separates the encryption key and decryption key and ensures encryption security.

### IPFS:

Interplanetary File System (IPFS) is a protocol for storing and sharing data in a distributed file system. IPFS uses content addressing to uniquely identify each file in the global namespace that connects IPFS hosts.

### SHA256:

SHA-256 first introduced at the network launch in 2009, is a popular hashing algorithm used in Bitcoin encryption.

### Web3.0:

Web 3.0 encompasses individual control of personal data and the use of cryptocurrencies and blockchain.

### Python:

Python is a dynamic language-oriented language ideal for rapid application development due to its writing, binding, and easy syntax.

### J Query:

jQuery is a fast, small, and feature-rich JavaScript library. It simplifies various tasks of web development like HTML document traversing, event handling, animating, and Ajax interactions for rapid web development.

### Flask:

Flask is a Python-based web application framework designed for flexibility and speed. It simplifies the environment and project setup for web applications, allowing developers to focus on their application rather than HTTP, routing, or datasets.

### Java:

Java, a programming language, is concurrent, class-based, and object-oriented, and aims to minimize application dependencies.

### Android:

Android provides rich applications that allow you to create new applications and games for mobile devices in the Java environment.

### Ganache:

Ganache is a private blockchain for Ethereum and Corda that spreads app improvement.

## 4.3 Functional requirement

1. The system should be connected to the efficient speed of the internet.
2. The system should be able to store the product information with the QR code of the user in the blockchain network.
3. Mobile apps must have a scanner to scan a QR code.

## Non-functional requirement

1. Mobile apps should be connected to the internet.
2. The system must be compatible with the user's mobile.

## V ALGORITHM

Step1: Manufacturer Login page:

The manufacturer uses his Ethereum wallet to connect to his manufacturer account, create a QR code for the product, and add Product Details like Product ID, Product Name, Product Category and Product Price.

Step 2: Retailer Login page:

The retailer logs into the retailer account and views the product details and the Manufacturers Location. Step 3: The Retailer sends a request to the manufacturer for the product.

Step4 Customers: Customers can check the integrity of the product by scanning the QR code Step 5: The current location of the Manufacturer is viewed.

Step6: Customers: Customers can check the integrity of the product by scanning the QR code; The QR code will record the transaction history to verify the authenticity of the product.

Step 7: View the product history of the product on the Android Application.

Step 8: When the customer purchases, after scanning the QR code the customer will know that the product is fake or not.

Step 9: The result decides whether the user will purchase or not, if yes then the customer has to claim the product and register the product on his/her name.

## VI RESULTS

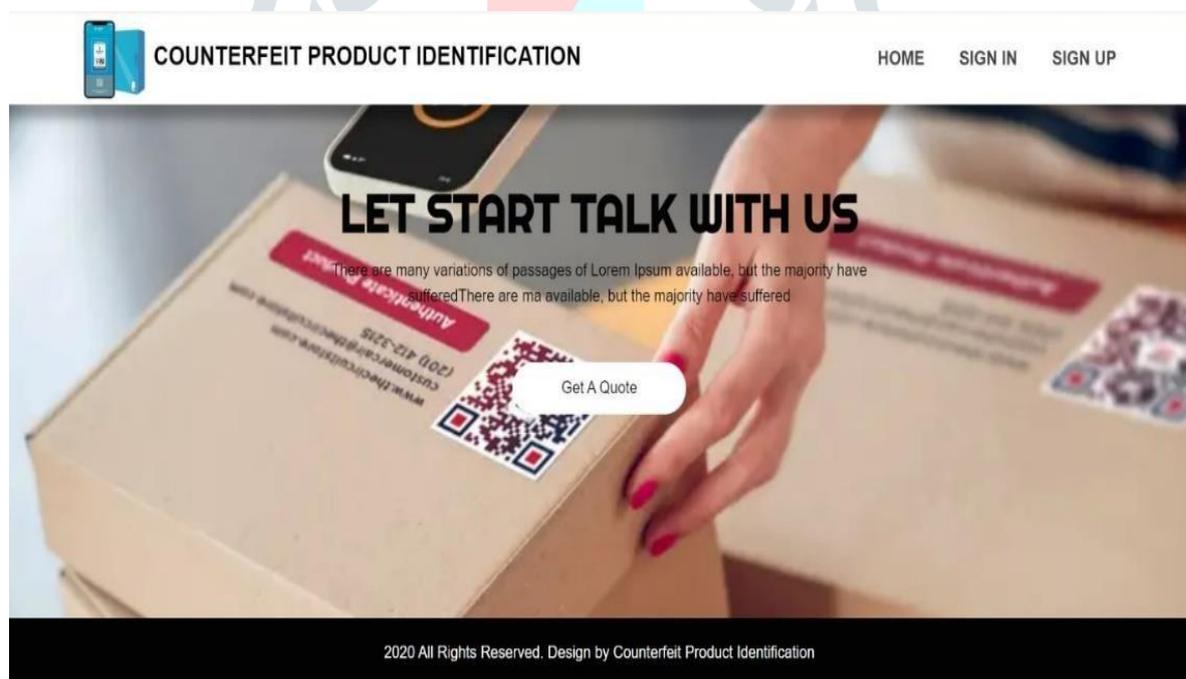


Fig 6.1 Home page.

The Manufacturer, Retailer, User can sign up and Login on the Main Index Page.

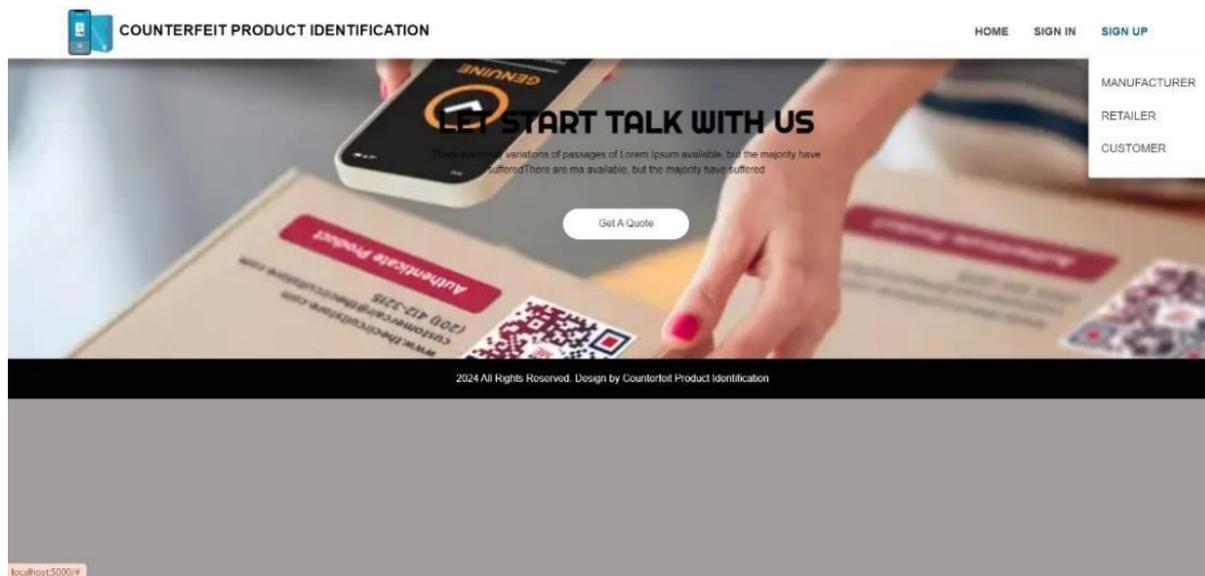


Fig 6.2 Home page sign up dropdown.

The Home Page has a Sign in Dropdown where Manufacturer, Retailer, Customer can register themselves.

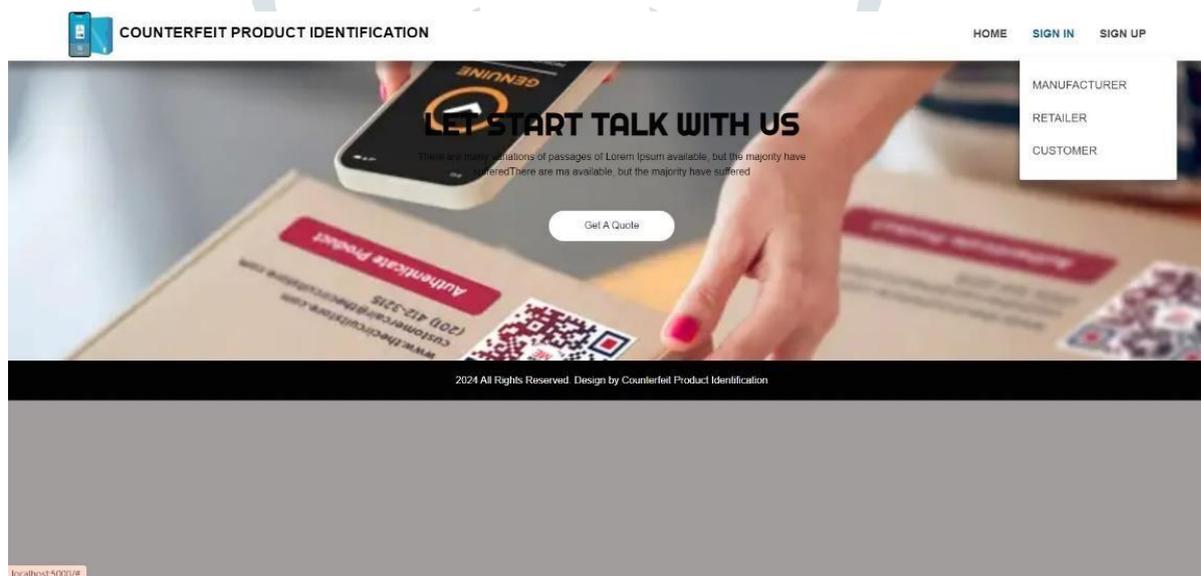


Fig 6.3 Home page sign in dropdown.

The Home Page has a Sign in dropdown where Manufacturer, Retailer, Customer can Login

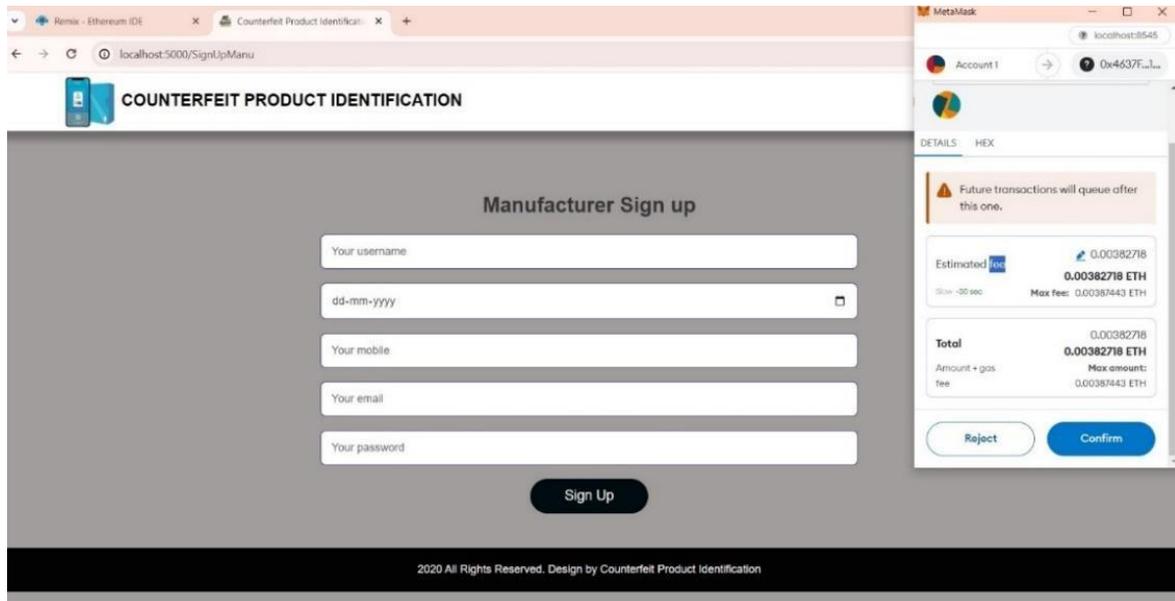


Fig 6.4 Manufacturer Sign up page.

The details of the registered manufacturer are saved in the blockchain.

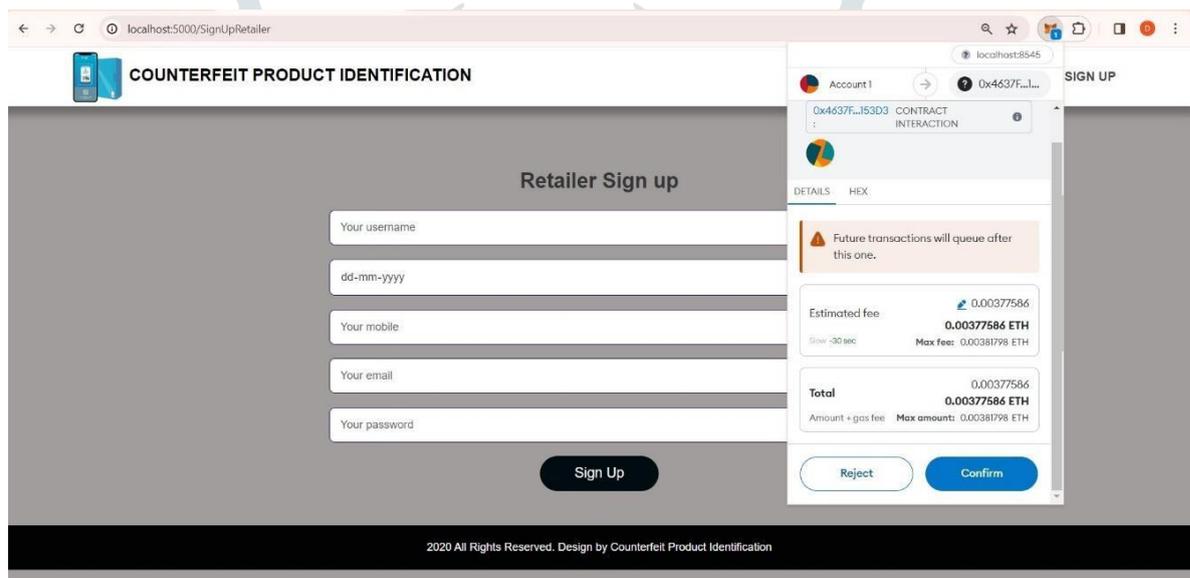


Fig 6.5 Retailer sign up page

The details that has to be entered by Retailer are name, date, mobile number, email address, password. The details of the registered retailer are saved in the blockchain.

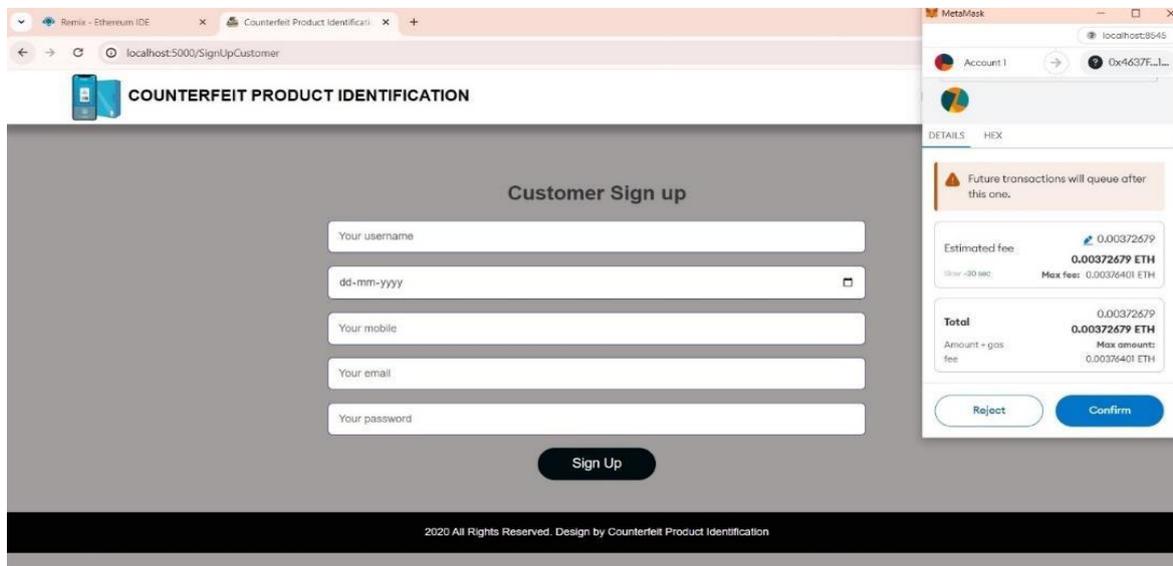


Fig 6.6 Customer Sign up page.

The Details that has to be entered by Retailer are name, date, mobile number, email address, password. The details of the registered manufacturer are saved in the blockchain.

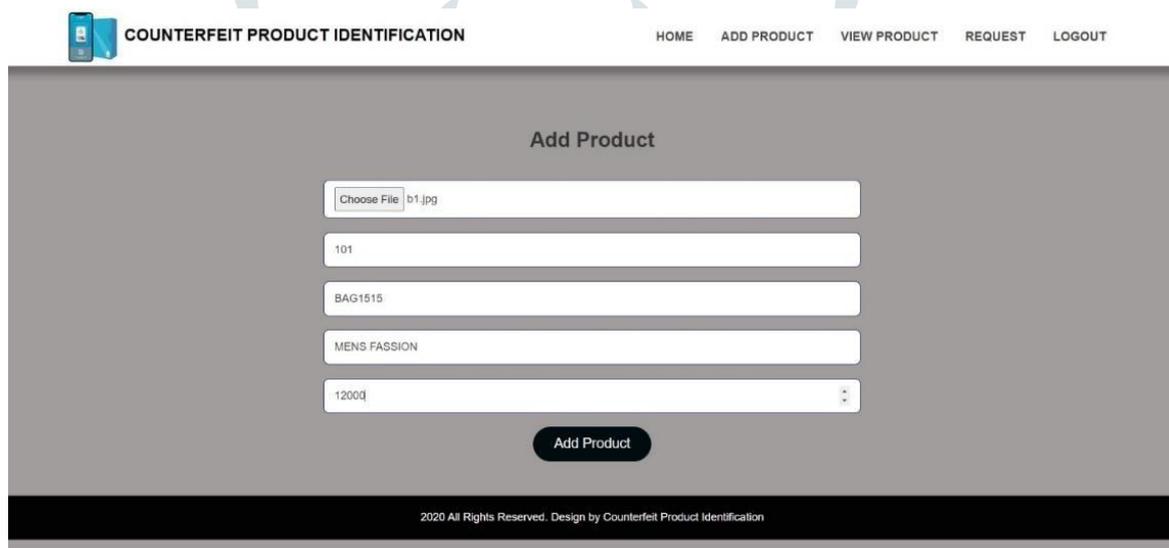


Fig 6.7 Add product page.

The Photo of the Product, Product ID, product category, Product Type, Price are the details given at the time of adding Product.

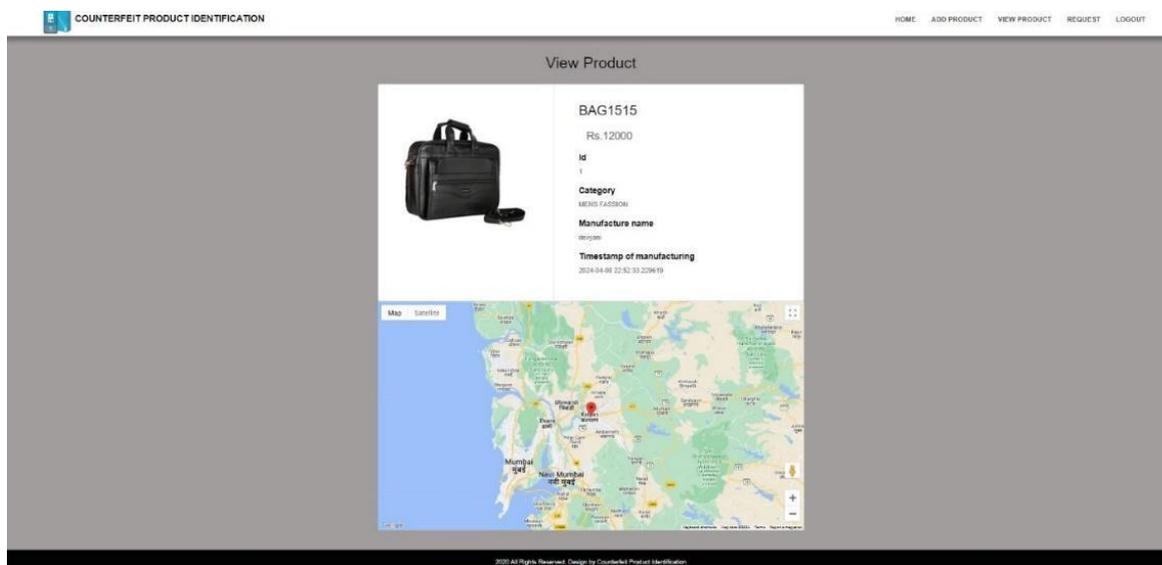


Fig 6.8 View product page.

The Product Details and Location details of the manufacturer are given at the time of adding products are displayed.

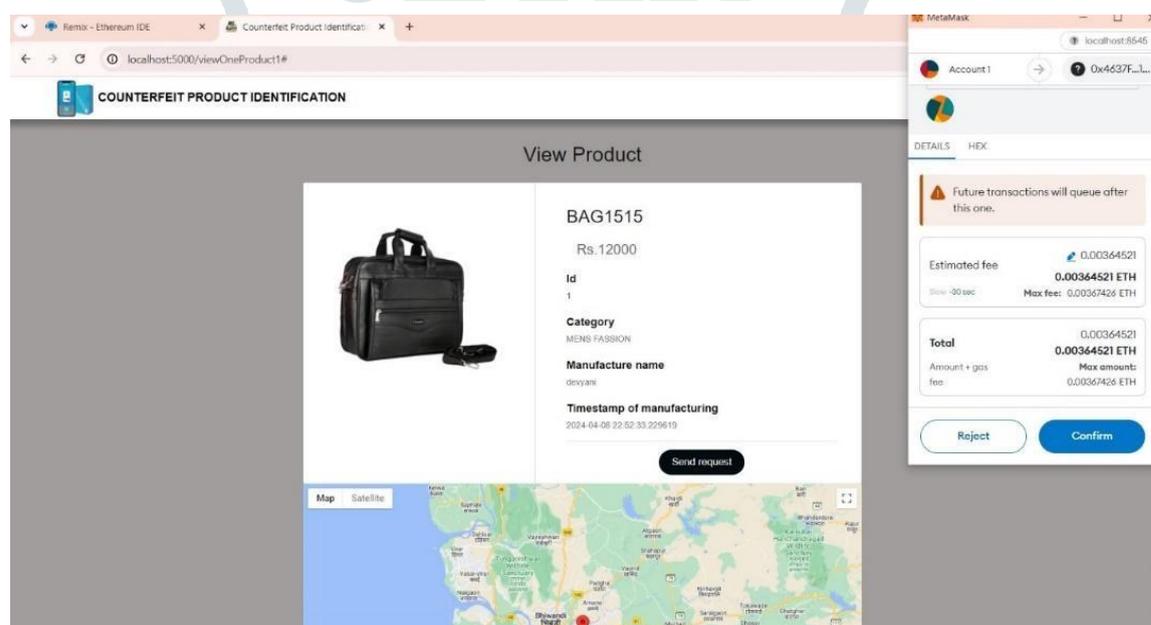


Fig 6.9 View product in retailer page.

The Retailer sends a request to the manufacturer for ordering the product.

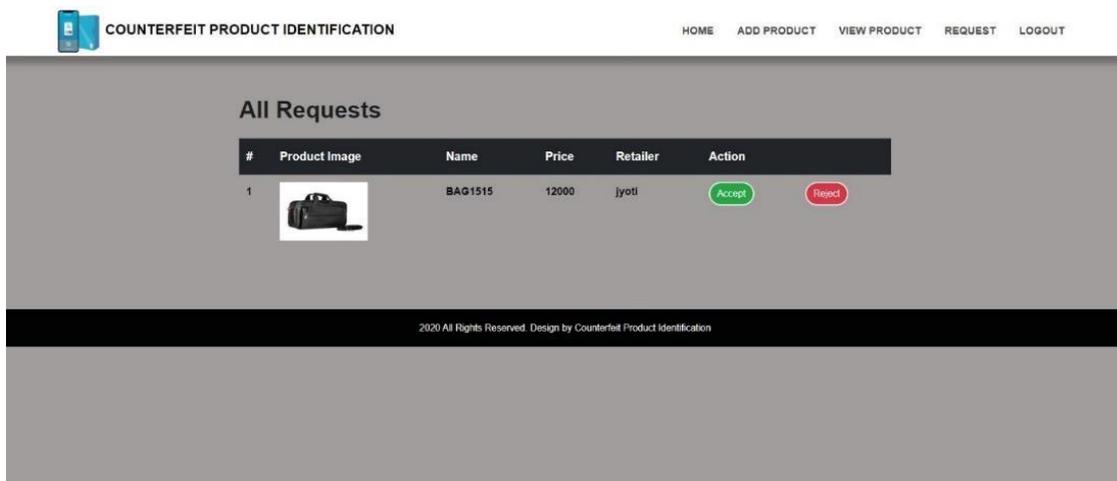


Fig 6.10 Request page.

All the requests received by the manufacturer are displayed.

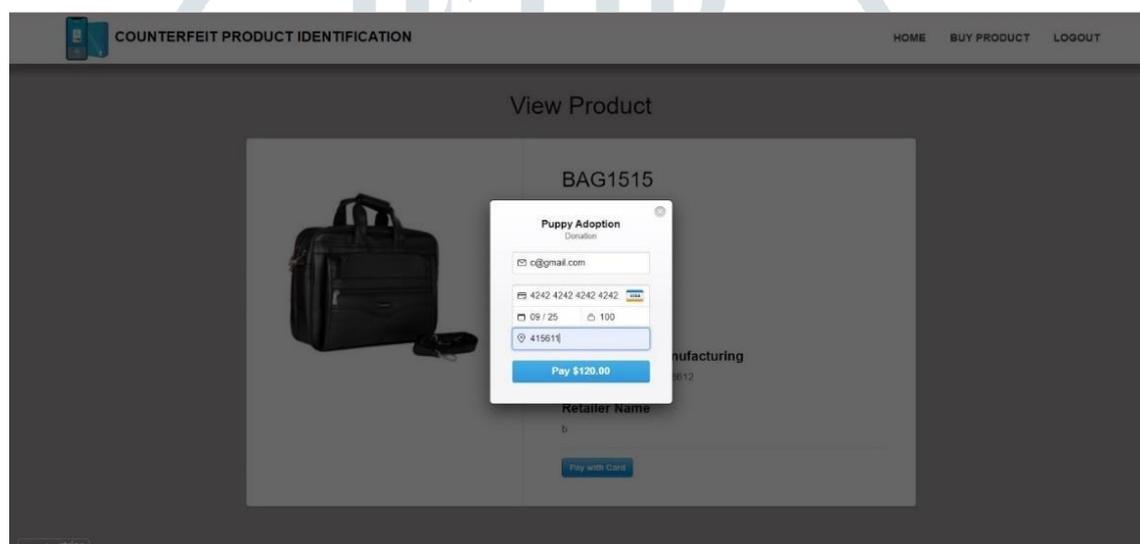


Fig 6.11 Buy product page.

The Payment Box appears where the Payment Details are to be mentioned.

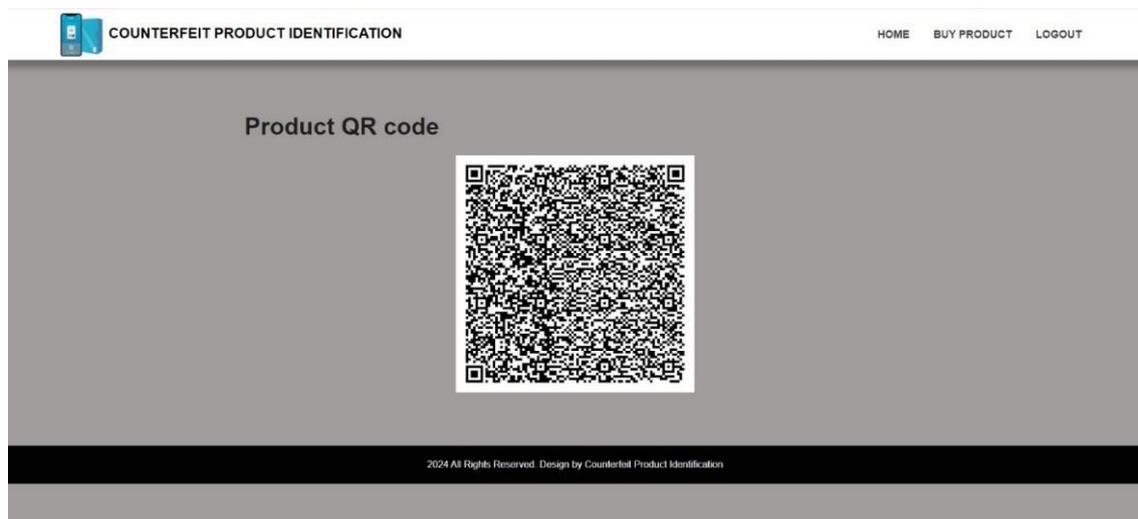


Fig 6.12 Product QR code page.

This is QR Code generated after the product is added by the manufacturer is displayed to scan.

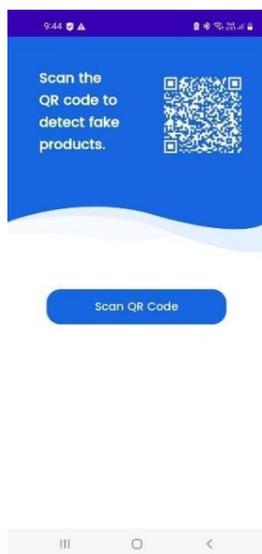


Fig 6.13 Home page of Android app.



Fig 6.14 Product details page.

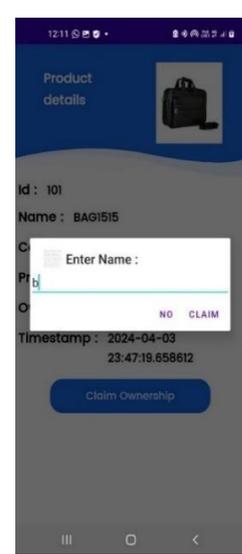


Fig 6.15 Claim ownership page.

Scan the QR code and you will get the product details.

After scanning the QR code, the decrypted product details are shown.

The ownership is claimed by entering the name and the product is booked.

## VII CONCLUSION AND FUTURE WORK

This paper presents a completely functional fake counterfeit blockchain system, which is an excellent Blockchain framework. Clients of our framework need not worry about the possibility of receiving counterfeit goods at this time, as they will not be required to pay any transaction costs. In a similar vein, the suggested architecture is crucial for end users to recognize fake goods in the inventory network. When a client scans the QR code attached to an object, they can access all associated data, including trade history and the current owner, which they can use to determine whether or not the item is authentic.

Since blockchain technology is still in its infancy, further research is necessary. This framework's potential use as evidence of the simplicity of the code is possible. The customer might not think that the program's straightforward code makes it work, and no extraneous code will be put to further use. When a blockchain is assigned that is resistant to fraud and traction, platform development is ensured in terms of genuine products. Presenting the complete resource will improve the client experience clear and open framework.

**VIII REFERENCES**

- [1] Kunal Wasnik 1 , Isha Sondawle , Rushikesh Wani 1 , and Namita Pulgam 1 1 Ramrao Adik, Detection of Counterfeit Products using Blockchain Institute of Technology D Y Patil Deemed to be University Navi Mumbai , 2022.
- [2] Harshitha G L, Lavanya V S, Mushaffiq Ahmed Mujale, Pavan Kalyan Y A, RFID-based counterfeiting system, 2022.
- [3] Tejaswini Tambe, Sonali Chitalkar , Manali Khurud , Madhavi Varpe , S. Y. Raut, Pravara Rural Engineering College Loni, Maharashtra, India, Vol-7 Issue-4 2021
- [4] JINHUA MA, SHIH-YA LIN, XIN CHEN, HUNG-MIN SUN "A Blockchain-Based Application System for Product Anti-Counterfeiting " IEEE Access January 13, 2020.
- [5] B.Prabhu Shankar, Dr.R.Jayavadeivel, A Survey Of Counterfeit Product Detection, volume 8, issue 12, December 2019.
- [6] Jinhua ma1 , shih-ya lin2 , xin chen3 , hung-min sun4 , yeh-cheng chen5 , and huaxiong wang6, A Blockchain-Based Application System for Product Anti-Counterfeiting,2017.
- [7] Shangping wang1 , dongyi li1 , yaling zhang2 , and juanjuan chen1 1 School of Science, Xi'an University of Technology, Xi'an 710048, China,2017
- [8] Lukáš KUBÁČ, Transactions of the VŠB – Technical University of Ostrava, Mechanical Series,2018.
- [9] Tejaswini Tambe, Sonali Chitalkar , Manali Khurd, Madhavi Varpe , S. Y. Raut “ Fake Product Detection Using Blockchain Technology ” IJARIE-ISSN(O)-2395-4396.

