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## FAKE PRODUCT DETECTION USING BLOCKCHAIN TECHNOLOGY

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**Abstract:** The manufacturing as well as marketing of counterfeit or duplicate products and goods leads to consequential financial, health and safety threat to end users. It also has adverse effect on the economic growth of original manufacturers and businesses through revenue loss, product defamation, downtime, replacement expenses, forcing many brands to spend money on fighting counterfeits, trust among business partners can also be at risk, stealing sales etc. To overcome and stop these crucial effects of counterfeiting, a blockchain based system is used in identification of original products and also detects duplicate products to ensure the identification of original goods. In this project, with massive emerging trends in wireless technology, QR (Quick Response) codes and barcodes provides a technique to cut down the practice of counterfeiting the products. The fake products are identified using camera scanner, where QR or barcode of the product or goods is linked to a blockchain to store product details and guaranteed unique code of each product stored as blocks in the database. If the code in product matches, the notification will be sent to the customer indicating the authenticity of the product and else if it does not match the code in database, a notification will be sent to customer indicating that product is fake or counterfeited and notification is also sent to manufacturer about the place of purchase if customer accepts the request made by the application. This approach to cut down counterfeit ensures that consumers won't completely rely on merchants to determine if products are original or forged.

**Index Terms - Blockchain, smart contracts, QR (Quick Response) code, anti- counterfeit.**

### I. INTRODUCTION

The global development of the product or branded product always comes with risk factors such as counterfeiting and duplication of product which in turn can affect the company name, reputation, revenue and customer satisfaction. The trading and marketing of counterfeit products is growing at high rates. It affects adversely on the sales, reputation, and profits of the companies and also do poses a fatal threat for the unsuspecting buyers. In order to ensure the identification and traceability of fake goods or products throughout the supply chain and to overcome this phenomenon, a fully functional blockchain system is proposed. Companies need to pay very low transaction fees and they don't need to worry about the possibility of delivering counterfeit products to end-users. Because of fake products builder, original manufacturers face the biggest problems and huge losses in sense of brand damage as well as revenue loss. To find the originality of the product a functional blockchain technology can be used. Blockchain is a chained arrangement of recorded information that makes it difficult or impossible to modify or hack the framework. Once the product is stored on the network, hash code is generated for that product and it is possible to maintain all transaction records of the product as well as its current owner as a chain created for that product transactions. It will store all the transaction records as blocks in the blockchain. In the proposed system we are assigning a QR code or barcode generated for a particular product created by manufacturer along with all the details of the product. The end customer can scan that QR code to get all information about that product. After scanning the QR code or barcode on the product, the user can identify whether the product is real or fake.

### II. RESEARCH METHODOLOGY

Nowadays, with the rise of technology and markets the problem to differentiate with original and duplicate has also incurred a lot of damage to consumers, distributors, retailers and also manufacturers. Therefore, in order to combat this a blockchain based application fake product detector is proposed. This chapter briefs the design of the system including a full description of the function and user interface of the system. The goal is used to use the blockchain features to provide a convenient, accurate and low-cost product anti-counterfeiting solution. The system is a blockchain based android application used to detect counterfeit products on daily basis.

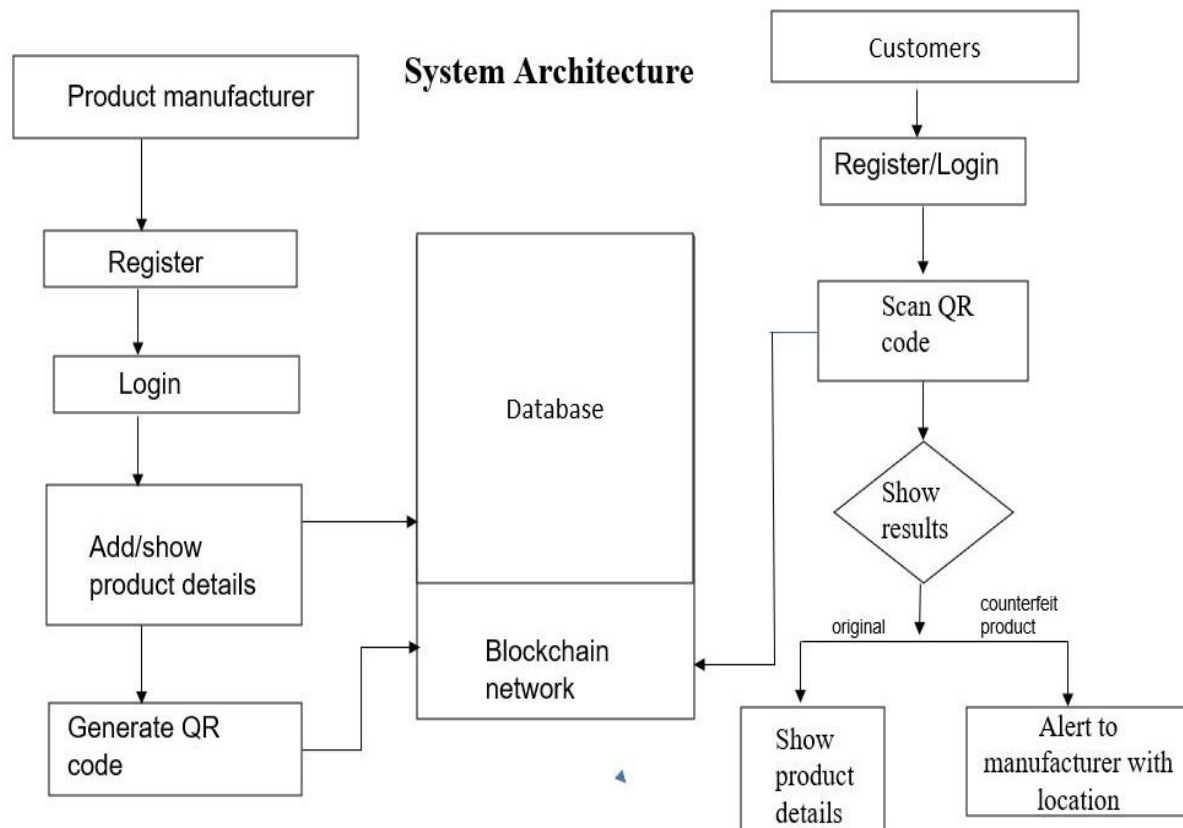


Fig: System Architecture

The system consists of manufacturer and consumer part application:

**MANUFACTURE END:** The company after verification of mail Id for registration and authentication purpose. They can login to the system and add new product/item, upload the product details with system generated QR code which stores all the details of the products. Serializing the QR code is also advised for more security and to keep track of the product. The product details will be stored in database and QR code is made tamper proof using secure graphic technique which makes the QR code copy sensitive that is when copied it loses information and printed irreversibly.

**CUSTOMER END:** Customer has to register/login with email ID and password. After the completion of user authentication, the product initiates with scan button to scan QR code of the product. Here user is customer who wants to confirm whether the product is legit or not. The unique scanned code from the customer will be compared with the code produced by the manufacturer in blocks. Then the user will be notified with authenticity of the product. There is an option for customers to check product details like name, manufacturing year, price, total quality, quality of the product and also the details of manufacturer.

#### WORKING:

The system will detect counterfeit products using QR (Quick response) code, where QR code is chained to a specific product and linked to smart contracts to scan the code using smart phones or any device that scan. This will notify whether the products are original or fake.

A company after verification of mail Id and registration process will be given access to upload the product details with system generated QR code.

The product details include brand and product name with manufacturing year, price, total quantity, quality of the product and also the details of manufacturer. This will be stored in database(firebase) and QR code will be stored in decentralized block using Blockchain technology.

Each transaction of block will contain a unique QR code which cannot be reused by the manufacturer for different product.

Manufacturer can make the tracing and identification process more secure and reliable by making use of serialized QR code with can show product information, engage customers and increase sales.

Customer has to register/login to the system before scanning the QR or barcode of the product.

After the completion of user authentication, the unique scanned code from the customer will be compared with the code produced by the manufacturer stored in blocks of smart contracts.

If code matches, then user will be notified that product is original with all its details and authentic certificate from database.

If code does not match, the user will be notified that product is fake which can prevent purchasing of falsified product and that may result in significant health or financial losses.

Even manufacturer can be benefitted if product is fake then the location of the user will be accessed with permission and alert will be sent to manufacturer who can take further legal actions on distributor, retailer and black-market manufacturer.

This ensures customers trust on merchants and increases the user's satisfaction and also can save manufacturer time and money in fighting the defamation and sales because of forged manufacturers.

### III. RESULTS

#### CUSTOMER END



Fig: Final Result

MANUFACTURER END:

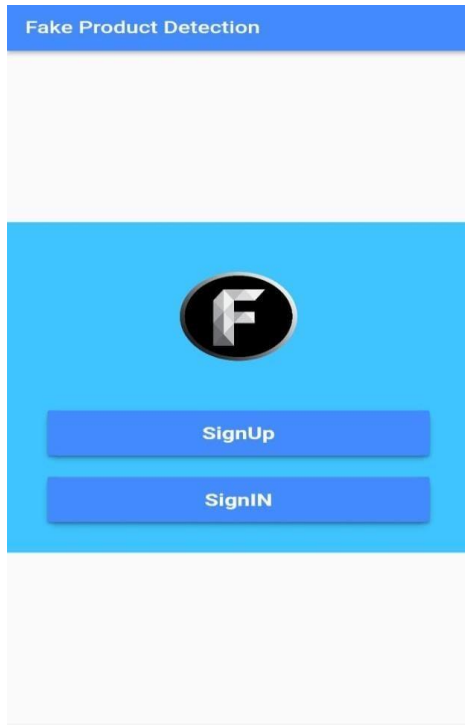


Figure: Email Authentication from company

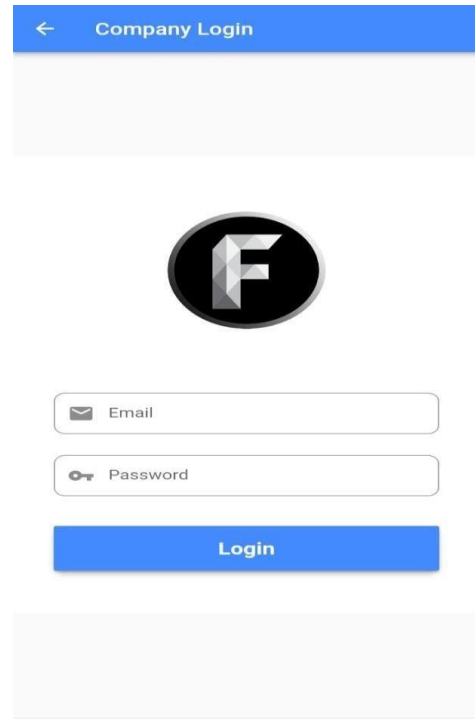


Figure: Product Registration

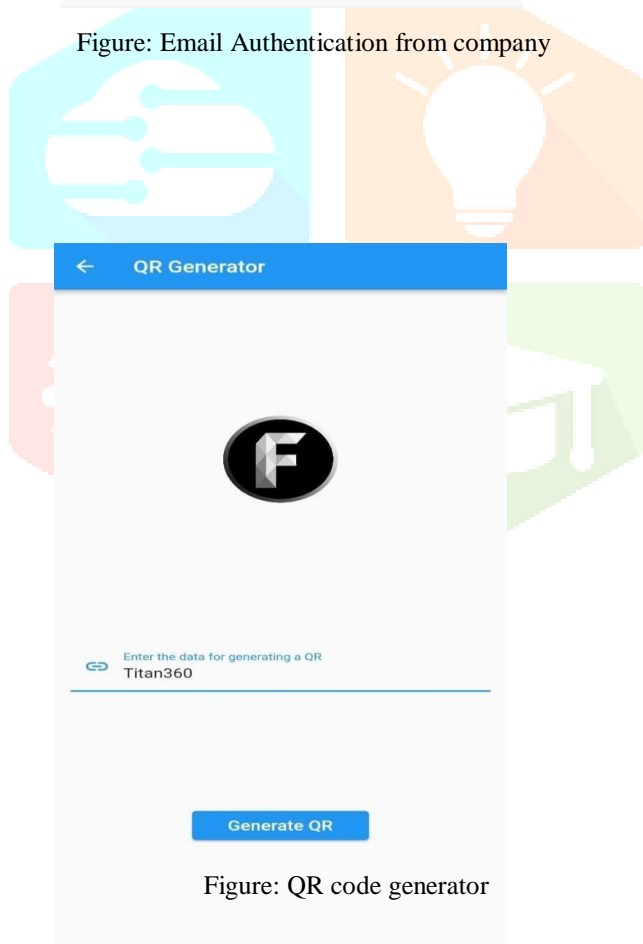


Figure: QR code generator

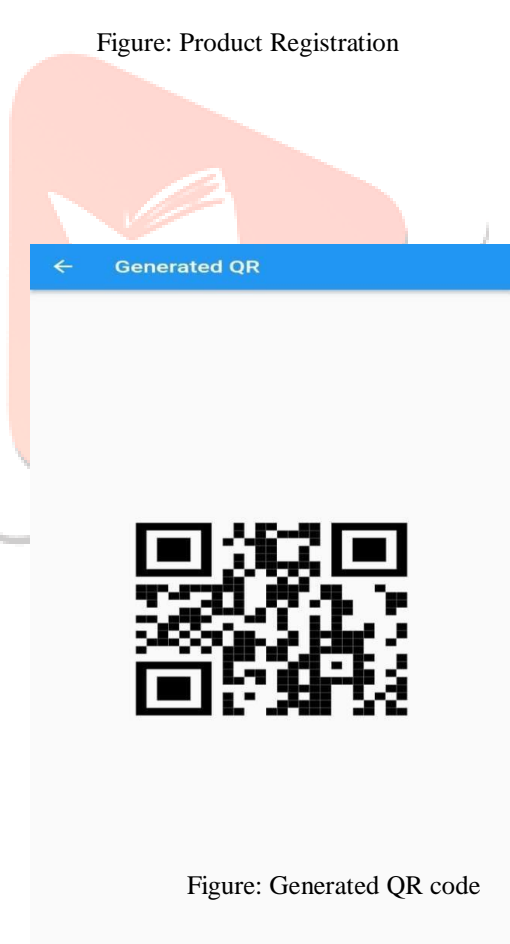


Figure: Generated QR code

**IV. CONCLUSION AND FUTURE WORK:**

The fully functional application can effectively reduce the threshold of the anti-counterfeiting of branded goods and provide the industries with limited financial resources and also easier approach to provide consumers with the trust and surety that they will not be purchasing unsusceptible counterfeited goods. Overall, this blockchain technology-based application can emerge as a life saver for the companies and provide a new system for trading, marking and purchasing which is more secure and user friendly.

The total cost of running on the Ethereum public chain is directly related to the code simplicity of the distributed applications. The future work of the system can be proof of code simplicity which can indirectly increase consumer’s trust because of distributed applications. It can be difficult on the manufacturer side to add all the details of the products manufactured so instead of manually adding the products details, data can be extracted using company’s API which can increase efficiency and manufacturer friendly.

QR code is not hackable but information in it can be copied or known to generate similarly QR code as well as print out of QR code works well to scan and retrieve information so in order to overcome this secure graphic QR code can be used that if when QR code is photocopied then it will lose information due to the ink smearing. These copy detection pattern or secure graphic is a digital image with optimal design to lose information when copied and it is printed irreversibly. Customer when found the product is counterfeited then system should able to show the same products but original from different sites with price differences to improve usability, efficiency and effectiveness of the system.

#### V. REFERENCES

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