A Novel Decentralized Product Verification using Blockchain Technology

[1]MR. G. MAHAMMAD IDRUSH, [2]G. MANOJ, [3]K. MUQUITUDDIN, [4]K. DHANUSH

[1](Assistant Professor) ,**CSE.** Teegala Krishna Reddy Engineering College Hyderabad

[234]B,tech scholar ,**CSE.** Teegala Krishna Reddy Engineering College Hyderabad

ABSTRACT

The project introduces a new way of certifying products using blockchain technology. We all want to know if the products we buy are genuine. But sometimes it's hard to be sure. Our system makes it easy. Each product receives a special code that is securely stored on the blockchain. This code tells us everything about the product, like who made it and where it was. Anyone can verify this information by scanning the product code. This helps prevent counterfeit products and increases trust between buyers and sellers. Our system is simple, secure and makes shopping safer for everyone.In today's global marketplace, ensuring the authenticity and integrity of products is paramount to maintaining consumer trust. However, traditional product control methods often lack transparency, leading to problems such as counterfeiting, fraud and supply chain inefficiencies.

1. INTRODUCTION

Decentralized The process of verifying the authenticity and source of products can be carried out in adecentralized manner by utilizing the inherent characteristics of blockchain technology, such as its immutability and transparency. This approach eliminates the need for a centralized authority, as the blockchain's distributed ledger provides a tamper-proof record that can be accessed and validated by all participants in the network. By leveraging the blockchain's ability to securely store and share data, businesses can establish a trustworthy system for tracking products throughout the supply chain, ensuring their genuineness and traceability

without relying on a single point of control. Blockchain is a decentralized technology that enables data to be safely recorded, maintained, and disseminated across computer networks known as nodes. Every block within a blockchain comprises a collection of transactions, and these blocks are chronologically linked together, forming an uninterrupted chain. This architecture allows for the secure storage and sharing of data across the network without the need for a centralized authority.
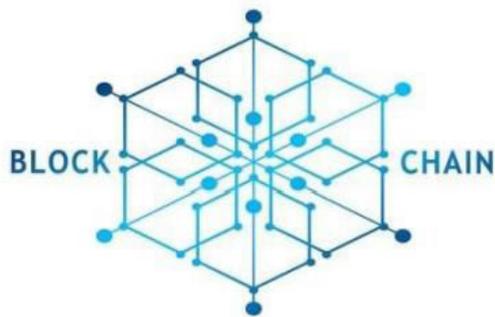

Figure 1: Blockchain Diagram

Key features and concepts of blockchain: 1. Decentralization: In contrast to conventional systems with centralized data storage or control, blockchain distributes data across multiple nodes, eliminating the need for a singular authority. 2. Security: Cryptographic methods are employed to safeguard transactions and information shared with in the blockchain network, ensuring data integrity and privacy.

Smart Contracts:

These are automated contracts with predetermined conditions encoded directly into the software, enabling self-execution without intermediaries. How block chain will help for Novel decentralised product verification using block chain technology: Imagine you just bought a new pair of designer sunglasses. With traditional methods, you can rely on the reputation of the store or the hologram sticker and trust that they are real. But blockchain verification is like a digital passport for your sunglasses: a. Scan and see the journey: Your sunglasses tag may have a small QR code. Scan it with your phone and it can connect you to a secure blockchain record. There you could see details such as the manufacturer, where the materials came from and even customs documents. This transparency increases trust - you can see the journey of the sunglasses yourself. b. Spot Fakes Easily: suppose your friend got the same pair of sun glasses from an unknown seller at a much lower price. They scan their code, but the blockchain doesn't show the ledger. This is a red flag – the right sunglasses should have a traceable history. Blockchain verification makes it harder for counterfeiters to operate. One promising arrangement to this challenge is the utilize of

checking advances coupled with secure confirmation calculations.

By leveraging innovations such as QR codes, RFID labels, or barcodes, coupled with progressed cryptographic calculations, producers and customers can confirm the realness of items rapidly and precisely. This approach not as it were gives customers with peace of intellect but too makes a difference producers ensure their brand notoriety and incomes by foiling forgers. Leveraging the immutable and transparent characteristics of blockchain technology enables decentralized verification of product authenticity and origin without reliance on a central authority. This approach utilizes the distributed and tamper-proof nature of blockchain to establish a trustworthy system for tracking and validating products throughout the supply chain.

1.1 Problem Statement:

Managing the supply chain means making sure everything runs smoothly from making a product to delivering it to customers. But sometimes, companies face problems like not being able to see where things are, delays in getting products out, and mistakes in orders. These problems can make customers unhappy and hurt the company's reputation. And often, the old-fashioned systems companies use don't help because they can't track things in real-time, making it harder to fix problems quickly. 3

1.2 Description:

We are interested in pinpointing inefficiencies in current supply chain management practices. Once we know the problems, we can figure out ways to make things better, like making supply chains run smoother, being more adaptable, and staying competitive. One idea is to create a system where we can check if products are genuine without relying on just one company. We'll use blockchain, a technology that keeps a secure record of information, to track products and make sure nobody messes with the data. Absolutely! Here's the revised version without bolding or bullet points. By leveraging smart contracts, essentially self executing digital agreements,we can ensure trust and data integrity throughout the product journey within the supply chain.

2. LITERATURE SURVEY

Paper: Product Verification using Blockchain Technology: A Systematic Review: Analysis: This review examines how blockchain can authenticate products, thwarting counterfeit schemes. It surveys current studies, emphasizing blockchain's

potential in curbing product replication. Nonetheless, it underscores hurdles and gauges blockchain's efficacy versus conventional methods. Addressing these obstacles is crucial for blockchain to revolutionize industry practices. Ultimately, blockchain emerges as a promising tool for ensuring product legitimacy, though practical barriers must be surmounted for wide spread in tegration. Paper: Pinpointing vulnerabilities in product authentication with blockchain-enabled verification for enhanced security: Analysis: While traditional methods struggle to verify authenticity, especially for high-value products vulnerable to counterfeiting, blockchain technology offers a promising solution. Its secure and transparent ledger allows businesses to track products throughout the supply chain, from manufacturing to distribution, effectively combating counterfeits. However, implementing blockchain requires technical expertise in areas like unique product identification and secure node networks. Paper: Fake Product Restriction using BlockChain: Analysis: This paper explores how blockchain tackles the rising issue of counterfeit products, fostering trust among distrustful parties. In today's global market, detecting fake goods is increasingly crucial,

with consequences ranging from consumer harm to brand reputation damage. Blockchain offers a potentialsolutionby providing a secure and transparent ledger to trace transactions.

3. SYSTEM DESIGN

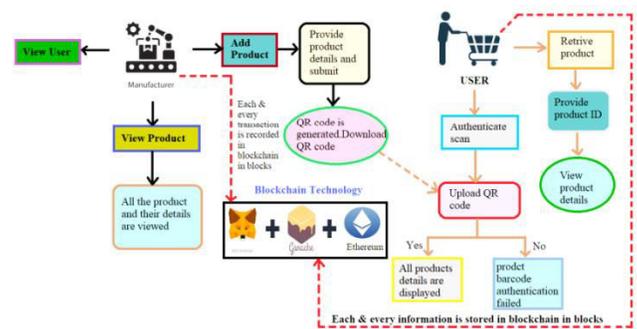## 3.1 Proposed system architecture:

Figure 3.1 : Proposed System Architecture

The system is designed to be used by two types of users: manufacturers and customers. Manufacturers can save product information such as product price, name, manufacturing date, location, and expiry date in the blockchain as smart contracts. This information can then be saved in QR codes and NFC tags, which can be used as digitalized invoices for the products. Customers can use the mobile application to scan the QR codes or NFC tags to access product information, allowing them to confirm the authenticity and quality of products. The mobile application also

includes authentication capabilities, which are handled using Firebase, allowing businesses to track the number of authenticated customers and other analytics.
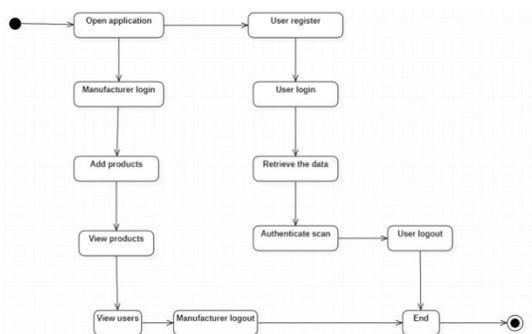
3.2 Activity Diagram:

Figure 3.2: Activity Diagram

4. OUTPUT SCREENS

Landing Page UI: The Actual UI of Landing page.

Figure 4.1 : Landing Page UI

Interface for Manufacturer/User:

This interface which has Manufacturer/User will take you to their login pages respectively. Interfaceoption1 connects you to the Manufacturer's login page, while option 2 links to the User's login/Signup page.

Figure 4.2 : Interface for Manufacturer/User

Manufacturer Login Screen: Manufacturer logins to the website to Manage Products.

Figure 4.3: Manufacturer Login Screen

Successful Login:

Figure 4.4: Successful login

Manufacturer's Homepage:

Here Manufacturer add, view product details and can view the users.

Figure 5.5: Manufacturer's Homepage

Adding Product details:

Here the manufacturer add all the product details.

Figure 4.6: Adding Product details

QR Code download screen:

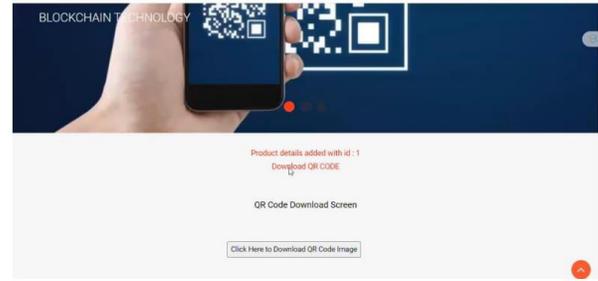Product details are encrypted in QR code.

Figure 4.7: QR Code download screen

Starting the webcam:

Figure 4.8 : Starting the webcam

QR code Scanner:

Here user can verify the product by showing the downloaded QR code.

Figure 4.9 : QR code Scanner

QR code verification successful:

Figure 4.10 : QR code verification successful

5. CONCLUSION

Blockchain acts like a secure and public "history book" for products. It empowers you, the consumer, to be your own verification expert. By offering both transparency and enhanced tracking, blockchain has the potential to revolutionize how we ensure the authenticity and quality of the things we buy. With a scan of a code, you'll see the product's history, from where it was made to who else handled it. Fake stuff gets caught easier. Every step the product takes gets tracked, making it much harder for phonies to sneak in. If something seems fishy, you can trace it back to the source quickly. Basically, blockchain cuts out the middleman and gives you the power to be sure you're getting the real deal. It's a win-win for everyone: you get the right products and businesses have a smoother system to track things. 40

6. FUTURE ENHANCEMENT

Integration of Emerging Technologies: Combining blockchain with IoT, AI, and Big Data can enhance supply chain operations by improving efficiency, intelligence, and automation capabilities. Blockchain's Potential: While blockchain has already shown promise in finance, healthcare, and logistics, it can be applied to various other sectors for supply chain management. Exploring New Industries: Future scope includes investigating how blockchain can benefit industries like agriculture, pharmaceuticals, and luxury goods, addressing their specific challenges and requirements. Tailored Solutions: Each industry can benefit from customized blockchain solutions to optimize their supply chain processes and improve overall performance. Real time process: we are buliding the project that will help the customers to verify each product by scanning QR code directly.

7. REFERENCES

[1] Emmanuel O. Igbekele; Joshua Aideloje; Abayomi A. Adebiyi; Ayodele Adebiyi, "Product Verification using Blockchain Technology: A Systematic Review" published in 2023 International Conference

on Science, Engineering and Business for Sustainable Development Goals (SEB-SDG), DOI: 10.1109/SEB-SDG57117.2023.10124602.

[2] Harsha Vardhan V, Rohan L, Aditya Reddy K, Murlidher Mourya, "Mitigating Counterfeiting Using Blockchain Enabled Product Authentication" published in International Journal for Research in Applied Science & Engineering Technology (IJRASET), Volume 11 Issue IV Apr 2023.

[3] Sanidhya Raut; Maruti More; Manish Nayak; Anil Hingmire, "Fake Product Restriction using BlockChain" , published in 2023 8th International Conference on Communication and Electronics Systems (ICCES), DOI: 10.1109/ICCES57224.2023.10192775.

[4] Mrs. R. Subapriya, S. Karthikeyan, A. Gokul Prasath, M. Shankar, "Product Authentication and Traceability Using Blockchain" published in International Journal of Engineering Technology and Management Sciences, 2023, Volume 7 Issue 2.

[5] Raghavendra Rao "FAKE PRODUCT IDENTIFICATION SYSTEM USING BLOCKCHAIN AND DECENTRALISED FINANCE (DEFI)", published in International Research Journal of Computer Science, 30 July 2020, Computer Science, Business, DOI:10.26562/irjcs.2020.v0707.004.