Fake Product Identification using Blockchain Technology

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Abstract

This project aims to develop a fake product identification system using blockchain technology. The proposed system will help the customer to identify the counterfeit product in the market while purchasing and make a smarter decision. Blockchain technology will help to ensure security and transparency in the system. By using Blockchain technology, the manufacturers can guarantee the users for confirmation of product safety. The Quick Response (QR) codes is used which provide a technique to fight the practice of counterfeiting the products. The fake Products are detected by scanning the QR code.

Keywords: Blockchain, Fake Product Identification

1. Introduction

The world is producing a large number of counterfeit products. The goal is clear: to develop a robust system that uses blockchain technology to fight counterfeit products effectively. Counterfeit goods not only harm businesses but also put consumers at risk. They undermine trust in the products we buy. Blockchain, often likened to an unbreakable chain of trust, lies at the core of our solution. It's like the guardian of product authenticity, ensuring that each item's history is safe and transparent. This technology empowers manufacturers, suppliers, and consumers to verify product authenticity, leaving counterfeiters with no room in the market. The proposed solution seeks to change that. It's all about giving manufacturers, suppliers, and consumers the tools they need to ensure product authenticity through an unchangeable blockchain record. Blockchain technology offers strong data security and transparency, making it a powerful tool for detecting fake products. Blockchain allows everyone involved in a supply chain to see and confirm transactions. This means counterfeit goods can't sneak in unnoticed. Once data is on the blockchain, it's locked in and can't be tampered with. This guarantees the accuracy of product information. Each product gets a unique digital ID on the blockchain, so you can trace its entire journey from production to sale. The scope for using blockchain technology in this project is to build a system that is promising and maintains transparency among the users. There is a variety of industries facing the problem of counterfeit product such as fashion, electronics, luxury brands, food and many more. To overcome this problem and to build a healthy relationship between brand and the customer, we can use an authentication system. It will also ensure that there is genuine product available in market. This will make the customer aware about the cost their paying for the

product is right or not. It will also help companies to safeguard their brand reputation by ensuring only genuine products bearing their brand name reach the market.

2. Literature Survey

Detection of Counterfeit Products using Blockchain by Kunal Wasnik, Isha Sondawle, Rushikesh Wani, and Namita Pulgam [1] This paper introduces a system that helps manufacturers and suppliers securely store product details. Customers can easily check a product's history to ensure it's genuine, building trust between businesses and consumers. By using blockchain and smart contracts written in Solidity, the system tracks products from source to destination. Any change in destination flags a potential fake. The process is tested locally using Ganache and deployed on the Ethereum blockchain with Truffle. The user-friendly interface, created with React, connects to the blockchain through Web3.js and Metamask for a simple product verification experience. The goal is to bring transparency and trust to the supply chain, making things easier for everyone involved.

Fake Product Identification using Blockchain Technology by Nruthya Ganapathy B, Keerthan Kumar, Poojary Shreya Jaya, Rajath D Shetty, Dr. Shreekumar T [2] proposed a system which generates a QR code and show the product details and if the product is detected fake then, an alert is send to the manufacturer with location. The system can show the alert to manufacturer with the location when the product is detected as fake.

Fake Product Detection Using Blockchain Technology by Tejaswini Tambe, Sonali Chitalkar, Manali Khurud, Madhavi Varpe, S. Y. Raut [3] proposed a system that uses blockchain technology which shows that the product is real or fake. In this system the customer can easily view and get all information like transaction history, current owner, etc..

Fake Product Detection Using Blockchain Technology by Mr. Dipak B. Khadse, Taniya Argulewar, Nishtha Kalra, Ishan Zade [4] proposed a system which builds a smart contract between the manufacturer and the customer using solidity. The transaction record is added to the Ethereum blockchain network.

Improving Fake Product detection Using AI-based technology by Eduard Daoud, Dang Vu, Hung Nguyen and Martin Gaedke [5] proposed a system which consists of two steps: training model and detecting images. The system uses deep learning model for detection process. The model is trained with input images and the model predicts the result. It is easy to train and draw predictions. The results can be accurate. But the prediction based model has no security and won't be able to deal with the real time data.

An AI-Based Fake Products Identification System by Richu Jacob Varghese, Shilpa Shaji Nellikkakunnel, and Sruthy Sunilkumar [6] proposed a system which is based on various techniques such as image processing, NLP, shape detection, logo detection. The model is trained with different images and using the images the system predicts. The model is trained with an existing dataset and it supports various types of raw data.

Enhancing fake product detection using deep learning object detection models by Eduard Daoud, Dang Vu, Hung Nguyen and Martin Gaedke [7] The system is based on deep learning. The product is detected

with the help of pre trained images. The counterfeit report can be send to the authority. Fake Product Detection using Image Processing by Pooja C P and Arunkumar K L [8] proposed a system where the image dataset is trained. The images are detected using KNN algorithm. The system can detect and classify the fake inserted images.

Fake Product Detection Using Diverse Technologies by P Nikhitha Priya . B Gopi Reddy . J Sheik Mohamed [9] has describes various technologies like RFID tags, Cryptography, Artificial Intelligence (AI), Blockchain and NFTs, which are used to detect the fake products. This paper also describes the how these technologies works with their advantages and limitation.

3. Proposed System

3.1. System Architecture

The proposed system consists of workflow diagram and entities involved in the supply chain. The manufacturer will request registration in the system. The admin will get a request from the manufacturer to register. Admin will check whether all the details entered are authenticated or not. If yes then admin will accept the registration request. Same registration will follow for the Supplier registration. The manufacturer can list the product which will generate a unique QR code for each listed product. The product listed once cannot be alter by anyone, this will help to maintain transparency among the supply chain. The supplier acts as a middle man between the manufacturer and customer. The supplier sells the product from manufacturer to the customer. The customers can scan the QR code and check the authenticity of that product. If the product is detected fake then the customer can register a complaint.



Figure 1: System Architecture

3.2. Entities

Admin

Admin is the person who will be able to monitor the entire system. The admin has to authenticate the valid suppliers and companies.



Figure 2: Admin Process

Manufacturer

Manufacturer registers their company on the site. They list their product which generates a unique QR code that includes the information about the product. Only the manufacturer can add the product.



Figure 3: Manufacturer Process

Customer

The customer can scan the QR code and can see the information related to that product like the batch number, date of manufacturing and expiry, manufacturer details, etc.



Figure 4: Customer Process

4. Features of the System

4.1. For Admin

- He will be able to Login.
- He will be able to monitor the system.

4.2. For Manufacturer

- He will be able to register.
- He will be able to login.
- He will be able to add product to the system.
- He will be able to generate unique QR code for the listed product.

4.3. For Customer

- He will be able to login.
- He will be able to scan QR code.
- He will be able to register complaint.
- 5. Result

The system is where each product entered into the system is given a unique QR code, which is then linked to a secured using blockchain. Each QR code is given a unique hash value. This QR code contains information about the product such as brand name, date, expiry, etc. If the manufacturer wants to get registered into, he has to send a registration request which consists of personal and business details. Then the request is sent to the admin, he checks if all the information entered is genuine and authenticated. Accordingly, the admin approves or decline the request. If the request is approved the manufacturer, then he can log into the system and enter the product details. Each product entered generates a unique QR code. The process was straightforward for consumers, they could simply scan the QR code using a scanner to access the data and verify the product's authenticity.

One of the most significant outcomes of the project is that it can help reduction in counterfeiting rates. This can help the brand to maintain by reputation by providing their customers feature to authenticate the product they buy.



Figure 5: Landing Page

Login
Username:
Password:
Login
Register here

Figure 6: Login Page



Figure 7: Registration Page for New Manufacturers

Authentify						Logout
Dashboard	User Requests					
Manufacturer List						
Feedbacks	ld	Username	Brand Name	Email	GST No.	Actions
	1	Kavita Sharma	Embrace	kavita.sharma@gmail.com	GST987123456124	Approve
						Decline
	2	Dev Sharma	Embrac	dev.sharma@gmail.com	GST989123456125	Approve
						Decline
Figure 8: Admin Dashboard for Approval						

Admin Dashboard						Logout
Dashboard	Approved Manufacturers List					
Manufacturer List						
Feedbacks	ID	Username	Brand Name	Email	GST No	
	1	Priya Patel	Blaze	priya.patel@gmail.com	GST135791357123	
	2	Rohan Sharma	Nova	rohan.sharma@gmail.com	GST579135791123	
	3	Ananya Desai	Echo	ananya.desai@gmail.com	GST246813579123	
	4	Aarav Gupta	Zenith	ananya.i@gmail.com	GST135792468123	
	5	Pranjal	macera	p@gmail.com	GST135792468321	
	6	Siddharth Reddy	Арех	s@gmail.com	GST136792468321	
	7	Kavita Verma	Ember	kavita.verma@gmail.com	GST987123456123	

Figure 9: List of Manufacturers

Manufacturer Dashboard		Logout
No.	PRODUCT ID	
	BRAND NAME	
100	PRODUCT NAME	
	MANUFACTURING DATE	
- KALE	EXPIRY DATE	
	mm/dd/yyyy PRICE	
A A	Add Product	

Figure 10: Manufacturer Dashboard

6. Conclusion

People often unknowingly buy fake products, risking safety and trust. We need a solution that uses blockchain to guarantee product authenticity and trace their journey from the factory to the store. The Fake Product Identification system using Blockchain technology will help users to make sure what they buy is real and safe, from where it's made to where they buy it. This paper aims to develop a healthy chain which can help to maintain transparency. The system will can not only help the users to identify the counterfeit products but also help them to register complaint. This can help to reduce the frauds that are taking place throughout the supply chain.

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