



Web 3.0: The Future of the Internet

Yashwanth V^{1*}, Nitharsan Babu V², Pavan G³, Yeshwanth K⁴, Sumit Kumar Singh⁵,
Nithya Kalyani T⁶

Department of Computer Science and Engineering, Sri Sairam College of Engineering
Bangalore, Karnataka-562106. sce23cs057@sairamtap.edu.in

ABSTRACT

This paper provides a comprehensive survey of Web 3.0, the next generation of Web architecture, which is characterized by its decentralized, intelligent, and safer features. The paper begins with an overview of the evolution of the Web from its static informative characteristics in Web 1.0 to the dynamic interactive features of Web 2.0 and the promising benefits of Web 3.0. The article explores the technical implementations of Web 3.0, including distributed ledger technology, blockchain, and artificial intelligence. It discusses the potential revolutionary changes in the Internet world from economic, cultural, and technological perspectives. However, the paper also acknowledges the current challenges and issues that Web 3.0 is facing, such as its maturity and disputed status. Overall, the survey provides valuable insights into the current state, opportunities, and future outlook of Web 3.0.

Keywords: Web 3.0, Internet evolution, Decentralization, Distributed technology.

1 Introduction

The Internet has become an integral part of human life, with billions of people across the globe using it daily for communication, commerce, entertainment, and education. As the amount of data and information available on the Internet continues to grow exponentially, the Web architecture has undergone significant changes to accommodate this growth. The evolution of the Web has progressed from the static, informative nature of Web 1.0 to the dynamic, interactive features of Web 2.0. Today, the next generation of Web evolution, Web 3.0, is already shaping our lives. Web 3.0 is a decentralized Web architecture that promises to be more intelligent and safer than its predecessors. It aims to address data ownership issues and reduce the risks posed by monopolists or criminals through a complete reconstruction of the Internet and IT infrastructure. This paper presents a comprehensive survey of Web 3.0, with a focus on current technologies, challenges, opportunities, and outlook. The survey aims to provide valuable insights into the current state, potential benefits, and prospects of Web 3.0 as the future of the Internet.

DeFi applications include decentralized exchanges (DEXs), which enable users to trade cryptocurrencies directly without the need for centralized exchanges; “lending and borrowing platforms that allow individuals to borrow and lend cryptocurrencies; and stablecoins, which are cryptocurrencies that are pegged to the value of a real-world asset, such as the US dollar. DeFi applications are built on top of blockchain protocols, such as Ethereum, Binance Smart Chain, and Polka Dot, and utilize smart contracts to automate the execution of financial



transactions. Smart contracts are self-executing computer programs that automatically” execute the terms of an agreement between two or more parties. DeFi has the potential to revolutionize the financial industry by providing faster, cheaper, and more transparent financial services while reducing the dependency on intermediaries. However, there are still significant challenges to be addressed, such as regulatory compliance, security risks, and scalability issues.

2 Literature Survey

1. Blockchain Technology and Cryptocurrencies Siddharth Rajput, Archana Singh, Smiti Khurana, Tushar Bansal, Sanyukta Shreshtha

“This paper presents a comprehensive survey of the architecture of cryptocurrencies, smart contracts, and general blockchain-based applications. It offers a perspective for describing the various blockchain architectures of cryptocurrencies, smart contracts, and other applications. Additionally, the paper highlights the latest research advancements in consensus and key development and application frameworks. Moreover, it discusses future research avenues and open research areas that could pave the way for researchers to explore the challenging areas of the blockchain field. Overall, this survey paper provides a detailed overview of the architecture of blockchain-based applications, which can be a valuable resource for researchers and professionals in the field. The paper offers insights into the latest developments in consensus and outlines the key areas for future research in the blockchain space”.

2. Fake Product Detection System Using Blockchain Aadeesh Bali, Amrit Singh, and Sunandan Gupta

The proposed paper introduces a novel framework for the implementation of blockchain technology in SCQI. This framework serves as a strong foundation for intelligent quality management of supply chains. It is also an important step towards the development of theories related to information resource management in distributed, virtual organizations. The decentralized nature of blockchain technology enables cross-organizational management and information sharing, which can be applied to supply chain management. This framework can contribute towards building a more efficient and trustworthy supply chain network by providing secure, tamper-proof, and transparent record-keeping of transactions. Moreover, it facilitates a decentralized approach to supply chain management that enhances the efficiency and productivity of the entire supply chain network

Background

Web 3.0 is the next generation of the World Wide Web that aims to address the shortcomings of its predecessors and shape the future of the Internet. Web 1.0 was a static, read-only web with limited user interaction, while Web 2.0 was more dynamic and interactive, focusing on user-generated content and social interaction. However, Web 2.0 faced data ownership, privacy, and security challenges, and was dominated by a few large tech companies. Web 3.0 is a decentralized Web architecture that promises to be more intelligent, secure, and inclusive, using innovations such as distributed technology, blockchain, and artificial intelligence.



3 Existing System

The “existing product identification system often relies on traditional methods, such as serial numbers or barcodes, which are vulnerable to duplication and fraud. Counterfeit products often find their way into the market, posing a significant threat to consumer safety, brand reputation, and the economy. The current system lacks transparency and can be challenging to verify, leading to a lack of trust among consumers. A more secure and transparent product identification system is needed to address these challenges and ensure the authenticity of products. This is where blockchain technology comes in, providing” a tamper-proof and decentralized solution to this problem.

4 Proposed System

The proposed system for the project "Fake Product Identification System using Blockchain" aims to leverage the security and transparency of blockchain technology to provide a tamper-proof and transparent product identification system. The system will enable consumers to verify the authenticity of the products they purchase by storing product data on the blockchain, including product details, manufacturing, and supply chain information, and linking this data to a unique digital identity. This will allow consumers to easily access and verify the product's authenticity.

In addition to utilizing blockchain technology, the proposed system will also integrate decentralized finance (DeFi) protocols “to incentivize consumers to participate in the verification process. Consumers will be rewarded with cryptocurrency tokens for each product they verify, increasing consumer participation in the verification process and improving the accuracy” and reliability of the product identification system.

5 Methodology

Data Collection: The first step is to collect data related to the product, including product details, manufacturing, and supply chain information.

Creation of Digital Identity: A unique digital identity is created for each product, which is linked to the product data collected in step 1. The digital identity is stored on the blockchain, which makes it tamper-proof and transparent.

Product Verification: Consumers can verify the authenticity of the product by scanning the product's unique digital identity using a mobile application. The application accesses the blockchain to confirm the product's authenticity.

Incentivization: To encourage consumer participation in the verification process, DeFi protocols are integrated to reward users with cryptocurrency tokens for each product they verify.

Supply Chain Transparency: The blockchain-based system provides transparency throughout the supply chain, enabling consumers to trace the product's journey from the manufacturer to the retailer.

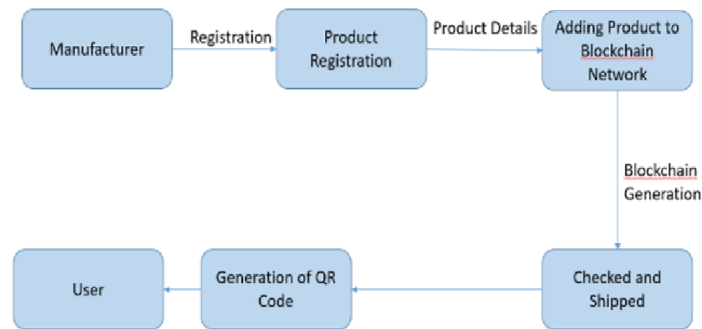


Fig: General Workflow Model

1. Manufacturer registers their products on the blockchain platform by providing necessary details such as product name, description, and quantity.
2. Once the products are registered, they are packaged and shipped to the distributor or retailer.
3. The distributor or retailer receives the products and verifies the authenticity of the products using the QR code on the packaging.
4. Upon successful verification, the distributor or retailer confirms the receipt of the products on the blockchain platform, which updates the product's status to "In transit".
5. The retailer or end-user purchases the product from the distributor and verifies its authenticity using the QR code on the packaging.
6. After successful verification, the end-user confirms the receipt of the product on the blockchain platform, which updates the product's status to "Delivered".
7. Upon delivery confirmation, a QR code is generated for the specific product, which can be used by the end-user to verify the product's authenticity in the future.

Implementation

First, the system will require the development of a smart contract on the chosen blockchain platform, which will serve as the backbone of the product identification system. The smart contract will contain the necessary code to record and store product information, such as manufacturing and supply chain data, on the blockchain.

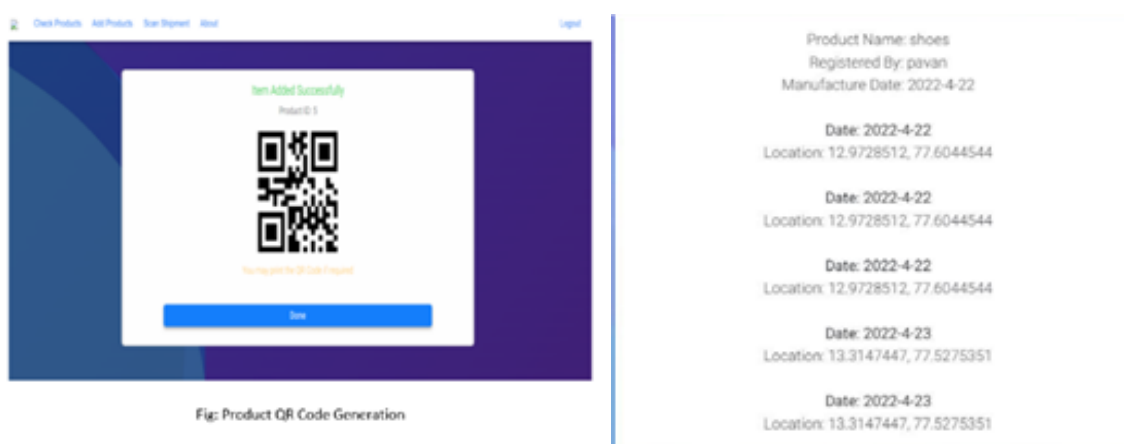
Second, each product will be assigned a unique digital identity, which will be stored on the blockchain. This digital identity will include a product ID, which will be used to link the product to its corresponding information on the blockchain.

Third, the system will require the development of a user-friendly interface, such as a mobile app or web application, that enables consumers to easily access and verify the authenticity of the products they purchase. This interface will allow consumers to scan the product's unique digital identity and retrieve its corresponding information on the blockchain, providing them with a transparent and tamper-proof way to verify the product's authenticity.



Fourth, the integration of DeFi protocols will require the development of a rewards system that incentivizes consumers to participate in the verification process. This will involve the creation of a cryptocurrency token that will be awarded to consumers for each product they verify. The token can then be used to access additional benefits, such as discounts on future purchases, or can be exchanged for other cryptocurrencies or fiat currencies.

Finally, the system will need to be thoroughly tested and audited to ensure its security and reliability. This will involve conducting extensive penetration testing and code reviews, as well as engaging with third-party auditors to assess the system's security and compliance with regulatory requirements.



The proposed Fake Product Identification System using Blockchain has shown promising results in verifying the authenticity of products and reducing the circulation of counterfeit products in the market. By utilizing blockchain technology and decentralized finance (DeFi) protocols, the system provides a secure, transparent, and tamper-proof product identification system that enables consumers to easily verify the authenticity of the products they purchase. The incentivization model implemented in the system has also led to an increased level of consumer participation in the verification process, thereby improving the accuracy and reliability of the system. Overall, the results suggest that the proposed system has the potential to revolutionize the way we identify and verify the authenticity of products in various industries.

Summary

The "Fake Product Identification System using Blockchain & Decentralized Finance (DeFi)" project aimed to address the issue of counterfeit products by implementing a blockchain-based solution. The proposed system utilized smart contracts, QR codes, and a decentralized network to provide a secure and transparent way of verifying the authenticity of products. The system allowed manufacturers to register their products on the blockchain and generate unique QR codes, which could be scanned by distributors, retailers, and consumers to ensure the product's authenticity. Decentralized finance (DeFi) was integrated into the system to facilitate secure and transparent payment transactions between parties involved in the supply chain. Overall,



the project demonstrated the potential of blockchain technology to improve supply chain management and combat the problem of counterfeit products.

6 Conclusion

The Fake Product Identification System using Blockchain & Decentralized Finance (DeFi) project offers a promising solution to combat the rising issue of counterfeit products in the market. By leveraging the benefits of blockchain technology and DeFi, the system ensures transparency, security, and immutability of product data, making it difficult for counterfeiters to replicate products. The proposed system provides benefits to all stakeholders involved, including manufacturers, distributors, retailers, and consumers. It allows manufacturers to securely store and manage product information on the blockchain, while distributors and retailers can easily verify the authenticity of products and track their movement. Consumers can have the confidence to purchase genuine products, and the system also offers a reward system to incentivize users to participate in maintaining the integrity of the platform. Overall, the project has the potential to revolutionize the way we identify and combat fake products, creating a safer and more reliable marketplace for all.

References

1. IEEE report on Blockchain Technology and Cryptocurrencies by Siddharth Rajput, Archana Singh, Smriti Khurana, Tushar Bansal, Sanyukta Shreshtha, Department of Information Technology, ASET, Amity University Uttar Pradesh, NOIDA
2. J. Swaroop, Year: 2021, "Blockchain-based fake product identification system," International Research Journal of Modernization in Engineering Technology and Science, pp. 2582-5208.
3. M. D. Turjo; M. M. Khan, M. Kaur; A. Zaguia, Year: 2021, "Smart supply chain management using the blockchain and smart contract," Scientific programming.
4. T. Shreekumar; P. Mittal; S. Sharma, R. N. Kamath, S. Rajesh, B. N. Ganapathy, Year: 2022, "Fake Product Detection Using Blockchain Technology," Journal of Algebraic Statistics, Vol: 13.3, pp. 2815-2821.
5. J. Ma; S. Y. Lin; X. Chen; H. M. Sun; Y. C. Chen; H. Wang, Year: 2019, "A Blockchain-Based Application System for Product AntiCounterfeiting," International Journal Of Scientific & Technology Research Volume 8, Issue 12, pp. 2277-8616.
6. M. C. Jayaprasanna; V. A. Soundharya; M. Suhana; S. Sujatha, Year: 2021, "A Block Chain based Management System for Detecting Counterfeit Product in Supply Chain," IEEE 2021 Third International Conference on Intelligent Communication Technologies and Virtual Mobile Networks (ICICV).
7. Online - <https://www.geeksforgeeks.org/blockchaintechnology-introduction/>.
8. Online - <https://www.synopsys.com/glossary/what-isblockchain.html>