International Journal of Multidisciplinary Engineering in Current Research - IJMEC

Volume 10, Issue 5, May-2025, http://ijmec.com/, ISSN: 2456-4265

Fake Product Identification Using Block Chain

Pathapati Jyothi Sindhuri
PG scholar, Department of MCA, CDNR collage, Bhimavaram, Andhra Pradesh.
K.Suparna
(Assistant Professor), Master of Computer Applications, DNR collage, Bhimavaram, Andhra Pradesh.

Abstract:

Counterfeit products, especially in sectors like pharmaceuticals, pose serious threats to consumer safety and lead to significant financial losses. Traditional supply chains and online transactions often rely on third-party intermediaries, increasing the risk of data tampering and fraud. This project proposes a blockchain-based fake product identification system to address these issues by leveraging the decentralized, tamper-proof nature of blockchain technology. In this system, product details and barcodes are converted into digital signatures and stored securely on the Ethereum blockchain using Solidity smart contracts. The application consists of two main user roles: admin, who adds product details and manages users, and user, who verifies product authenticity. Users can retrieve product details and authenticate barcodes by comparing the scanned barcode's digital signature with the one stored on the blockchain. The system ensures data integrity and prevents counterfeit products by detecting any mismatch in digital signatures due to tampering. The blockchain's distributed hash verification further enhances security by detecting inconsistencies across nodes. The application is built using Flask for the backend and interacts with the Ethereum blockchain to perform real-time verification, offering a decentralized, secure, and transparent method for product authentication.

I. Introduction

In today's global market, the rise of counterfeit products has become a serious concern, especially in critical industries like pharmaceuticals, electronics, and consumer goods. Fake products not only result in massive financial losses for companies but can also pose severe health risks to consumers. One of the main reasons for the spread of counterfeit items is the vulnerability of traditional supply chains and the dependency on third-party intermediaries, who may tamper with product data or replicate barcodes to push fake goods into the market.

To address this issue, this project introduces a blockchain-based system for fake product identification. By leveraging the decentralized and tamper-resistant features of blockchain technology, the system ensures secure storage and verification of product data without relying on third parties. Each product's barcode is converted into a digital signature and stored on the Ethereum blockchain using smart contracts. This allows both companies and consumers to verify the authenticity of products in real-time, thereby strengthening trust in the supply chain and reducing the risk of counterfeit goods.

II. Literature Survey

1. Tian, F. (2016). "An agri-food supply chain traceability system for China based on RFID & blockchain technology."

This paper proposes a blockchain-based traceability system integrated with RFID to improve food safety in the agri-food supply chain. The author highlights how blockchain ensures tamper-proof and transparent data, reducing the risk of counterfeit food products. This work provides a strong foundation for using blockchain in any supply chain requiring product authentication.

2. Kshetri, N. (2018). "Blockchain's roles in meeting key supply chain management objectives."

This study explores the benefits of blockchain in enhancing supply chain transparency, reducing fraud, and increasing trust among stakeholders. It discusses various blockchain applications in logistics and product tracking, showing how decentralized data storage can prevent counterfeit items from entering the supply chain.

3. Toyoda, K., Mathiopoulos, P. T., Sasase, I., & Ohtsuki, T. (2017). "A novel blockchain-based product ownership management system (POMS) for anti-counterfeits in the post supply chain."

The authors present a blockchain framework for managing product ownership and detecting counterfeit goods. By recording every transaction in the supply chain on a blockchain, the system enables users to verify product authenticity and ownership history, making it highly applicable to anti-counterfeit efforts.

4. Kim, H. M., & Laskowski, M. (2018). "Toward an ontology-driven blockchain design for supply-chain provenance."

This paper introduces a semantic model that works with blockchain to track product provenance across a supply chain. It emphasizes the importance of combining ontologies with blockchain for better interoperability and data integrity, especially useful for industries battling counterfeits.

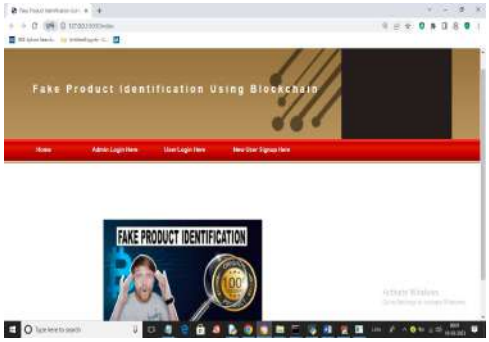
5. Francisco, K., & Swanson, D. (2018). "The supply chain has no clothes: Technology adoption of blockchain for supply chain transparency."

This research critically analyzes the adoption of blockchain in the supply chain industry, focusing on transparency and fraud prevention. It explains how blockchain can eliminate the need for intermediaries and ensure that only verified product data is shared across the supply network, making it harder for fake products to be introduced.

Proposed Method

The proposed system utilizes blockchain technology to create a secure and tamper-proof method for identifying fake products in the supply chain. In this system, product details and their associated barcodes are converted into digital signatures and stored on the Ethereum blockchain using smart contracts developed in Solidity. When a product is scanned by a user or distributor, its barcode is reprocessed to generate a digital signature, which is then compared with the original signature stored on the blockchain. If the signatures match, the product is verified as authentic; otherwise, it is flagged as counterfeit. This eliminates the need for third-party verification and ensures data integrity, as any unauthorized modification to product data would be immediately detected through hash mismatches. The system provides modules for admin and users to manage product data, perform real-time authentication, and securely store all records on the blockchain network.

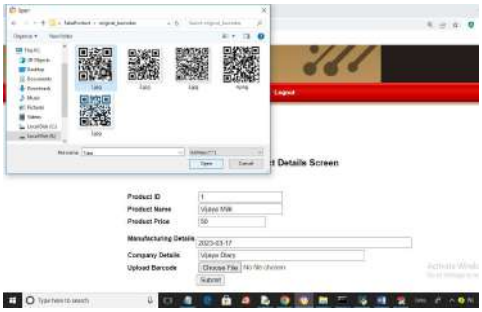
Results



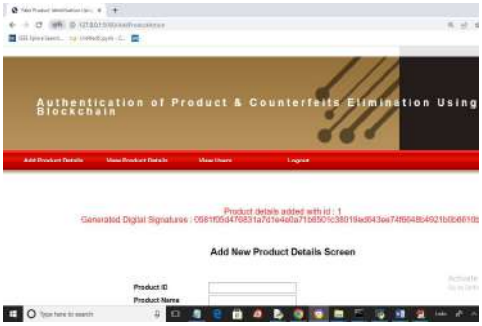
In above screen click on 'Admin Login Here' link to get below login screen

In above screen admin is login using username and password as 'admin and admin' and after login will get below admin Home page

In above screen admin can click on 'Add Product Details' link to add new product details

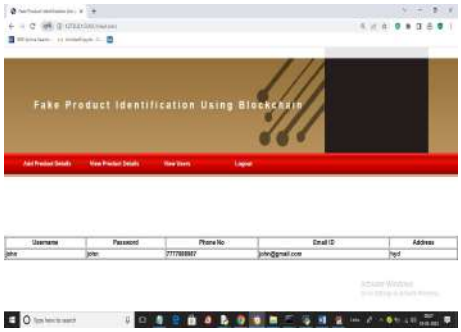


In above screen admin is entering product details and then uploading related Barcode and then press Submit button to extract digital signature from Barcode and then store in Blockchain and then will get below output

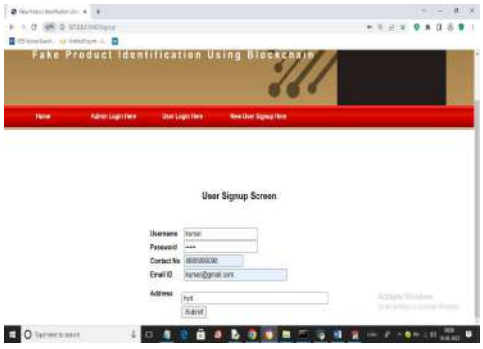


In above screen in red colour text we can see product ID and its generated signature stored in Blockchain and now admin can click on 'View Product Details' link to get below output

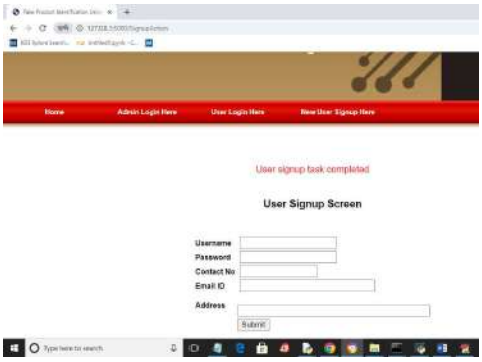
In above screen admin can retrieve product details from Blockchain and then view it and now click on 'View Users' link to get below output



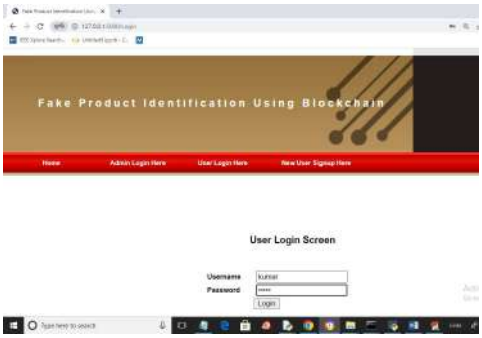
In above screen admin can retrieve all registered user details from Blockchain and then view it and now logout and then signup and login user



In above screen user is signing up and then press button to store user details in Blockchain and get below output

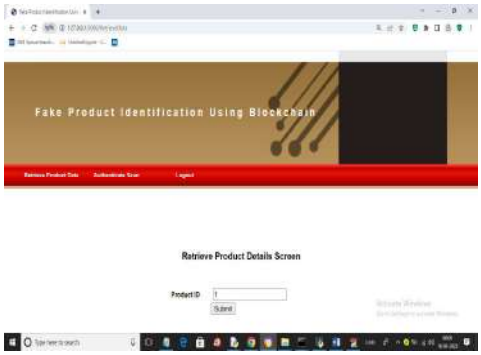


In above screen we can see user signup task completed and now click on 'User Login Here' link to get below screen

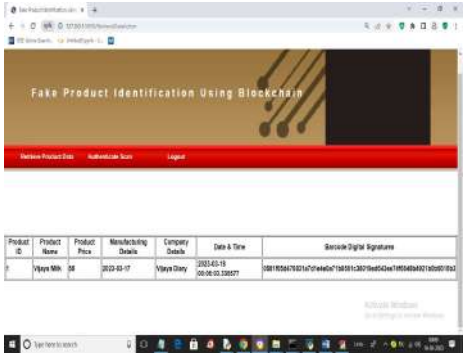


In above screen user is login and after login will get below user home page

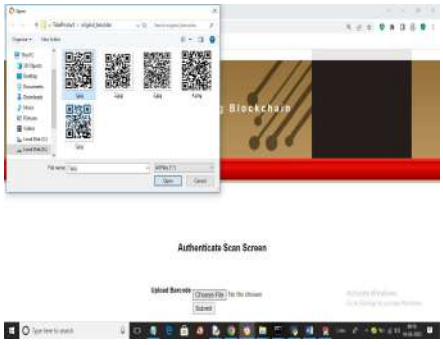
In above screen user can click on 'retrieve Product Details' link to search products using Product ID



In above screen user entered product ID as 1 and then press button to get below output



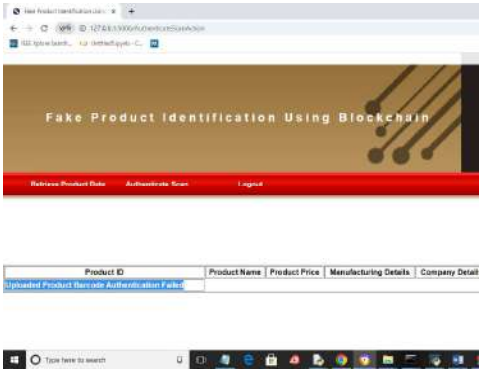
In above screen user can view all product details of Given ID and now click on 'Authenticate Scan' link which allow user to upload Product Barcode and then application will generate Digital Signature and verify with Blockchain signature and if signatures valid then will get product details else authentication get failed



In above screen I am uploading original Barcode and then press button to get below output

In above screen Barcode authenticated and we got all details from Blockchain and now upload Fake Barcode

In above screen selecting and uploading Fake barcode and then press button to get below screen



In above screen in blue colour text we can see fake barcode authentication got failed

Similarly you can add any number of product details and perform authentication using Blockchain

Conclusion

In conclusion, the proposed blockchain-based fake product identification system offers a robust and decentralized solution to combat the growing issue of counterfeit goods in the supply chain. By leveraging the immutable and transparent nature of blockchain technology, the system ensures that product data and barcodes remain secure and tamper-proof throughout their lifecycle. The integration of digital signatures and Ethereum smart contracts enables real-time authentication without relying on third parties, thus increasing trust, security, and efficiency in product verification. This approach not only helps protect consumers and manufacturers but also sets a foundation for broader adoption of blockchain in various industries requiring data integrity and traceability.

References

1. Tian, F. (2016). An agri-food supply chain traceability system for China based on RFID & blockchain technology. *13th International Conference on Service Systems and Service Management (ICSSSM)*, 1–6. IEEE. https://doi.org/10.1109/ICSSSM.2016.7538424
2. Kshetri, N. (2018). Blockchain's roles in meeting key supply chain management objectives. *International Journal of Information Management*, 39, 80–89. https://doi.org/10.1016/j.ijinfomgt.2017.12.005
3. Toyoda, K., Mathiopoulos, P. T., Sasase, I., & Ohtsuki, T. (2017). A novel blockchain-based product ownership management system (POMS) for anti-counterfeits in the post supply chain. *IEEE Access*, 5, 17465–17477. https://doi.org/10.1109/ACCESS.2017.2720760
4. Kim, H. M., & Laskowski, M. (2018). Toward an ontology-driven blockchain design for supply-chain provenance. *Intelligent Systems in Accounting, Finance*

and Management, 25(1), 18–27. https://doi.org/10.1002/isaf.1424

5. Francisco, K., & Swanson, D. (2018). The supply chain has no clothes: Technology adoption of blockchain for supply chain transparency. *Logistics*, 2(1), 2. https://doi.org/10.3390/logistics2010002