

# Identification of Counterfeit/Fake Products using Blockchain

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**Abstract:** Due to a lack of transparency, supply chain management regularly experienced problems such as service redundancy, insufficient departmental coordination, and a lack of standardization. These days, product counterfeiting is a highly common occurrence, and it is nearly impossible to identify a counterfeit goods by its appearance alone. For reputable businesses, counterfeiters pose serious problems, yet the full impact of counterfeit goods on brands is too often unknown. Several strategies have been developed in the past to deal with the issue of product counterfeiting. The most widely used techniques include the use of QR code-based systems, artificial intelligence, and RFID tags. However, there were a few drawbacks to each of them. Artificial intelligence employs CNN and machine learning, which require a lot of processing power. A QR code can be duplicated from a real product and placed on a false one, and so on.

The goal of this research is to enhance the identification of counterfeit goods by tracing their supply chain's past. Blockchain technology, which guarantees the identification and traceability of genuine products across the supply chain, makes this possible. With a blockchain-based system, several parties can access everything simultaneously and it becomes decentralized. One of its key benefits is that the recorded data is very safe and protected from any vulnerabilities because it is hard to alter without the agreement of all parties involved. This study describes a system for detecting counterfeit goods that uses blockchain technology.

**Keywords:** Counterfeit Products, Blockchain, Supply Chain Management, QR Code, Smart Contracts, Ethereum, Product Integrity, Authentication, Decentralized, Tamper-Resistance

## I. INTRODUCTION

When a product is sold as a counterfeit product, this is product counterfeiting. Faking to be another product. It is consumer fraud and generally referred to as unfair business practices. Cause consumers to incur losses financially or otherwise. As per the reports of the Authentication Solution Providers' Association it costs the Indian economy INR 1 trillion every year. The fake incident is increasing 20% average between 2018-2020.[1]. Counterfeit goods include fake handbags, clothes, makeup, and electronics. It not only affects the economy negatively but citizens as well. For instance, poor cosmetics can affect skin and skin diseases and rashes, fake electronic components can cause failure in gadgets, and it can even lead to unfavorable situations and mishaps. Poor quality clothes, when worn, shoes can be uncomfortable. Hence this issue requires finding some remedy for the sale of fakes.

Another effect of counterfeiting is reputation loss of a company. Because many customers are being enormously unaware that the thing, they are holding is a knock-off, if the knock-off product falls short of the expectation, breaks up with the great speed or do not satisfy their expectations, they will accuse the valid company. Customers demand recompense, whether as a refund form or as an exchange product, and they obtain it directly from the reputed company itself. Those affected businesses may find themselves in a situation where they are handling an unhappy customer lamenting over the poor state of the product's quality, and the customer care representative is not aware that the item in question is a counterfeit. Companies find themselves in a difficult situation where they need to satisfy their clients but also aim to avoid spending time and effort dealing with subpar imitations of their products. The damage by counterfeiters goes beyond interactions with clients. Distributors, retailers, and other business partners usually lose faith in real firms due to the actions of counterfeiters.

The best ways to reduce the risk of misleading counterfeiting in global supply chains are through supplier relationship management, cost control, and pre-supply evaluation techniques, as well as network transparency. Therefore, the purpose of this article is to introduce the Blockchain-based anti-counterfeit system and to empower suppliers and end users to monitor the product supply chain in a safe environment.

The suggested method aims to address the issue of brand counterfeiting and give suppliers, vendors, and customers the ability to verify the authenticity of the product.

## **II. LITERATURE REVIEW**

### **2.1 Blockchain Based Fake Item Identification System[1]**

The main objective of the author is to employ decentralized supply chain systems and blockchain technology to address the problem of counterfeit goods. The issues presented by counterfeit goods, possible threats to consumers and businesses, and suggested methods for utilizing blockchain, QR codes, and other technology to confirm the authenticity of goods are all covered in the document. The document also examines the functions of various stakeholders in the suggested structure, including producers, sellers, and purchasers.

Advantages:

By using secure, immutable data and smart contract automation, the suggested blockchain-based approach improves supply chain transparency and guarantees product authenticity. It fights counterfeiting, upholds customer confidence, and safeguards the reputations of producers.

Disadvantage:

Adoption is hindered by obstacles such adoption problems, security threats, privacy issues, and complicated implementations. These factors must be carefully considered for adoption to be successful.

### **2.2 An Ethereum based Fake Product Identification System using Smart Contract [2]**

This research paper presents an Ethereum-based system that uses smart contracts and blockchain technology to fight counterfeit goods. The system, authored by Balasubramani S, Rohit Singh, SoumenPranick, and Dhananjay Kumar from the Hindustan Institute of Technology and Science, improves product integrity by leveraging the immutability and decentralization of blockchain technology. Smart contracts and serial numbers are used to provide a transparent and safe way for customers to confirm the legitimacy of a product. The authors highlight the potential of their suggested approach in resolving the expanding problem of counterfeit goods by providing a thorough system architecture, algorithm, and analysis of the outcomes. They also include proposals for future security and efficiency enhancements to the system.

Advantages:

Using smart contracts and serial numbers, the Ethereum-based Fake Product Identification System uses blockchain technology to provide safe, immutable data that allows for independent product verification. It strengthens user empowerment, security, and transparency in the face of counterfeits.

Disadvantages:

Although the Ethereum-based solution improves product validity, blockchain presents scalability and cost issues. Potential negatives include adoption, environmental problems, and user awareness.

### **2.3 Detecting the Traceability Issues in Supply chain Industries using Blockchain Technology[3]**

The application of blockchain technology, particularly Ethereum and Hyperledger, to enhance safety and traceability in supply chain management for agriculture is examined in this article. It draws attention to problems with conventional systems and suggests fusing blockchain technology with Internet of Things methods like RFID and QR codes. The authors go over several consensus algorithms and stress how blockchain technology may improve supply chain authenticity, decrease fraud, and increase transparency.

Advantages:

Transparent traceability, real-time monitoring, and improved food safety are all ensured by blockchain in agriculture. Its decentralized structure lowers fraud, promotes transparency, lowers expenses, and fortifies general security, all of which are crucial advantages for supply chains involved in agriculture.

Disadvantages:

There are adoption, energy, and scalability issues with blockchain in agriculture. Cost-effectiveness is impacted by environmental issues and transaction fees. For the implementation to be successful, these problems must be resolved.

#### **2.4 Fake Product Identification using Blockchain [4]**

The study suggests a blockchain-based anti-counterfeiting solution that enables supply chain product tracking through QR codes. It talks about the growing problem of counterfeit goods hurting consumers and businesses. Technology guarantees transparent and safe identification, enabling customers to confirm the legitimacy of products. A comprehensive system architecture involving manufacturers, blockchain, smart contracts, merchants, and customers is part of the process. The study highlights the need for continued research to address issues like blockchain scalability, even though it acknowledges them. JavaScript is used for the front end, Ethereum blockchain is used for safe transactions, and Solidity is used for smart contracts. The system's viability is shown by the outcomes, and the significance of these systems for customer safety and brand reputation is emphasized in the conclusion. Future additions are advised, such as the use of digital signatures.

Advantages:

A blockchain-based anti-counterfeiting solution guarantees transparent, safe supply chains that are impenetrable. Improves scalability, security, and real-time visibility, effectively combating counterfeit goods.

Disadvantages:

The blockchain anti-counterfeiting system has several drawbacks, such as difficulties scaling, slower processing, increased transaction fees as it expands, possible security threats, difficult implementation, and interoperability problems. Even while attempts are being made to overcome these issues, they may still prevent widespread adoption.

#### **2.5 Strengthening Supply Chain Integrity with Blockchain-based Anti-Counterfeiting Measures [5]**

The study suggests a blockchain-based method to stop the supply chain from being filled with fake goods. The authors argue in favor of a decentralized solution, highlighting the threats that counterfeit goods represent to consumer health and retailer reputation. The technology authenticates products via barcodes and QR codes connected to blockchain, giving customers the ability to independently confirm authenticity. Web3js, MongoDB, and Ganache are some of the technologies used in the suggested architecture. The document includes thorough implementation instructions for producers, retailers, and buyers in addition to citations from relevant works. All things considered, the writers conclude that blockchain provides a practical and open-source way to deal with the problems caused by fake goods in the supply chain.

Advantages:

Anti-counterfeiting using blockchain technology: QR codes, blockchain, and decentralization protect supply chains, increase transparency, and give customers more control. Removing middlemen reduces expenses, stops income loss, and guarantees authenticity. It's essentially an affordable, transparent, and safe approach.

Disadvantages:

Anti-counterfeiting solutions based on blockchain face difficulties such as scalability problems, integration complications, and a learning curve. Additional barriers to wider use include privacy issues, regulatory compliance, energy consumption, interoperability, and legal difficulties.

#### **2.6 Fake Product Detection Using Blockchain Technology [6]**

To reduce the financial and safety hazards connected with phony goods, the research article presents a blockchain-based method for detecting counterfeit items. With the use of a camera scanner and barcodes connected to a blockchain, the system allows consumers to confirm the legitimacy of products. Producers designate distinct QR codes, encoding product information in unchangeable segments. Consumers can verify validity by scanning the code, and they will receive notifications if they do. The method offers a safe and decentralized option for product authentication and seeks to increase confidence, reduce dependency on retailers, and prevent counterfeiting.

Advantages:

Blockchain technology and QR codes are used by this method to stop the sale of fake goods. It increases the transparency of the supply chain, reduces losses for producers, and gives customers the ability to independently confirm the authenticity of products.

Disadvantages:

Difficulties include opposition from the industry, expensive setup, privacy issues, and reliance on broad acceptance. Furthermore, using QR codes only requires smartphone accessibility and user involvement.

### **2.7 Fake Product Identification with the Help of Block Chain Technology [7]**

The benefits of Blockchain technology are examined in the paper, with a focus on how it may be used to build transparent and safe systems without the need for middlemen. Data security, decentralization, untrace ability, transparency, and flexibility are important characteristics. Three parties make up the authors' proposed Blockchain-based product anti-counterfeiting framework: the buyer, seller, and manufacturer. By enabling producers to keep product data on Blockchain, the system guarantees sales transparency. Buyers have the option to verify vendor-side. Discussions on system architecture, code readability, and prospective upgrades are included in the paper's conclusion. All in all, it sheds light on how Blockchain technology might be used to solve problems like product counterfeiting in a decentralized way.

Advantages:

Blockchain uses public key cryptography to provide safe, decentralized, and transparent transactions. Data security, decentralization, untrace ability, transparency, and flexibility are some of the features of the technology. The study suggests a supply chain security and product authentication blockchain-based anti-counterfeiting system.

Disadvantages:

The disadvantages of blockchain technology encompass difficulties with scalability, excessive energy usage, regulatory obstacles, potential for 51% assaults, intricacy impeding acceptance, and a dearth of standards.

### **2.8 Fake Product Detection Using Blockchain [8].**

The use of blockchain technology for product detection is covered in the abstract with the goal of boosting consumer confidence and lowering the amount of counterfeit goods. The suggested approach makes use of QR codes that are unique to every product and enable users to scan them to confirm authenticity. The decentralized structure of blockchain provides safe storing of transaction data. The process includes actions including creating QR codes, registering products, and authenticating scans. The system architecture stores data on the Ethereum blockchain and MySQL, and it comprises merchants, end users, and administrators. The application interface and transaction history are displayed in the results. The potential to eradicate counterfeit goods through widespread adoption is emphasized in the conclusion. Studies on blockchain technology and its uses are cited.

Advantages:

Blockchain technology guarantees dependable identification of counterfeit goods, enabling customers through safe, decentralized verification. By streamlining the procedure, QR codes encourage authenticity and openness.

Disadvantages:

Challenges for blockchain-based phony product identification include the requirement for broad acceptance, possible regulatory obstacles, and scalability concerns. Furthermore, the dependence on technology can leave out people with little access to digital resources.

### **2.9 Fake Product Detection Using Blockchain Technology[9]**

This study explores the use of blockchain technology for the identification of counterfeit goods, putting forth a decentralized verification, smart contract, and unique QR code system. Improving supply chain coordination, lowering fraud, and increasing transparency are the objectives. Notwithstanding the possible advantages, issues with scalability are recognized. According to the study, blockchain will revolutionize the fight against counterfeit goods and provide a more secure marketplace for both customers and enterprises.

Advantages:

Blockchain improves the security of the supply chain's counterfeit goods detection and transparency. Smart contracts minimize fraud and promote cooperation by guaranteeing an unchangeable record. This decentralized structure creates a more secure marketplace and increases consumer confidence.

Disadvantages:

Lack of standards, possible inefficiencies, and technical complexity are obstacles in blockchain-based false product identification. Additional negatives include worries about privacy and secrecy, scalability, and regulatory compliance.

**2.10 QR Code with Block Chain Technology for Medical Device Ownership [10]**

The study makes recommendations for a solution to prevent fake medical equipment that incorporates blockchain technology and QR codes. It is suggested that medical devices be identified quickly and affordably using QR codes, and that data be stored securely in a decentralized manner using blockchain technology that makes data manipulation challenging. The technology, which enables users to confirm medical equipment ownership, attempts to improve security, privacy, and authenticity in the healthcare supply chain. The study highlights how crucial it is to protect patient data related to medical devices at every stage of their lives.

Advantages:

The solution combines blockchain technology with QR codes to offer safe and effective medical device management. While blockchain guarantees tamper-resistant records, preventing counterfeiting, improving data privacy, and providing strong authentication for medical devices, QR codes allow for speedy verification.

Disadvantages:

There are difficulties in implementing the system, such as integration barriers, scalability issues with blockchain, and vulnerabilities with QR codes. Resolving them is necessary for broad success.

**III. ANALYSIS TABLE**

The following table gives the analysis of techniques and methods used in research papers on image processing and identification.

Sr. No	Paper Title	Techniques	Addressed Issue
1	Blockchain Based Fake Item Identification System [1]	QR Codes, Blockchain Technology, Data Encryption (AES), Secure Protocols: VPN, SSH, and HTTPS, Smarts Contracts, Cryptography Techniques (Hashing, RSA)	Using blockchain technology and QR codes for safe product validation along the supply chain, the system fights counterfeiting. It tackles e-commerce issues by guaranteeing an open and safe supply chain and by using the immutability of blockchain to stop data manipulation. This method improves security against fake goods, traceability, and transparency overall.
2	An Ethereum based Fake Product Identification System using Smart Contract [2]	Blockchain Technology, Solidity Smart Contracts, Verification of Serial Number, Development of Decentralized Applications (DApps), IPFS (Interplanetary File System) SHA256 Blockchain Algorithm for Decentralized Storage, Mining Blockchain, Consensus Mechanism for Blockchain, Public Key	The use of blockchain technology to address problems with fraud, duplication, and counterfeit goods is covered in the text. It focuses on the use of blockchain in social networks, smart agriculture, supply chain management, and healthcare. The suggested approach seeks to strengthen product traceability, stop counterfeit items, and increase security.



		Infrastructure (PKI) for Authentication, Polygon Chain Integration with Ethereum Chain.	
3	Detecting the Traceability Issues in Supply chain Industries using Blockchain Technology [3]	Blockchain Platforms: Ethereum Hyperledger (specifically, Hyperledger Sawtooth) IoT (Internet of Things) Techniques: Barcodes, RFID, NFC, QR codes	The study discusses problems with traceability in the agricultural supply chain, including centralized systems, opaqueness, and inaccurate data. To improve traceability, it suggests utilizing blockchain technology and Internet of Things methods like barcodes and RFID. The goal is to reduce worries about food safety and quality by enhancing the agri-food supply chain's security, dependability, and transparency.
4	Fake Product Identification using Blockchain [4]	Blockchain Technology, Smart Contracts, QR code Integration, Product Information Ledger, Authentication Mechanisms, Real-time Visibility, Cooperation and Trust, integration with IoT Devices, QR Code Verification, Enhancements through Digital Signature.	The suggested method uses blockchain, QR codes, and smart contracts to address the problem of counterfeit products and create transparent, traceable supply chains. Assuring product authenticity and real-time visibility in the supply chain promotes collaboration among stakeholders, improves customer safety, and protects company reputations.
5	Strengthening Supply Chain Integrity with Blockchain-based Anti-Counterfeiting Measures [5]	Blockchain Technology, Smart Contracts, QR code, Web3.js, Ganache, MongoDB.	Duplication and counterfeiting of goods. influence on the earnings and reputation of the company. Risks to the safety and health of consumers Monetary losses as a result of fake goods Business partners' lack of trust in one another Challenges in identifying fake goods. Possibility of disputes between producers and retailers Obstacles in the regulation of product quality revenue loss for legitimate producers higher expenses to combat counterfeit goods.
6	Fake Product Detection Using Blockchain Technology [6]	Blockchain Technology, Smart Contracts, QR code, Barcodes, Camera Scanner Technology, Firebase Database, Encryption Techniques, OTP Authentication, Meta Mask Wallet, Web3.js, Remix IDE	This study paper addresses the many problems associated with counterfeit goods, which put consumers' money, health, and safety at risk and cost original manufacturers money. In an effort to decrease dependency on third-party verification and raise general consumer confidence in the market, it presents a blockchain-based system for identifying and tracking counterfeit items.

7	Fake Product Identification with the Help Of Block Chain Technology [7]	BlockchainTechnology, Decentralization, Digital Signatures, Data Protection and Privacy, SQL Databases	By guaranteeing product authenticity and cutting expenses, the suggested approach uses blockchain technology to address the problem of counterfeit products. It challenges established trust protocols and makes use of digital signatures for identity verification, decentralized blockchain, and tamper-proof and transparent records. By utilizing blockchain characteristics like decentralization and data security, it offers a strong defense against fake goods.
8	FAKE PRODUCT DETECTION USING BLOCKCHAIN [8]	BlockchainTechnology, MetaMask Wallet, Smart Contracts, QR Code, NodeJS, Web3.js Library, React, MySQL Database	The method uses blockchain technology to solve the growing problem of counterfeit goods. Financial losses and security issues have resulted from counterfeiting. Using product specific QR codes, the suggested method enables customers to independently confirm authenticity via blockchain. By fostering confidence between retailers and customers, this decentralized strategy may lessen the negative effects of counterfeit goods.
9	FAKE PRODUCT DETECTION USING BLOCKCHAIN TECHNOLOGY [9]	BlockchainTechnology, Smart Contracts, QR Code, Supply chain Tracking, Fraud Detection, Reporting and Remediation, Collaboration and Transparency, Continuous Monitoring and Updates	The system solves issues with conventional approaches by using blockchain to fight counterfeit goods. Manufacturers authenticate and register their items through QR code verification and smart contracts, guaranteeing traceability and transparency. This strategy improves stakeholder participation while resolving difficulties with data quality and privacy, providing a viable option for a safe marketplace.

**IV. CONCLUSION**

In Conclusion, the study papers bring to light the widespread problem of counterfeit goods and the negative effects they have on different sectors of the economy, consumers, and the reputation of brands. Supply chain transparency, product authenticity, and traceability are to be improved by the suggested solutions, which primarily make use of blockchain technology, QR codes, and smart contracts.

The development of decentralized, tamper-resistant systems that can greatly reduce the hazards associated with counterfeit goods is made possible in large part by blockchain technology. Blockchain provides a strong platform for creating transparent supply chains, fostering consumer confidence, and protecting brand reputations by guaranteeing safe and unchangeable records. The efficiency of these systems is further increased by the incorporation of smart contracts and QR codes, which offer mechanisms for speedy product inspection and automated agreement implementation.

Although the suggested solutions show promise, it is noted that there are still issues with scalability, adoption barriers, privacy, and technological complexity. For blockchain-based anti-counterfeiting techniques to be widely used and successful, several obstacles must be overcome.

**REFERENCES**

- [1] N. Saxena, H. Singh, P. Singh, N. Agarwal and V. Tyagi, "Blockchain Based Fake Item Identification System," 2023 IEEE IAS Global Conference on Emerging Technologies (GlobConET), London, United Kingdom, 2023, pp. 1-6, doi: 10.1109/GlobConET56651.2023.10149933. keywords: {Codes;Databases;Manufacturedproducts;Supply chains;QR codes;Blockchains;Counterfeiting;Web;Blockchain;Fake;Consumer;Producer},
- [2] B. S, S. Pramanick, R. Singh and D. Kumar, "An Ethereum based Fake Product Identification System using Smart Contract," 2022 6th International Conference on Intelligent Computing and Control Systems (ICICCS), Madurai, India, 2022, pp. 292-296, doi: 10.1109/ICICCS53718.2022.9788449. keywords: {Industries;Productcodes;Impedancematching;Smartcontracts;Marketresearch;Control systems;Blockchains;Blockchain;Ethereum;Authentication;Counterfeit;Serial number;Solidity},
- [3] B. Subashini and D. Hemavathi, "Detecting the Traceability Issues in Supply chain Industries using Blockchain Technology," 2022 International Conference on Advances in Computing, Communication and Applied Informatics (ACCAI), Chennai, India, 2022, pp. 1-8, doi: 10.1109/ACCAI53970.2022.9752478. keywords: {Productivity;Systematics;Supply chain management;Qualityassurance;Supplychains;Globalization;Organizations;Blockchain;SupplyChain;Traceability;IOT;Ethereum;Hyper ledger Saw tooth},
- [4] R. Pitale, K. Tajane, S. Khandagale, V. Gadewar, A. Mhaisale and G. Bidwai, "Fake Product Identification using Blockchain," 2023 5th International Conference on Inventive Research in Computing Applications (ICIRCA), Coimbatore, India, 2023, pp. 1267-1271, doi: 10.1109/ICIRCA57980.2023.10220902. keywords: {Surveys;Supplychains;Authentication;QRcodes;Companies;Blockchains;Safety;Fakeproduct;QRcode;Blockchain;Supply Chain},
- [5] S. Prajapati, J. Gadhari, T. Sawant, J. Kini and S. Solanki, "Strengthening Supply Chain Integrity with Blockchain-based Anti-Counterfeiting Measures," 2023 International Conference on Innovative Data Communication Technologies and Application (ICIDCA), Uttarakhand, India, 2023, pp. 786-790, doi: 10.1109/ICIDCA56705.2023.10100264. keywords: {Wireless communication;Productcodes;Manufacturedproducts;Supplychains;QRcodes;Companies;Blockchains;Blockchain;SmartContracts;QR (Quick Response) code},
- [6] Shreekumar, T., et al. "Fake Product Detection Using Blockchain Technology." Journal of Algebraic Statistics 13.3 (2022): 2815-2821.
- [7] S. Kalpana Devi, K. Samy Durai, K. M. Shri Balaji and J. Ravi Kumar, "Fake Product Identification with the Help of Block Chain Technology," 2021 Innovations in Power and Advanced Computing Technologies (i-PACT), Kuala Lumpur, Malaysia, 2021, pp. 1-6, doi: 10.1109/i-PACT52855.2021.9696859. keywords: {Technological innovation;Codes;Costs;Productdesign;Forgery;Blockchains;Qualityassessment;Blockchain;Legitimate;Counterfeit;Decentralised},
- [8] Khan, Abdul Rawoof, et al. "Fake Product Detection Using Blockchain." International Research Journal of Modernization in Engineering Technology and Science 4.07 (2022).
- [9] Tiwari, Kishan, et al. "Fake Product Detection Using Blockchain Technology." International Research Journal of Engineering and Technology (IRJET) 10.03 (2023).
- [10] K. Makanyadevi, S. Rithika, S. Biratheep and S. Subanki, "QR Code with Block Chain Technology for Medical Device Ownership," 2023 9th International Conference on Advanced Computing and Communication Systems (ICACCS), Coimbatore, India, 2023, pp. 1760-1764, doi: 10.1109/ICACCS57279.2023.10112771. keywords: {Medical devices;Protocols;Supplychains;QRcodes;Tokenization;Blockchains;Safety;Secure Medical Device Information;QR Code Generation;BlockchainTechnology;Authenticity;Verification;Medical device purchase},
- [11] Jadhav, Roshan, et al. "System for Identifying Fake Product using Blockchain Technology." 2022 7th International Conference on Communication and Electronics Systems (ICCES). IEEE, 2022.
- [12] Wasnik, Kunal, et al. "Detection of Counterfeit Products using Blockchain." ITM Web of Conferences. Vol. 44. EDP Sciences, 2022.
- [13] Mhatre, Mrunal, et al. "BCPIS: Blockchain-based counterfeit product identification system." Journal of Applied Security Research 18.4 (2023): 740-765.
- [14] Jambhulkar, Swaroop, et al. "Blockchain Based Fake Product Identification System." International Research Journal of Modernization in Engineering Technology and Science 4.05 (2022).



- [15] Kumar, Randhir, and Rakesh Tripathi. "Traceability of counterfeit medicine supply chain through Blockchain." 2019 11th international conference on communication systems & networks (COMSNETS). IEEE, 2019.
- [16] Singhal, Ishaan, Himanshu Singh Bisht, and Yogesh Sharma. "Anti-Counterfeit product system using blockchain technology." International Journal for Research in Applied Science & Engineering Technology 9.12 (2021): 291-295.
- [17] Singhal, Ishaan, Himanshu Singh Bisht, and Yogesh Sharma. "Anti-Counterfeit product system using blockchain technology." International Journal for Research in Applied Science & Engineering Technology 9.12 (2021): 291-295.
- [18] Singhal, Ishaan, Himanshu Singh Bisht, and Yogesh Sharma. "Anti-Counterfeit product system using blockchain technology." International Journal for Research in Applied Science & Engineering Technology 9.12 (2021): 291-295.
- [19] Bali, Aadeesh, Amrit Singh, and Sunandan Gupta. "Fake Product Detection System Using Blockchain." Conference: Fake Product Detection Using Blockchain. 2022.
- [20] Dsouza, Antony Roshan, Shantala Devi Patil, and K. Amuthabala. "Identification of Fake Products Using Blockchain." International Journal of Human Computations & Intelligence 2.2 (2023): 73-81.
- [21] Shaik, Cheman. "Preventing counterfeit products using cryptography, qr code and webservice." Computer Science & Engineering: An International Journal (CSEIJ) 11.1 (2021).
- [22] Timothy, J. Kevin, et al. "Fake Product Detection Using Blockchain Using QR Code." 2023 International Conference on Quantum Technologies, Communications, Computing, Hardware and Embedded Systems Security (iQ-CHESS). IEEE, 2023.
- [23] Prathipa, S., et al. "Counterfeit Product Detection in Supply Chain Management with Blockchain." 2022 1st International Conference on Computational Science and Technology (ICCST). IEEE, 2022.
- [24] Pitale, Rahul, et al. "Fake Product Identification using Blockchain." 2023 5th International Conference on Inventive Research in Computing Applications (ICIRCA). IEEE, 2023.
- [25] Hussain, Syed Naimatullah, Ms Shruti Jalapur, and Mr Anil Pawar. "IDENTIFYING FAKE PRODUCTS USING HYPERLEDGER FABRIC BLOCKCHAIN." Journal of Data Acquisition and Processing 38.1 (2023): 712.
- [26] Prathyusha, M., and VanikShrest. Detecting Fake Products with Blockchain Technology. No. 10629. EasyChair, 2023.
- [27] Begum, Gousiya, G. Pavan Kumar, and Ch Bharath. "Fake Product Identification Using Blockchain."
- [28] Shreekumar, T., et al. "Detection of Fake Products Using Blockchain Technology." Journal of Algebraic Statistics 13.3 (2022).
- [29] Katti, Jayashree, et al. "VERIFYING AUTHENTICITY OF PRODUCTS BASED ON BLOCKCHAIN AND QR CODE TO AVOID COUNTERFEITING."
- [30] Jadhav, Abhishek, et al. "DETECTION OF FAKE PRODUCTS USING BLOCKCHAIN."