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E-COMMERCE MANAGEMENT USING WEB3 TECH

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Abstract: Blockchain and NFT tokens will play an important role in the technology sector in the near future, and this process may help us to prevent scams in online exchange products as well as generate worthy trust in society. Hundreds of complaints have been filed in which the buyer or seller claimed to be defense personnel and displayed fake ID proofs to gain trust.

Because Traditional Marketplace currently lacks a feature for reviewing sellers, users who want to buy products have little doubt about whether the seller can be trusted with the items they sell. Users can use it to determine whether a seller is reliable or not. Also, as a reference for purchasing items from the seller using NFT tokens. The Web3 is advancing more quickly in our society. Hopefully, it will have the widest possible audience for its reliable exchange, ownership transparency, and certified products.

An NFT marketplace is a gateway to trade digital assets.The latest web assets, from simple artwork to expensive asset exchange, are available for purchase and sale on the NFT marketplace. Non-fungible tokens' ownership verification capabilities are their main advantage. Given that they are on a blockchain network, NFTs can help to link ownership to a single account. Since the blockchain can permanently store information about the product, checking for rarity and authenticity will soon be a thing on physical products too. In the rapidly evolving landscape of online marketplaces, the emergence of NFT (Non-Fungible Token) technology has ushered in a new era for both the sale of new and used products. This abstract delves into the dynamics of an NFT marketplace that caters to a diverse range of commodities, offering a seamless platform for buyers and sellers alike.

This innovative marketplace leverages blockchain technology to tokenize both new and used products, providing each item with a unique digital identity that is securely stored on the blockchain. The use of NFTs ensures authenticity and provenance, instilling trust among users and mitigating the risk of counterfeit goods. The platform employs smart contracts to automate transactions, streamlining the buying and selling process while reducing the need for intermediaries.

I. INTRODUCTION

Blockchain, the foundational technology underpinning cryptocurrencies, is a decentralized and distributed ledger that records transactions across a network of computers. In the context of blockchain and NFTs (Non-Fungible Tokens), a domain refers to a specific area or category within the blockchain where unique digital assets, such as NFTs, are created, traded, and verified. Blockchain domains ensure the immutability and transparency of transactions related to NFTs, providing a secure and tamper-proof record of ownership and provenance.

Within the blockchain domain for NFTs, each token represents a distinct and indivisible asset, often tied to digital or physical items like art, music, virtual real estate, or collectibles. The decentralized nature of the blockchain ensures that no single entity has control over the entire domain, promoting trust and eliminating the risk of unauthorized alterations to ownership records.

NFTs, as unique tokens on the blockchain, derive their value from scarcity, authenticity, and the verifiable ownership granted by the blockchain domain. Smart contracts, self-

executing code on the blockchain, facilitate the creation and transfer of NFTs, automating processes such as royalty payments to creators when their NFTs are resold.

1.1 Blockchain

Blockchain, at its core, is a decentralized and distributed ledger technology that enables secure, transparent, and tamper-resistant recording of transactions. The fundamental concept involves a chain of blocks, where each block contains a list of transactions, and these blocks are linked together in a chronological and cryptographic manner. This cryptographic linkage ensures the integrity of the entire transaction history, making it virtually impossible to alter past records without changing subsequent blocks. Consensus mechanisms, such as proof-of-work or proof-of-stake, govern how transactions are added to the blockchain. Participants in the network, known as nodes, validate and agree on the transactions through a consensus process, ensuring a single version of truth across the entire network. This decentralized validation mechanism enhances security and eliminates the need for a central authority.

Immutability is a key feature of blockchain, meaning that once a block is added to the chain, its content cannot be changed retroactively. This immutability, combined with decentralization, mitigates the risk of fraud and unauthorized manipulation. Cryptographic techniques, such as public and private key pairs, secure the identity of participants and enable secure ownership and transfer of digital assets. Smart contracts, self-executing code stored on the blockchain, add programmability to the system, automating complex transactions and agreements without the need for intermediaries. These contracts execute predefined rules when specified conditions are met, further enhancing the efficiency and autonomy of blockchain applications. Blockchain technology finds applications beyond cryptocurrencies, extending to supply chain management, healthcare, finance, and more. Its decentralized and secure nature makes it a transformative force, reshaping how we manage, verify, and trust data in the digital age. As a foundational technology, blockchain has the potential to revolutionize various industries, providing a new paradigm for trust and transparency in a global, digitalized society.

1.2 Smart Contract for NFTs

Smart contracts play a pivotal role in NFT (Non-Fungible Token) marketplaces by automating and facilitating the creation, transfer, and execution of various processes related to digital assets. Here's an explanation of how smart contracts work in an NFT marketplace:

1. Creation of NFTs:
Smart contracts are used to create NFTs on the blockchain. When an artist or content creator mints a new digital asset, a smart contract is deployed to represent that asset as an NFT. The smart contract defines the unique characteristics of the NFT, such as ownership details, metadata, and any associated terms or conditions.

2. Ownership and Transfer:
The ownership and transfer of NFTs are managed by smart contracts. When a user purchases an NFT, the smart contract automatically updates the ownership records on the blockchain, transferring control and ownership to the buyer. This process is executed securely and transparently, ensuring the authenticity and provenance of the digital asset.

3. Royalties and Revenue Sharing:
Smart contracts in NFT marketplaces often incorporate royalty mechanisms. When an NFT is resold or transferred to a new owner, the smart contract automatically enforces predefined royalty percentages for the original creator. This automated revenue-sharing feature ensures that creators continue to benefit from the resale of their work in the secondary market.

4. Auction and Bidding:
Smart contracts can facilitate auction mechanisms within NFT marketplaces. Users can bid on NFTs, and the smart contract automatically manages the bidding process, updating the highest bid and transferring ownership to the highest bidder once the auction concludes. This eliminates the need for intermediaries and ensures a fair and transparent auction process.

5. Conditional Execution:
Smart contracts allow for conditional execution based on predefined rules. For example, a smart contract could stipulate that certain conditions must be met before an NFT is transferred, such as the approval of multiple parties or the occurrence of a specific event.

6. Interoperability and Standards:
Standardization of smart contracts ensures interoperability across different NFT marketplaces and platforms. Common standards, like ERC-721 and ERC-1155, provide a consistent framework for creating, transferring, and interacting with NFTs, fostering a broader ecosystem for digital assets.

By leveraging smart contracts, NFT marketplaces enhance the efficiency, transparency, and automation of various processes, ultimately contributing to the growth and

widespread adoption of NFTs across diverse industries and applications.

1.3 Polygon

Polygon, formerly known as Matic Network, is a layer 2 scaling solution for Ethereum, designed to enhance its scalability and improve transaction speeds. Launched in 2017, Polygon aims to address the limitations of Ethereum, such as high gas fees and slow confirmation times, by providing a framework for building and connecting multiple blockchain networks. The platform leverages a combination of sidechains, Plasma chains, and other scaling techniques to achieve its goals.

Three main characteristics of blockchain:

1. Decentralization: One of the fundamental characteristics of blockchain is its decentralized nature. Instead of relying on a central authority, blockchain operates on a distributed network of nodes that validate and record transactions. This decentralization enhances security, reduces the risk of a single point of failure, and promotes trust among participants.

2. Immutability: Blockchain ensures the immutability of recorded transactions. Once a block is added to the chain, it becomes extremely difficult to alter or tamper with the information within that block. This immutability is achieved through cryptographic hashing and consensus mechanisms, providing a transparent and secure record of transactions over time.

3. Consensus Mechanism: Blockchain networks rely on consensus mechanisms to agree on the validity of transactions and the order in which they are added to the blockchain. Various consensus algorithms exist, such as Proof of Work (PoW) and Proof of Stake (PoS), each with its own advantages. Consensus mechanisms contribute to the security and integrity of the blockchain by ensuring that all participants reach an agreement on the state of the ledg

II. LITERATURE SURVEY

MOHAMMAD MADINE [1] developed the context of time-bound access and monetization of private data using blockchain and NFTs, a major technical advancement involves the development of decentralized access control mechanisms. Smart contracts are employed to create NFTs that represent time-limited access rights to specific datasets. The blockchain ensures transparency and immutability in tracking access permissions, while the time-bound nature of these NFTs provides a secure and auditable way to grant and revoke access to private data.

RAJA JAYARAMAN [2] To address the inherent privacy concerns in sharing private data, a key technical aspect involves integrating privacy-preserving technologies with blockchain and NFTs. Zero-knowledge proofs and homomorphic encryption are employed to enable secure and private transactions on the blockchain. NFTs act as verifiable credentials, allowing users to access specific data without revealing sensitive details. This technical work ensures that time-bound access and monetization of private data can occur within a framework that prioritizes user privacy and data security.

Senay A. Gebreab [3] In the realm of AI, establishing secure ownership and transparent trading mechanisms for AI models poses a significant challenge. Traditional methods often lack the necessary traceability, immutability, and auditability to effectively manage these valuable assets. Blockchain technology, with its inherent characteristics of decentralization, security, and transparency, offers a promising solution to address these shortcomings. By leveraging blockchain technology, a secure and trustworthy framework can be established for AI model ownership and trading. Each AI model can be represented as a unique non-fungible token (NFT) on the blockchain, providing an indisputable record of ownership and facilitating transparent transactions. The immutability of the blockchain ensures that ownership records remain unaltered, preventing unauthorized modifications or claims of ownership.

IBRAR YAQOOB [4] maintaining transparent ownership and trading mechanisms for AI models is crucial, ensuring the privacy and security of these models is equally important. Sensitive information contained within AI models should be protected from unauthorized access, while legitimate users should be granted appropriate access privileges. Granular access control mechanisms, implemented through blockchain technology and NFTs, can effectively address these privacy concerns. By associating access permissions with specific NFTs, the proposed framework enables fine-grained control over who

S.No	Title	Author	Pros	Cons
1.	Blockchain and NFTs for Trusted Ownership, Trading, and Access of AI Models	Ammar, Mohammad Madine, Ibrar Yaqob	Improved transparency and fairness - Secure and verifiable access control	Integration challenges and additional costs - Potential security vulnerabilities
2.	Blockchain and NFTs for Time-Bound Access and Monetization of Private Data	Mohammad Madine, Khaled Salah, Raja Jayaraman, Ammar Battah, Haya Hasan, And Ibrar Yaqob	Enhanced data privacy and control - Monetization of private data	Integration challenges and additional costs - Potential privacy breaches
3.	NFTCert: NFT-Based Certificates With Online Payment Gateway	Xiongfei Zhao, Yain-Whar Si	Secure and verifiable proof of ownership - Streamlined issuance and payment processing	Integration challenges and compatibility issues - Potential fraud
4.	Design and Implementation of NFT-Based System	Jiahui Huang, Yuzhuo Shan, Yining Wang	Enhanced device security and traceability - Improved device management	Integration challenges and infrastructure requirements - Privacy concerns
5.	NFT-Based Traceability and Ownership Management of Devices	Senay A. Gebreab, Haya R. Hasan, Khaled Salah, (Senior Member, IEEE), AND Raja Jayaraman	Enhanced device tracking and verification - Improved supply chain transparency	Integration challenges and infrastructure requirements - Privacy concerns

can access and utilize AI models. Furthermore, proxy re-encryption techniques can be employed to ensure secure data access without compromising the privacy of the AI model itself. Proxy re-encryption allows authorized users to decrypt and access the model's data without revealing the original encryption keys, protecting the model's integrity and confidentiality.

XIONGFEI ZHAO [5] The NFTCert framework utilizes a standardized schema to define the structure and attributes of NFT-based certificates. This schema ensures consistency and interoperability across different issuing entities and verification platforms. Key elements of the NFTCert schema include:

Certificate Identifier: A unique identifier that distinguishes each NFT-based certificate.

Issuing Entity: The organization or institution authorized to issue the certificate.

Certificate Recipient: The individual or entity to whom the certificate is awarded.

Certificate Type: The specific type of credential, such as academic degree, professional certification, or skill badge.

Certificate Metadata: Additional details about the certificate, such as issuance date, expiration date, and any relevant coursework or training.

Fig. 1. Literature survey

III. BACKGROUND WORK

The conventional marketplace, while ubiquitous, suffers from inherent challenges related to transparency and authenticity, undermining customer trust. In this traditional setting, recognizing product ownership and originality becomes a substantial concern, as customers lack the means to verify the legitimacy of goods. Ownership fraud, where a product is illicitly sold to multiple individuals, further compounds this issue. This occurs when the original owner advertises the product as available for sale in the conventional market, leading to a lack of clarity regarding the true ownership status.

Enter Non-Fungible Tokens (NFTs), a transformative solution that addresses these shortcomings. NFTs, being inherently immutable and tamper-proof, serve as an ideal mechanism for securely storing ownership and authenticity data indefinitely. Manufacturing facilities leverage NFTs to guarantee the authenticity of products, ensuring that items are genuine and not mere copies or imitations. The reputation of NFTs in maintaining ownership records becomes paramount in eliminating concerns related to multiple ownership claims.

In the NFT ecosystem, the term "originality fraud" is rendered obsolete. This type of fraud occurs when vendors attempt to sell unauthenticated items, including customized products or falsely replicated goods. The blockchain-based nature of NFTs provides an unassailable defense against originality fraud, offering a secure and transparent record of a product's authenticity and origin. This robust system prevents the circulation of cloned or counterfeit items within the marketplace.

NFTs generated by manufacturing facilities play a pivotal role in assuring consumers of the authenticity of their products. Through the decentralized and trustless nature of blockchain technology, NFTs ensure that ownership records remain accurate and cannot be manipulated. When a product is sold to a customer, the ownership transfer is seamlessly executed through wallet-based transactions. This instantaneous transfer of ownership not only enhances the security of transactions but also provides customers with immediate and transparent confirmation of their legitimate ownership status.

In conclusion, the integration of NFTs in marketplaces revolutionizes the transparency and authenticity of transactions. By leveraging the immutable nature of blockchain technology, NFTs eradicate concerns related to ownership and originality fraud, instilling confidence in customers regarding the authenticity of the products they purchase. The efficiency of wallet-based transactions further enhances the overall trustworthiness and integrity of the marketplace, paving the way for a more secure and transparent consumer experience.

Here we broadly classify various categories of credential fraud:

Multiple Ownership Fraud:

This type of fraud occurs when a product or asset is sold to multiple individuals simultaneously or successively without the knowledge or consent of the original owner. The fraudster may exploit gaps in the traditional marketplace system, leading to a lack of clarity regarding the true owner. Multiple ownership fraud undermines the integrity of ownership records and can result in disputes over the rightful possession of the item.

Originality Fraud:

Originality fraud involves the sale of unauthenticated items, often in the form of counterfeit or cloned goods. Vendors may attempt to pass off fake or replicated products as genuine or original, deceiving unsuspecting buyers. This type of fraud is prevalent in markets where the verification of a product's authenticity is challenging. Non-genuine items can lead to financial losses for buyers and damage the reputation of manufacturers and sellers.

Identity Theft Fraud:

Identity theft fraud occurs when an individual falsely represents themselves as the legitimate owner of a product. This can involve the fraudulent use of personal information, such as a seller claiming ownership of an item that they do not possess or attempting to sell items on behalf of the true owner without authorization. Identity theft fraud can lead to unauthorized transactions and disputes over ownership rights.

Title Washing Fraud:
Title washing fraud typically occurs in markets where legal titles or certificates of ownership are integral to the transfer of assets. Fraudsters engage in activities to erase negative ownership history or liens associated with a product, creating a false sense of legitimacy for prospective buyers. This deceptive practice can lead to unsuspecting buyers acquiring assets with undisclosed issues or legal complications.

IV. EXISTING SYSTEM

The traditional market operates as a parallel system for consumers, akin to popular online platforms such as OLX, Quikr, and classifieds applications. In this conventional approach, individuals seeking to sell their goods have the option to upload advertisements, mirroring the process one would undertake on a classifieds portal. Meanwhile, potential buyers peruse these listings in their pursuit of desired items. However, a significant drawback of this traditional model lies

in the absence of a comprehensive record-keeping system, thereby heightening the risk of ownership fraud. In the realm of traditional marketplaces, vendors showcase their products without the assurance of a valid or legal framework, leaving both buyers and sellers vulnerable to potential discrepancies. The absence of a structured and transparent verification system may lead to a lack of trust between the involved parties, posing challenges for secure transactions. As buyers identify the items they wish to purchase, the subsequent step involves contacting the seller directly. This direct interaction is a key characteristic of traditional markets, setting them apart from more modern, digital platforms.

However, a notable drawback of this method is the absence of a formalized record-keeping system. Unlike blockchain-based platforms, which provide an immutable ledger for transactions, traditional markets lack the mechanism to document and verify product transactions. This deficiency significantly heightens the risk of ownership fraud, as there is no secure and transparent method to confirm the legitimacy of the goods being offered for sale. In the absence of a digital and secure transactional framework, the burden falls upon the buyer to physically meet with the seller to inspect the product and finalize the transaction. While this approach allows for direct engagement and evaluation, it introduces logistical challenges, particularly if the buyer and seller are located in different geographic locations.

Moreover, the reliance on face-to-face interactions and physical inspections makes the process time-consuming and may hinder the efficiency and convenience that many modern consumers seek. The absence of a digital record also means that the transactional history, including any negotiations or agreements, is not systematically captured, potentially leading to disputes and difficulties in case conflicts arise.

In conclusion, the traditional market, resembling the operations of platforms like OLX, Quikr, and classifieds applications, offers a familiar avenue for buying and selling goods. However, the absence of a formalized and secure transactional framework, coupled with the risk of ownership fraud, underscores the limitations of this approach. As the digital landscape evolves, there is a growing need for more secure and transparent methods of facilitating transactions to ensure the trust and confidence of consumers in the marketplace.

V. PROPSOED SYSTEM

EaIn our innovative solution, we leverage Non-Fungible Tokens (NFTs) as a cornerstone for securely storing ownership records, unique images featuring watermarks, and other detailed product descriptions. This proposal is encapsulated within it, where Verified Clients undergo a robust authentication process using their Metamask wallet addresses, ensuring a high level of security.

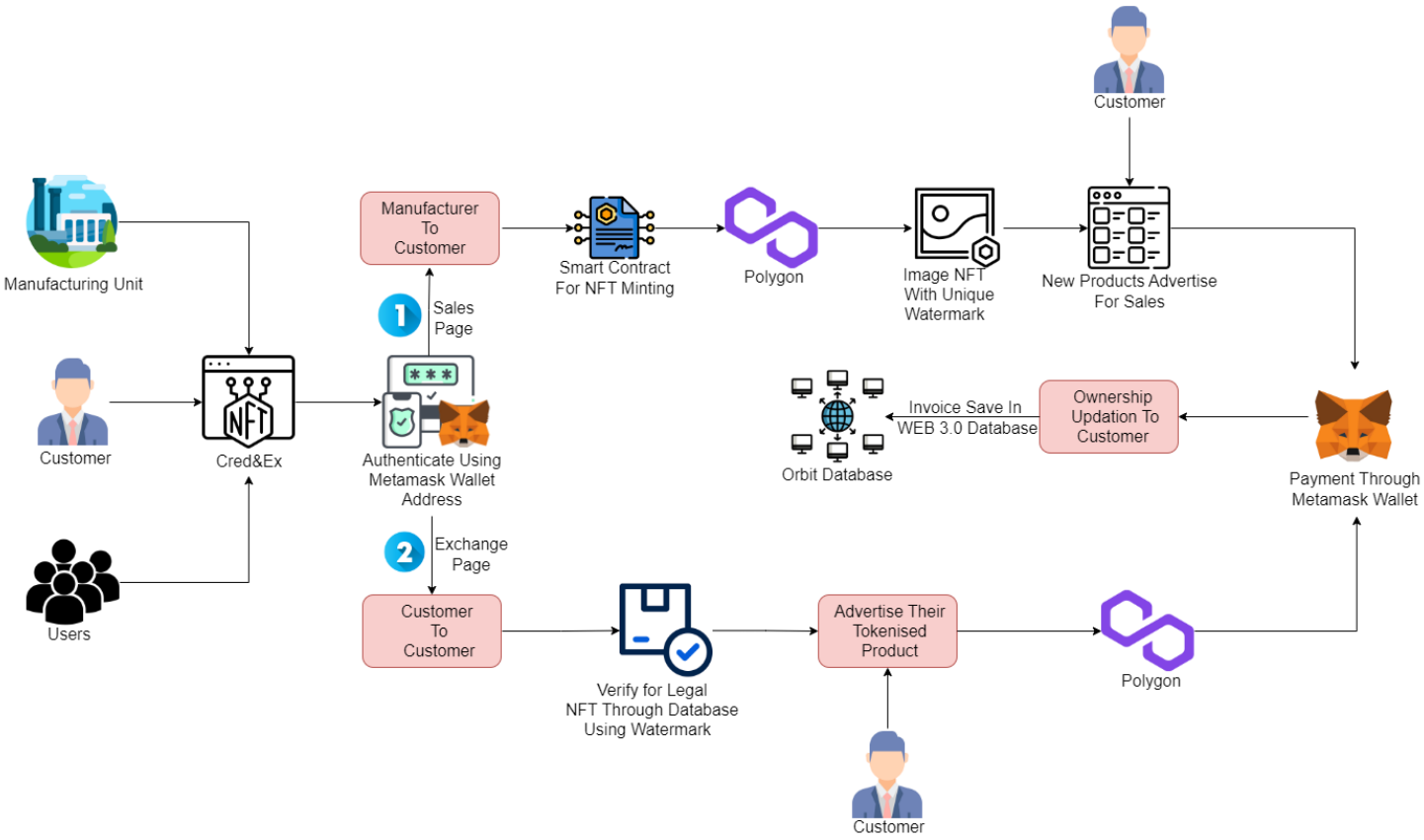
The operational framework of the application unfolds in two distinct phases: the manufacturer-to-customer phase and the customer-to-customer phase, each contributing to a seamless and secure transactional experience. In the initial phase, exclusive minting privileges for NFTs are restricted to manufacturing entities, accessible only through their organizational wallet addresses. During this manufacturing phase, NFTs are minted for newly created products, embedding a unique identifying code as a watermark directly onto the product image. This ensures a verifiable and distinctive mark for each item. Importantly, NFT minting is strictly regulated, limiting access to organizational use.

The Sales Phase of the application is dedicated to the manufacturer-to-customer interaction. Incorporated manufacturing entities, upon successful Metamask wallet authentication, gain premium access to the platform. Subsequently, NFTs are minted for the goods they produce, featuring a common image for product models and a watermark code for individual identification. These NFT-equipped products are then showcased through advertisements on the platform, facilitating initial client sales. To initiate a purchase, customers must authenticate using their wallet addresses, and upon completing a transaction, the ownership of the product is seamlessly transferred. All transaction invoices are securely stored in a decentralized database known as the orbit database, ensuring transparency and immutability.

Moving to the Exchange Phase, where customer-to-customer transactions occur, both sellers and buyers log in using their wallet addresses for heightened security. Vendors are required to publish advertisements for their products, each containing its unique NFT. Prior to closing a purchase, buyers can verify crucial product information, including ownership details, by leveraging the transparency provided by the NFTs. Once the product is received and validated, the buyer finalizes the transaction, updating ownership records securely and efficiently.

In summary, it orchestrates a comprehensive and secure blockchain-based solution for the exchange of tokenized goods, encompassing distinct phases for manufacturers and end-users. The strategic use of NFTs, restricted minting access, and secure wallet address authentication collectively fortify the platform's integrity, ensuring a trustworthy and efficient marketplace for both manufacturers and customers alike.

ARCHITECTURE DIAGRAM



VI. ADVANTAGES

Control of Fake Products:

In an NFT marketplace, the control of fake products is significantly enhanced through the implementation of blockchain technology. Each product is represented by a unique NFT, providing an immutable and transparent record of its origin and ownership. The decentralized nature of the blockchain ensures that these records cannot be tampered with, reducing the risk of counterfeit goods. Buyers can confidently verify the authenticity of products by tracing their provenance through the blockchain, mitigating the prevalence of fake products within the marketplace.

Immutability:

Immutability is a core advantage of NFT marketplaces, stemming from the use of blockchain technology. Once information is recorded on the blockchain, it becomes resistant to alteration or deletion. In the context of NFTs, this ensures that ownership records, transaction history, and associated details remain secure and unchangeable. The immutability of NFTs enhances trust and transparency in the marketplace, providing a verifiable and permanent ledger for every digital or physical asset tokenized within the system.

Ownership of Products Record:

NFTs revolutionize the concept of ownership records in the marketplace by representing each product with a unique token on the blockchain. The ownership record is stored in a decentralized and tamper-resistant manner, ensuring that it cannot be disputed or manipulated. Users can easily and transparently verify ownership details by referencing the blockchain, facilitating a seamless transfer of ownership when transactions occur. This transparent and verifiable ownership record instills confidence in buyers and sellers, fostering a trustworthy environment within the NFT marketplace.

Quality Assurance:

Quality assurance is bolstered in NFT marketplaces through the transparent and traceable nature of blockchain records.

Each NFT is associated with a digital or physical product, and the blockchain stores details about its creation, authenticity, and any relevant certifications. Buyers can review this information to assess the quality and legitimacy of the product they intend to purchase. The decentralized and secure nature of the blockchain ensures that the quality assurance data remains intact and trustworthy, providing a reliable source for users to make informed decisions about the products they engage with in the marketplace.

VII. CONCLUSION

In the near future, the NFT industry is expected to grow steadily. NFTs are encrypted tokens that can be stored on a digital blockchain. This application will make a market more secure. This is because they can help reduce the risks associated with purchasing and selling assets. Customers now demand higher levels of security and openness during transactions. To overcome the efficiency concerns in the current electronic product exchange websites, it certified ownership method is more trustable.It enables customers to sell things without having to worry about payment processing troubles, etc.The seller's products can be checked to see if they are genuine or counterfeit by using the distinctive watermark, which is a key feature of the application.It decreases the number of fraudsters and checks the authenticity of the product and the vendor. We intend to apply this approach in the future to a variety of industries, including jewelry , land registration, movie contents (Copyrights), and more.

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