IARJSET ISSN (O) 2393-8021, ISSN (P) 2394-1588

International Advanced Research Journal in Science, Engineering and Technology

ISO 3297:2007 Certified ⁜ Impact Factor 7.12 ⁜ Vol. 10, Issue 2, February 2023

DOI: 10.17148/IARJSET.2023.10228

Warranty with NFT

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Abstract: The use of Non-Fungible-Token (NFT) in online market has the potential to address a number of challenges in the field sales and purchase of products online. There are a number of problems associated with buying any product, but luxury or high-end purchases pose additional concerns regarding authenticity. Digital warranties enable customers have greater peace of mind when purchasing luxury items. Additionally, it can offer information about the item's history of purchases, its warranty, and other details. When a customer makes a transaction using our application, the NFT are sent to their account. Asset tokenization, which entails the creation of NFTs that stand in for trading assets, can be a successful strategy to combat fake goods. Digital warranties aid luxury brands in thwarting fakes. Consumers will be able to choose authentic products if these solutions become commonplace in the business and make it clear that products without a guarantee as an NFT are probably not real. On request from a few merchants, assurances will be given to franchises of luxury brands. Additionally, it offers retailers with certified imports from other nations without the express consent of the brand. Luxury brands can organize a consortium in the meanwhile to embrace digital warranty solutions and deal with the industry's counterfeiting problems. This solution is yet to gain momentum among the wider blockchain community, so the challenges persist and remain to be addressed effectively in lieu of the massive potential of the NFTs, the marketplace for which is growing rapidly.

Keywords: NFT, Blockchain, Tokens, Warranty, Marketplace, Digital Assets, Tokenization, Decentralize

I. INTRODUCTION

Nonfungible tokens (NFTs) are being created, traded, and used in several business applications, and this is a significant development. The growth of the NFT business is anticipated to be influenced by a number of variables, including Web3 and the metaverse, which are seen by many analysts as the next big things. The fact that many of the tokens are not economically and socially beneficial has been mentioned as an issue with NFTs, garnering major high-profile media coverage. Ethereum cofounder Vitalik Buterin noted that "ultimately the goal of crypto is not to play games with million-dollar pictures of monkeys, it's to do things that accomplish meaningful effects in the real world," when referring to Yuga Labs-owned Bored Ape Yacht Club's (BAYC) best-selling series of NFTs.[5] One of such issue is purchasing and control over product warranty after reselling of product mainly luxury or high-end expensive products. Today's warranty providers are still battling the three major issues facing the sector: fending off false claims, identifying 31 fake goods, and determining the status of coverage. Businesses are getting more and more complicated, and to make matters worse, there are more vendors, distant manufacturing locations, new distribution channels, and disruptive business models. Therefore, it should come as no surprise that warranty processing and administration expenses continue to rise. According to an IBM study, only one-third of warranty expenses in the electronics sector go toward fixing or replacing damaged products, with the other two-thirds going into processing and administration. To prevent expenses from constantly escalating, there is a critical need to discover better ways to manage warranties.

A non-fungible token (NFT) is a mechanism to track, record, and confirm who owns a special asset, whether it be digital or physical. Therefore, NFTs can be used to represent any kind of object that might be regarded as unique or rare, including a work of art, futures contract, music score, book, real estate, etc. Since NFTs are created, held, and transferred on a blockchain, malicious parties are unable to seize or alter them. NFTs, on the other hand, can instantly demonstrate authenticity and provenance, solving the issue of counterfeiting. The first half of 2021 saw record-breaking NFT sales of $2.5 billion. The ERC-721 token has been revolutionizing investor interactions with nonfungible assets, whose elasticity of supply is nearly zero, or in some cases, completely zero, much like the ERC-20 token revolutionized fundraising through Initial Coin Offerings (ICO) in 2017. Although both sorts of tokes were initially formed on the Ethereum blockchain, they are now being produced on other types of blockchains, some of which are exclusively used for NFTs (e.g., Flow, Ethernity, Efinity).[1] Blockchain technology is a cutting-edge

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computer protocol that is used to digitally record and store data across many computers, or nodes. The so-called "Ledger," which resembles a relational database, is one of the most crucial components of Blockchain. A block, or list of encrypted digital transactions, is what makes up a blockchain. Then, using a cryptographic signature, each block is "chained" to the following block in a sequential, chronological order. The most recent transactions since the last block was added are replicated in the blocks. As a result, eliminating the need for a third party, the shared block, or ledger, is connected to all users who utilize their computers in a network to authenticate or confirm transactions. Blockchain is used in a novel and distinctive way to distribute and safeguard data. Direct transactions between non-intermediaries or intermediary services would drastically increase as a result of the disappearance of a central instance in the dispersed network (Tapscott & Tapscott 2016). Thus, a transaction can never be changed or destroyed in Blockchain and updates can only be made by system participants coming to a consensus (Fanning & Centers 2016). In contrast to a conventional, centralised database with a usercontrolled access mechanism, its distributed database cannot be breached, altered, or otherwise disrupted. In other words, the data cannot be changed or removed from the ledger after it has been added to a Blockchain. This includes system administrators. Considering that each data block has a time stamp and is connected chronologically by a cryptographic signature. Almost any transaction involving value, including those involving money, goods, land ownership, medical information, or even votes, can be made using blockchain technology. Asset tokenization, which entails the creation of NFTs that stand in for trading assets, can be a successful strategy to combat fake goods. Digital warranties aid luxury brands in thwarting fakes. The digital certificates can be useful for product resale if owners want to do so because they demonstrate legitimacy. Additionally, buyers can assign other persons ownership of their timepieces.

II. LITERATURE SURVEY

Some notable work has already been done in this area and was referred to gain the general idea required for this research and to understand some key concepts. The blockchain technology consists of a growing list of data known as blocks that are linked together and encrypted. Each block normally includes transaction data that is created to ensure that these transactions are immutable, a timestamp, and a cryptographic hash code of the preceding block. Because every operation is recorded in a distributed ledger that is accessible to all network members, blockchain technology is renowned for its capacity to offer transparency, consistency, and reliability. Data cannot be changed or destroyed thanks to this sort of recording, which raises the blockchain's legitimacy. A blockchain's legitimacy depends on the confidence of two or more participants who do not know one another yet can conduct legitimate transactions. This trust can be continuously strengthened through the sharing of multiple processes and records. Additionally, blockchain technology can significantly reduce the time it takes to process transactions, making it a more efficient option compared to traditional methods. Overall, the use of blockchain technology can greatly improve the speed, security, and transparency of various processes.[3] Non-fungible tokens (NFTs) are cryptographic assets on a blockchain that can be distinguished from one another by their distinctive identifying codes and metadata. They cannot be bought or exchanged for equivalent amounts like cryptocurrencies can. This contrasts with fungible tokens, like cryptocurrencies, which are interchangeable and can thus be used as a medium for business transactions. Non-fungible tokens (NFTs) are exclusive cryptographic tokens that are only available on blockchains and cannot be copied. Real-world objects like artwork and real estate can be represented by NFTs. These physical assets can be "tokenized," which improves the efficiency of trading while lowering the risk of fraud. NFTs can be used to represent a variety of things, including people's identities and property rights. NFTs have drawn the attention of collectors as their value, which first rose but has now calmed. NFTs have a variety of potential applications.

For instance, they are the perfect means of digitally representing tangible things like real estate and art. NFTs, which are based on blockchains, can also be used for identity management or to cut out middlemen and link artists with audiences. NFTs have the ability to eliminate middlemen, streamline transactions, and open up new markets. Non-Fungible Token (NFT) is a type of cryptocurrency that is derived by the smart contracts of Ethereum. NFT was initially put forth in EIP-721 for Ethereum and further developed in EIP-1155. NFT differs from traditional cryptocurrencies like Bitcoin in terms of their built-in characteristics. Bitcoin is a standard coin, meaning that every coin is identical and interchangeable. NFT, on the other hand, is distinct and non-fungible (i.e., non-exchangeable), making it appropriate for uniquely identifying something or someone. To be more precise, a creator can easily demonstrate the existence and ownership of digital assets in the form of movies, photographs, arts, event tickets, etc. by leveraging NFTs on smart contracts (in Ethereum [115]). A sort of cryptocurrency called Non-Fungible Token (NFT) is derived from Ethereum's smart contracts. NFT was initially put forth in EIP-721 for Ethereum and further developed in EIP-1155. NFT differs from traditional cryptocurrencies like Bitcoin in terms of their built-in characteristics. Bitcoin is a standard coin, meaning that every coin is identical and interchangeable. NFT, on the other hand, is distinct and non-fungible (i.e., non-exchangeable), making it appropriate for uniquely identifying something or someone. To be more precise, a creator can easily demonstrate 33 the existence and ownership of digital assets in

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the form of movies, photographs, arts, event tickets, etc. by leveraging NFTs on smart contracts (in Ethereum [115]). It was reported that the 24-hour trading volume on average of the NFT market is 4, 592, 146, 914 USD, while the 24-hour trading volume of the entire cryptocurrency market is 341, 017, 001, 809 USD. The liquidity of NFT-related solutions has accounted for 1.3% of the entire cryptocurrency market in such a short period (5 months). Early investors obtain thousandfold returns by selling unique digital collectibles. At the time of writing (May 2021), the NFTs-related market has significantly increased compared to one year ago (January 2020). Specifically, the total number of sales is 25, 729 and their total amounts spent on completed sales reach 34, 530, 649.86 USD. In particular, the total number of primary-market sales occupies 17, 140, while the number of secondary sales (user-to-user) is 8, 589. Correspondingly, the total USD used on primary market sales is 8, 816, 531.10. Besides, the active market wallets achieve 12, 836, which is still increasing at a high speed as time goes. Surprisingly, the sale of NFTs was estimated at 12 million (December 2020) but exploded to 340 million within just two months (February 2021). Such skyrocket booming development makes NFT become a craze, or even be described by some as the future of digital assets.[4] Through the process of "minting NFT," digital artwork can become a part of the Ethereum Blockchain. Similar to how metal coins are "minted" and put into circulation, NFTs are tokens that are "minted" once they have been created. Digital art is represented as an NFT, which enables it to be purchased and sold on the market and to be digitally traced throughout the entire transaction. In the second half of 2020, the NFT market experienced a significant upswing thanks to the sale of an NFT artwork for USD 69 million. Additionally, the overall sales volume of NFTs in 2020 was USD 2.5 billion while it exceeded USD 10.7 billion in the first half of 2021. This indicates a significant change in the growth of NFTs over a short period of time. The 24-hour normal trading volume of the NFT market is USD 4 billion, while the 24-hour normal trading volume of the entire cryptographic money market is USD 341 billion.[2] Various online marketplaces can provide a platform for buying and selling NFTs but some of them are more sought- after than others as shown in Table I. However, not all marketplaces sell the same collectibles or works of art. As a result, the type of collectible is solely determined by the type of market. The majority of these marketplaces sell a diverse range of NFTs, but each platform operates differently.

Table 1: TOP NFT Marketplaces (Upto October 2021)

Market	**Traders**	**Volumes**
OpenSea	46,067	$73.45m
Axie Infinity	40,429	$19.44m
Cryptopunks	12	$2.45m
AtomicMarket	7103	$1.03m
PancakeSwap	1342	$783.74k

Luxury clothing companies are making use of the NFTs' capabilities for permanent ownership, royalty acquisition, and unique ownership. Many fashion businesses use their internet presence to increase their audience, but they still stay out of the reach of the average person due to their high prices, which fuels the desire for replicable and fake goods. 34 Businesses are losing a lot of money because of counterfeit products bearing their logos, but the consequences can be reduced, if not totally eliminated, with the usage of NFTs. Although the usage of NFTs in fashion is still a relatively new idea, the fashion industry is striving to expand its prospects by forging ahead with fashion tech after the pandemic forced the closure of physical storefronts for about a year. Companies have already begun embedding digital NFTs to physical articles to distinguish ownership and retain exclusivity. Jacob & Co., a luxury goods brand, auctioned a digital watch which was sold to the highest bidder for USD 100,000. RTFKT, a virtual fashion brand, sold a jacket for a price of more than USD 125,000. High valuation of fashion-based NFTS indicate the presence of demand for virtual clothing articles. Since the fashion industry relies on the sales of physical goods, it is unlikely that NFTS will completely replace the same but it provides a lucrative opportunity for luxury fashion businesses to utilize it as an extension".[2] NFT usage has increased significantly recently, including main NFT offerings and frenetic secondary market NFT trading. In addition to fundraising, remittance, store of value, borrowing, and lending, the NFT sector represents another significant use case for blockchains. Our dataset's NFT risk and return variables yield a number of intriguing findings. First, we discover that NFTs often generate first-day returns of 130%. The returns on IPOs, or new companies going public on a typical stock exchange, are orders of magnitude lower than this. The first-day NFT volume is likewise unusually high, suggesting that a significant amount of assets were traded on that day. Second, we demonstrate that both on a raw and risk-adjusted basis, NFTs offer greater long-term returns. Compared to long-term returns from IPOs and returns from VC investments, NFT returns are significantly higher (approximately 23% of NFTs in our dataset have returns larger than 1,000%). Furthermore, NFT volatility is still too high (11% daily or 175% annually), suggesting that NFTs are only suitable for investors who are willing to take on a significant amount of risk. NFTs, on the other hand, can lower portfolio variance while maintaining expected return because the correlation between them and the S&P 500 is almost nonexistent. This final characteristic makes NFT a desirable diversifier.

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Finally, we calculate the NFT alphas and betas. We find that at the portfolio level, NFTs deliver positive and significant alpha and have an above-average beta. Finally, we run an event-study and estimate blockchain valuation effects that come about as a result of implementing the NFT technology. We show that incorporating NFTs into the existing blockchain networks can boosts their market valuations by over 20%.

III. INDEX OF FUNCTIONALITIES

Ideology: Online luxury goods shopping has a number of hazards, especially about authenticity. Customers have more peace of mind when purchasing luxury items because to digital warranties. Additionally, it can offer information about the item's history of purchases, its warranty, and other details. The warranty card is delivered to the customer's smart phone and contains the item's serial number. Digital warranties aid luxury brands in thwarting fakes. Consumers will be able to choose authentic products if these solutions become commonplace in the business and make it clear that products without a guarantee as an NFT are probably not real.

Objective: The goal of creating METAMART is to do away with physical warranties in favour of blockchain-based warranties powered by NFT. Users of the DApp can track repairs and replacements as well as view past ownership information. After a predetermined amount of use, the NFT warranty expires, making warranty benefits no longer redeemable.

Technical Components:

Blockchain: This structure allows storing all the details of a party in one A blockchain is essentially a distributed digital transaction record that spans the whole computer network. Because it is distributed, a centralized authority is not necessary for it to operate. The first crypto-currency to use blockchain technology was Bitcoin, which was created in 2008 and released in 2009. Since then, numerous projects from different industries have been drawn to the distributed ledger concept, but the financial sector is still seen as the main customer. It appears that this is because it is frequently impossible to determine who is the actual current owner of an asset. Blockchain functions in the following method to verify and authenticate ownership: it is composed of data packets called "blocks" that are cryptographically connected to one another, and by adding each new block, it develops a chain, which is an entire digital ledger. Using distributed ledger technology (DLT), numerous individuals manage a single decentralized database. Blockchain is a type of distributed ledger technology in which blocks can be authenticated by the network using cryptographic techniques and transactions are saved using an irreversible cryptographic signature known as a hash. With this idea, the blockchain's integrity is guaranteed all the way back to the first block. Since each hash value is distinct, fraud may be stopped since any changes made to a block in the chain immediately affect the hash value. Ethereum is a decentralized blockchain platform that creates a peer-to-peer network for safely executing and validating smart contract application code. Participants can do business with one another using smart contracts without the need for a reliable central authority. Participants have complete ownership and visibility over transaction data since transaction records are immutable, verifiable, and securely distributed across the network. Ethereum accounts that users have created both send and receive transactions. As a cost of processing transactions on the network, a sender must sign transactions and use Ether, Ethereum's native coin. Using the native Solidity scripting language and Ethereum Virtual Machine, Ethereum provides a remarkably flexible platform on which to develop decentralized apps. The robust ecosystem of developer tools and well-established best practices that have emerged with the protocol's maturation are beneficial to decentralized application developers that implement smart contracts on Ethereum. With wallets like MetaMask, Argent, Rainbow, and others offering straightforward user interfaces through which to interact with the Ethereum blockchain and the smart contracts deployed there, this maturity also extends to the quality of the user-experience for the average user of Ethereum applications. The vast user base of Ethereum encourages developers to release their programmes on the network, further solidifying Ethereum as the go-to platform for decentralized programmes like DeFi and NFTs. Future decentralized applications requiring higher transaction throughput will be able to be built on a more scalable network thanks to the backwards compatible Ethereum 2.0 protocol, which is presently under development.

OpenSea API: Using OpenSea, users may buy, trade, and auction off NFTs, rare digital products, and crypto collectibles on a global, peer-to-peer marketplace. OpenSea provides extensive integrations and tooling for dApps in the NFT area for developers. Since they have existed since the first projects were listed, they provide the largest dataset of NFTs, index them, and serve as a secondary market for well-known collections and projects. A number of widely-used tokens and chains are supported by Open Sea, and they are actively expanding their list. They provide tooling for Polygon and Klaytn in addition to Ethereum, and they support both ERC-721 non-functional tokens and ERC-1155 semi-functional tokens. In addition to their market, OpenSea's API platform excels in third-party tooling, with its REST API acting as the foundation of numerous sizable projects in the Web3 community, including Rainbow,

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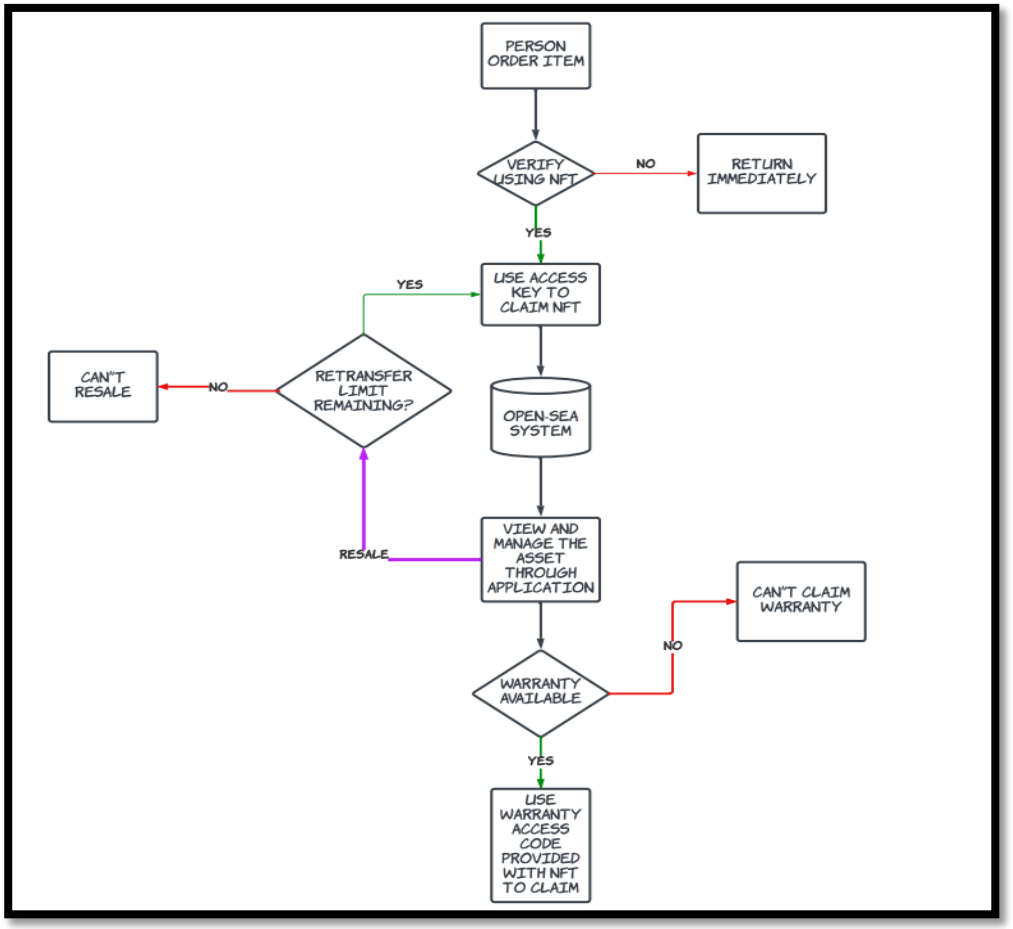
MetaMask, and Coinbase Wallet, among others. The developer tooling provided by OpenSea is made up of a REST API that allows access to and visualization of NFT metadata and a Software Development Kit (SDK) that builds on the API to enable direct interaction with the blockchain, such as the establishment of NFT marketplaces through the exchange of digital assets. The OpenSea development platform offers a number of significant value additions.NFT: Non-fungible tokens (NFTs) are cryptographic assets on a blockchain that can be distinguished from one another by their distinctive identifying codes and metadata. They cannot be bought or exchanged for equivalent amounts like cryptocurrencies can. This contrasts with fungible tokens, like cryptocurrencies, which are interchangeable and can thus be used as a medium for business transactions. Non-fungible tokens (NFTs) are exclusive cryptographic tokens that are only available on blockchains and cannot be copied. Real-world objects like artwork and real estate can be represented by NFTs. These physical assets can be "tokenized," which improves the efficiency of trading while lowering the risk of fraud. NFTs can be used to represent a variety of things, including people's identities and property rights. NFTs have drawn the attention of collectors as their value, which first rose but has now calmed. NFTs have the potential for several use cases. For example, they are an ideal vehicle to digitally represent physical assets like real estate and artwork. Because they are based on blockchains, NFTs can also work to remove intermediaries and connect artists with audiences or for identity management. NFTs can remove intermediaries, simplify transactions, and create new markets.

IV. CHRONOLOGY AND WORKFLOW

1. Upon placing an order, the warranty and a key to claim NFT is transferred by the manufacturer/previous owner.
2. The NFT is present in the OpenSea. All the details regarding previous transactions and details are fetched.
3. Each NFT has been given an expiry date according to its warranty period.
4. Integration of Scratch the Card and Loyalty program to increase engagement.
5. If the user want to resale the product and if the NFT is still in the resale period , they can place the NFT in the OpenSea again.
6. If the product is under the warranty period as stated in the NFT the user can easily claim the warranty benefit.



SYSTEM WORKFLOW

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V. USECASES

1. Fraud detection by NFT verification before purchasing: Blockchain is a distributed shared ledger that cannot be altered. To promote trust, accountability, and transparency in business partnerships, it enables authenticated contributors to store, view, and share digital information in a secure environment. Companies have been investigating ways to leverage blockchain technology to avoid fraud in sectors like finance, identity management, and supply chain in an effort to take advantage of these advantages.

2. Provide the purchasing history and other item information: Your gateway to seeing every transaction that has ever taken place on a blockchain is a block explorer. From this point, you may view each transaction's specifics, the amount for each address, and more. You can check the balance of specific addresses you enter or the transaction details of any Transaction ID by using these block explorers. You can view all the details after entering. This pertains to addresses and entails each incoming and outgoing transaction that particular address has ever experienced. For transactions, it displays the sender, the amount sent, the recipient, and the costs associated with the transaction. In short, a block explorer is kind of like an encyclopedia for blockchain transactions and addresses – its entire history can be looked up.

3. Claim the warranty on the product and decay the warranty card as soon as it goes out of warranty: Setting up the limit on the application for the listed NFT and it's corresponding warranty, this in turn will provide hassle-free service of warranty. Since, the product have a definite time period under which the warranty can be claimed for the same our application provides audibility for the product- that whether the product is still legible to avail or not, and if not, the warranty will decay and there will be no scope of misuse of the product warranty henceforth.

4. Transfer warranty and related document with a straightforward click upon resale: Since, the application provides the details of every nook and cranny of the product be it past or present, hence, the transfer of the warranty and original documentation from one owner to another becomes seamless as both seller and buyer have utmost clarification about each other and the product.

5. Reduces complexity and the number of intermediaries involved: The application plays a dynamic role in connecting the business community-customers, retailers, companies, service centres and product warehouses and hence each entity have pleasure to contact directly to the specific entity according to their terms and conditions. This in turn reduces intermediaries to the utmost level and provide fastest and seamless user experience while their demands is being met.

VI. FUTURE SCOPE

1. Integration of intelligent contract within the webpage.
2. Organize the NFT into different categories.
3. Addition of GUI for NFT creation by Manufacturers.
4. Possibility of adding outbound NFT whenever needed by limiting number of transfers.
5. Integration of Scratch the Card and Loyalty program to increase engagement.
6. Easy creation of NFT for manufacturers without code.
7. Each individual does not have an account on the blockchain wallets.
8. Due to its limited scalability, NFT cannot be used for every small item.
9. Limited by the laws of a country with respect to the use of blockchain technology for commercial use.

VII. CONCLUSION

According to a theoretical analysis of the literature, Blockchain Technology offers high potential for solving issues with data integrity, increasing transparency, enhancing security, reducing fraud, and establishing trust and privacy. Blockchain technology has the potential to revolutionize several industries, including finance, accounting, e-government, business process management (BPM), insurance, entertainment, trading platforms, healthcare, the internet of things, law firms, and others. Because technical innovation and applications can be used to achieve economic efficiency and societal benefits, Blockchain Technology has a significant potential to introduce novel solutions, depending on the field or industry in which it is used. However, adopting blockchain technology at businesses in several industries could be highly expensive. Organizations must invest a large amount of money in transferring or migrating outdated systems. Organizations that adopt blockchain technology will need to set up a unified platform to accommodate hybrid application architectures that combine blockchain and older systems at this nascent stage. They

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must therefore gain a deeper grasp of blockchain technology, including its importance, potential benefits, and potential threats. Because of this, there are very few cases where the technology has been used with these systems. NFTs are transparent, traceable, and secure since they are built on blockchain technology, particularly Ethereum. Unique tokens' innovative property allowed for use cases that had never been proven, such exclusive ownership of digital assets. Each asset's ownership may be tracked, which improves authenticity. Art collectors and fans were drawn to the concept of having complete possession of an original, purchased digital asset, such as photographs, gifs, films, music, etc., which spurred a quick expansion in the market. NFTs are not just restricted to digital assets; they may also be used to exchange tangible artistic works that are equivalent to their digital equivalents.

The purchasing and selling of NFTs, which include media of many types, is made possible by a variety of venues. Its application also spread to many other fields, such as education, where NFTs are used for certification and licencing, fashion, where it is used to identify each item, and sports, where a new method of generating income through basketball cards has been developed, among others. However, the growing popularity of NFTs comes with a number of difficulties, such as the absence of industry-wide security standards for smart contracts, uncertainty regarding intellectual property rights, fraud risks due to impersonation of artists, transparency that compromises user security and privacy, and severe negative environmental effects because of high energy consumption. In light of the enormous potential of NFTs, whose market is expanding quickly, the issues still exist and have not yet been successfully addressed by the larger blockchain community as a whole.

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