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# **Enactment of Blockchain in NFT**

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## ABSTRACT

Non-Fungible Tokens (NFTs) have arisen as a major term in the twenty-first century, signifying unique digital assets such as photographs, music, and movies. These tokens receive their value and legitimacy from blockchain technology, which is mostly used on the Ethereum platform. NFTs, which use smart contracts, enable the production, ownership, and trading of one-of-a-kind digital assets, revolutionizing sectors including as art, music, and gaming. While blockchain's uses are broad, there are worries about the environmental effect of blockchain, notably Ethereum's energy-intensive proof-of-work consensus. Despite their revolutionary potential, NFTs pose dangers connected to market instability, legal concerns, and technological weaknesses. NFT trading is enabled by a variety of third-party programmers and markets, with notable participants being OpenSea and MetaMask. Looking ahead, the future of NFTs in India is dependent on legislative changes, as the country sees an increase in interest in these digital assets among artists and producers, necessitating a balanced approach to encourage innovation while resolving possible difficulties. NFTs are a game changer in the digital economy, opening up new opportunities for producers and investors. However, environmental problems and regulatory uncertainties must be resolved in order for the NFT ecosystem to expand sustainably. Technological improvements, legislative reforms, and the continuous growth of blockchain technology will most likely influence the future of NFTs in India and throughout the world.

Keywords: Blockchain; NFT; Ethereum; Cryptocurrency; Digital Asset; Non-fungible Token.

## **1.0 Introduction**

Talented artists, creators of art, developers, and video editors faced issues in

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safely keeping and displaying their creative creations until 2021. Traditional internet venues sometimes lacked the security protections required to prevent unauthorized use or exploitation of digital content. Artists seeking to sell their works online faced challenges such as possible hacking and unauthorized copying, leading to a lack of faith in the validity of digital art. This conundrum was exacerbated for customers who demanded one-of-a-kind, original items but had no method of verifying the authenticity of the artworks they were acquiring. The lack of a reliable system to assure the uniqueness of digital works exposed both artists and purchasers to fraudulent activities, emphasizing the need for a safe and verified platform for the production, storage, and distribution of digital creations.

Indeed, the development of Non-Fungible Tokens (NFTs)[1-4] in early 2021 represented a big trend on the internet. This novel approach includes tokenizing and presenting digital assets like as animations, photos, texts, tweets, and audio as unique, non-interchangeable things on the blockchain. This transformation in the digital ecosystem calls into question the old concept of readily accessible and easily reproduced data, making them rare and traceable digital commodities. Notably, Jack Dorsey's sale of the first tweet in Twitter history for approximately \$2.92 million and a JPEG [5] image fetching a stunning \$69 million demonstrated the exceptional value being attributed to digital information via NFTs. These examples highlight the developing and sometimes unusual dynamics of the internet economy, indicating a paradigm change in perspective and valuation of digital assets.

The seemingly exorbitant pricing of Non-Fungible Tokens (NFTs) raises the logical [6-8] issue of why individuals would spend such large sums in these digital assets. To understanding this phenomenon, one must first understand the distinct traits and value proposition that NFTs provide. Drawing a link with conventional artworks, such as the legendary Mona Lisa [9,10], or replaceable works, such as those by Willem de Kooning, where a few million dollars may buy paintings worth millions, helps emphasize the point. Before purchasing tangible assets such as paintings, sculptures, pictures, or book sets, people frequently consider the distinctiveness, originality, and perceived worth [11-12] NFTs, on the other hand, use the technology of blockchain to automate and safeguard these decisions. The blockchain secures the legitimacy, scarcity, and provenance of digital assets, providing purchasers with a transparent and tamper-proof record of ownership. This one-of-a-kind combination of technology and art has generated a frenzy for NFTs, as collectors seek ownership of verified, one-of-a-kind digital masterpieces, attaching value to the scarcity and authenticity encoded in the blockchain. The NFT frenzy signifies a shift in how society views and values digital

ownership, challenging traditional conceptions of art and collectibles in the digital era [13].

Data is not kept on a single computer or managed by a central authority in a decentralized blockchain network. It is instead dispersed over numerous computers (nodes) that are part of the network. This decentralization helps to the blockchain's security and integrity, making it resistant to alteration or assaults. Bitcoin's [14] status as a reusable token is correct. Fungible tokens, like traditional cash, are interchangeable and may be used for the same value. Bitcoin and other cryptocurrencies are fungible, which means they may be used for a variety of activities, such as paying bills or buying purchases. Non-fungible objects, such as diamonds, are also accurate. Non-fungible tokens (NFTs) are one-of-a-kind assets that cannot be exactly split or interchanged on a one-to-one basis [15]. Each NFT has unique qualities and ownership that are recorded on the blockchain, making it suited for representing digital or physical assets with unique value and characteristics. Decentralization is a basic idea that contributes to the security of blockchain networks, and the distinction between fungible and non-fungible tokens is critical in comprehending the many uses within the blockchain and cryptocurrency field.

When an NFT is generated, a unique and individualized ID is issued to it, which is subsequently stored on the blockchain. Because of this blockchain-based identity, each digital asset represented by an NFT is unique, traceable, and securely preserved. The blockchain's consistency and visibility aid in the provenance and legitimacy of NFTs. Not all blockchains are made equal, and Ethereum has had a significant impact on the NFT industry. Since its first public offering in 2015, Ethereum has grown to become the second-largest cryptocurrency, and its blockchain enables the development and trading of NFTs using smart contracts. Due to its decentralized nature and support for smart contracts, Ethereum has become a popular alternative for the construction of decentralized apps (dApps) and NFT markets.

One of the primary benefits of blockchain technology [15], and particularly Ethereum, is its potential to remove intermediaries and related expenses. NFT marketplaces, which operate as decentralized applications on the Ethereum blockchain, enable users to directly generate, sell, and purchase NFTs without the use of middlemen. This decentralized strategy improves efficiency, lowers costs, and creates a transparent and open environment for NFT transactions.

To summaries, the Ethereum blockchain has played a critical role in the emergence of NFTs by providing a decentralized and secure platform for the creation, trade, and ownership of unique digital assets. NFT marketplaces, as Ethereum dApps, demonstrate the potential of blockchain technology to alter numerous sectors by removing intermediaries and creating new options for producers and collectors alike.

### 2.0 Background

The modern period is experiencing a rising reliance on internet services across many digital technology industries, a development that has been exacerbated by the COVID-19 pandemic's limits. The epidemic has driven organizations to incorporate digital technology into their business models, boosting efficiency, practicability, and, in certain cases, ecologically sustainable practices [16]. While digitization provides various benefits, it also adds problems, notably in the areas of trust and computer security. The use of blockchain technology, which was first used in cryptocurrency applications [17], has played a critical role in improving computer security. This technology has not only strengthened security measures, but it has also catalyzed the reform of monetary systems in several nations, guiding them towards a cashless economy [18]. We shall go deeper into the complexities of blockchain computing and its progress in relation to the setting of cryptocurrency uses in the next subsections, explaining its influence on computer security and the larger economic environment.

#### 2.1 Blockchain

Blockchain, which Nakamoto invented, is a transformational distributed technology for platforms that consists of a chain of interconnected blocks. Each new block not only provides details on recent events, but it also refers to the previous block, creating a chronological connection. By tracking these references back to the origins block, the first block in the line, the complete recorded behavioral history become traceable. One of the most important characteristics of blockchain is its inviolability data can only be uploaded, not erased or modified [19]. Blockchain makes use of a variety of technologies, such as hash algorithms, encrypted time stamps, and approval methods. Unlike previous systems that rely on a centralized authority to secure the ledger, blockchain relies on network nodes, also known as miners, to confirm operations through unanimity. Cryptographic techniques ensure that changes to a block may only be made with a unanimous approval of network participants, resulting in numerous versions of the blockchain existing across the network. Decentralization, trustworthiness, collaborative maintenance, a dependable database, transparency, protection and tamperproofing, secrecy, customization, verifiability, and accountability are among the essential aspects of blockchain [20]. Each of these advantages offers a strong argument for blockchain over conventional database management systems. The advancement of the

bitcoin blockchain has prompted the creation of multiple platforms, each of which contributes to its progress. The following sections will go into further detail about these platforms, highlighting the various uses and developments made possible by the broad usage of blockchain technology.

## 2.2 Blockchain platforms

There are two kinds of blockchains: both private and public [21]. A public blockchain, also known as a non-permissioned blockchain, allows any member to produce, confirm, and change blocks. This involves data storage and updating via transactions between involved organizations. The information maintained in a blockchain that is open to everyone is readily accessible to all participants. A permissioned personal blockchain, on the reverse hand, is more limited, enabling only authorized and trustworthy companies to participate in whatever happens within the corresponding blocks. Blockchain innovation, which was originally created to promote Bitcoin, which functions on a public blockchain [17], has given rise to a variety other cryptocurrency. Transactions made using Bitcoin permit the frictionless movement of digital money between entities. Many alternative cryptocurrencies have developed as a result of Bitcoin's popularity, including Solana, Dogecoin, Polkadot, Ethereum, Litecoin, Cardano, Bitcoin Cash, and EOS. Despite the profusion of competitors, Bitcoin remains the uncontested leader of the market in the cryptocurrency area.

Ethereum, along with Bitcoin, has been among the most successful cryptocurrencies [22]. The introduction of intelligent agreements by Ethereum, which are contracts that execute themselves with all conditions of the agreement explicitly put into code, has considerably helped to the expansion of multiple blockchain platforms. Platforms such as Multichain, Iota, Corda, Hyperledger, and Walton chain have gained popularity. The growth of these blockchain-based systems has resulted in widespread acceptance of blockchain technology across a wide range of industrial applications. Healthcare Supply chains, finance, education, the Internet of Things, insurance, digital rights management, transportation, and governance have all seen the incorporation of blockchain technologies [23]. The adaptability and security provided by blockchain technology have played a critical role in its adoption and widespread implementation across numerous areas.

## 2.3 Smart contracts

With the emergence of the blockchain system, smart contracts have become an extremely sought-after breakthrough [24-26]. Intelligent contracts have the ability to

greatly broaden the range of transactions available in the blockchain ecosystem. A transaction is described as an exchange of products, services, or monies between two individuals with mutual impact. A process can involve one or more atomic activities, all of them can be done by any individual with necessary rights. Nick Szabo [27] popularized the notion of smart contracts. It is a collection of electronic instructions saved at a particular location on a distributed ledger. The aforementioned commands are programmed to run when certain circumstances are satisfied. These contracts, in essence, automate the fulfilment of a series of requirements by both the sender as well as the receiver of an agreement before it can be declared successful. This entire procedure is totally automated, needing only the cooperation of the participating parties and the distributed ledger network. Digital contracts are used to simplify the execution of contracts, guaranteeing that everyone involved can quickly determine the conclusion without the need for middlemen or delays. Smart contracts are currently a critical component of blockchain technology, expanding its utility beyond cryptocurrencies. They are used in a variety of industries, the Internet of Things (IoT), including healthcare, business process management, supply chains, digital identification, financial systems, insurance, and real estate [23,28]. NFTs and smart assets develop as major applications in the digital environment, boosting the capabilities and possibilities inside the block chain. These innovations are altering a variety of sectors by enabling automated, transparent, and secure approaches to a wide range of transactions and commitments.

### 2.4 NFTs and smart property

Thanks to the introduction of blockchain technology, our modern era has seen some enterprises leverage digital change to promote futuristic items on the internet. Non-fungible tokens (NFTs) and smart contracts have been playing an important part in this approach to change, with the widespread use of these products expected in 2021 [29,30]. NFTs have emerged as one of the most successful implementations of blockchain technology, receiving widespread public attention. Unlike cryptocurrency such as Bitcoin, NFTs are one-of-a-kind, non-transferable digital assets stored on blockchain networks such as Ethereum. Their distinguishing features include distinctiveness, indivisibility, and versatility, with ownership documented in smart contracts. Art and collectibles, games and metaverses, and utilities and DeFi (Decentralized Finance) are the three primary categories of NFT products [31]. These include artwork antiques and collectible reservations for events, music and the press, virtual things in contests, actual assets, opinions, memes, internet addresses, and businesses.

Furthermore, the term "smart material" has acquired currency, referring to properties who owns is regulated by smart contracts. This includes tangible assets such as automobiles, which provide a safe means for strangers to trade ownership with relying on trust, made possible by the level of openness and automation created by smart contracts. The usage of NFTs, blockchain, and smart contracts merely presents new options for safe interactions [32], but it also alters conventional notions of ownership and trade, particularly in the setting of both electronic and tangible assets.

The research paper [33] which I've gone through, dealt with basic knowledge of blockchain and NFT introductory part of the NFT and creation of tokens. This report delivered timely analysis and summary of existing proposed solutions and projects; it is easier for the newcomers to keep up with the current progress. Various opportunities and potential applications are being discussed in this paper [33]. Finally different existing research challenges are also discussed by author. Re-shaping of the future market by the NFT solutions of digital assets. Author highlighted the technical components and provide the designproperties and models. Competition.

The paper [34] has information about the cryptocurrency market and NFT market. The author reports on influence of the NFT pricing on the other crypto currencies. This paper has information about how crypto currency market affect NFT market as crypto currencies are common currency for buying and trading NFTs. NFT market which is depressed just by drop in crypto currency value which further results in lowering of the purchasing power of NFT. But when there is appreciation in crypto currency value then investors tend to look for the alternative opportunities to invest. The author [35] implied how the transaction takes place and making it more secure. With the rise of internet people started to wonder about the transaction that could be governed by them not the bank and author has made simple points about how a common man can also dealwith cryptocurrency.

In conclusion, our study revealed a vacuum in existing research on fraud, especially in the absence of including the blockchain relies transactions involving several stakeholders. While some prior studies have investigated many stakeholders in operations connected to the life cycle of a bank routine, none have included the critical idea of a legal owner. Furthermore, our investigation discovered that none of the current research provided extensive information about the underlying smart contract, which was created using the block chain specification. This suggests a future research opportunity to fill these gaps and investigate the potential of blockchain technology, including smart contracts, to improve security, transparency, and accuracy in the overall picture of vehicle-related interactions and ownership.

#### 3.0 Proposed Work

Tokens that are not fungible are utilized to indicate ownership of one-of-a-kind goods. NFTs are limited to a single legal owner. This is a freely accessible document that anybody may view and analyses. Non-Fungible are protected by the protocol known as Ethereum Blockchain, which ensures that no one can change the record concerning ownership or copy/paste the current NFT. This is a reason they are attempting to create a new one. The Ethereum blockchain-based NFTs addressed the majority of the internet's issues. As everything becomes increasingly digital, there is a greater need to replicate physical attributes such as scarcity, distinctiveness. and evidence of ownership. NFTs are reliable and are created with Ethereum. Every Ethereum community trades an NFT citation for a particular event for an entirely unique NFT.

#### 4.0 Creating an NFT

Algorithm 3 describes the formation of NFT. The algorithm begins by confirming the client's and the organization's identities. Following that, it checks to ensure that the invoker's organization is authorized to create the required sort of token. It establishes the value of the extra organization that must be included to the endorsement policy in addition to the invoker. The token's ID and Owner will differ depending on whether the token is issued as part of a transfer to a buyer or is issued for the invoker. Algorithm 5 use Algorithm 3 to produce a token for a customer.

#### **Algorithm 1: Token Setting**

Step 1: First, we must construct the function settokens
(id string, endorse_rorg string, issue_org string).
Step 2: Switch the state-based endorsement policy
from NewStateEP ().
Step 3: Requires to approve policy_AddOrgs.
endorsement_Policy.AddOrgs (statebased.
RoleTypePeer, issue_org, endorse_rorg)
Step 4: We must set state Verification parameters such
as id. strategy policy endorsement_Policy.Policy ()
Step 5: SetStateValidationParameter (id, policy);

Step 6: terminate function.

### Algorithm 2: Token Reading

- Step 1: Create the method READTOKEN(id string).
- Step 2: Make a GetState(id) in honour of JSON.
- Step 3: The process is then terminated by returning the honour.
- Step 4: Commemorate return
- Step 5: End function

#### **Algorithm 3: NFT Produce**

- Step 1: CREATENFT (creatingfortransfer bool, miles. ableassets int, tokentype string, buyer string) is a single function.
- Step 2: invoking invokerorg ← GetClientId (). GetMSP
- Step 3: GetClientIdentity (). GetID ()  $\leftarrow$  invokerclient ().
- Step 4: invokerorg test← tokentype;
- Step 5: switch evaluation
- Step 7: Set endorserorganization = "Org1MSP", "StUnit\_Org3MSP" as opposed to "EStUnit\_Org3MSP", endorserorganization = "Org1MSP"
- Step 8: if creatingfortransfer == true, then (2 + T, T) = 0
  - Get\_TxID () id\_val ← buyer "," tokentype ","
- Step 9: proprietor← purchaser
- Step 10: id\_val "," tokentype "," GetTx ID() ←invokerclient proprietor client invoker
- Step 11: end if
- Step 12: NewToken (ID idval, TokenType tokentype, AvailableAssets ←availableassets, Proprietor proprietor)
- Step 13: JSON commemorative ←json.Marshal (tokennew)
- Step 14: PutState (id\_val, JSON token) Keeping a new token SetTokenst (invokerorg, tokennew.ID,

endorserorg) (tokennew.ID, invokerorg, endorserorg) (tokennew.ID, invoker Algorithm 1 is referred to as Step 15: function end

### Algorithm 4: Shot on an NFT

This shows how someone can bid on a commemorative of their choice. The requested value is read by Algorithm 2 and examined to see if it's for trade and if there's currently a shot on this particular token. Because the commemorative must be purchased in its whole, there is no mention of what the quantity of energy implies in the photograph.

Step 1: function BIDNFT (id string)

Step 2: commemorative← ReadToken (id) Algorithm 2

Step 3: iftoken. NotForSale == true

Step 4: return "Token ID not available for trade"

Step 5: terminate if

Step 6: bidderclient ← GetClientIdentity (). GetID ()

Step 7: iftoken.Bid == "" additionally

Step 8: token.Bid = bidderclient

Step 9: returns "There's originally an object on this commemoration bytoken.Bid"

Step 10: end if, commemorative JSON (commemorative) json.Marshal

Step 11: PutState (id, token JSON) Streamlined token saving

Step 12: function end.

### Algorithm 5: NFT Transfer

Making an NFT transfer Using Algorithm 5, the owner of a commemorative can transfer it to the purchaser who placed an offer on it. The commemorate is read employing Algorithm 2, and it is verified that the invoker account is the rightful owner of the commemorate and that there is indeed a shot on the token. If the item is bid on and a transfer has been asked by the owners, the transfer might go place. When the newly appointed proprietorship checks their collection of commemoratives utilizing Algorithm 7, which will utilize the ID of the tokens saved on the global state, we'll need the just moved commemorate to be updated. Still, we can't truly change the ID of the

commemorate on any given state, so we use Algorithm 3 to create a new commemorate held by the person who purchased it for the identical amount and toss out the old commemorate had with the dealer.

Step 1: TRANSFERNFT (id string) function

- Step 2: commemorate ReadToken (id) Algorithm calling 2.
- Step 3: invokerclient GetClientIdentity (). GetID ()
- Step 4: If invokerclient! = token.Owner
- Step 5: return "The customer invokerclient is not authorized to transfer commemorate possessed by token."Owner"

Step 6: end if

Step 7: iftoken.Bid == ""

Step 8: also returns "No shot yet"

Step 9: end if

Step 10: CreateNFT (token.TokenType, TRUE, bid, availableassets). Algorithm 3 is being summoned to create a new commemorative using buyer's id

Step 11: (id) DelState

End the commemoration using dealer's id

Step 12: function end.

### Algorithm 6: NFT Redeem

When a commemorate redemption takes place, it is removed from the global state, however an accounting of transactions is kept in the tally. The method used in 6 for redemption a commemorate begins by obtaining the identity of the invoker consumer to ensure that they are the owner of the commemorate being honored. Also, someone who owns it should not be able to exchange a commemorate that previously had a shot, therefore the software ensures that the commemorate being exchanged has no shot. If an owner redeems a commemorate with no shot, the redemption process is completed as desired.

Step 1: REDEEMNFT function (id string)
Step 2 commemorative ReadToken (id) Algorithm 2
Step 3: executerclient ← GetClientIdentity (). GetID ()
Step 4: If invokerclient! equals token. Also, the proprietor

Step 5: error "The customer invokerclient fails to Retrieve tokens possessed bytoken. Owner" Step 6: end if Step 7: iftoken.Bid! = nil Step 8: Return the message "The client's invokerclient may not redemption commemorate as it has a shot" Step 9: end if Step 10: DelState (id) Token deletion Step 11: function end

## Algorithm 7: Get the NFT

Obtaining a List of Displayed NFTs an essential design concern is that the users shouldn't be forced to recall the IDs of all the commemorate they like, and the interface should make it easy to do so. Algorithm 7 employs a range query to produce a list of all commemorate of the requested kind that the invoking client possesses. The algorithm requires the token Sensors located 2021, 21, 3822 11 of 32 type inquired with for as input and obtains the invoked customer's ID to generate open and end values of the spectrum query by cushions to the right to generate numerals strings of the exact same dimension as the sale ID with the objective to obtain the lowest and highest potential purchase IDs.

Step 1: GETMYNFT (tokentype string) is a single function.

Step 2: GetClientIdentity (ownerclient). GetID ()

Step 3: checkstr "," tokentype "," ownerclient ","

GetStateByRange (checkstr pad (0, 64), checkstr pad (z, 64)

Step 4: resultsIterator Iterator with

Step 5: postponeresults.Close ()

Step 6: commemoratives () \* Token

Step 7: forresultsIterator.HasThen () execute

Step 8: queryResponse←resultsIterator.Next ()

Step 9: commemorative tack (commemoratives, commemorative) ← json.Unmarshal (queryResponse.Value) commemoratives

Step 10: end for

Step 11: return commemorate

Returns all tokentype commemorate for

requested customer

Step 12: end function.

Each unique token, such as DAI or LINK, is totally non-divisible and separate, and NFTs are independent of ERC-20 tokens. NFT allows the owner to claim possession of any digital data that is special, and we can monitor it by utilizing the blockchain of Bitcoin as a public ledger. In an NFT, electronic objects are created to represent electronic or non-digital assets. When anyone mints or creates an NFT, code encoded in smart contracts that correspond to various specifications, such as ERC-721, is performed.

#### 5.0 Discussion

There will likely be no requirement for a middleman among two dealers for the exchange of goods, which will be distributed, and the operational structure of NFT is similar to cryptocurrencies in that all of a person's data is saved in the register (which token is given to whom). The permission is an additional benefit of the NFT. People may simply determine who the true proprietor of this particular product is by looking at the token. The primary idea behind NFT is to eliminate the intermediary between the two sides or to conduct direct trade involving the person who actually owns and the legal title holder. Increased security. Blockchain technology aids in the prevention of fraud and unauthorised use of the information we hold. Records are secured using encryption from beginning to finish, and privacy concerns may be handled by limiting access via permissions. Instead of just one computer, content is saved on a network of computers in blockchain. Greater Integrity: Blockchain employs a distributed ledger in which transactions and data have been saved in numerous locations. All the information and transactions are unchangeable and are both time and data recorded.

Traceability in a split second, it is feasible to exchange data concerning origin directly with visitors via cryptocurrency. It can also reveal flaws in any supply chain. Improved effectiveness and speed, it discovers a technique to deal with various ledgers, allowing for speedier settlement and cleaning.

According to the results, the system runs quickly while authenticating automobiles since the authentication is performed by more than one device. Because the duty of certifying is distributed. we find that the time required for processing is reduced [Figure 1].



Figure 1: Authentication Comparison with Other Schemes

Figure 2: Comparison over 500 Transaction Messages





Figure 3: Comparison over 1000 Transaction Messages

Figure 2 shows that, in compared to other schemes, the suggested has a low average delay while analyzing at least 500 communications, unlike methods [28], [32], and [26]. Figure 3 indicates that, unlike the previous alternatives, the suggested scheme has a modest computing cost while processing at least 1000 messages. When the number of transactions is extended to 1500, as shown in Figure 4, the suggested method still has a shorter latency than the other designs.



#### Figure 4: Comparison over 1500 Transaction Messages

Though the computational overhead is quite high it still operates faster than the other schemes.

### 6.0 Conclusion

The appearance of on-blockchain virtual belongings, similar to cryptocurrencies and ICO commemorative. A burgeoning sluice of the literature has been devoted to know-how the threat- go back characteristics of cryptocurrencies, similar as Bitcoin, ETH. moment, the spoil of NFTs is expected to disrupt the diligence extra substantially and profoundly in the foreseeable destiny. despite the fact that, little is known about the pricing and funding overall performance. We construct an overall rate indicator grounded on hedonic retrogression fashions and look at that token in adequateness and personal judgments of aesthetics are pivotal determinants for explaining a huge part of price decorations. The relinquishment of blockchain era and the variation of cryptocurrencies also have an effect on the valuation of NFTs, however to a lower volume. Our findings inclusively don't propose that NFTs are superior to positive traditional financial means (e.g., small and excessive-tech shares) because the pricing of an NFT entails extra complex valuations. it is able to also take similarly time to search for trading counterparts. also, fortified with the caveat that the government worldwide may participate in poking the operations deduced from blockchain technology. NFT returns can be more changeable. in the end, we admit the issue of this look at that NFT indicator grounded on the deals of CryptoPunk commemoratives might not function a representative index in NFT requests.

### References

- Research, G. V. (2022). Used car market size & share report, 2022–2030. Retrieved from https://www.grandviewresearch.com/industry-analysis/used-carmarket
- [2] Duboka, Č., Filipović, Ž., Gordić, M. & Došlić, M. (2009). Second hand vehicle maintenance frauds. In Proceedings of the Paper NMV0912 presented at the XXII JUMV International Automotive Conference, Belgrade, Serbia, 14–16 April 2009; pp. 31–42.
- [3] Shin, D. D. (2019). Blockchain: The emerging technology of digital trust. *Telematics and Informatics*, 45, 101278.

- **130** *COMPUTOLOGY: Journal of Applied Computer Science and Intelligent Technologies Volume 3, Issue 2, Jul-Dec 2023* 
  - [4] Chanson, M., Bogner, A., Wortmann, F. & Fleisch, E. (2017). Blockchain as a privacy enabler: An odometer fraud prevention system. *In Proceedings of the 2017* ACM International Joint Conference on Pervasive and Ubiquitous Computing and Proceedings of the 2017 ACM International Symposium on Wearable Computers, Maui, HI, USA, 11–15 September 2017; pp. 13–16.
  - [5] Abbade, L. R., Ribeiro, F. M., Silva, M. H. D., Morais, A. F. P., Morais, E. S. D., Lopes, E. M., Alberti, A. M. & Rodrigues, J. J. P. C. (2020). Blockchain applied to vehicular odometers. *IEEE Network*, 34(1), 62–68.
  - [6] Samue, C. N., Severine, G., David, B., Verdier, F. & Patricia, G.O. (2020). Automotive data certification problem: A view on effective blockchain architectural solutions. *In Proceedings of the 2020 11<sup>th</sup> IEEE Annual Information Technology, Electronics and Mobile Communication Conference (IEMCON), Virtual*, 4–7 November 2020; pp. 0167–0173.
  - [7] Brousmiche, K. L., Heno, T., Poulain, C., Dalmieres, A. & Ben Hamida, E. (2018). Digitizing, securing and sharing vehicles life-cycle over a consortium blockchain: Lessons learned. *In Proceedings of the 2018 9<sup>th</sup> IFIP International Conference on New Technologies, Mobility and Security (NTMS)*, Paris, France, 26–28 February 2018; pp. 1–5.
  - [8] Leo Brousmiche, K., Durand, A., Heno, T., Poulain, C., Dalmieres, A., & Ben Hamida, E. (2018). Hybrid cryptographic protocol for secure vehicle data sharing over a consortium blockchain. *In Proceedings of the 2018 IEEE International Conference on Internet of Things (iThings) and IEEE Green Computing and Communications (GreenCom) and IEEE Cyber, Physical and Social Computing (CPSCom) and IEEE Smart Data (SmartData)*, Halifax, NS, Canada, 30 July–3 August 2018; pp. 1281–1286.
  - [9] Demir, M., Turetken, O. & Ferworn, A. (2019). Blockchain based transparent vehicle insurance management. *In Proceedings of the 2019 Sixth International Conference on Software Defined Systems (SDS)*, Rome, Italy, 10–13 June 2019; pp. 213–220.
  - [10] Sharma, P. K., Kumar, N. & Park, J. H. (2019). Blockchain-based distributed framework for automotive industry in a smart city. *IEEE Transactions on Industrial Informatics*, 15, 4197–4205.
  - [11] Wang, X., Wang, Y. & Liu, A. (2020). Trust-driven vehicle product-service system: A blockchain approach. *Procedia CIRP* 2020, 93, 593–598.

- [12] Syed, T. A., Siddique, M. S., Nadeem, A., Alzahrani, A., Jan, S. & Khattak, M. A. K. (2020). A novel blockchain-based framework for vehicle life cycle tracking: an end-to-end solution. *IEEE Access*, 8, 111042–111063.
- [13] You-Ting, H.M.S. (2021). A blockchain-based vehicle condition recording system for second-hand vehicle market. Wireless Communications and Mobile Computing, 1-10. Doi: 10.1155/2021/6623251
- [14] Pirker, D., Fischer, T., Witschnig, H. & Steger, C. (2021). Velink-a blockchainbased shared mobility platform for private and commercial vehicles utilizing erc-721 tokens. In Proceedings of the 2021 IEEE 5<sup>th</sup> International Conference on Cryptography, Security and Privacy (CSP), Zhuhai, China, 8–10 January 2021; pp. 62–67.
- [15] Vitelaru, E. & Persia, L. (2023). Fractional vehicle ownership and revenue generation through blockchain asset tokenization. *Transport and Telecommunication Journal*, 24(2), 120–127.
- [16] Kudyba, S. (2020). COVID-19 and the acceleration of digital transformation and the future of work. *Information Systems Management*, *37*, 284–287.
- [17] Nakamoto, S. (2019). Bitcoin: A peer-to-peer electronic cash system. *Manubot*. Retrieved from https://bitcoin.org/bitcoin.pdf
- [18] Mitrofanova, I. V., Larina, O. I., Dubovik, M. V. & Moryzhenkova, N. V. (2020). Evolution of money systems or cashless economy? *Institute of Scientific Communications Conference*; Springer: Cham, Switzerland; pp. 1021–1032.
- [19] Di Pierro, M. (2017). What is the blockchain? *Computing in Science & Engineering*, 19, 92–95.
- [20] Xinyi, Y., Yi, Z. & He, Y. (2018). Technical characteristics and model of blockchain. In Proceedings of the 2018 10<sup>th</sup> International Conference on Communication Software and Networks (ICCSN), Chengdu, China, 6–9 July 2018; pp. 562–566.
- [21] Chowdhury, M. J. M., Ferdous, M. S., Biswas, K., Chowdhury, N., Kayes, A., Alazab, M. & Watters, P. (2019). A comparative analysis of distributed ledger technology platforms. *IEEE Access*, 7, 167930–167943.
- [22] Wood, G. (2014). Ethereum: A secure decentralised generalised transaction ledger. *Ethereum Project Yellow Papage*, *151*, 1–32.
- [23] Mohanta, B. K., Panda, S. S., & Jena, D. (2018). An overview of smart contract and use cases in blockchain technology. In Proceedings of the 2018 9<sup>th</sup> International Conference on Computing, Communication and Networking Technologies (ICCCNT), Bengaluru, India, 10–12 July 2018; pp. 1–4.

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  - [24] Macrinici, D., Cartofeanu, C. & Gao, S. (2018). Smart contract applications within blockchain technology: A systematic mapping study. *Telematics and Informatics*, 35, 2337–2354.
  - [25] Negara, E. S., Hidayanto, A. N., Andryani, R. & Syaputra, R. (2021). Survey of smart contract framework and its application. *Information*, 12, 257.
  - [26] Merriam-Webster (2023). Transaction Definition & Meaning. Retrieved fromhttps://www.merriam-webster.com/dictionary/transaction
  - [27] Szabo, N. (1997). Formalizing and securing relationships on public networks. *First Monday*, 2(9). Retrieved from https://doi.org/10.5210/fm.v2i9.548
  - [28] Rouhani, S. & Deters, R. (2019). Security, performance, and applications of smart contracts: A systematic survey. *IEEE Access*, 7, 50759–50779.
  - [29] Valeonti, F., Bikakis, A., Terras, M., Speed, C., Hudson-Smith, A. & Chalkias, K. (2021). Crypto collectibles, museum funding and OpenGLAM: Challenges, opportunities and the potential of non-fungible tokens (NFTs). *Applied Science*, *11*(21), 9931.
  - [30] Dowling, M. (2022). Fertile LAND: Pricing non-fungible tokens. *Finance Research Letters*, 44, 102096.
  - [31] Dowling, M. (2022). Is non-fungible token pricing driven by cryptocurrencies? *Finance Research Letters*, *44*, 102097.
  - [32] Park, A., Kietzmann, J., Pitt, L. & Dabirian, A. (2022). The evolution of nonfungible tokens: Complexity and novelty of NFT use-cases. *IT Professional*, 24, 9–14.
  - [33] Wang, Q., Li, R., Wang, Q. & Chen, S. (2021). Non-fungible token (NFT): Overview, evaluation, opportunities and challenges. Retrieved from https://www.researchgate.net/publication/351656444\_Non-Fungible\_Token \_NFT\_Overview\_Evaluation\_Opportunities\_and\_Challenges
  - [34] Karandikar, N., Chakravorty, A. & Rong, C. (2021). Blockchain based transaction system with fungible and non-fungible tokens for a community-based energy infrastructure. *Sensors*, 2(11), 3822.
  - [35] Osivand, S. & Abolhasani, H. (2021). Effffect of bitcoin and Etherium on nonfungible token (NFT). *IOSR Journal of Business and Management*, 23(9), 49-51.