

How Digital Art can be Converted into the NFT (Non-Fungible Token) and used to Identify/Secure the Digital Assets and the Ownership of the Digital Art

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Abstract:- This article presents the potential value of that NFT (Non-Fungible Tokens) which uses the technology called blockchain. In this we have shown how NFT tokens can be used to identify the digital assets (like artist works music, games, pdf etc). This will ensure the security and privacy of digitalized assets. It takes the records of the proof of ownership from the very beginning of the digital assets. Blockchain technology has emerged as one of the major disruptive innovations in last decade. Beginning from Bitcoin mainly popular in recently.

Keywords:- NFT (nonfungible Token), Blockchain, Smart contract, Ethereum blockchain, IPFS (Interplanetary File System), ERC-721

I. INTRODUCTION

NFT tokens has advantages in terms of the proof of the ownership, unique and cannot interchangeable with digital assets token (i.e. fungible). This uniqueness of the non-fungible token exists as a cryptographic record on blockchain, or distributed ledger and this can be easily readily seen by anyone.

➤ Flow Chart

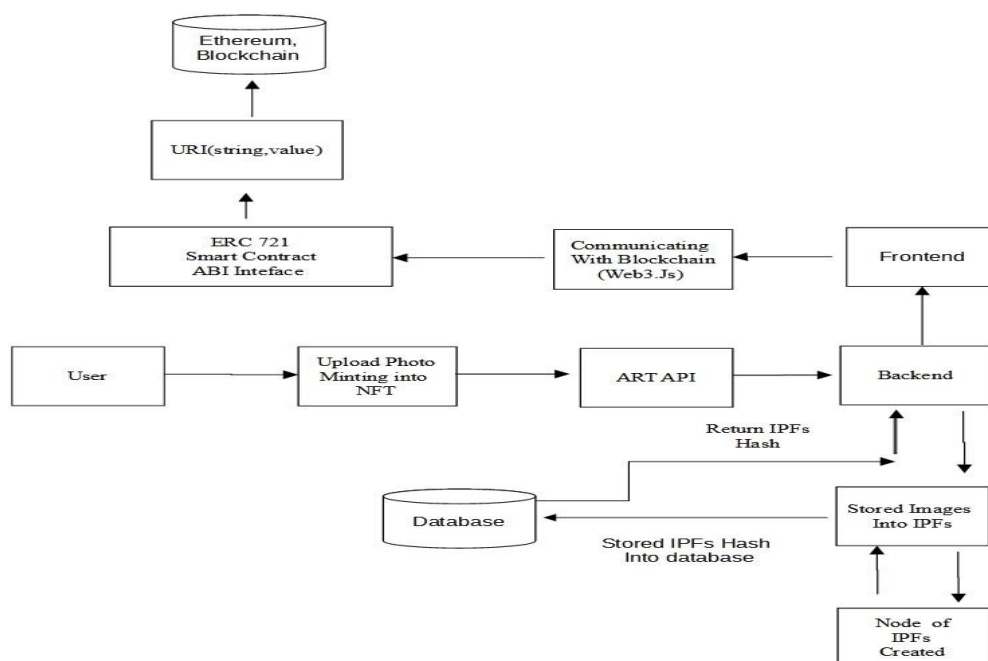


Figure 1: Flow Chart of how digital Art is Minted and stored on ethereum Blockchain

➤ *Exploring the Technology Behind NFT*

Beyond the integrity of data, blockchain aims, by its decentralized nature, to rebalance the balance of power between Internet users and trusted third parties such as GAFA. Indeed, as explained by Thibault Verbiest, partner at DS Advocates, blockchain is a way of “giving the power back” to the consumer, giving them the opportunity to decide what they share. More generally, he says that “there is a promise in blockchain that hasn't been held by the Internet, that of autonomy of people in their business.

The objective of this paper is to explore to what extent blockchain technology enhances the security of data and information across various sources. To include a new block in an existing chain, Bitcoin has to solve a cryptographic puzzle: which string provides the same hash-value as the encoding of the new block. Once a knot has solved a puzzle, the solution is checked and adopted by all.

➤ *Token standards and NFT properties:*

➤ *ERC-721*

ERC-721 is a non-fungible token (NFT) standard written in the Solidity language on the Ethereum blockchain. It allows users to mint or tokenize the ownership of any data. In some aspects, the primary objective is to create tokens that are immutable. The ERC-721 standard was created by William Entriken in the year of 2018.

ERC-721 which stands for Ethereum Request for Comments 721 is a non-fungible token that implements an API for tokenization within smart contracts.

ERC-721 (Ethereum Request for Comments 721), proposed by William Entriken, Dieter Shirley, Jacob Evans and Nastasia Sachs in January 2018, is a non-fungible token standard that implements an API for tokenization within smart contracts.

ERC standard is the one which have core features like transfer of tokens from one user account to another user account, to easily identify the the correct owner of the particular token and also to get know about the total supply of the on the current network. Apart from these it also has some other features like to approve that an amount of token forms a user account can be moved by a third-party user account.

NFT (Non-Fungible Tokens) has a uint256 variables called tokenId, and the couples of contract address and uint256 tokenId which is unique, and moving further, the tokenId can be used as an input to generate special identifications.

➤ *NFTs Desired Proprieties*

NFT schemes are essentially decentralized applications, and thus enjoy the benefits/properties from their underlying public ledgers.

Verifiability: NFTs can be public with their token metadata (data of data) and its ownership.

Verified transparent execution. Applications or use cases of NFT include minting, selling and buying, decentralized accessible that can be accessed by anyone.

Availability: NFT system uses a technology called blockchain because blockchain is a decentralized application NFT system never slows down. All digital assets created by Smart Contrast are always available to buy and sell.

Tamper-resistance: The NFT metadata and all the records of buying and selling them are securely stored and cannot be manipulated once the transactions are confirmed.

Usability: Once digital assets are melded to form NFTs. Each NFT contains updated ownership information that is user-friendly and the information is very clear.

Atomicity. Trading NFTs can be accomplished in an atomic, consistent, isolated and durable (ACID) transaction. NFTs can run in the same shared execution state.

Tradability: Each NFT and its related products can be traded and exchanged arbitrarily.

II. CHALLENGES

A. *Intellectual Property Right*

Intellectual property issues are the next important entry in the list of NFT risks and constraints. It is important to evaluate the ownership rights of a person for a certain NFT. It is important to determine whether the seller actually has the NFT before making a purchase. There has been an issue of someone photographing an NFT or making replicas of an NFT. As a result, when an NFT is purchased, the owner only gets the right to use it, but not the intellectual property rights. The metadata of the underlying smart contract contains the terms and conditions of owning the NFT. It is clear that NFT applications can provide huge revenue opportunities. However, they have to face many problems. NFTs are being endorsed by celebrities, and there is a huge market hype bubble around them. The trading volume of NFTs has increased more than once in just one year, indicating that they have great potential. On the other hand, the trading of NFTs is not governed by any specific restrictions.

B. *Smart Contracts*

Smart contract development and security is one of the key concerns in the NFT environment. Hackers recently targeted Poly Network, a well-known decentralized finance (de-fi) protocol that provides cross-chain interoperability. The NFT theft, which resulted in losses of nearly \$600 million, focuses attention on serious flaws in smart contract security. In the case of Solidity, there are no clear security standards with industry-wide validation, which is one of the major reasons that can lead to vulnerabilities in smart contracts. Smart contract transactions and code are both immutable, which means developers must ensure the security of the code and each transaction. However, there is no defined standard process for designing smart contracts that developers must follow in all projects. Developers do not have the tools they need to make it easy to develop, test, verify,

and audit smart contracts, and most importantly, they do not have the tools to collaborate.

C. Environmental Impact

The increase in understanding of NFTs is influencing people to invest in crypto technology but there is a lot of evidence about its harmful effects on the environment. Ethereum was recently estimated to use 43.17 terawatt-hours of electricity per year. Nevertheless, moving from POW (Proof of Work) to POS (Proof of Stake) resulted in a reduction in electricity calculations, roughly equivalent to the annual electricity consumption of countries such as Qatar and Hungary. The total amount of electricity usage in relation to the mining of bitcoin is easily comparable to the electricity usage of countries such as Malaysia and Sweden. According to a recent study, blockchain-based technologies could push the Earth's temperature 2 degrees Celsius above historical levels if blockchain-based technologies are widely adopted like other new technologies. Crypto miners have already been blamed for power outages in Iran. A recent study showed that energy consumption from blockchain-based technology in China exceeds the combined annual greenhouse gas emissions of the Czech Republic and Qatar.

D. Cyber Security

The growth of the digital world, as well as the number of NFT transactions, has resulted in a significant increase in cyber security and fraud risk. Malicious actors can imitate well-known NFT artists and sell counterfeit NFTs in their names. Copyright theft, copying of popular NFTs or false airdrops, and NFT giveaways are some of the other major nonfungible token's threats and issues in terms of cybersecurity and fraud. One of the most recent examples of the NFT cybersecurity concern is the theft of NFTs from Nifty Gateway users by hackers. The advancement of technology not only allows for greater efficiency in the trade of digital assets, but it also introduces unwelcome danger, notably in the area of cyber security.

E. High gas prices

High gas prices have become a major problem for the NFT marketplace, especially when NFTs are mined on a large scale that requires metadata to be uploaded.

F. Blockchain Network

Each transaction involving NFTs is more expensive than a simple transfer transaction because smart contracts involve computational resources and storage to be processed. At the time of this writing, the cost of mining an NFT token is over USD 60 (equivalent to approximately 5 X 10²wei). It can run between USD 60 and USD 100 for each transaction to complete a simple NFT trade. Expensive fees due to complex operation and high congestion limit its widespread adoption.

III. DISCUSSION

NFTs offer better ways to enforce the authenticity and legality of asset ownership by linking unique information to a single account on the blockchain. Consumers of NFTs are leveraging the benefits of NFTs to generate revenue through the sale of their core functions with greater convenience and

security. However, along with the benefits of NFTs come several challenges and risks. We discuss some methods that can be implemented in some use cases to address the risks and overcome some of the problems that we have discussed above. Privacy and security issues are one of the most prominent risk factors for many use cases of NFTs. All transactions take place over the Internet where information related to each transaction is vulnerable to unauthorized

IV. CONCLUSION

NFTs are built on blockchain technology, specifically Ethereum, making them transparent, traceable and secure. Novel feature of unique tokens enabling use cases not previously demonstrated such as exclusive ownership of digital assets. The ownership of each asset is traceable resulting in increased authenticity. The idea of having complete ownership of an authentic, purchased digital assets such as images, gifs, videos, music, etc. attracted art collectors and enthusiasts, which led to a sudden growth in its market. NFTs are not limited to digital assets but can also be applied to physical artistic works, allowing physical assets to be exchanged in the same way as their digital counterparts. Several platforms facilitate the buying and selling of NFTs, which include a variety of media. In addition, it is used in many other domains such as education where NFT is applied for licensing and certification, fashion where it is used to differentiate each article, sports where basketball cards are one of the revenue generations through NFT. A new instrument is created, and so on. The increasingly widespread use of NFTs, however, comes with a number of challenges, including the lack of industry-wide security standards for smart contracts, the uncertainty of intellectual property rights, and the risk of fraud.

These solutions have yet to gain momentum among the wider blockchain community, so challenges remain and effective yet to be addressed adequately is in return for the vast potential of NFTs, for which the market is growing rapidly.

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