

Blockchain-Based Decentralized NFT Marketplace For New Fine Art

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ABSTRACT- Nonfungible tokens (NFTs) are distinct digital assets that provide digital content ownership and legitimacy. An NFTs Market is a blockchain-based platform that makes it easier to create, trade, and collect NFTs. This article delves into the NFT Marketplace and its blockchain technology, highlighting its tokenization capabilities for any type of property, its ability to create smart contracts with flexibility, and its promotion of NFTs with quick and inexpensive exchanges. The pros and cons of the platform are also covered, including issues with scalability, user-friendliness, and fraud susceptibility.

The appearance of non-fungible tokens (NFTs) for artists and content providers has ushered in a new era of unexpected opportunities for financial freedom and reimbursement in the digital art business!! This article describes the developmental importance of the NFT markets, which allow artists to sell their products directly to customers, bypassing traditional intermediaries like galleries and auction houses. The first abstract describes the NFT market's exponential growth and demonstrates how it may become a valuable source of income for talented individuals. It is written from two distinct points of view. Meanwhile, the second abstract highlights NFTs in particular and introduces OpenNFT, A decentralized web app that offers safe and effective digital asset management by fusing deep learning models with blockchain technology!! This web application integrates features including minting, markets, safe wallet connections, NFTs image creation, and profile management to show how deep learning and blockchain technology can transform digital asset administration.

KEYWORDS– NFT, Token, Blockchain, Market, Asset

I. INTRODUCTION

Non-fungible tokens (NFTs) are a category of virtual assets based on blockchain technology that has recently gained a lot of attention from investors. While some consider them a craze, others believe they represent the future of digital art. In auctions, NFTs come in various types and have been sold

for millions of dollars. Non-fungibility is a characteristic of NFTs that distinguishes them from other digital assets and may become an important aspect of blockchain development and exchange in the future.

A non-fungible token (NFT) is a digital data unit kept on a blockchain that cannot be exchanged for other digital assets [15]. The term "fungible" refers to anything that can be exchanged with an identical or similar object. Money can be of various types, such as very paper-made, valuable materials, or fungible objects,[19][20] allowing them to be used as mediums of exchange because of their perceived equal value.

Creating an NFT comprises putting a file onto an NFT auction market, where it is recorded on the digital log as a unique code that may be purchased or sold using the digital currency [6]. Even if an artist owns the exclusive right to an NFT representing their artwork, they are still allowed to copyright the piece and develop new NFTs based on it. Therefore, buying an NFT does not necessarily offer exclusive access to the original digital file [6][7].

Aside from artworks, various digital collectibles, such as basketball-related NFTs and videogame-based NFTs [2] have also been sold for high prices. Furthermore, audio-centered creative works can also be tokenized as NFTs.

II. LITERATURE REVIEW

With the CryptoPunks' support, NFTs began to draw in noticeable spectators in October 2017. However, as digital artist Mike Winkelmann made history vended his labor for an estimated USD 70 million. The most extensive art transaction ever their fame has boomed. The notice that artists and art buffs have given to NFTs has contributed to their fast increase. The Ethereum blockchain needs to be hitched with digital art to mint NFT [1][2]. The procedure of "digging" and allocating post-making tokens, or NFTs, is similar to that of metal currencies. Thanks to its NFT portrayal, digital art can be gained, vended, and supervised digitally all through the whole transaction procedure. Until December 2021, only a petite segment of the blockchain community accepted NFTs as being broadly endorsed.

However, by that same month, they had their own market, with sales of more than USD 1.2 Billion. Besides NFT sales, there are other execution-related challenges that must be vanquished. Intellectual property comes next on the list of NFT dangers and challenges [3][16]. Gauging a person's ownership rights to a certain NFT is pivotal. Before inking a deal, check if the vendor truly holds the NFT. The rise of the digital economy and the quantity of non-convertible token transactions have significantly augmented the danger of fraud and the requirement for cyber safety. Con artists could mimic the identities of popular NFTs artists to peddle deceptive NFTs under their names. The cloning of well-known NFTs, deceptive airdrops, and NFT freebies are some more key non-convertible token weaknesses and cybersecurity problems. Hackers thieving NFTs from Nifty Gateway patrons is one of the freshest occurrences of the NFT cybersecurity dilemma. Safety and judicious arrangement development are pivotal NFT trials. Hackers have currently zeroed in on Poly Network, a renowned decentralized finance (Defi) protocol that greenlights cross-chain interaction. Grave flaws in smart contract security were uncovered by the NFT looting, which set one back an estimated \$600 million [16][17]. One of the chief quandaries in Solidity's situation that can give rise to smart contract vulnerabilities is the scarcity of well-defined security standards with broad industry assent. As NFTs gain traction, more folks are investing in Bitcoin technology; notwithstanding, a burgeoning grouping of research evinces that this technology has detrimental environmental effects. Study findings divulge that Ethereum is prophesied to guzzle 44.94 terawatt-hours of energy per annum, which is analogous to the yearly power usage of countries like Qatar. During a rocking market upturn in the last half of 2020, NFT paintings traded for USD 69 million. Additionally, NFT sales reached a total value of USD 2.5 billion in 2020 but spiked to USD 10.7 billion in 2021. This exhibits how the NFT expansion altered considerably in a brief phase. The cryptographic money market has a volume of USD 341 billion, whereas the NFT market has an absolute 24-hour typical trading volume of USD 4 billion. According to stats from NFT platforms like CryptoPunks and OpenSea, the first quarter of 2022 had the greatest transaction volumes, signaling a substantial push in interest in NFTs in 2022. As they offer a more direct connection between producers and consumers than Web 2 e-commerce companies can, NFT marketplaces are indispensable. The peer-to-peer nature of NFT marketplaces also denotes that no one can impede your transactions [8][9]. The NFT marketplace's complete openness increases the possibility of data breaches, but any attempt at manipulation will be detected, and the identities knotted will remain anonymous. These platforms may be beneficial for fledgling companies and new firms that necessitate early attention to shape a community.

Table 1: Top NFT Marketplace

Market	Traders	Volumes
Axic Infinity	40,429	\$73.45m
CryptoPunks	120	\$2.45m
AtomicMarket	7,103	\$2.45m
PancakeSwap	1,342	\$783.74k

III. PROBLEM STATEMENT

NFTs are distinct digital assets that assure digital content's authenticity and ownership [7]. An NFT Marketplace is a blockchain-based platform that facilitates their creation, trading, and collecting. It uses blockchain technology to ensure authenticity and ownership of NFTs, offering secure and transparent transactions. This report covers the NFTs Marketplace and its blockchain technology, including the ability to tokenize any asset, create customizable smart contracts, and sell NFTs with low fees and instant trades. It also discusses pros and cons, such as user-friendliness, susceptibility to fraud, and scalability challenges.

IV. WORKING OF NFTs

NFT creation involves uploading a digital file to an NFT marketplace and saving it on a digital ledger for buying or selling using digital currency[2][3]. Artists retain ownership rights to the original work and can make further NFTs based on it. The origination problem is common in the NFT space, where imposters can upload NFTs to auction platforms. NFTs are unique and do not require central authority. Buyers do not receive any ownership rights to the original artwork. Core Component of NFTs Blockchain, Smart Contract Address and Transactions, Data Encoding Tokenization.

V. DESIGN AND IMPLEMENTATION

The NFT Market, or OpenNFT website, went through various stages during its formation. This involved fashioning the user interfaces, depositing smart bonds on the blockchain, fusing other APIs, and testing. We provide an in-depth rundown of every step, including the utensils used, the predicaments faced, and the resolutions devised [3]. We also describe the methodologies used to safely link users' pouches, produce individual NFTs, mint them on the blockchain, and design user profiles. Our goal is to present top-notch approaches for formulating a user-friendly and secure open-sea platform for handling and exchanging digital resources.

- **Wallet Connection**
- **NFT Creations**
- **NFT Marketplace**

A. Wallet Connection

Wallet Connect is a vital feature of OpenNFT Marketplace. It enables secure connection of users' cryptocurrency wallets to MetaMask without revealing private keys, eliminating the possibility of illegal entry or key theft. To make this interaction secure and user-friendly, we integrated the well-known Ethereum-based network library Ether.js with

React.js. Ether.js provided a simple API for connecting OpenNFT with users' cryptocurrency wallets through MetaMask (see figure 1).

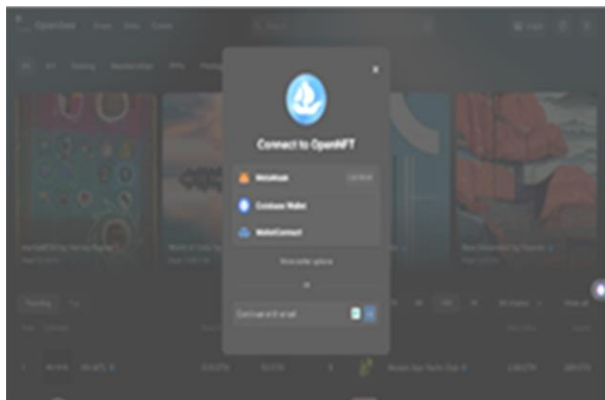


Figure 1: Meta Mask Wallet Connection

B. NFT Creations

To create art for NFTs, artists first craft their digital masterpieces using software like Photoshop, Illustrator, Blender, or traditional methods which are later digitized. Once the artwork is ready, artists choose a blockchain platform like Ethereum to mint their creation as a unique NFT, assigning metadata such as title, description, and edition details. After minting, they list the NFT for sale on various NFT marketplaces, setting a price and any additional terms. Promotion through social media, newsletters, and collaborations helps attract potential buyers and collectors. As sales occur, artists monitor their NFTs' performance, engage with the community, and continue to create and promote their art, building their presence in the NFT space (see figure 2).



Figure 2: NFTs creations

C. NFT Marketplace

NFT marketplaces are digital spaces where you may purchase, sell, and trade non-fungible tokens (NFTs) [4]. Users can browse listings, view NFT details, and pay with cryptocurrency. Popular NFT marketplaces include Risible, Foundation, and SuperRare. These marketplaces connect artists, creators, and collectors and offer a space to discover new works in the growing NFT ecosystem (see figure 3).

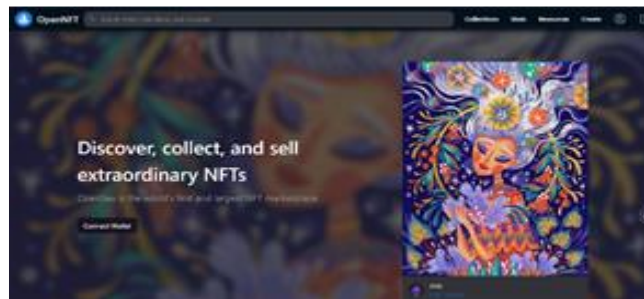


Figure 3: NFTs Marketplace

VI. METHODOLOGY

The core component of NFTs:

A. Blockchain:

In this technology records transactions and tracks assets in a business network [19]. It creates a shared, transparent, and secure environment for smart contract execution, which makes it an ideal choice for NFT schemes. Ethereum is the most used blockchain platform for this purpose [5]. By using blockchain, businesses can improve accuracy, speed, and security while reducing the risk of fraud and cyberattacks.

B. Smart Contracts:

Smart contracts are automated applications on a blockchain that ensure both parties in a transaction fulfill their end of the agreement. They contain only code that executes actions when certain conditions are met and do not contain legal language or terms [2][15]. Ethereum and Bitcoin blockchains have smart contract capabilities. Most NFT systems use smart contract-based blockchain platforms to enable order-sensitive executions.

C. Addresses and Transactions:

Blockchain addresses and transactions are the two primary ideas behind cryptocurrency. Like a bank account, a blockchain address is a single unique identification for moving and receiving assets [1][2]. To transfer NFTs, the owner must provide proof of ownership for the private key and use a legitimate digital signature to send the assets to a new address. This is known as proposing a transaction using the ERC-777 smart agreement standard and is carried out using Bitcoin Pocket.

D. Data Encoding:

Data Encoding the Bitcoin network has intentional computational constraints in its core software, as it is designed to be utilized for Bitcoin transactions. However, alternative solutions have been successful in attempting to encode arbitrary data into the blockchain [12]. Encoding is a way of switching data from one form to another. Usually, a lot of files are encoded in decongested formats to achieve high quality or resolution, or inefficient, condensed forms to save memory. Hex values are used in blockchain systems like Ethereum and Bitcoin to encode transaction components including function names, arguments, and return values!

E. Tokenization:

Tokenization NFTs are becoming a vital part of the internet and future commerce, and organizations of all kinds have begun to take notice. The majority have immersed their toes in the digital water with lines of NFT artwork, but other choices can have a more significant impact on fans. NFT tokenization, in particular, is one way for anyone to leverage assets they already have as digital collectibles. NFT tokenization is the process of minting and selling an NFT object, which might be a rare guitar, shirt, artwork, or some other thing [14][15]. Once the asset has been minted as an NFT, people buy and sell it on a website in much the same way as they would buy any other type of memorabilia. If the holder chooses, they can receive the actual item shipped to them. Tokenized NFT assets are liquid, and since their markets are never stopping, they profit from 24/7 trades. The market staying enduringly open is particularly important, as NFT creators get commissions whenever one of their NFTs sells, which equals higher income from each asset. NFTs are also releasing widely valuable market access, giving organizations more chances to explore[8]. To be compliant with the joint standards, a smart contract must follow a token standard, which is an interface and a set of rules.

- Tokens that are unique (i.e., non-fungible) part of the ERC-721 Non-Fungible Token Standard, which makes it

possible to track distinctive assets [5]. Every asset's belonging must be handled separately and atomically!

- THE 1155-ERC Multitude-Ticket Norm permits the management of any assemblage of exchangeable and non-exchangeable tickets in one agreement, including shifting plural ticket sorts quickly [6][7]. According to this average, obedient tickets should include six mandatory duties and four events.

The most important properties of NFTs:

- **Authenticity:** The NFT's ownership, existence, and token details can all be verified through publicity.
- **Execution Performance:** The public can see every step that NFTs take, including minting, selling, and buying.
- **Accessibility:** The NFT system is impervious to failure, and all tokens and issued NFTs are always available for purchase and sale.
- **Tamper-resistance:** Once a transaction is deemed genuine, the NFT metadata and trading records are stored indefinitely and cannot be altered.
- **Usability:** The most recent ownership data is available for each NFT, and it is simple to use and packed with details.
- **Atomicity:** NFTs can be exchanged in a single atomic, consistent, isolated, and durable (ACID) transaction [1]. Every NFT can be in the same operational state at once.

In the below figure 4 is showing the working diagram of NFT.

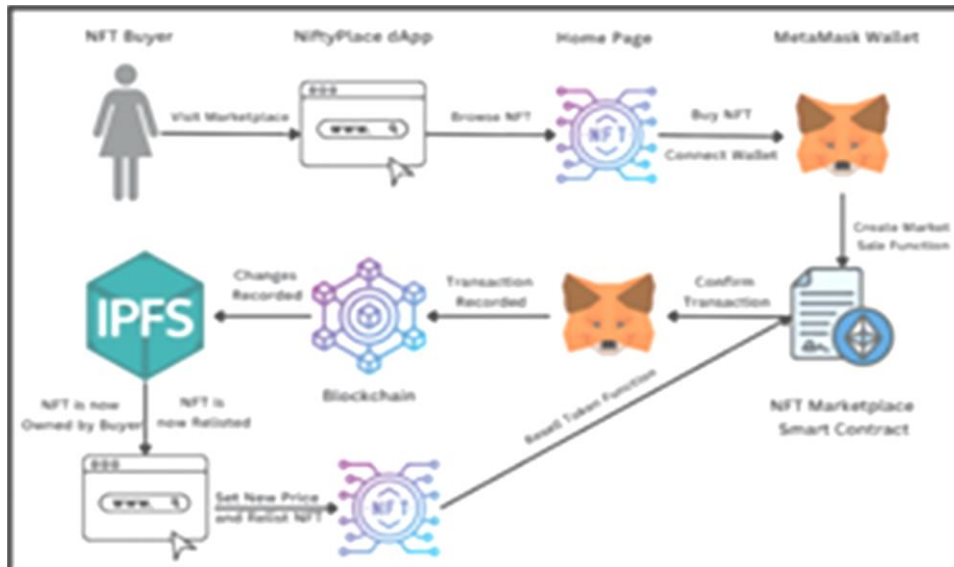


Figure 4: Working Diagram

The processes to purchase NFTs are as follows: Connect MetaMask -> Choose NFT to Purchase -> Use Buy Function -> Receive a confirmation alert from MetaMask -> NFT Purchased Successfully

VII. RESULT AND DISCUSSION

This section presents the results of our performance and makes use of assessments completed on our work. In table 2 is showing the performance of different component, the time

it took to mint NFTs using smart contract transactions on the Goerli testnet and to produce NFT pictures using OpenAI's API was measured as part of the performance evaluation. Ten customers who live close to campus were requested to participate in the usage research and rate the marketplace's overall usability, purchase procedure, clarity, and visual appeal. The results of the research are shown as lines to represent the responses of the participants!

A. Connecting the Meta Mask wallet

You can connect our Meta Mask wallet to the NFT Marketplace essay. Click on the website's MetaMask button, as shown in Figure 5.

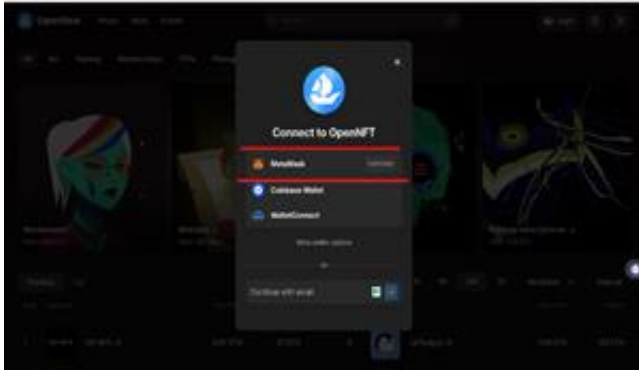


Figure 5: MetaMask wallet

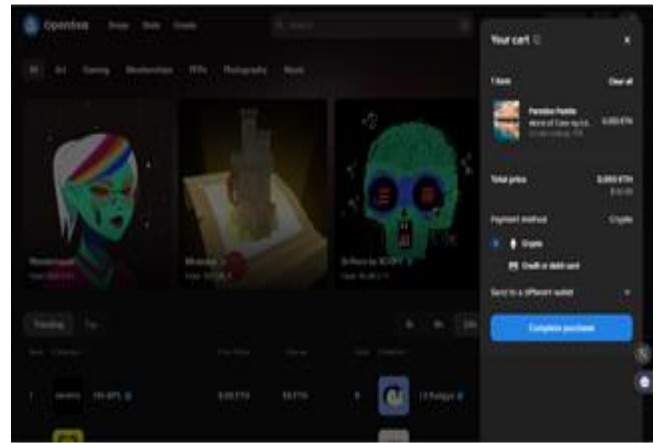


Figure 8: NFTs Buy/Sell

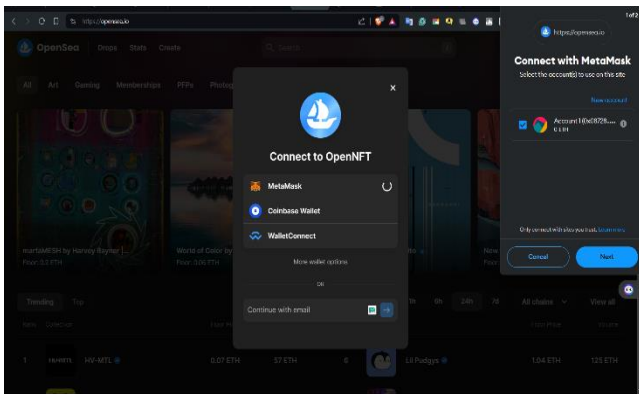


Figure 6: Wallet Connected to the marketplace

D. Create & Drop NFTs

On the NFT marketplace (OpenNFT), you can create your own NFTs and drop-on platforms, as shown in figure 9.

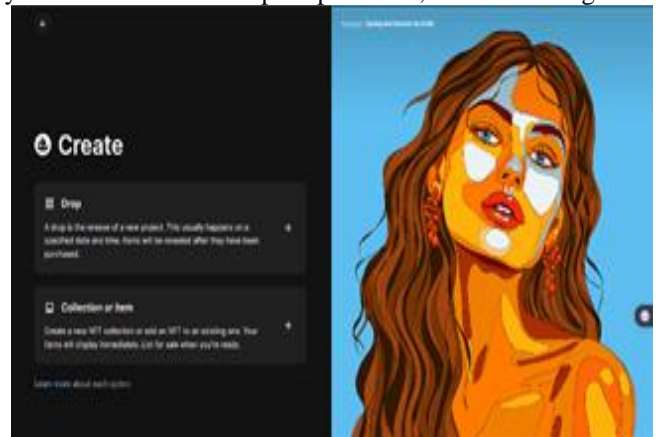


Figure 9: Create & Drop NFTs

B. Marketplace

Figure 7 shows the different types of NFTs available on the website (Marketplace).

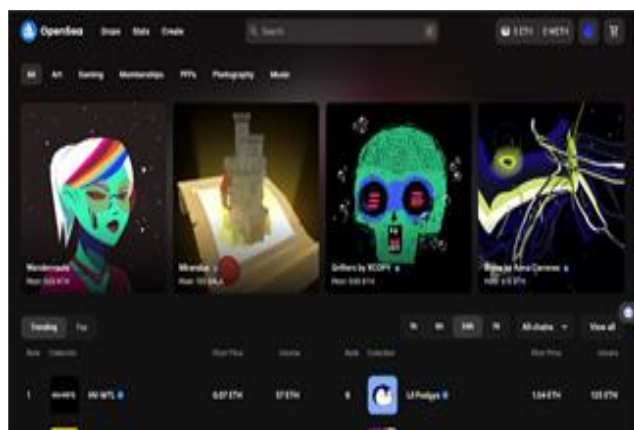


Figure 7: OpenNFT Marketplace

C. Buy/Sell

You can buy and sell NFTs easily on the NFT Marketplace (OpenNFT), as shown in Figure 8.

Table 2: Compare the Result between Component

Component Name	Working	Result
Marketplace	The website working is properly.	Result Positive
MetaMask Wallet Connection	The wallet connection is working fine.	Result Positive
Add NFTs	You can add our NFTs properly.	Result Positive
Buy/Sell	The buy or Sell function works properly.	Result Positive
Create NFTs	NFTs creation functionality working is fine.	Result Positive

VIII. CONCLUSION

The NFT Marketplace, termed 'OpenNFT', operates on blockchain technology, primarily Ethereum, which assures transparency, traceability, and security. The marketplace's

unique NFT tokens enable exclusive ownership of digital assets, enhancing authenticity through ownership rights traceability. The concept of complete ownership of an authentic digital asset such as photographs, gifs, videos, music, and so on is propelling the expansion of the NFT economy. NFTs, like the digital system, can be utilized to exchange corporeal assets. Platforms allow users to purchase and sell NFTs, and the marketplace has expanded to include education, licensing, certification, fashion, and so on, increasing global income generation. NFT owners do, however, have additional difficulties, such as the absence of standardized smart contracts, ambiguity around intellectual and property rights, fraud risks, and transparency that infringes upon users' rights to privacy and security. While solutions are yet to acquire traction in the larger blockchain community, the potential of NFTs is vast, and the industry is expanding.

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CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

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