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DIGITAL ASSET MARKETPLACE USING BLOCKCHAIN TECHNOLOGY

[1]Pranav S P, [2]Sujan S, [3]Spoorthi N Shetty, [4]Tejas N, [5]Madhu G

[1] Under Graduate Student [2] Under Graduate Student, [3] Under Graduate Student, [4] Under Graduate Student
[1,2,3,4] Dept. Of Computer Science And Engineering,
[1,2,3,4] Jyothy Institute Of Technology Visvesaraya Technological University, Belagavi Bengaluru-560082, India
[5]Assistant Professor, Dept. Of Computer Science & Engineering, Jyothy Institute Of Technology Visvesaraya Technological University, Belagavi Bengaluru-560082, India

Abstract: Blockchain technology, which offers a decentralized and safe platform for the creation, ownership, and exchange of distinctive digital assets, has emerged as a key component in the growth of Non-Fungible tokens (NFT) markets. NFTs use the immutable ledger of blockchain technology to indicate ownership or authenticity of digital content and to prohibit unauthorized changes. Smart contracts are used by the blockchain technology used in NFT marketplaces, which is frequently based on Ethereum or other compatible blockchains, to automate the generation and execution of NFT transactions. By defining the guidelines for the creation, transfer, and verification of NFTs, these smart contracts do away with the need for middlemen and increase participant trust. The provenance of NFTs is determined in large part by the key aspects of blockchain technology, including decentralization, cryptographic security, and consensus procedures. This addresses issues with intellectual property and authenticity by guaranteeing that the history of any digital item, from its creation to its current owner, is traceable and verifiable.

Index Terms - Non-Fungible tokens (NFT), Blockchain technology, Smart contracts, Ethereum, Decentralized

INTRODUCTION

The primary characteristics of blockchain technology, including as decentralization, cryptographic security, and consensus processes, greatly influence the origin of NFTs. This ensures that the history of every digital asset, from its creation to its current owner, is traceable and verifiable, addressing concerns with intellectual property and authenticity.

The way we view and exchange digital assets has been completely transformed by the combination of blockchain technology and NFTs. For musicians, artists, and content producers, it has created new avenues for them to tokenize and profit from their creations in a safe and open way.

Blockchain technology provides a decentralized and tamper-resistant ledger that records the ownership and transaction history of NFTs. This ensures the authenticity and provenance of digital assets. Artists can tokenize their work as NFTs, creating a unique digital certificate of ownership that can be easily verified on the blockchain. This is a significant departure from traditional digital files, where ownership is often challenging to establish and prove.

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LITERATURE SURVEY

[1] The proposed system provides an in-depth exploration of Non-Fungible Tokens (NFTs) and their underlying technologies, primarily blockchain and Ethereum. It discusses the evolution of NFTs, and their applications across various sectors such as digital art, fashion, education, sports, and more. The unique characteristics of NFTs, including proof of ownership and indivisibility, are highlighted as key contributors to their success.

[2] The proposed system discusses the potential positive impact of blockchain technology and Non-Fungible Tokens (NFTs) in the business environment. It emphasizes the uniqueness of NFTs, their digital nature, and how they are traded online using cryptocurrencies. The inclusion of royalties in NFTs, where creators receive a portion of sales, is also discussed.

[3] Software licenses are legal agreements of sale and usage among software developers and clients. Such legal agreements are crucial to effectively manage ownership and protect the rights of involved parties. Today's software licensing mechanisms are mostly centralized and do not address the ever-increasing issues and complexities of modern software that may include multiple licenses, and utilizing royalty payments for monetization.

[4] The proposed system is the evolving challenges in healthcare supply chains, particularly concerning the traceability and authenticity of medical devices. The existing centralized systems are criticized for being a single point of failure and lacking transparency. To overcome these issues, the paper proposes a solution based on nonfungible tokens (NFTs) and blockchain technology.

[5] According to this system, the emergence of Web 3.0, primarily based on blockchain technology, and its advantages such as decentralized control structures and transparency over trustless and permissionless networks. While existing web applications are transitioning to Web 3.0 technologies, real-time services, particularly in media streaming, face challenges due to technical difficulties associated with decentralized storage and compatibility issues with various operating systems, media players, and browsers

[6] The paper emphasizes the importance of historical medical data in healthcare and addresses challenges arising from incomplete patient records across multiple institutions. It proposes a solution—a secure federated learning framework for intelligent health diagnosis. This framework includes a blockchain-based incentive mechanism and an NFT-based marketplace, employing NFTs to manage ownership and access to patients' historical medical data.

[7] The paper talks about NFTs, unique digital assets on blockchain, with sales exceeding $10 billion in Q3 2021. However, NFT owners face privacy issues as people can easily discover their entire NFT collections. This is problematic for categories like art and game collectibles where owners may sell for profit. To address this, the paper introduces Aegis, a protocol allowing private NFT swaps for regular token payments.

[8] This review explores blockchain benefits, challenges, and functionalities across government, finance, manufacturing, and healthcare sectors. Of the 1976 articles, 168 were selected. Results are categorized into benefits, challenges, and functionalities. Aimed at aiding professionals and stakeholders, the review offers practical insights for informed decision-making in implementing blockchain in their sectors.

[9] Blockchain is a revolutionary technology known for its transparency, decentralization, and security. Initially associated with cryptocurrencies like Bitcoin, it's set to transform various aspects of our lives and businesses. This survey provides a comprehensive overview, covering the evolution, architecture, development frameworks, and security issues of blockchain. It includes a comparative analysis of frameworks, consensus algorithms, and security risks.

[10] Blockchain and NFTs (Non-Fungible Tokens) are interconnected concepts gaining attention in digital assets. Blockchain is the technology empowering NFTs, unique digital assets, while NFTs use blockchain to establish ownership and authenticity. They solve the challenge of digital scarcity, allowing creators to sell limited-edition, one-of-a-kind digital items. NFTs traded on platforms like Opensea and YoungParrot, feature listings from brands like 9NFTMANIA.

EXISTING SOLUTION

The literature survey explores various innovative approaches to automated bird species identification and Blockchain technology has been widely utilized in NFT (Non-Fungible Token) marketplaces to ensure transparency, security, and authenticity in the buying, selling, and trading of digital assets. Keep in mind that developments may have occurred since then, so it's advisable to check for the latest information. NFT (NonFungible Token) marketplaces have made extensive use of blockchain technology to guarantee authenticity, security, and transparency while purchasing, selling, and trading digital assets. Remember that things could have changed since then, so it's best to find out the most recent details.

Blockchain technology ensures security and transparency in NFT marketplaces. The two main platforms are Ethereum and Binance Smart Chain. NFT procedures, such as royalties and ownership transfers, are automated via smart contracts. Scalability is addressed with layer 2 solutions and cross-chain interoperability. Features of marketplaces are improved by auction systems and user-friendly interfaces. IPFS is used to store metadata off-chain in order to minimize bloat. Smart contracts that pay royalties offer continuous compensation. Blockchain prevents unwanted changes by guaranteeing provenance and authenticity. Keep abreast with the latest developments in this quickly changing industry. It's important to stay updated with the latest developments in the blockchain and NFT space, as technology and trends in this field evolve rapidly.

PROPOSED SOLUTION

The proposed blockchain solution for the NFT marketplace focuses on leveraging robust and scalable blockchain infrastructure, such as Ethereum or Binance Smart Chain, known for their smart contract capabilities. Smart contracts are utilized to automate key processes, ensuring transparency and security in the creation, ownership, and transfer of NFTs.

To enhance user accessibility, the solution emphasizes interoperability by supporting blockchain standards like ERC-721 and ERC-1155, fostering compatibility with various wallets and platforms. Scalability is addressed to handle high transaction volumes, ensuring smooth operations even during peak times, while gas fees are optimized through layer 2 scaling solutions or alternative blockchain networks to improve user affordability.

Decentralized storage solutions, such as IPFS, are employed for storing NFT metadata, enhancing data integrity, and reducing reliance on centralized servers. The implementation of a decentralized governance model allows token holders to participate in decision-making processes, ensuring a fair and inclusive ecosystem.

The user experience is further improved with a user-friendly interface for artists, collectors, and investors to easily navigate and interact with the NFT marketplace. Security measures, including encryption, secure

key management, and regular audits, are prioritized to protect users' assets and maintain trust within the community.

Finally, the proposal considers environmental impact by exploring eco-friendly blockchain options and addressing concerns related to energy consumption. In summary, the goal is to create a secure, transparent, and user-friendly

NFT marketplace that fosters a vibrant ecosystem for creators and enthusiasts alike

METHODOLOGY

i. Using React Js and Next Js for building the front-end of our NFT Marketplace website template.
ii. Complete custom CSS will be used in this to complete NFT marketplace for designing components & website template.
iii. Writing solidity smart contract for NFT marketplace and maintaining state in the contract Hardhat for testing the solidity smart contract in localhost.
iv. Node Js and, NPM packages are used for building the front end and the back end of this NFT marketplace project.
v. Mango DB Atlas as a back-end server for maintaining the information of all the NFTs and users in this full-stack NFT Marketplace.

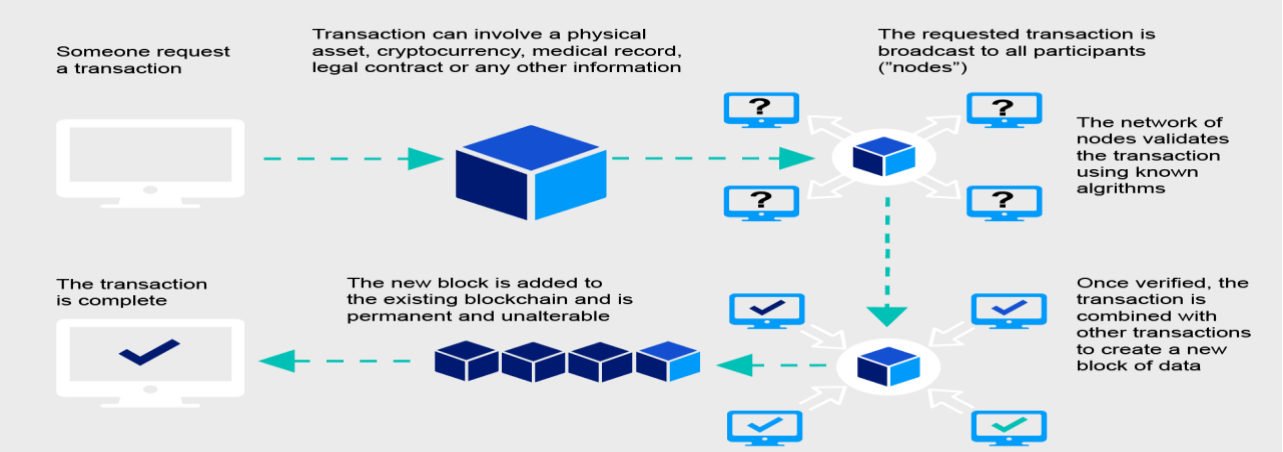

Figure 1: Model architecture

CREATING NFT

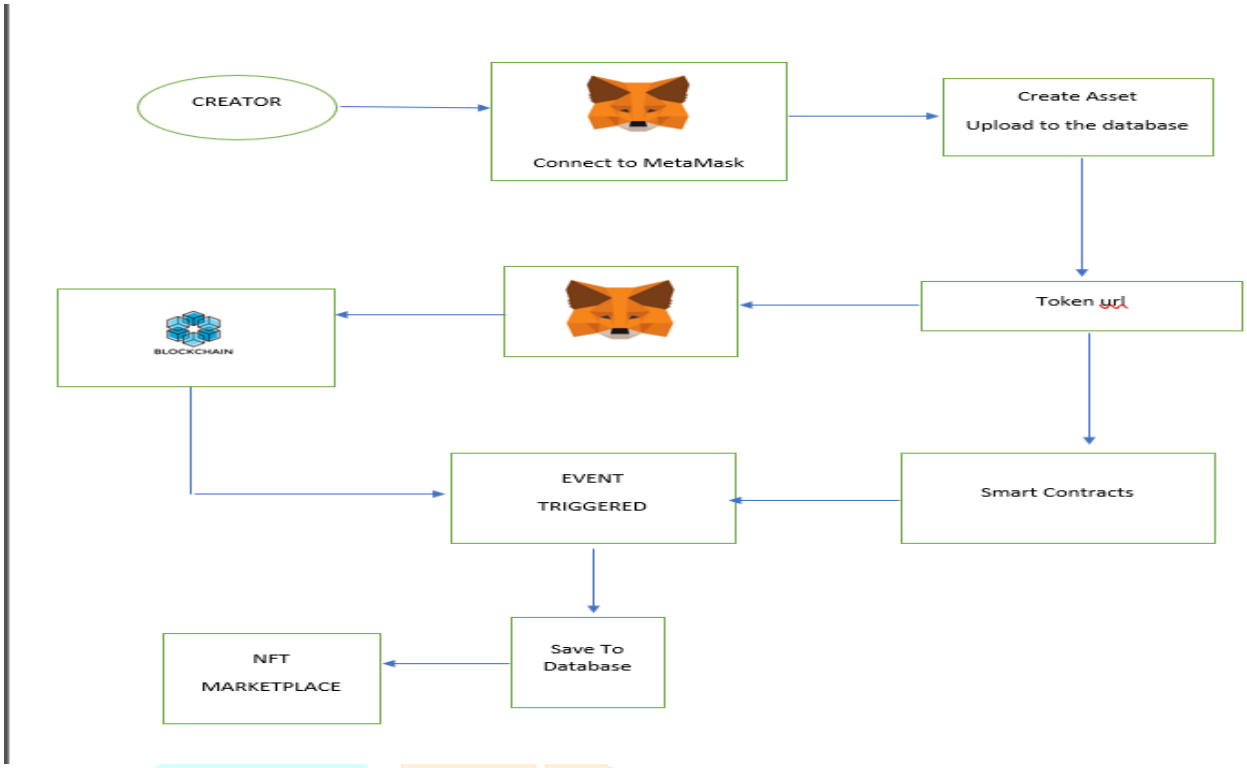

Figure 2: *Creating NFT Using MetaMask Wallet*

BUYING NFT

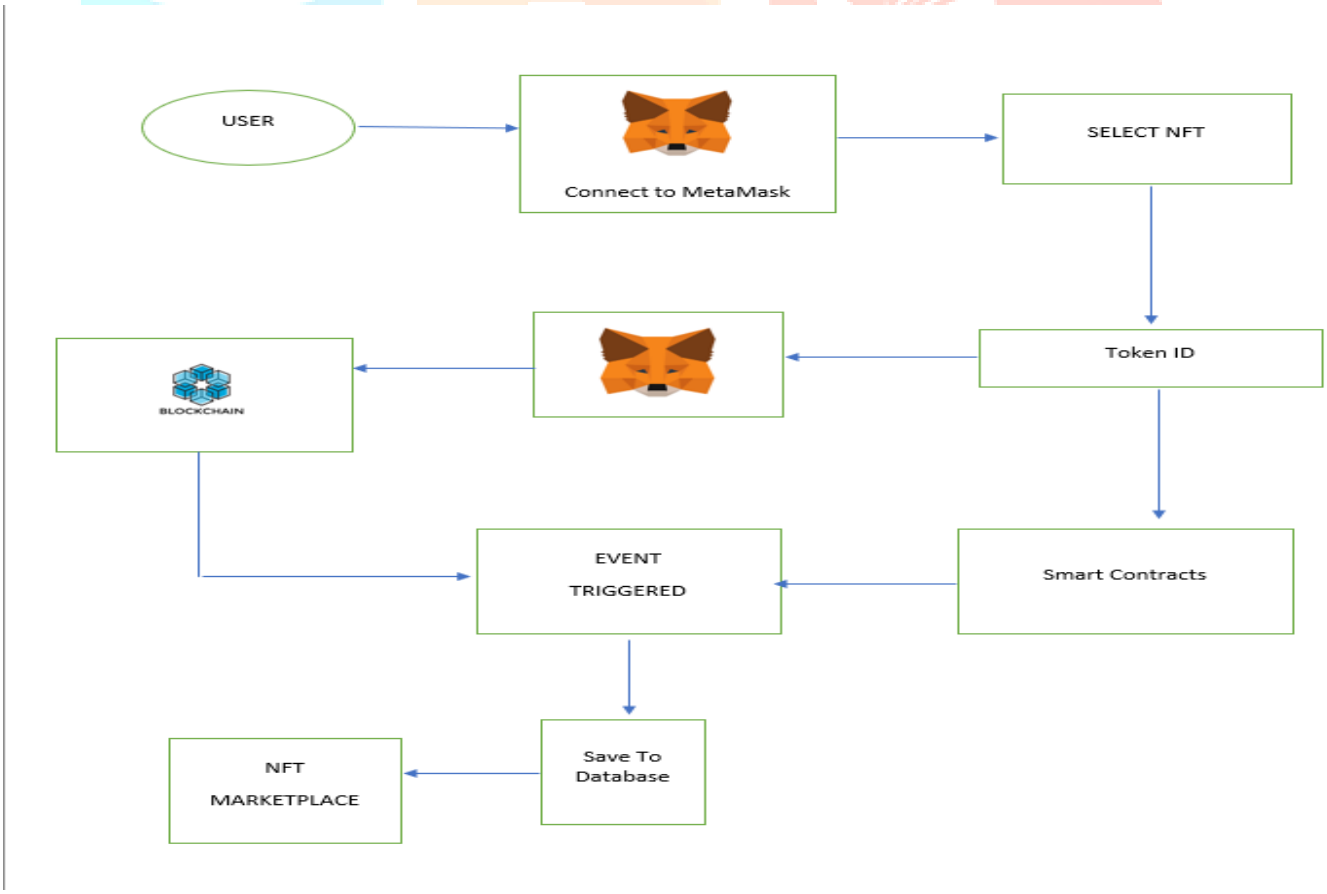

Figure 3: *Buying NFT Through MetaMask Wallet*

i. Create and Execute Smart Contracts: Create and execute smart contracts to manage NFT creation, ownership, and transfer. This covers NFT standard contracts (like ERC-721 or ERC-1155), marketplace functions (including buying, selling, and auctions), and any other features you may like to incorporate.

ii. .Develop Front-end Interface: Design the marketplace's user interface, which allows users to communicate with the platform. This entails developing and putting into use displays for controlling auctions, making listings, perusing user profiles, and exploring NFTs.

iii. .Integrate with Meta Mask or Wallet Connect: Enable customers to link their Ethereum wallets (like Wallet Connect or Meta Mask) to the marketplace by implementing wallet integration. They may now safely manage their assets, purchase and sell NFTs, and sign deals thanks to this.

iv. Implement Backend Services: Provide backend services, such as event alerts, NFT metadata storage, user authentication, and transaction monitoring, to enable the marketplace's operation. These services will use web3.js or related frameworks to communicate with the Ethereum blockchain.

v. Manage Payments and Transactions: To make it easier for buyers and sellers to conduct business, provide payment processing features. This might entail setting up direct bitcoin payments or connecting with a payment gateway.

CONCLUTION

The adoption of blockchain technology in the NFT (Non-Fungible Token) marketplace has brought about transformative changes and introduced a new paradigm in the way digital assets are bought, sold, and owned. In essence, the integration of blockchain technology into NFT marketplaces has revolutionized the way we perceive and interact with digital assets. As the technology continues to evolve, it is likely that further innovations will enhance the user experience, address challenges, and contribute to the ongoing growth of the NFT ecosystem.

FUTURE SCOPE

It is probable that NFT marketplaces will develop in a way that gives environmental sustainability, scalability, and interoperability top priority. Users' assets and information will be protected by improved security and privacy measures. DAOs for community governance will promote a democratic environment. With the help of sophisticated metadata and content management, NFTs will grow to reflect real-world assets and enable dynamic experiences. New opportunities will arise from integration with different digital platforms, such as social networking and gaming. The use of auction techniques will be important in enabling honest and open transactions.

Future Transaction Scope:

1. Fractional Ownership: Expand accessibility and investment options by allowing users to buy percentage shares of highly valued NFTs.
2. Instant Buy**: Provide a feature that allows fixed-price NFTs to be purchased right away, saving waiting times and offering convenience.
3. Escrow Services: Reduce fraud risks by introducing safe transactions with money kept in escrow until purchasers verify receipt of NFTs.
4. Multi-Token Support: Increase user flexibility by adding ERC-20 tokens, stable coins, and other NFTs as payment choices in addition to Ether.

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Future Auction Scope:

1. Dynamic Auction Formats: To accommodate varying tastes, introduce a variety of auction formats, such as English, Dutch, sealed-bid, or Vickery auctions.
2. Automatic bid extensions should be used in order to stop sniping and guarantee equitable auction results.
3. Non-Fungible Bundles: Providers can provide a variety of bidding options by auctioning off numerous NFTs as a single lot.

RESULT

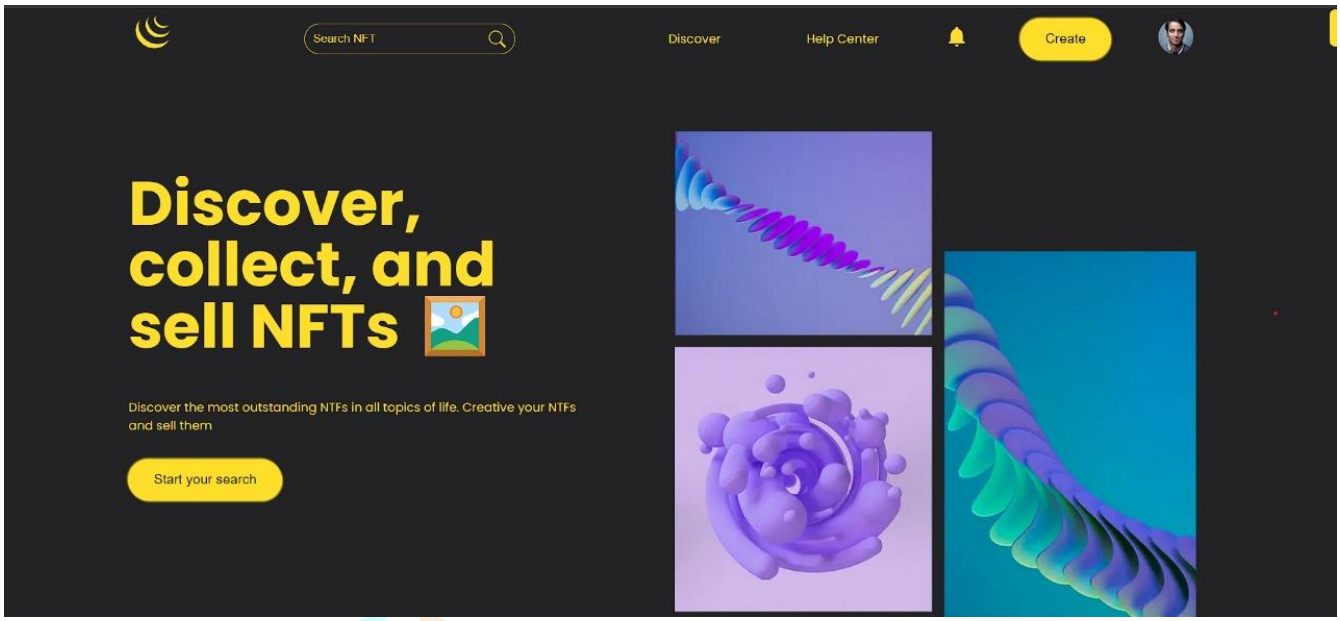

Figure 1: *Home Page*

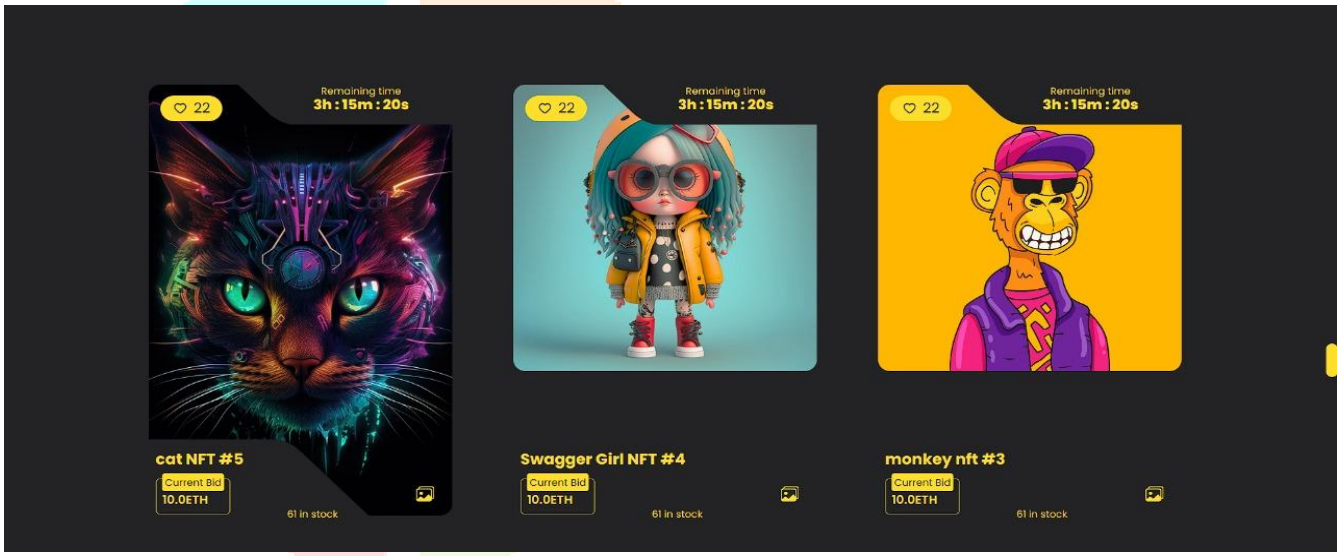

Figure 2: *NFT Collections*

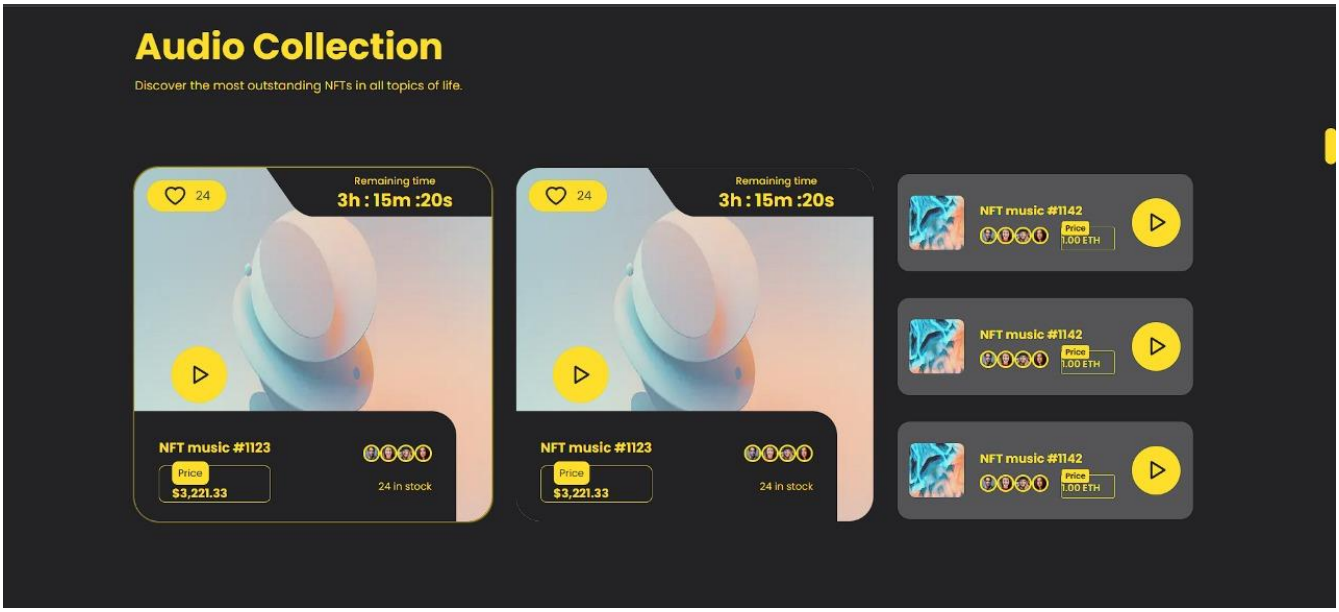

Figure 3: *Audio NFT*

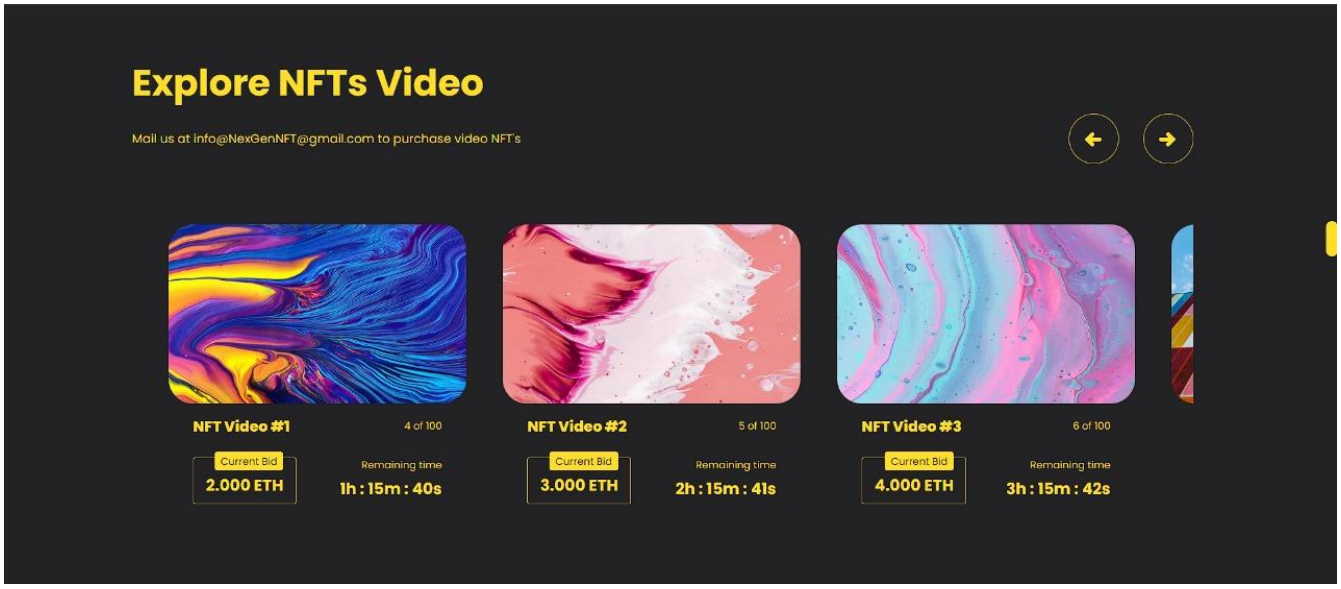

Figure 4: *Video NFT*

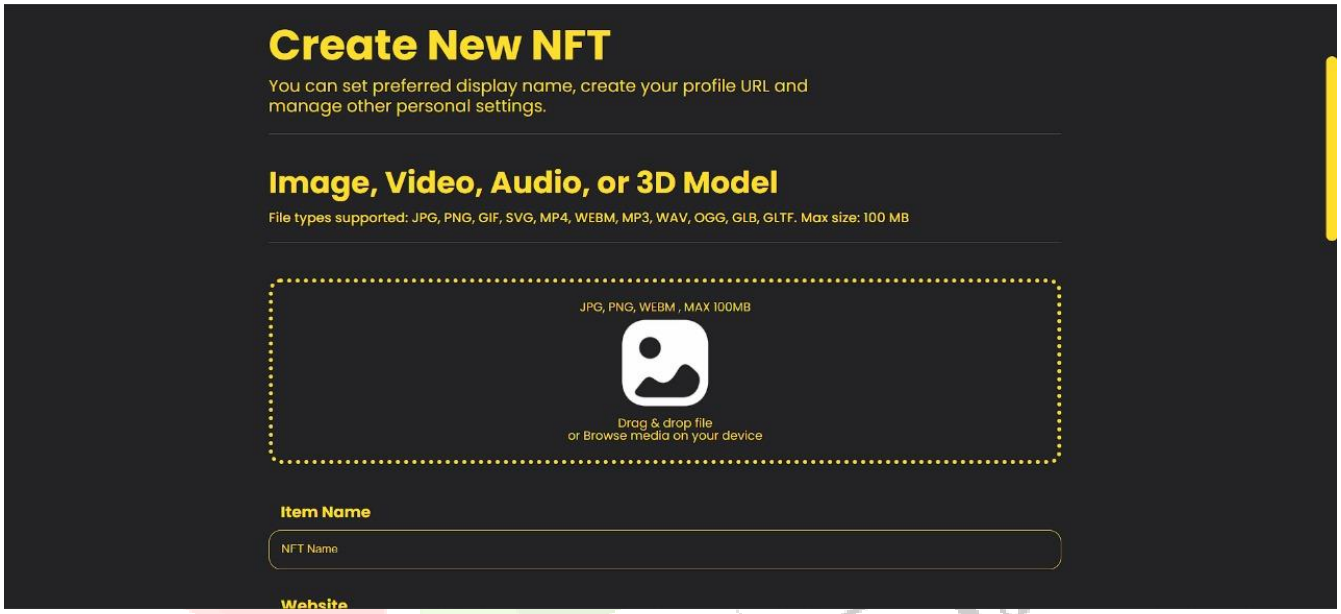

Figure 5: *Create New NFT*

Figure 6: *Buy NFT*

Figure 7: *NFT Transaction*

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