



NFT MART DAPP

Mr.Sandesh Patil,
Assistant Professor,
Universal College of Engineering

Abhishek Tekalkar, Animesh Singh, Grishma Chavan, Sakshi Dond
Students,
Universal College of Engineering

Abstract:

The blockchain technology underpinning the marketplace ensures the security, transparency, and immutability of transactions. Smart contracts enforce provenance and ownership, providing a trustworthy framework for NFT creation, trading, and exchange. Currently, artists face a lot of trouble selling their artwork which could be in different formats like JPEG, PNG, MP4, etc. Different Online platforms face a need to give access to certain people with their content which is only available through subscription-based models which is usually non-refundable. These problems could be solved using an NFT marketplace where people could list their NFTs, and potential buyers can buy them. Users can confidently navigate the marketplace, knowing that their digital assets are genuine and exclusive. By merging the creative potential of AI with blockchain's decentralized infrastructure, this NFT mart offers a democratized platform for artists and enthusiasts alike. It eliminates barriers to entry, enabling emerging creators to gain recognition and income from their digital artistry, while also giving collectors access to a wealth of novel and unique digital assets. Also, it gives the user-friendly UI so artists can easily interact with the NFT Mart Dapp platform.

Keywords: Web3 function, decentralized application, P2P, blockchain network, NFT, Artificial Intelligence, Solidity based.

1.Introduction

Non-Fungible Commemoratives(NFTs) are a type of cryptographic asset that represents power or evidence of authenticity of a unique item or piece of content, generally digital in nature. Unlike cryptocurrencies similar as Bitcoin or Ethereum, which are commutable and can be changed on a one- to- one base, NFTs are inseparable and can not be changed on a suchlike- for- suchlike base due to their oneness. NFTs operate on blockchain technology, which is a decentralized digital tally that records deals across a network of computers. Each NFT is associated with a unique identifier stored on the blockchain, furnishing an endless and tamper- evidence record of power. This ensures that the authenticity and failure of the digital asset can be vindicated by anyone. Each NFT is distinct and can not be replicated, making it one- of-a-kind. NFTs can not be divided into lower units like cryptocurrencies, as they represent whole means. NFTs give empirical power and provenance of digital means, enabling generators to monetize their work and buyers to collect and trade unique particulars. NFTs can be bought, vended, and traded across colorful online commerce and platforms, enhancing liquidity and availability. NFTs are erected on

blockchain platforms that support smart contracts, enabling automated prosecution of deals and royalties for generators. NFTs have gained significant traction in the digital art world, allowing artists to tokenize their work and sell it directly to collectors. NFTs are used to produce digital collectibles, including trading cards, virtual faves, and in-game particulars, offering failure and authenticity to digital means. NFTs are integrated into gaming ecosystems, enabling players to enjoy, trade, and monetize virtual means within games. NFTs are employed to represent the power of virtual land and parcels in virtual worlds and metaverses. Without a particular account, a person can't steal or sell deals at the NFT business. Putting in an account is necessary, as a way to also ensure authenticity and authorization within the business. The running specific of the NFT request is simple. With the aid of following the given way, it's easy to easily understand the functional procedure of the NFT request, and one also can easily sell their transition in the request. The NFT request is a brand-new age of request for trading, promoting, and buying virtual shops. With the developing character and growing valuation of cryptocurrency, it's safe to assume that the commerce for NFTs and the entire blockchain network will be in demand ultimately, which is why it's important in modern times and the approaching future.

2. Literature Review

According to Q Chunyu Mao, Anh-Duong Nguyen, Wojciech Golab Discusses Byzantine fault tolerance of blockchain applications. It is published in IEEE International Conference on Blockchain and Cryptocurrency (ICBC). This paper examines two techniques for interleaving the shards of permissioned blockchains, which we refer to as strong temporal coupling and weak coupling. Experimental results show that strong coupling can achieve lower latency as compared to weak coupling but same level of throughput.[1]

According to Lennart Ante, In a study, the researchers examined the connections between NFT sales, NFT users (unique active blockchain wallets), and the pricing of Bitcoin (BTC) and Ether (ETH). The analysis was based on daily data from January 2018 to April 2021 and revealed that a shock in the price of Bitcoin led to a rise in NFT sales, while a shock in the price of Ether resulted in a decrease in the number of active NFT wallets. [2] According to Mieszko Mazur, A non-fungible token (NFT) is a unique digital asset recorded on a blockchain that cannot be exchanged for other similar assets. Unlike fungible assets such as traditional currency, which are interchangeable, NFTs are distinct and have their own unique attributes and characteristics. The findings suggest that NFTs are a promising and growing aspect of the blockchain world, and may offer significant returns to investors.[3]

In paper, The author Pavel Kireyev emphasizes the importance of conducting research on the target audience, major competitors, and industry trends in order to create a successful NFT marketplace. They highlight the use of two popular NFT smart contracts, ERC-721 and ERC-1155, which are based on Ethereum's blockchain. The author also stresses the importance of integrating the frontend and backend, ensuring a user-friendly interface, and conducting tests to guarantee the functionality and quality of the NFT marketplace solution.[4]

According to Shayel Shams, discuss the market analysis of the NFT. how Non-fungible tokens are beneficial and also discuss the history of the NFT, many platforms of the NFT such as OpenSea, SuperRare etc. what is the role of NFT's in virtual real estate. Author compares the NFT internet and today's internet.[5]

According to Venu D. Manekar, Mrunmai Chaudhari, the UN is developing an electronic "ePhyto" Certificate. System that will be controlled by the UN (UN). The national plant protection organization (NPPO) of the exporting country sends an ePhyto certificate to the

NPPO of the importing Country. The UN system establishes a secure channel of communication between pre-registered NPPOs. Industry participants who are not connected to the UN system, on the other hand, are unable to verify the authenticity of an e-Phyto certificate or if it has been canceled or renewed.[6]

3. Problem Statement

The digital art and collectibles industry has experienced a revolutionary transformation with the advent of Non-Fungible Tokens (NFTs). These unique digital assets have enabled artists and creators to monetize their work and collectors to establish ownership of digital items in an unprecedented way. However, there are several significant challenges and limitations within the current NFT marketplace ecosystem that our project aims to address:

- **Limited Creativity Access:**
Existing NFT marketplaces primarily focus on trading and collecting art created by established artists. They provide limited opportunities for emerging artists, enthusiasts, and non-artistic users to actively engage in the creative process.
- **Dependency on Centralized Creators:**
The current NFT landscape heavily relies on artists to generate NFTs. Users are often bound by the availability and willingness of artists to produce new content, limiting the diversity and availability of NFTs.
- **Authenticity and Trust:**
While blockchain technology provides a secure and transparent environment for NFT transactions, issues related to the authenticity of NFTs still exist. Users often rely on the trustworthiness of the platform and the artists to confirm the provenance of NFTs.
- **Underrepresentation of AI Art:**
The immense potential of AI-generated art and content is underrepresented in the NFT marketplaces. AI offers a vast creative landscape that remains largely untapped.

4. Objectives

The primary goals for establishing a decentralized marketplace for NFTs (Non-Fungible Tokens) include:

- To utilize blockchain technology to establish a decentralized marketplace where ownership and transaction records are stored on a distributed ledger, thereby diminishing dependence on centralized authorities and improving transparency.
- To enable the creation and trade of non-fungible tokens representing unique digital or physical assets such as artwork, collectibles
- To offer a platform for creators and collectors to buy, sell, and trade NFTs, making the market accessible to a global audience.
- To encourage experimentation and innovation in digital art, gaming, virtual worlds, and other creative fields by providing a platform for new forms of expression and interaction.

- To ensure the immutability of ownership records by recording NFT transactions on the blockchain, providing undeniable proof of ownership and provenance for digital assets.
- To use AI to produce unique and innovative digital means, expanding the creative possibilities within the NFT space.
- To facilitate collaboration between human creators and AI systems to co-create NFTs, leveraging the complementary strengths of both to produce innovative and impactful digital content.

5. System Architecture

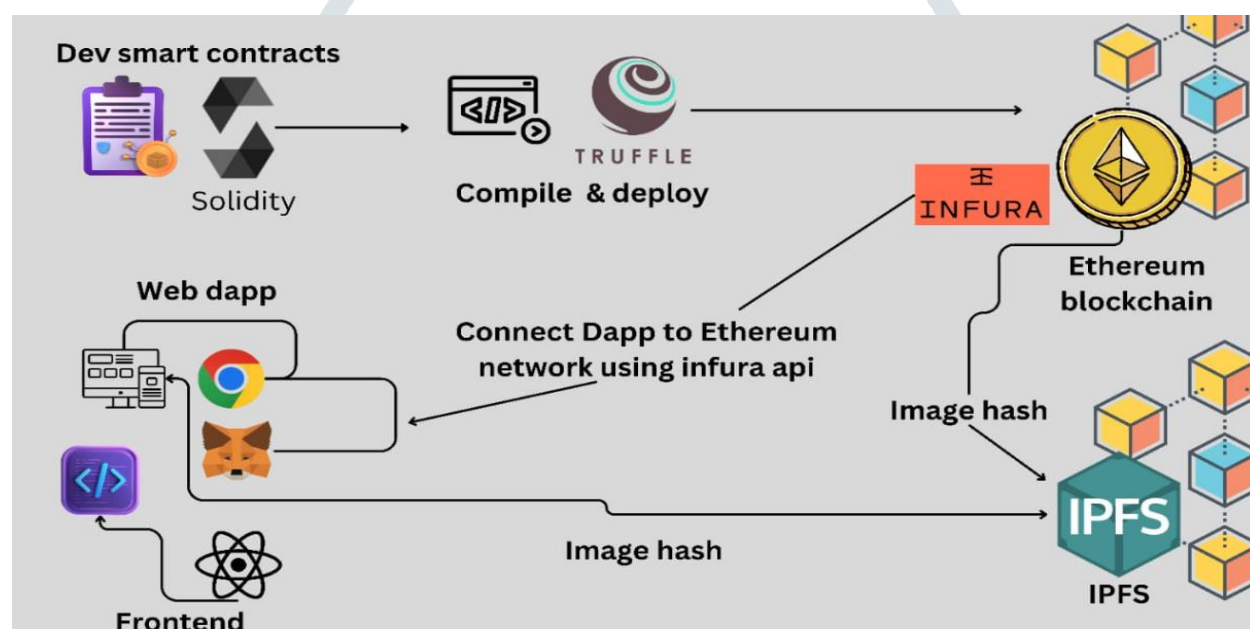


Figure. 1-System Architecture

In NFT Mart D'App, Users start by connecting their Metamask wallets to the DApp, which provides access to their Ethereum accounts. After connecting to Metamask, users land on the home page. The home page displays an NFT feed, showcasing existing NFTs owned by users. Users have the option to create their ai generated NFTs. By clicking the "Create NFT" button, users initiate the process of minting an NFT. During the NFT creation process, users can upload asset data, including images and metadata. Asset data is stored on IPFS, and each asset gets a unique IPFS content address. After uploading asset data and providing details (e.g., price and description), the NFT minting process is initiated. Metamask pops up to confirm the transaction for minting the NFT. Users must approve the transaction for it to proceed. Upon successful confirmation, the minted NFT is displayed in the NFT feed, accessible to all users. The NFT's hash will be stored on IPFS. Users can generate the NFT with the help of Artificial intelligence, users can click on the prompt of AI generated NFT and write the description of NFT as they want then click on generate. Users can see the AI generated NFT they can download the NFT or mint the NFT.

6. Methodology

The implementation done by the user can be explained in the following manner.

Users can register on the NFT Marketplace by connecting their MetaMask wallet. This connection authenticates their registration process, ensuring security and transparency. After successful registration, users can log in to the marketplace using their MetaMask wallet credentials. This step verifies their identity and grants access to the platform. Once logged in, users can navigate through the marketplace to explore various NFTs available for purchase. They can view details such as the name, description, image, and price of each NFT. If a user finds an NFT they like, they have the option to buy ownership of that particular NFT at the price set by the current owner. The transaction is facilitated using digital currency available in the user's MetaMask wallet. Upon successful purchase, the ownership log of the NFT is updated to display the new owner's name. This confirms the transfer of ownership, with the new owner becoming the current holder of the digital asset. If a user wants to sell NFT, they can click on the "Create NFT" button which is on the homepage. Users can Add NFT by choosing a file from the device. They can add title, set the price on which they want to sell the NFT, description to the NFT and then click on the "Mint NFT". After creating NFT user can confirm the NFT and post the NFT by confirming the transaction, the NFT's hash value will be saved on IPFS. After confirming the transaction, users can see their NFT's on the home page. Other users can then bid on or purchase the NFT at the user's specified price. In addition to this, artists can get help from AI generated NFTs. They have an option of "Generate NFT" on the navigation bar of the homepage. By clicking on it, the user can type a prompt and then click on the "generate" button. It will generate an image which can be downloaded.

7. Implementation

In the preliminary phase of our application, users engage in the authentication process by connecting with their MetaMask wallet. MetaMask, serving as a decentralized wallet, functions as a secure conduit for managing digital assets and interfacing with decentralized applications (dApps) built on the Ethereum blockchain. This wallet acts as an intermediary between the user's browser and the Ethereum network, facilitating the seamless storage and administration of Ethereum-based cryptocurrencies and tokens.

Upon a successful login, users gain insight into the showcased Non-Fungible Tokens (NFTs), unique digital assets symbolizing ownership of distinct items like images, videos, or music on the Ethereum blockchain. Distinguished by their non-interchangeable nature, NFTs are particularly suited for representing digital art and collectibles.

Users navigate the Nft-Mart platform to explore and select NFTs tailored to their preferences. The acquisition process involves purchasing desired NFTs through the MetaMask wallet, utilizing smart contracts to ensure secure and automated transactions. These self-executing agreements are encoded with terms that run on the blockchain, ensuring transparency and the tamper-proof execution of contractual terms. This decentralized approach eliminates intermediaries, offering a transparent and secure mechanism for complex or high-value transactions.

Our implementation introduces an innovative integration of AI-generated NFTs, allowing users to harness advanced AI models for crafting unique digital assets. Users provide prompts to these AI-driven models, previewing the generated NFTs before making a purchase. This creative addition enhances the user experience and adds a dynamic layer to the Nft-Mart ecosystem.

Upon the completion of a transaction facilitated by the smart contract, the claimed NFT is seamlessly removed from the platform, ensuring exclusivity for the new owner. This contributes to the evolving landscape of the Nft-Mart ecosystem, where transactions are executed with precision and security.

8. Results

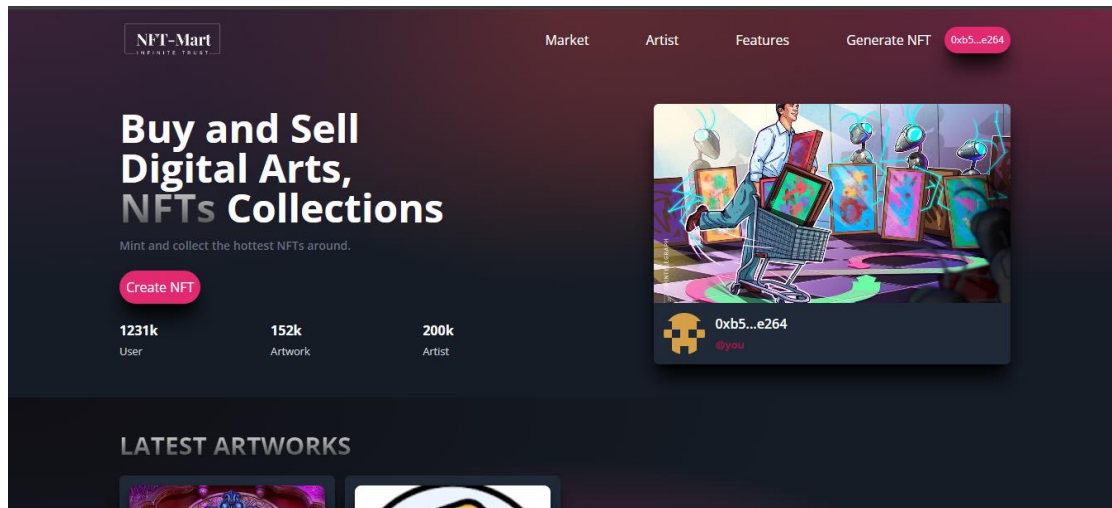


Figure 8.1:- Home Page

Figure 8.1 shows the home screen with different options on it. To visit The Application user need to enter the following cmd command as:

- Open project folder in vs code
- Open new terminal
- Direct the directory to the folder where the main file is located.
- Activate the environment where all required packages and modules have been downloaded for the project.
- Run the command: npm start
- The application will run on url:-"localhost:3000/"

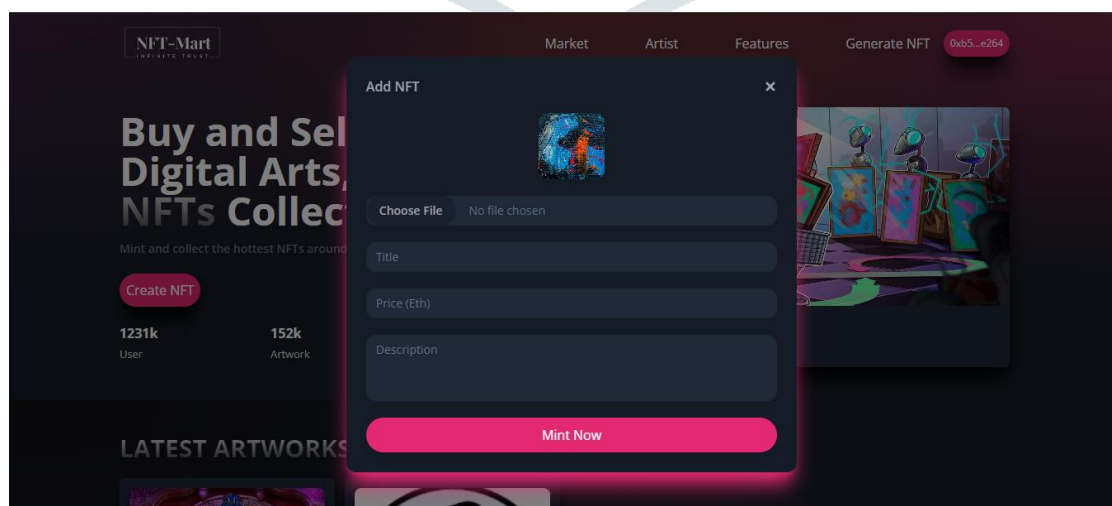


Figure 8.2:- Create NFT

Figure 8.2 shows how to create the NFT.

Users need to create NFT or upload NFT from their local machine and also they have to add the title and description about NFT as well as the price in ETH.

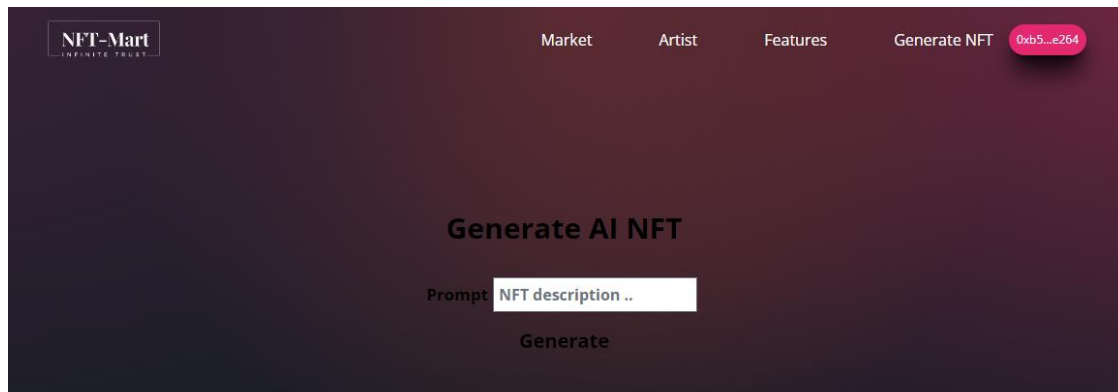


Figure 8.3:- AI prompt

Figure 8.3 shows the prompt where user can enter the detail of NFT, figure 8.4 shows ai-generated NFT as per their input. Users can download that ai-generated NFT.

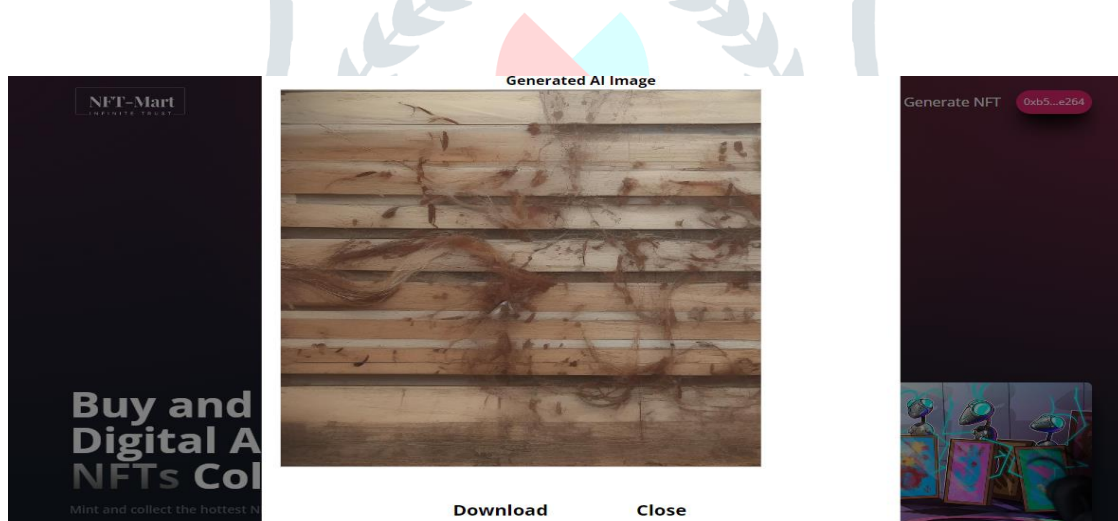


Figure 8.4:- AI generated NFT

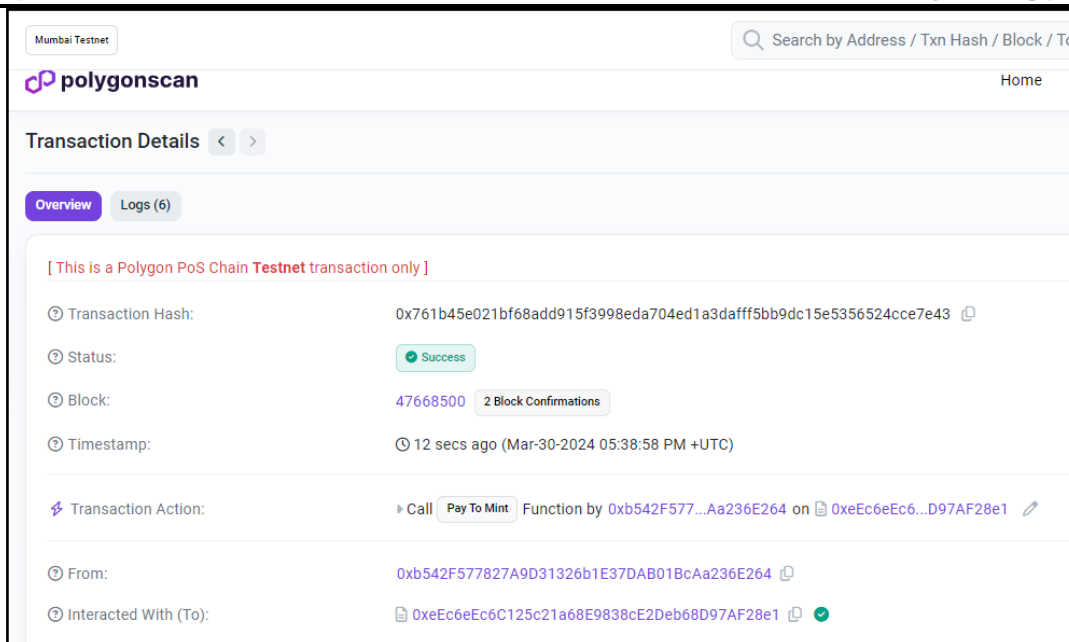


Figure 8.5:- Transaction detail page

Figure 8.5 shows the details of the transaction process on the testnet detail page. Here we used Mumbai testnet and the details are shown on polygonscan.

10. Future Work

In the nutshell, it can be summarized that the future work of the project are:

1. Mobile App Development:

Consider developing a mobile app for the platform to expand its accessibility.

2. Integration with Other Blockchains:

Explore integration with multiple blockchains beyond Ethereum to reach a broader audience.

3. Gamification:

Add gamification elements to encourage user engagement, like challenges and rewards.

4. Detailed Analytics on NFTs and Insights into the Market:

Provide users with detailed analytics on their NFTs and insights into the market.

5. User Education:

Offer resources and educational content to help users understand NFTs, AI, and the platform's features.

The above-mentioned points are the enhancements which can be done to increase the availability and usage of the project. Proposed system is scalable to adapt future requirements in the system to enhance the functionalities of the system. In the end we would like to thank all the persons involved in the development

of the system directly or indirectly. We hope that the project will serve its purpose for which it is developed by underlining the success of the process.

11. Conclusion

In this project, a blockchain-based decentralized NFT marketplace application has been developed, providing enhanced integrity and security compared to conventional software solutions. The proposed system eliminates the requirement for a centralized repository, decentralizing the NFT framework and mitigating reliance on centralized computing resources for storage, processing, and uptime. Additionally, users have the capability to generate NFTs using AI, catering to individuals lacking proficiency in NFT creation by offering them a conceptual framework for their NFTs.

12. References

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