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NFT Marketplace using Blockchain

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Abstract: *The This paper discusses the potential positive impact of blockchain technology and Non-Fungible Tokens (NFTs) on the business environment. NFTs are digital representations of real-world objects that can be traded online using cryptocurrency. Unlike fungible tokens, NFTs have unique digital signatures that make them impossible to exchange for another NFT. NFTs can offer artists and content creators the opportunity to obtain financial remuneration for their work, without relying on galleries. Additionally, NFTs have the feature of royalties where a certain amount is credited to the original creator of a particular NFT every time the said NFT is sold. Although blockchain technology is relatively new, it has the potential to revolutionize the art and content creation industry by providing a platform to mint and trade NFTs. This paper suggests that the NFT marketplace could be at the core of various use-cases for NFTs*

Keywords: Blockchain, Non-Fungible Token, Smart Contract, ERC Standards

I. INTRODUCTION

Non-Fungible Tokens (NFTs) are unique data units stored on the blockchain with the help of smart contracts. Although this wasn't the first use-case for blockchain technology, which was initially used only for financial and trading transactions, several studies have shown that blockchain technology has farbigger applications due to its high level of transparency. For example, the total amount of currencies and the volume of transactions in the world can be tracked swiftly and clearly. Because it is a peer-to-peer system, no central authority is required to approve or execute operations. NFTs have unique characteristics that set them apart from fungible tokens. They can represent anything online, such as art, gaming, or music, and each NFT bears a digital signature that prohibits them from being substituted for or compared to one another (hence, non-fungible). NFTs reflect possession of something inherently unique and rare, such as artwork, music, a collection, an in-game item, or real estate property, whether it is a digital or physical asset. NFT marketplaces are platforms for storing, presenting, trading, and issuingNFTs. Artists can sell their NFT artworks via dedicated marketplaces, and potential buyers can easily search for the NFTs they desire and place a bid on them or buy them.

II. LITERATURE SURVEY

Ante, Lennart, The non-fungible token (NFT) market and its relationship with Bitcoin and Ethereum (June 6, 2021) [3]
This paper shows how the use of NFTs has revolutionized the way the digital assets were managed previously. Before NFTs the right to ownership was not possible for the digital assets. This paper also demonstrates the technologies that will be required to build a proper NFT marketplace.
Khan R. Kothari, M. Patel and N. Banoth, "Enhancing Non-Fungible Tokens for the Evolution of Blockchain Technology," 2022 International Conference on Sustainable Computing and Data Communication Systems (ICSCDS), 2022 [1]
The purpose of this paper is to provide extensive information on the NFT, including its application, method of operation, buying, creating, and selling procedures, as well as its use. The NFT when paired with Metaverse, represents a significant advancement and revolution in the realm of virtual reality and blockchain, giving artists a new avenue to express their unique and valuable work.
Regner, Ferdinand & Schweizer, André & Urbach, Nils. (2019). NFTs in Practice– NonFungible Tokens as Core Component of a Blockchain-based Event Ticketing Application.[4]

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This paper discusses about the widespread of NFTs built on Ethereum blockchain on various fields. Also, it shows the comparison between the different NFT marketplaces that are built on the Ethereum blockchain Mainnet.

Wang, Gang & Nixon, Mark. (2021). SoK: Tokenization on Blockchain. 10.1145/3492323.3495577.[2] Blockchain, a potentially disruptive technology, advances many different applications, e.g., crypto-currencies, supply chains, and the Internet of Things. Under the hood of blockchain, it is required to handle different kinds of digital assets and data. The next-generation blockchain ecosystem is expected to consist of numerousapplications , and each application may have a distinct representation of digital assets. However, digital assets cannot be directly recorded on the blockchain, and a tokenization process is required to format these assets. the tokenization process on the blockchain. To the best of our knowledge, this is the first systematic study fortokenization on blockchain.

III. PROPOSED SYSTEM

Blockchain Technology

Polygon is a fast and secure decentralized digital asset exchange based on the highly performant matching engine built on distributed consensus. It has a dual chain architecture that aims to empower its users, so they can build their digital assets and decentralized apps on a single blockchain. Here, people can take advantage of quick trading and exchange. Polygon Chain aims to improve flexibility from the programmability standpoint.

Pinata - Storage Platform

Pinata is also one of the popular platforms to upload and manage files on IPFS. It provides secure and verifiable files for NFTs.

ERC 721

A standard interface allows wallet/broker/auction applications to work with any NFT on Ethereum/Polygon. We provide for simple ERC-721 smart contracts as well as contracts that track an arbitrarily large number of NFTs. Additional applications are discussed below. This standard is inspired by the ERC-20 token standard and builds on two years of experience since EIP-20 was created. EIP-20 is insufficient for tracking NFTs because each asset is distinct (nonfungible) whereas each of a quantity of tokens is identical (fungible).

ReactJS – Frontend Framework

React. js/React is an open-source frontend framework that is based on JavaScript, developed by Facebook, and best known for its virtual DOM feature. With React, we recommend Express. js/Express as a backend service.

NodeJS – Server-side Framework

Node. js (Node) is an open source development platform for executing JavaScript code serverside. Node is useful for developing applications that require a persistent connection from the browser to the server and is oftenused forreal-time applications such as chat, news feeds and web push notifications

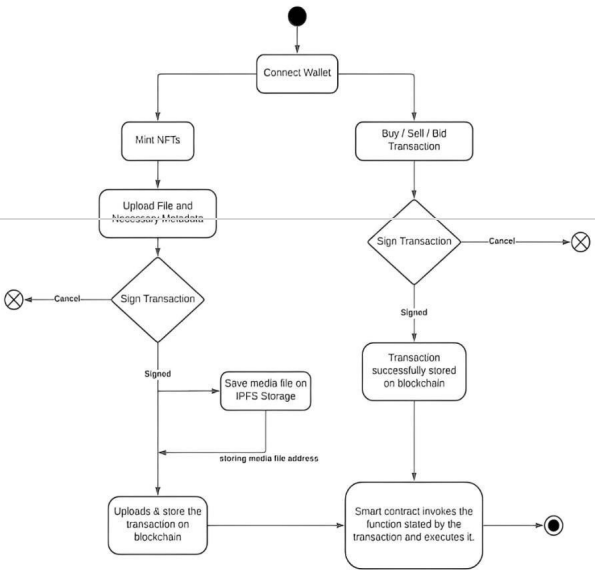

Fig. 1 Architecture Diagram

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IV. IMPLEMENTATION AND RESULT

To create an NFT marketplace on Polygon network using React.js and Node.js, several key steps need to be taken. First, smart contracts must be created for the minting and trading of NFTs using Solidity or compatible languages. These smart contracts should include functions for creating and transferring ownership of NFTs, pricing mechanisms, and metadata storage on IPFS. The marketplace should then betested on Polygon's testnet to ensure its proper functionality and user-friendliness. Once testing is complete, the smart contracts can be deployed on the Polygon mainnet. To enable users to interact with the marketplace, a combination of web3.js and Polygon.js libraries should be used to handle transactions and queries related to the smart contracts. This interface allows for seamless buying, selling, and trading of NFTs. Overall, creating an NFT marketplace on Polygon requires a solid understanding of blockchain technology, smart contract development, and web development, but it offers exciting opportunities for artists and collectors alike.

V. RESULTS

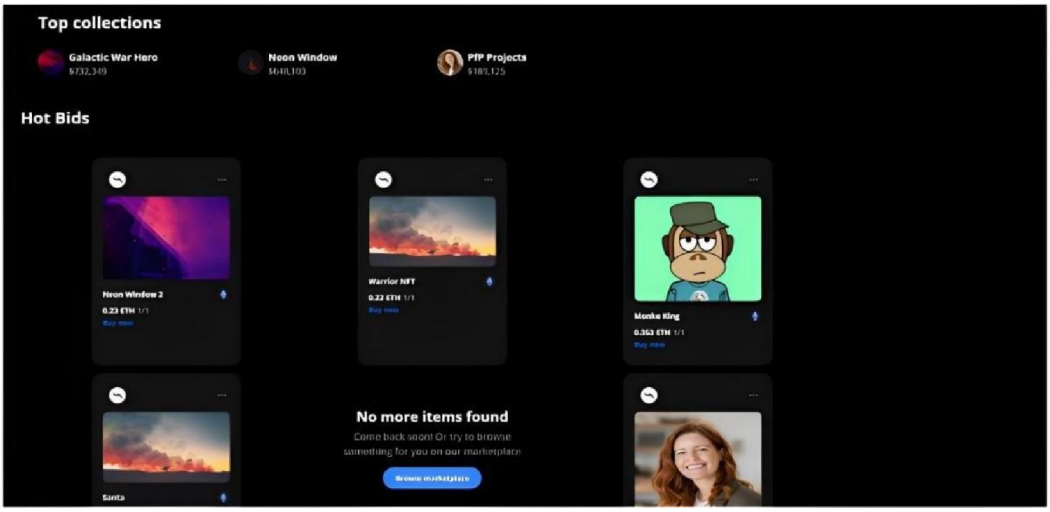

Fig. 2 NFT Collection Page

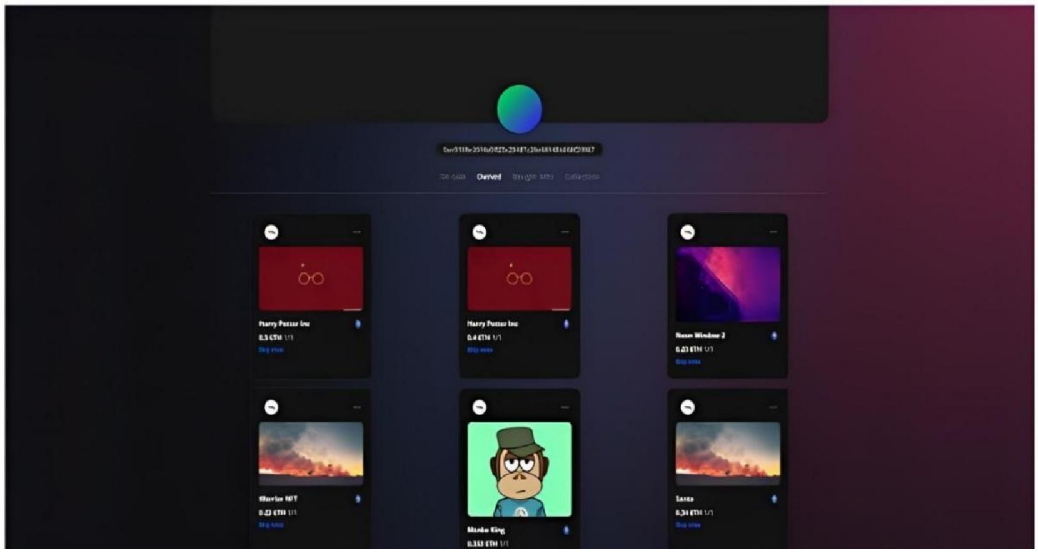

Fig 3. User Profile Page

VI. CONCLUSION

This paper provides valuable insights into the implementation of an NFT Marketplace on a blockchain network. By following a proper implementation strategy and designing a good system architecture, the challenges faced can be effectively resolved. Utilizing an appropriate ERC standard and integrating a Layer 2 solution can greatly improve the

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user experience and enhance the marketplace's efficiency and gas- friendliness. Additionally, the paper highlights the significance of NFT creation and the role of NFT Marketplaces in facilitating the buying and selling of these tokens. The critical features of a good NFT Marketplace, including a user-friendly storefront, search function, and compatibility with different types of wallets, are also emphasized. These insights provide helpful guidance for individuals and organizations seeking to implement an NFT Marketplace while considering important factors.

VII. FUTURE SCOPE

The primary objective of the developed system is to integrate with decentralized finance (DeFi) protocols, thereby providing liquidity and enabling lending and borrowing of NFTs. The system leverages artificial intelligence and machine learning algorithms to enhance NFT valuation and provide valuable insights to both buyers and sellers. To expand the scope of NFT Marketplaces, the system supports a wider range of digital assets, including gaming items, music, and collectibles. Additionally, the system incorporates social media features to enable better engagement and communication among NFT creators, buyers, and sellers. To address environmental concerns, the system implements eco-friendly solutions to minimize the carbon footprint of NFT transactions. Overall, the developed system aims to enhance the functionality, accessibility, and sustainability of NFT Marketplaces

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