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NOVANFT MARKETPLACE USING SOLIDITY

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ABSTRACT

In the past few years, tech has changed how we talk, make, & own stuff on the web. One big new thing is NFTs. They show who owns what, like art or music online. NFTs help artists share their stuff & let folks buy digital goods. Each NFT is one of a kind. It can't be made again. It uses blockchain to show who owns it. This project is called NFT Marketplace. It's a site where folks can make, show, sell, & swap NFTs. It's safe & clear. This site doesn't use the middle men that other sites do. It lets users, like artists, run things with blockchain & smart deals. The main aim here is to cut the need for big sites that charge lots & may not show all work. Many artists find it hard to get paid well. This is where they can sell NFTs, earn money, and receive higher level of payments in the event that their items are resold. Smart deals on Ethereum are done with this. Technologically our project is based on new tools to be used in the sphere of good scale, safety and easy use. The intelligent deals are written in Solidity. They deal with issuing tokens, transfer of ownership and sales. The system does all this and stores this information safely on the blockchain. The front end is React.js. which creates a clean and speedy feel of use. The Ethers.js is a JavaScript library that takes care of the connection between the user bit and Ethereum net. It also ensures the safety of wallets so users can make and look after NFTs with only a few taps.

Keywords: *NFT (Non-Fungible Token), Smart Contracts, Digital Asset Ownership, IPFS (Interplanetary File System), Wallet Integration*

INTRODUCTION

The web has grown big, good for sharing, making, & having digital stuff. Yet owning stuff online can be hard to know. Can we own a piece of digital art or a game item? How do we know it's real or where it came from? These hard bits have led to tech like blockchain & more so, Non-Fungible Tokens (NFTs).

NFTs are one of a kind digital things kept on a blockchain. Each NFT is its own, great for showing art, music, vids, game stuff, & more. Not like the usual coins like Bitcoin or Ethereum, which are the same as each other, NFTs can't be swapped or made again. This one-of-a-kind trait is what makes them cost a lot online.

As more folks want NFTs, we need spots where users can make, buy, sell, & look after them well. That's

where an NFT Marketplace fits in. The aim of this work is to build a full free & user-good marketplace where makers can mint & trade NFTs safe, not needing to use third-party spots.

Usual digital spots often take a big share of makers' money & limit their say on how their stuff is used. In a change, this NFT marketplace is made to give makers all the say & fair money.

Using smart deals—self-run plans on the blockchain—makers can sell their work straight to buyers & even get cash when their NFTs are sold again.

LITERATURE SURVEY

Existing System

The idea of trading net stuff has been a thing for years. But it grew a lot with new tech like block chains & smart deals. Previously net stuff was selling in big single-boss stores. Like stock photo sites, game spots, music shops, or big online stores like Amazon or eBay. These sites placed the information, stuff and deals of users in one site.

These arrangements are seen to be clean but, have great weaknesses. One key flaw is no real own. When you buy net stuff, you might just buy a right to use it and not ownership. In addition, makers have to spend a lot of money on these sites- up to 30 percent- thus earn less. These one-boss sites would also introduce risks. Like data leaks, bad reach, messed with stuff and shut-ups, since all data exists in one location.

Applied with block chains, like those of Ethereum, fresh platforms like OpenSea, Rarible, and Foundation create no-boss frameworks of creation and selling of NFTs. The creators can now transform their creations into NFT and market it directly. Block chain owners check them and track them. All these are not no-boss methods. They are still able to stuff using one-boss servers, and the websites determine who/what has permission to do so.

The low change and own lead scope is one of the larger downs. Several millions of makers and collectors must adhere to set rules of the appearance of the site, the type of prices, the policy of payments, and the rules. Besides, they are capable of deleting NFTs, freezing individuals, or changing terms without the consent of the user. This inculcates the fears of lasting trust and possess. Plus, these spots often aim at folks who know block chain, which blocks new folks. The way to join, link wallets, & deal with deals can be hard or scare off non-tech folks, which cuts wide use.

Proposed System

The new NFT Market is to be all out in the open & for users. It lets you make, buy, sell, & move NFTs. It works on the Ethereum chain. It does all deals with no need for a main power. This way, the market makes sure all files & data stay set on-chain. You can check & move what you own in a safe way.

One big thing here is it helps creators. They can make NFTs from their bag, set prices, make rules for gains, & sell them. They do this with no need for others. They keep all the set-up also uses IPFS for spread-out store. Not like main ways where files stick in one place, IPFS spreads things out. You find content by its hash. It is safe from block, loss, or change.

The set-up is easy to use. It has a clear web face. You

can link your bag with MetaMask. You do not need to know code. You can make NFTs, look at lists, & start trades. The front end works on all tools. They use new code styles for this.

All must-dos are set in Solidity. These take care of making tokens, setting them for sale, buying, & moving what you own. They make sure it is safe, steady, & saves gas costs.

The market plans to grow. It could add more chains, new bid ways, spread-out group rule, & ways to track gains on all sales.

All trades are done by contracts. So, no one can twist the platform. This makes the system safe & clear. All you do is locked in by coderights & gains. There are no fees or cuts taken.

METHODOLOGY

Building the NFT Marketplace methodology was a very hands-on and step-by-step approach. Instead of getting into coding right away, we focused on problem comprehension at first, then gradually planned, designed, developed, tested, and improved the system. Here is the detailed work shown for each stage.

1. Understanding the Problem and Planning

The primary step was to recognize the reason behind a new NFT marketplace existence. We could find that numerous already existing platforms were either too complicated to utilize, charged very high fees or were lacking in proper decentralization. Creators do not have full authority over their creations most of the time, and buyers regularly get exposed to security issues.

Therefore, we decided to develop a marketplace where creators could not only mint their NFTs hassle-free but also keep them on a decentralized storage medium, IPFS, and sell them without the worry of a central authority controlling everything. In addition, the planning stage also included identifying the necessary features the platform needs to have, such as a wallet connection, file uploading, NFT minting, listing, and secure transactions.

2. Designing the System

The next step after the plan came to its maturity was the system design.

Frontend (User Interface): It basically describes what users get to see and do.A modern design with a clean and straightforward navigation was implemented, which a newcomer can easily cope with.

Blockchain and Smart Contracts: The core of the problem is addressed through this part of the platform where we developed the smart contracts in Solidity to handle NFT minting, NFTs' ownership, and sales. The Ethereum testnets such as Goerli and Sepolia are used for the experiments done on the smart contracts without the risk of harming the main network.

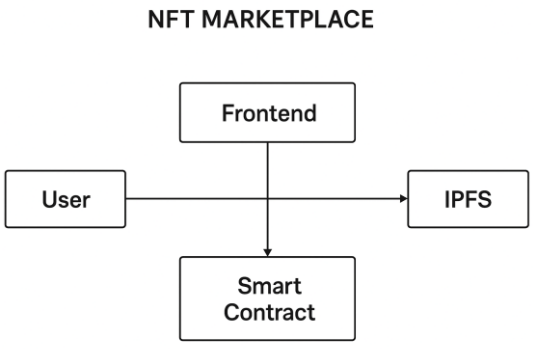

Fig 1. Block Diagram

Storage (IPFS): While files of an NFT were kept on a single server earlier, IPFS is used to store the images, videos, or any files related to NFTs.

These ensure that the files will always be available, can't be forged, and can be reached from any location.

3. Building the Core Features

The core features were developed step by step so as to ensure that each one is functioning perfectly before proceeding to the next Upload and Minting: The users can upload their files, and the system will create metadata for the same. The metadata consists of information like title, description, and owner details. Storage on IPFS: The metadata file is uploaded to IPFS, and an exclusive CID (Content Identifier) is allocated

Wallet Integration Testing: The ease of connection, the approval or rejection of transactions without any misunderstanding was ensured for users.

Smart Contract Interaction: The CID is just hand-in-hand with the smart contract which is used in creating a new NFT and the ownership of the user’s wallet is the one it is assigned to.

Marketplace Listing: After the minting, the NFT can be offered for sale or sent to another user. Smart Contracts Testing: We focused on finding vulnerabilities, the correctness of ownership, and gas efficiency.

Fast-loading pages and could recover from problems without crashing.

4. Security and Data Safety

One of the major issues that were addressed by the project was security. We implemented:

IPFS for the storage of data and metadata that is permanent and cannot be hacked or altered.

Smart Contract Auditing with the help of tools like Remix IDE to find all the possible risks before the deployment.

Task	Task Name	Status
1	Requirement Analysis & Feasibility Study	Done
2	Design of System Architecture & UML Diagrams	Done
3	Smart Contract Development & Testing	In Progress
4	Backend API Development (User, NFT, Listing services)	In Progress
5	Frontend Development (User Dashboard, Marketplace UI)	Not Started

EXPERIMENTAL RESULTS

The experimental stage of the NFT Marketplace project basically laid out the scope and the scale of what the platform could do as well as showing its capability to handle everyday scenarios. This phase saw a wide range of tests to evaluate the platform's performance, security, and user experience. The objective was to ensure that the system components - wallet connection, NFT minting, metadata storage, smart contract testing work was done in conjunction with the following functionalities - minting new NFTs, interactions, and user flow generally - function seamlessly and consistently listing them on the marketplace, buying them, and transferring ownership from one user to another. All these transactions were visible on the blockchain, and gas fees were also calculated to make sure that they were affordable. The contracts yielded the desired results; no errors or failures were experienced during the trials.

Firstly, the wallet integration was experimented with using MetaMask. Several users employed Ethereum test networks packages such as Goerli and Sepolia to connect their wallets to the platform. It was a confirmatory procedure to ascertain if users could potentially secure the accounts without the risk of exposing the private keys.

The results were good - connections were established in no time, and users could see their One of the most significant experimental evidence aspects refers to the user notification and transaction confirmation. After the NFT minting or purchasing was performed, the user was immediately informed through the frontend operator.

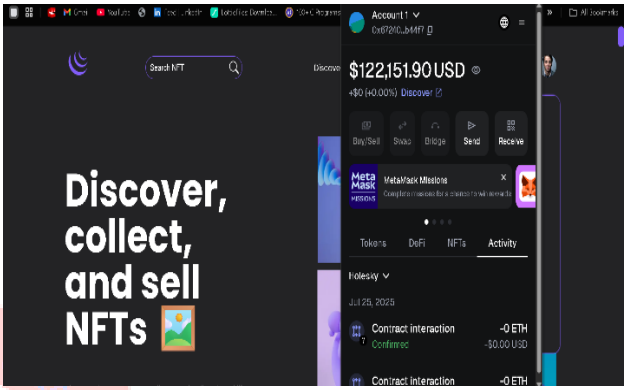

Fig 2. Wallet Connection

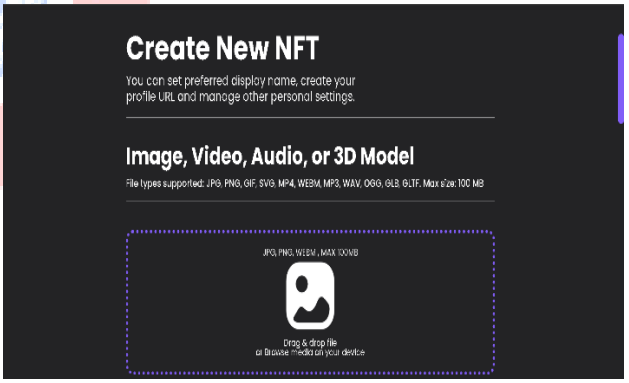

Fig 3. Creating/Uploading File for NFT

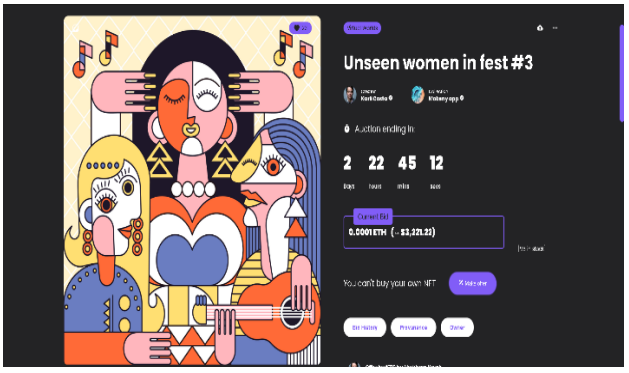

Fig 4. Showing Uploaded NFT

CONCLUSION

The making of the NFT Marketplace is a big step in mixing the tech of blockchain with owning and making digital things. This work was not just about making a working site; it was about making a safe, clear, and easy-to-use space where digital items could be sold and traded well. By using blockchain, mainly. This mix of tech depth and ease of use was key to make the market open to more and able to grow.From a tech view, this work gave us a lot to learn in areas like joining blockchain, making decentralized apps, and safe logins. Using logins like MetaMask not only made things safer but also let users keep their keys, fitting with the blockchain's free style. Trying it on Ethereum test nets made sure it can take on real uses without losing safety or speed.More than that, the NFT Marketplace changes our digital market today. . With ongoing changes and updates, the NFT Marketplace has what it needs to do well as a trusted space in the quick-moving world of digital stuff you can own.

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