International Journal of Art, Design, and Metaverse

ISSN 2985-8453 (online)
Vol 1, No 2, August 2023

Development of Simple NFT Marketplace Using Free Coding from GitHub

Siau Tung [a], Amelia Chang [b,*]
[a] Guangzhou University, China, tungsiautung@gmail.com
[b] Guilin University, China, 760914534@qq.com

Abstract

This research project explores the development of a Non-Fungible Token (NFT) marketplace by leveraging existing coding methods available on GitHub. The study aims to create a simplified NFT marketplace with a focus on practical implementation. By utilizing open-source resources and repositories from GitHub, the project seeks to provide insights into the construction of a basic NFT marketplace, highlighting the fundamental coding techniques and considerations involved. The research findings offer a foundational understanding of building a straightforward NFT marketplace, serving as a valuable starting point for developers and enthusiasts looking to enter the NFT space. While the scope of this project is limited to a simple NFT marketplace, it lays the groundwork for future exploration and expansion into more complex and feature-rich NFT trading platforms.

Keywords: NFT, marketplace, GitHub, development

I. Introduction

Games NFTs have revolutionized the way artists can monetize their work, offering a decentralized platform where creators can tokenize their unique digital assets, be it artwork, music, collectibles, or any digital creation, and sell them directly to a global audience without intermediaries [1]. This technology not only provides artists with greater control over their intellectual property but also allows them to earn royalties on secondary sales, ensuring a more sustainable income stream. Furthermore, NFT marketplaces foster a sense of community among artists and collectors, enabling them to engage in a decentralized economy that celebrates creativity and innovation. However, this exciting opportunity also comes with challenges, including environmental concerns related to blockchain energy consumption and issues, which must be addressed for the NFT marketplace to reach its full potential as a game-changer for artists.

1.1 NFT

NFT stands for Non-Fungible Token, and it represents a unique digital or cryptographic asset that is indivisible and cannot be exchanged on a one-to-one basis like cryptocurrencies such as Bitcoin or Ethereum [2]. NFTs are used to represent ownership or proof of authenticity of a specific digital item, which can include artwork, music, videos, virtual real estate, in-game items, collectibles, and more. Each NFT has a distinct value and set of metadata that makes it one-of-a-kind.

The relationship between NFTs and blockchain technology is fundamental. NFTs are built on blockchain platforms, primarily Ethereum, but also other blockchain networks like Binance Smart Chain, Flow, and others [3]. Here's how NFTs and blockchain are interconnected:

1. Blockchain Technology: NFTs are essentially smart contracts on a blockchain. These smart contracts define the rules and properties of the NFT, including its ownership, transferability, and metadata. This ensures that NFTs are secure, transparent, and tamper-proof.
2. Decentralization: Blockchain is a decentralized ledger technology, meaning there is no central authority controlling it. NFTs inherit this decentralization, allowing creators and users to transact without relying

ISSN 2985-8453 (online)
Vol 1, No 2, August 2023

on intermediaries like art galleries, record labels, or auction houses.

3. Immutability: Once an NFT is created on a blockchain, it is nearly impossible to alter or counterfeit. The ownership history and metadata of NFTs are permanently recorded on the blockchain, providing a secure and verifiable provenance for digital assets.
4. Interoperability: NFTs can be bought, sold, and traded across various platforms and marketplaces because they conform to standardized blockchain protocols (e.g., ERC-721, ERC-1155 for Ethereum). This interoperability allows for a broader ecosystem of NFTs.
5. Scarcity and Ownership: NFTs leverage blockchain's capabilities to prove ownership and scarcity of digital assets. Artists and creators can use NFTs to tokenize their work, specifying limited editions or unique pieces, and then sell or auction them to collectors.
6. Royalties and Secondary Sales: One of the unique features of NFTs is the ability to program royalties into the smart contract. This means that creators can earn a percentage of the proceeds from secondary sales of their NFTs, providing ongoing revenue streams.
7. Environmental Concerns: Blockchain's energy consumption, especially for proof-of-work networks like Ethereum, has raised concerns in the context of NFTs. The environmental impact of NFTs is a topic of debate and has led to exploration of more eco-friendly blockchain alternatives.

NFTs are a manifestation of blockchain technology's capabilities to create digital scarcity, verify ownership, and facilitate secure and transparent transactions in the digital realm. They have gained significant attention and popularity in various creative and entertainment industries as a new way for creators to monetize their digital assets and engage with their audience.

NFTs offer numerous benefits to artists, including the ability to gain greater control over their digital creations, secure a fair share of the value from their work through royalties on secondary sales, and reach a global audience without relying on traditional intermediaries like galleries or record labels. These tokens also establish verifiable provenance and authenticity for digital art, making it harder for piracy or unauthorized duplication to devalue the artist's work. Additionally, NFTs foster direct engagement with fans and collectors, creating a sense of community and enabling artists to experiment with new forms of creativity while generating sustainable income streams. [4]

An NFT marketplace requires a website as its primary platform to facilitate the buying, selling, and trading of non-fungible tokens [5]. This website serves as the central hub where artists, collectors, and users can browse, list, and interact with NFTs. It typically includes features such as user profiles, search and discovery tools, secure digital wallets for storing NFTs, auction functionalities, and a payment gateway to support transactions. The website acts as the storefront for artists to showcase their digital creations and enables collectors to explore, purchase, and manage their NFT collections. Additionally, it plays a crucial role in providing transparency, security, and trust within the NFT ecosystem, ensuring a seamless and user-friendly experience for participants in the market.

In the latter half of 2021, the NFT market witnessed an unprecedented surge in high-profile sales that captured global attention and reshaped the landscape of digital ownership [6]. Most notably, Beeple's groundbreaking digital artwork, "Everydays: The First 5000 Days," achieved an astonishing sale price of $69 million, a watershed moment that thrust NFTs firmly into the mainstream spotlight. This monumental transaction underscored the remarkable potential for digital art to command substantial value within the NFT market, challenging conventional notions of art ownership and investment.

During the same period, the rise of NFT marketplaces, such as OpenSea and Rarible, facilitat-

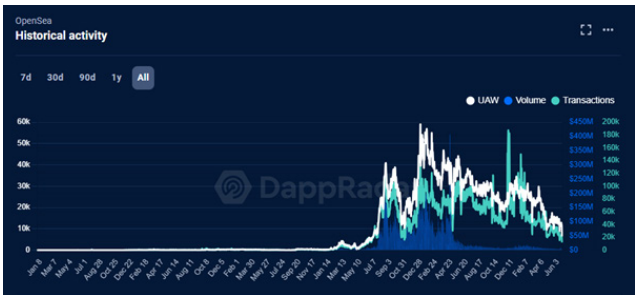

Figure 1 OpenSea Statistics Over One Year (Source) [6]

ISSN 2985-8453 (online)
Vol 1, No 2, August 2023

ed the buying and selling of NFTs, fueling the interest and participation of seasoned collectors and newcomers. The NFT space gained so much attention that the NFT volume on OpenSea exceeded $184 million in a day, with more than 43k active users.

1.2 Website

A website is a digital platform accessible via the internet that consists of web pages containing various types of content, such as text, images, videos, and interactive elements [7]. Websites are designed to serve specific purposes, whether informational, commercial, educational, or entertainment-related. They provide a means for individuals, businesses, organizations, or entities to establish an online presence, share information, communicate with audiences, and conduct various online activities. Websites can range from simple personal blogs to complex e-commerce platforms or interactive web applications, and they are typically accessed through web browsers on desktop computers, laptops, tablets, and mobile devices. Websites have become an integral part of our digital lives, serving as gateways to vast amounts of information, services, and opportunities across the internet.

This study is focused on the development of Non-Fungible Tokens (NFTs) without the traditional reliance on blockchain programming. NFTs have typically been associated with blockchain technology, which provides the underlying infrastructure for their creation, security, and transactional capabilities. However, this research aims to explore alternative methods or platforms that can enable the creation and utilization of NFTs in novel ways, potentially offering more accessible and eco-friendly approaches beyond the resource-intensive blockchain-based systems. By delving into NFT development without blockchain programming, this study seeks to expand the possibilities for digital ownership and asset tokenization, potentially opening up new avenues for artists, creators, and collectors in the evolving NFT landscape.

II. Research Method

Developing an NFT marketplace involves creating a digital platform where Non-Fungible Tokens (NFTs) can be bought, sold, and traded. This multifaceted endeavor encompasses various crucial aspects, from designing an intuitive user interface to ensuring robust security measures, implementing blockchain integration for token creation and ownership tracking, and establishing a vibrant community for artists, collectors, and users. Furthermore, it requires addressing scalability issues to accommodate the growing demand for NFTs while considering environmental sustainability concerns associated with blockchain technology. Building a successful NFT marketplace not only offers a space for artists and creators to monetize their digital assets but also plays a pivotal role in shaping the future of digital ownership and decentralized economies.

Developing an NFT marketplace from a GitHub repository involves several key steps:

1. Repository Selection: Start by searching for existing NFT marketplace projects on GitHub. You can use keywords like "NFT marketplace," "NFT platform," or "NFT exchange" to find relevant repositories. Carefully review the repositories to ensure they align with your project goals and requirements.
2. Fork the Repository: Once you've identified a suitable NFT marketplace project, fork the repository to create your copy. This copy will be stored in your GitHub account, allowing you to make changes without affecting the original project.
3. Set Up a Development Environment: Prepare your development environment. You may need to install specific programming languages, frameworks, and dependencies required by the project. Refer to the project's documentation for guidance.
4. Customization: Customize the NFT marketplace to meet your specific needs. This may involve modifying the user interface, adding or removing features, integrating payment gateways, and configuring blockchain integration.
5. Smart Contract Development: If the NFT marketplace relies on a blockchain (which is common), you'll need to develop or configure smart contracts to handle NFT creation, ownership, and transactions. This typically involves using blockchain-specific languages like Solidity for Ethereum.

ISSN 2985-8453 (online)
Vol 1, No 2, August 2023

6. Testing: Thoroughly test your modified NFT marketplace to ensure it functions correctly. Test all features, including user registration, NFT creation, listing, buying, selling, and wallet integration. Consider security testing to identify and fix vulnerabilities.
7. Deployment: Once testing is successful, deploy your NFT marketplace to a web server or cloud hosting platform. Ensure that the necessary infrastructure, such as databases and servers, is properly configured.
8. Security Measures: Implement security measures to protect user data and assets. This includes encryption, secure authentication, and robust access controls. Be aware of potential security risks, especially when dealing with blockchain transactions.
9. Documentation: Create clear and comprehensive documentation for your NFT marketplace. This should include setup instructions, user guides, and developer documentation for anyone who wants to use or contribute to your project.
10. Community Engagement: Foster a community around your NFT marketplace. Encourage developers, artists, and collectors to get involved, contribute code, and provide feedback. This can help your project grow and improve over time.
11. Legal Considerations: Be aware of legal and regulatory considerations related to NFT marketplaces, including intellectual property rights, licensing, and compliance with relevant laws in your jurisdiction.
12. Continuous Improvement: Regularly maintain and update your NFT marketplace to fix bugs, add new features, and stay current with blockchain technology advancements and industry trends.

Developing an NFT marketplace from a GitHub repository can be a challenging but rewarding project. It allows you to leverage existing code and contribute to the growing ecosystem of NFT platforms while tailoring the marketplace to your unique vision and requirements.

Creating an NFT marketplace based on an existing GitHub repository like "codewithsadee/naft-nft_marketplace" involves a series of steps to customize, develop, and deploy the marketplace according to your specific needs. Here's a general overview of the process:

1. Fork the Repository: Visit the GitHub repository you want to use as a starting point (https://github.com/codewithsadee/naft-nft_marketplace) and click the "Fork" button in the upper right corner. This creates a copy of the repository in your GitHub account.
2. Clone Your Fork: Clone the forked repository to your local development environment using Git. Open your terminal and run the following command, replacing <your_username> with your GitHub username:

bash

git clone https://github.com/<your_username>/naft-nft_marketplace.git

3. Setup Development Environment: Review the repository's README and documentation to understand the prerequisites and setup instructions. Ensure you have the required programming languages, frameworks, and dependencies installed.
4. Customization: Customize the NFT marketplace to align with your project goals. This may involve modifying the user interface (HTML, CSS), adding new features, updating smart contracts, and configuring settings. Refer to the repository's documentation for guidance on customization.
5. Blockchain Integration: If the NFT marketplace relies on a blockchain (likely Ethereum), you will need to configure and potentially modify the smart contracts. Use a tool like Remix or Truffle for smart contract development and testing.
6. Testing: Rigorously test your customized NFT marketplace to identify and fix any bugs or issues. Test all functionalities, including user registration, NFT minting, listing, buying, and selling. Security testing is essential to protect against vulnerabilities.
7. Deployment: Once testing is successful, deploy your NFT marketplace. You can deploy it to a web server, cloud platform, or use decentralized hosting options. Ensure that all components (frontend, backend, and smart contracts) are properly deployed and configured.
8. Security Measures: Implement robust security measures to protect user data, NFT assets, and transactions. This includes en-

ISSN 2985-8453 (online)
Vol 1, No 2, August 2023

cryption, secure authentication, and compliance with best practices for blockchain security.

9. Documentation: Create detailed documentation for your NFT marketplace. Include instructions for setup, usage guides, and developer documentation for contributors. Documentation is crucial for both users and potential contributors to understand your project.
10. Legal and Regulatory Compliance: Be aware of legal considerations surrounding NFTs and blockchain technology. Ensure your marketplace complies with intellectual property laws, licensing agreements, and relevant regulations.
11. Community Engagement: Encourage community involvement by opening your project for contributions, soliciting feedback, and fostering discussions. Building a supportive community can help your project grow and improve.
12. Continuous Improvement: Maintain and update your NFT marketplace regularly to fix bugs, add new features, and stay up-to-date with changes in the blockchain and NFT landscape.

Remember that creating an NFT marketplace is a complex undertaking that requires a good understanding of blockchain technology, web development, and security best practices. It's essential to plan thoroughly, test rigorously, and consider the evolving nature of the NFT market while developing your platform.

III. Result and Discussion

Developing NFT marketplace from Github is very easy. The display as shown in Figure 2 foe desktop, and Figure 3 for mobiedevice. First, download source file HTML from https://github.com/codewithsadee/naft-nft_marketplace.

Installing NAFT

To install NAFT, follow these steps:

Linux and macOS:

```
sudo git clone https://github.com/codewithsadee/naft-nft_marketplace.git
```

Windows:

```
git clone https://github.com/codewithsadee/naft-nft_marketplace.git.
```

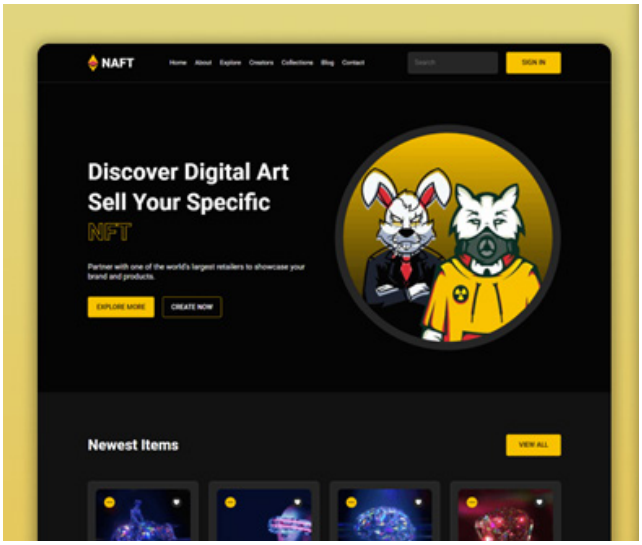

Figure 2 NFT marketplace is accessed on desktop

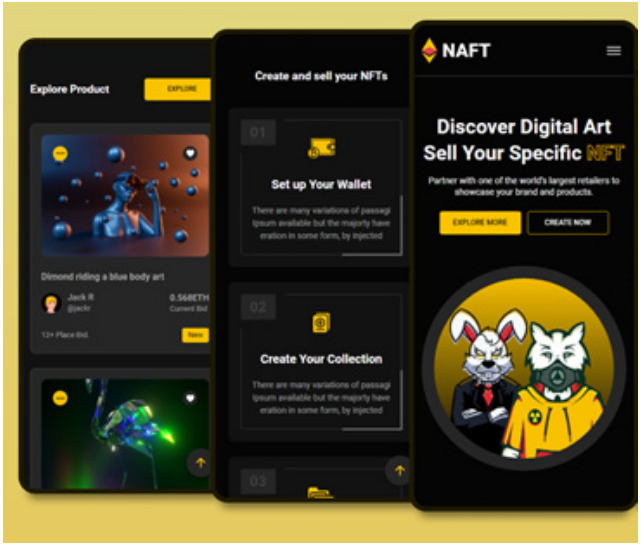

Figure 3 NFT marketplace is accessed on mobile device

IV. Limitation

The NFT marketplace is built solely with HTML and CSS and does not include a database or wallet integration, it comes with several limitations:

1. Lack of User Authentication: Without a database or user authentication system, you won't be able to provide users with personalized accounts. This means users won't have profiles, the ability to track their activity, or any form of identity verification.
2. Inability to Mint NFTs: Creating and minting NFTs typically require smart contracts and blockchain integration. If your marketplace lacks this functionality, users won't be able to create and list their NFTs directly on your platform.

ISSN 2985-8453 (online)
Vol 1, No 2, August 2023

3. No Wallet Integration: Connecting a cryptocurrency wallet is crucial for users to buy, sell, and manage NFTs securely. Without wallet integration, users won't be able to make transactions within your marketplace. They would need to use external platforms like OpenSea to interact with their NFTs.
4. Limited Trading Features: Users would be restricted to using external NFT marketplaces like OpenSea for all trading activities. They won't have access to features that a full-fledged NFT marketplace would offer, such as setting their prices, managing auctions, or interacting with other traders within your platform.
5. Reduced User Engagement: Without user accounts, wallet integration, and the ability to mint NFTs, user engagement on your platform may be limited. Users might prefer platforms that offer a more comprehensive and seamless NFT trading experience.
6. Dependency on External Platforms: Your marketplace's success would heavily depend on external platforms like OpenSea. If those platforms experience downtime or issues, it could impact your users' ability to trade NFTs.
7. Data Management Challenges: Since you're not using a database, it would be challenging to manage and analyze user data, transaction history, or any form of metrics related to user behavior and marketplace performance.

While a simple HTML and CSS-based NFT marketplace can serve as a basic showcase or portfolio of NFTs, it may not provide the features and functionality that users expect from a fully-featured NFT trading platform. To overcome these limitations and offer a more comprehensive user experience, you'd need to consider integrating blockchain technology, databases, and wallet functionality into your platform.

V. Conclusion

In conclusion, the development of an NFT marketplace is a dynamic and multifaceted endeavor that can offer artists and creators exciting opportunities for digital asset monetization and engagement with global audiences. The integration of blockchain technology, smart contracts, and wallet functionality is essential for creating a secure and functional marketplace that empowers users to mint, buy, sell, and trade NFTs seamlessly. While HTML and CSS-based showcases can serve as a starting point, they come with limitations that hinder user authentication, NFT minting, wallet connectivity, and robust trading features. To provide a comprehensive and competitive NFT trading experience, developers should consider leveraging the full potential of blockchain technology and databases to create a feature-rich platform that caters to the evolving demands of the NFT market.

The future of research in the field of NFTs (Non-Fungible Tokens) and NFT marketplaces is expected to be diverse and dynamic, with several promising avenues of exploration, such as Sustainability and Environmental Impact. It will give the concerns about the environmental footprint of blockchain networks used for NFTs, future research will likely focus on developing more eco-friendly blockchain solutions or exploring alternative technologies for NFT creation and trading that reduce energy consumption.

References

[1] Congressional Research Service, "Non-Fungible Tokens (NFTs)," 2022.
[2] Crypto Vantage, "A Brief History of Cryptocurrency," Crypto Vantage, 2023. https://www.cryptovantage.com/guides/a-brief-history-of-cryptocurrency/ (accessed Mar. 08, 2023).
[3] M. Johnsen, Blockchain in Digital Marketing: A New Paradigm of Trust. Johnsen, Maria, 2015.
[4] I. Volovyk, "□ Pricing Of Digital Collectibles: An Empirical Evidence of NFT Valuation," Kyiv School of Economics, 2022.
[5] M. Nadini, L. Alessandretti, F. Di Giacinto, M. Martino, L. M. Aiello, and A. Baronchelli, "Mapping the NFT revolution: market trends, trade networks and visual features," Sci. Rep., vol. 11, no. 20902, 2021, doi: 10.1038/s41598-021-00053-8.
[6] S. Datta, "Are NFTs Dead or Just Taking a Breather? Analyzing the Current State of the NFT Market," BSC News, 2023. https://www.bsc.news/post/are-nfts-dead-or-just-taking-a-breather-analyzing-the-current-state-of-the-nft-market.

ISSN 2985-8453 (online)
Vol 1, No 2, August 2023

[7] Remix, "Focused on web standards and modern web app UX, you're simply going to build better websites," Remix, 2022. https://remix.run/.

.