

AI based NFT Minting using Blockchain

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Abstract - The emergence of blockchain technology has significantly transformed digital asset ownership and exchange, with Non-Fungible Tokens (NFTs) playing a pivotal role in enabling secure, transparent, and verifiable ownership of digital assets. This research presents the design and development of an AI-powered NFT marketplace built on the Solana blockchain, aimed at enhancing user experience, transaction efficiency, and marketplace intelligence. By integrating artificial intelligence for personalized recommendations, fraud detection, and predictive analytics, the platform offers a more secure and engaging environment for creators and collectors. The use of Solana ensures high-speed, low-cost transactions while maintaining decentralization and scalability. This paper discusses the architecture, smart contract design, AI integration, and security mechanisms implemented in the system. The proposed solution addresses key challenges in traditional NFT platforms, such as high gas fees, slow transactions, and lack of intelligent automation, positioning it as a next-generation platform for NFT trading and creation.

Key Words: NFT Minting, Blockchain, Artificial Intelligence, Solana, Digital Assets, Marketplace

1. INTRODUCTION

The digital landscape has witnessed a paradigm shift with the integration of blockchain technology, leading to the rise of decentralized platforms and digital asset ownership. Among the most revolutionary developments is the concept of Non-Fungible Tokens (NFTs), which represent unique digital assets securely stored on a blockchain. NFTs have unlocked new possibilities for artists, gamers, collectors, and developers, enabling them to mint, buy, sell, and trade digital assets with provable authenticity and ownership.

However, mainstream NFT marketplaces often suffer from limitations such as high transaction fees, network congestion, and a lack of intelligent tools for users to navigate the ecosystem effectively. Ethereum, the most widely used blockchain for NFTs, frequently faces scalability issues and

unpredictable gas fees, creating barriers to entry for many users.

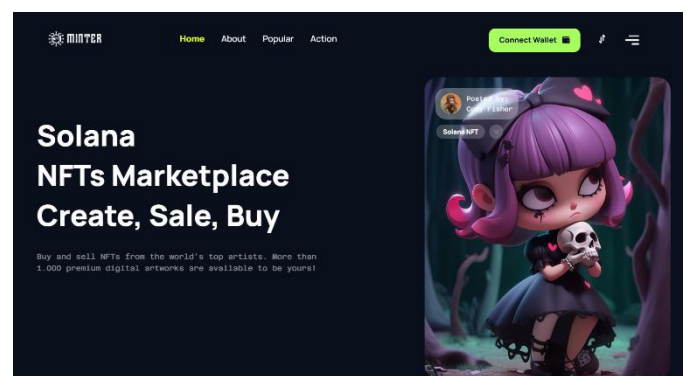
This paper aims to explore the design, development, and implementation of this AI-integrated NFT platform. By combining the speed and scalability of Solana with the adaptability and intelligence of AI technologies, the proposed solution aspires to redefine how users interact with NFTs in a secure, cost-effective, and personalized manner.

2. Body of Paper

This section presents the core components and outcomes of the developed system, emphasizing the integration of AI with NFT operations on the Solana blockchain. Each module is designed to provide scalability, usability, and automation across the NFT lifecycle.

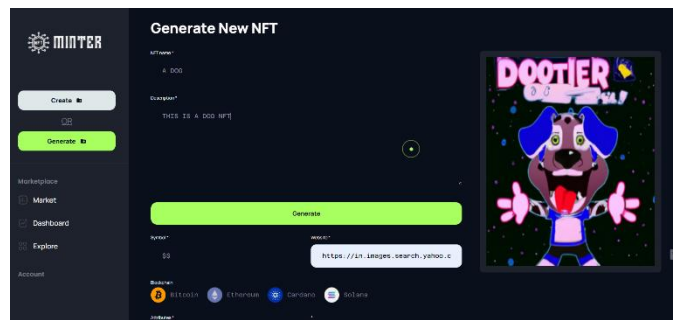
2.1 Home Page (User Dashboard Interface)

The home page serves as the landing dashboard where users are introduced to the platform's core features. It includes navigation options for browsing NFTs, creating new tokens, managing owned assets, and accessing real-time recommendations. The interface is developed using React.js and styled with Tailwind CSS, offering responsiveness across devices. A wallet connection feature is prominently integrated using the Phantom Wallet, enabling users to seamlessly connect to the Solana blockchain. AI-driven sections such as trending NFTs and personalized suggestions enhance user engagement by analyzing behavioral patterns and historical interactions.



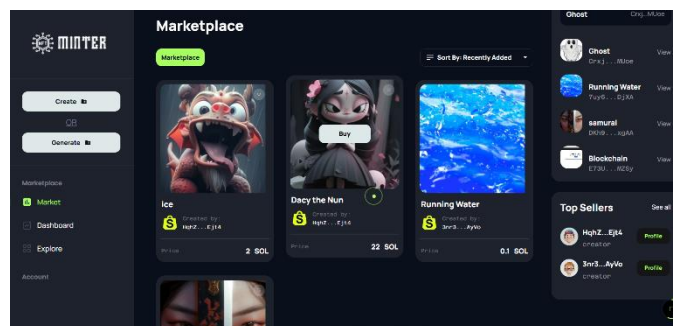
2.2 AI-Based NFT Creation Panel

This module allows users to mint NFTs with intelligent assistance. Users can upload digital assets such as images or music, add metadata (title, description, category), and let the AI engine automatically tag content using image recognition and NLP techniques. This ensures better discoverability in the marketplace. AI also suggests pricing ranges by comparing similar assets using regression-based price prediction models. Once confirmed, the minting transaction is processed via Solana smart contracts, and the asset becomes an immutable NFT stored on the blockchain.



2.3 NFT Marketplace

The marketplace showcases all minted NFTs in a card-style grid layout. Each NFT listing includes its image, metadata, price, and ownership history. AI enhances this section by curating collections based on user interests and highlighting trending NFTs. Users can buy, bid, or transfer NFTs directly using their connected Solana wallets. The blockchain ensures transparent transaction records, while the AI engine flags suspicious listings to maintain marketplace integrity.



3. CONCLUSIONS

The proposed AI-based NFT marketplace successfully combines the speed and cost-efficiency of the Solana blockchain with the intelligence of AI to enhance user experience, security, and marketplace efficiency. It addresses major limitations of traditional NFT platforms through smart automation and scalable infrastructure.

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