

Decentralized Platform for AI Assets using Blockchain and NFT's

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Abstract - The paper referenced proposes a decentralized marketplace model for trading, verifying, and managing the ownership of AI models by means of blockchain and NFTs. Given the need for trusted exchange and provenance in the management of AI assets, the authors propose a system wherein AI models and datasets are represented as NFTs on a public blockchain, providing transparent, traceable, and secure transactions. Smart contracts automate auctions, royalty distributions, and ownership transfers. Further security and privacy are provided by TEEs, proxy re-encryption, and decentralized storage (IPFS). Collaboration is enabled through the architecture, which allows contributors to improve and resell models, while royalty schemes guarantee fair compensation for creators. Details of the implementation include smart contracts in Solidity and cost analyses for transaction efficiency. Evaluation in terms of security is resilient against Sybil and Eclipse threats. It is also set up as broadly adaptable to both public and private AI assets and easily generalizable to other situations of digital assets to ensure robust provenance, fair remuneration, and trustless exchange.

Key Words: Blockchain, Non-Fungible Tokens(NFTs), Decentralized AI marketplace, Smart Contracts, Digital Ownership

1.INTRODUCTION

AI models have also become highly valuable digital assets across various industries. However, the challenges in their distribution and management through centralized platforms include the misuse of data and nontransparency in ownership. The protection of AI intellectual property and the guarantee of its use in an equitable way have turned out to be big issues.

• Decentralized Platform for AI Assets using Blockchain and NFTs: The project provides security and transparency in AI asset management, saving ownership on blockchain and displaying unique models of AI using NFT. Smart contracts enable the smooth processing of licensing,

royalty payments, and permission control to ensure trusted transactions.

• The decentralized structure thus forms a fair and cooperative AI community. It offers authenticity, antitampering protection, shared ownership, and open trading that inspires innovation. This project, with the integration of Web3 technologies and AI, thus sets a new standard for safe AI asset exchange.

2.Literature Review

1. “NFT Marketplace with Digital Currency Exchange,” SSRN(2023) Instead, the paper proposes an NFT marketplace that supports multiple ERC-20 tokens instead of locking users to a single cryptocurrency. It considers limited payment flexibility to be one of the major drawbacks of existing platforms and proposes an NFT marketplace with a multi-chain design on Ethereum. The integrated system would enable a built-in digital currency exchange so that users can seamlessly swap between supported tokens before purchasing an NFT. Smart contracts handle NFT minting, listing, and trades while managing liquidity pools for token swaps. The authors also emphasize secure authentication using wallets like MetaMask and tools such as ThirdWeb. Overall, this work tries to achieve better user experience and accessibility by combining NFT trading along with flexible on-chain currency exchange.

2. “NFT Marketplace using Blockchain,” IJARSCT(2024) This paper designs and implements an NFT marketplace primarily on the Ethereum/Polygon ecosystem, focusing on low fees and better performance. It explains how ERC-721 smart contracts are used for minting and tracking unique tokens and compares major existing marketplaces to motivate the proposed design. The architecture of the platform consists of React/Node frontends, Solidity contracts, and wallet integration for secure user authentication. Features essential to any marketplace that the authors emphasize include storefronts, search, wallet compatibility, and support for diverse digital assets ranging from art over music to game items. The

results of the implementation are that it successfully mints, lists, and trades NFTs on Polygon with improved gas efficiency. Future work will include integrating with DeFi protocols for lending, borrowing, and liquidity provision with NFTs.

3. "Decentralized NFT Marketplace Using Ethereum and IPFS with AI-based Analytics," IJCRT, (2025) This paper presents a fully decentralized NFT marketplace implemented over Ethereum, which deploys IPFS for offchain metadata and digital asset storage. It utilizes ERC721 contracts that let users mint, list, and buy NFTs without intermediaries, while IPFS removes dependencies on centralized servers. In particular, one of the strong contributions is the AI-based price prediction module, Random Forest Regression, trained on NFT features including traits, creator reputation, rarity, and market activity. The architecture is built by joining a Next.js frontend, Web3/ethers.js for the blockchain interface, and a Python backend for AI model inference. The reported experiments show strong predictive performance-e.g., high and low root mean square errorwhich can assist users in estimating a fair price and hence making better trading decisions. Limitations of this work involve using synthetic training data and the scalability issues affecting Ethereum, while future plans involve layer-2 adoption and richer real-world datasets.

4. Ravi Prakash and Tony Thomas on (2024), discussed in "Towards Secure AI Driven Industrial Metaverse with NFT Digital Twins" Security issues caused by NFTbased digital twins for industrial metaverse applications and it implements Deep-learning based methods that integrate the autoencoders and RNN-based classifiers have also been introduced in the paper to identify fake NFT digital Decentralized Platform for AI Assets using Blockchain and NFTs twins in real time. Furthermore, it suggests dynamic metadata and AI integrated smart contracts for their enhanced authenticity verification requirements.

5. Rischan Mafrur, published on 2025, Designed a "Albased Crypto Tokens: The Myth of Decentralized AI?", it critically examines the artificial intelligence-based crypto tokens designed for powering decentralized AI platforms. It discusses their technical designs, token use cases, and consensus mechanisms while emphasizing their limitations such as their reliance on off-chain computation and scalability problems. New trends discussed in the paper include on-chain authentication of AI outputs and blockchain-enabled federated learning.

6. KAVA News (2025), published a "Blockchain-Based AI Model Marketplaces: Democratizing AI Access

and Monetization", This article explores decentralized marketplaces that tokenize AI models, datasets, and GPU compute power. It discusses fractionalized ownership, smart contract-driven royalty mechanisms, and how these platforms lower entry barriers and spur innovation for AI developers and companies.

7. "NFT Marketplaces: Paving the Way for a New Era of Digital Ownership" (SSRN, 2024) The paper analyses the reshaping of digital asset ownership and trading in art, collectibles, and beyond via NFT platforms. First, the authors present the rise of NFTs, followed by a deep dive into a prototype marketplace they have developed that incorporates new social and engagement-oriented features: in-platform chat between buyers and sellers, video previews for NFTs, lottery-style giveaways, and auction mechanisms for high-value items. It also touches upon some aspects of how blockchain ensures transparency, authenticity, and scarcity of the assets listed, which effectively makes NFTs act like verifiable digital property. Market trends and high-profile sales are used to make a case that NFTs are a new asset class with long-term economic potential. Overall, the work positions feature-rich NFT marketplaces as key infrastructure for the future of decentralized digital ownership and creator monetization.

3. Methodology

A. Problem Statement:

- The current, highly centralized development and distribution of AI models present a number of major barriers to collaboration, transparency, and fair compensation. The AI models and datasets are usually locked within an organization due to limited interoperability, and the infrastructure for collaborative works is very expensive. This greatly favors large corporations and severely limits the potential contributions of smaller entities, independent researchers, and individual developers. A shortage of general access and incentives for wide participation restricts the growth and democratization of AI innovation.

- The existing mechanisms for managing the ownership of AI assets and trading in them suffer from serious limitations. They lack in achieving traceability, auditability, equitable remuneration, and security, and they lack transparent provenance or trusted mechanisms for asset exchange. Because it may be nearly impossible to have reliable data on how models were developed, improved, or validated due to such opacity, there is an erosion of user trust. In addition, the lack of fine-grained ownership records and mechanisms for fair compensation

discourages collaboration and knowledge sharing. Centralized platforms introduce single points of failure and vulnerabilities to manipulation and data breaches.

- The need of the hour, therefore, is a decentralized platform based on blockchain and NFTs that would enable secure, transparent, and trustless management of AI assets. In such a platform, model provenance could be tracked easily, and ownership could be proved in an immutable way. Additionally, royalty distribution could be automated through smart contracts. Decentralized storage, proxy re-encryption, and TEEs would protect contributor privacy, security, and intellectual property rights. This would democratize access to AI models and ensure fair compensation, increase collaboration in the larger AI community, and create a scalable, robust marketplace for digital AI assets. **B. Proposed Method:**

- The core of this will be integrating blockchain for immutable tracking of provenance and NFTs for unique ownership representation of the AI assets. Referring to your block diagram, the process starts with signing up/logging in, connecting a wallet to interact with blockchain components, uploading the AI asset from the home dashboard, and verifying on-chain whether the asset has been successfully minted as an NFT. If the asset is successfully minted, it moves to the portfolio of the user's assets, where one can securely trade or transfer them. Transactions are transparently completed and logged on-chain for traceability, with automated royalty distribution through smart contracts. If minting fails, the user is taken back home to try again, reinforcing robust validation for asset integrity.

- Smart contracts automate permissions, royalty payments, and asset transfers, while decentralized storage and proxy re-encryption secure the underlying models and metadata off-chain. The proposed system thus revolutionizes the way assets are managed for AI models by allowing trustless, peer-to-peer exchanges, ensuring fair remuneration of contributors, and compliance with norms related to privacy and intellectual property. Emphasized is intuitive user interaction—from onboarding and wallet connection, uploading their assets, minting NFTs, to finalizing transactions—operated genuinely in a decentralized and transparent environment. Beyond democratizing access to AI assets, this approach incentivizes innovation and collaboration among diverse contributors.

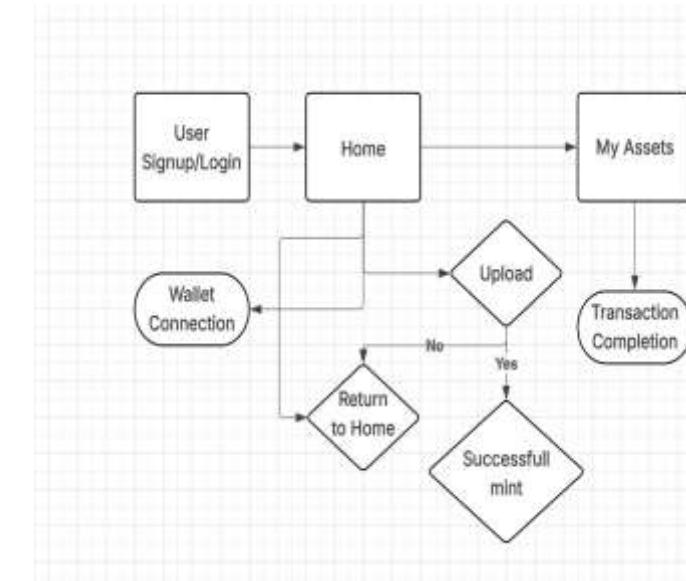


Fig1. Block Diagram

A.1.Blockchain and Smart Contracts:

- In our project, blockchain is the backbone that ensures security, transparency, and trust in every AI asset transaction, while smart contracts are the rules automated to keep things running smoothly and fairly. Every time someone uploads an AI model or dataset, blockchain gets to work, recording all the details of ownership and contribution, and all changes made, on a distributed, tamper-proof ledger. This means every creator and user can view instantly the history of any asset, helping prevent fraud and building lasting confidence in the marketplace.

- Smart contracts are like digital agreements coded directly on the blockchain. They ensure that rules regarding ownership transfer, auctions, and royalty payments are perfectly followed each time without requiring middlemen or manual intervention. For example, if a user uploads and mints an asset as an NFT, the smart contract automatically tracks ownership and distributes royalties in case of the sale or reuse of the asset. In fact, these contracts also handle complex situations: if there were multiple contributors to a model, every contributor receives compensation according to the terms agreed upon, instantly distributed by the contract itself. The best part? Nobody can hack or bypass the system—every action, payment, and record is enforced and visible to all participants.

- Altogether, blockchain and smart contracts make a playground where AI innovation and asset management are honest, resilient, and open for everyone. In cooperation, they get rid of centralized control, secure the rights of every creator and buyer, and automate even the most delicate

transactions, making your decentralized AI marketplace simple, fair, and future-proof. **A.2. How NFTs Works:**

- In our project, NFTs are the digital keys for true ownership of blockchain AI assets that make every model or dataset unique, traceable, and securely managed both for creators and buyers. When anyone uploads an AI asset, the system transforms it into an NFT—a special token on the blockchain acting like a certificate of authenticity and proof of ownership that cannot be duplicated or tampered with. This NFT is connected directly with metadata and the history of the asset, so every single change, improvement, or transfer will be recorded in real time. For users, it means complete transparency: you know who created the model, how it evolved, and whether it is legitimate.
- Minting an NFT is both simple and powerful. The platform checks the uploaded asset, then secures its details on the blockchain and assigns the NFT to the wallet of the creator. From there, the creator can confidently auction, transfer, or sell the asset while smart contracts handle the rules for royalties and payouts—fairly compensating everyone who may have contributed, even in previous versions. Even privacy protection is accounted for: assets can be securely stored and shared through decentralized storage combined with encryption, while the NFT remains public to guarantee irrefutable proof of ownership and rights management. Such an NFT system makes not only trading and collaboration effortless but also fosters trust and rewards innovation within your decentralized AI marketplace.

C. IMPLEMENTATION:

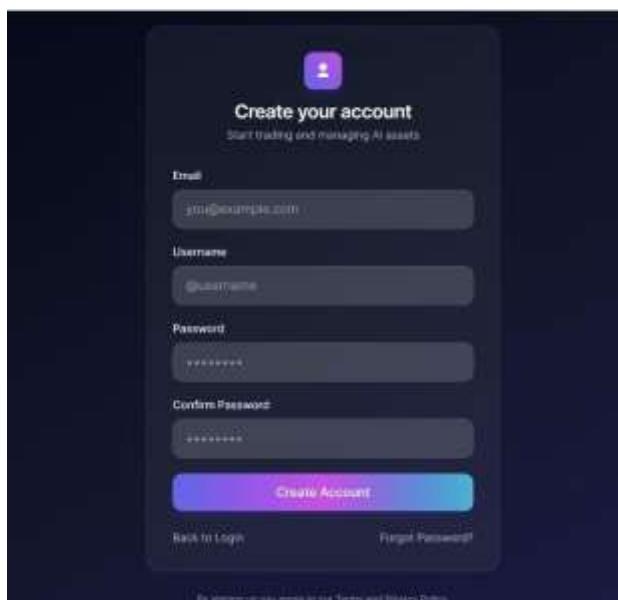


Fig:2 → Registration Page.

- The Image shows the user **registration page** for our project "Decentralized Platform for AI Assets using Blockchain and NFTs." It helps new users who want to

create an account by entering their email, username, and password to safely join the platform. This is the primary account-creation process by which users can access decentralized functionality: uploading, trading, and managing AI assets. The neat and clean design improves user experience while maintaining privacy and security. Users, upon registering, can connect their crypto wallets to validate ownership of NFTs that act as a repository of metadata regarding AI models. The interface as a whole serves as a gateway into an open, secure AI asset community based on blockchain.

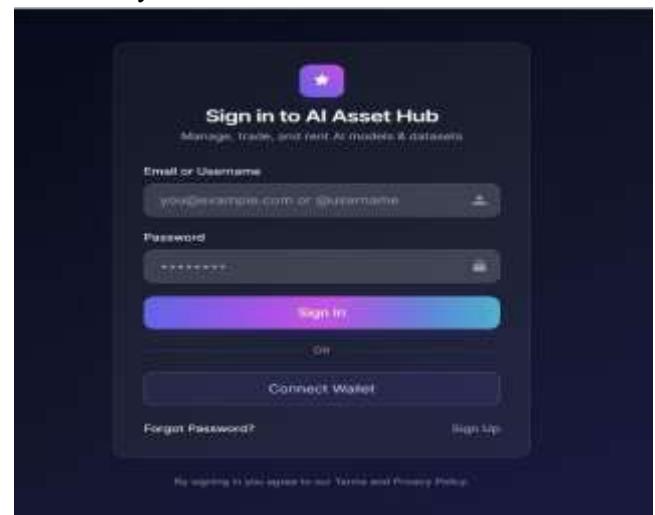


Fig:3 → Login Page

- Below is a sleek **login interface** for our "AI Asset Hub," the decentralized platform for AI assets built on blockchain and NFTs. It contains fields for email or username and password, emphasizing standard Web2style access for users who prefer familiar authentication flows. Below the traditional sign-in button, there is an option to connect a crypto wallet, highlighting seamless Web3 integration for on-chain identity and asset ownership. The copy "Manage, trade, and rent AI models & datasets" clearly states the core utility of the platform in a concise way. On a dark gradient background, the glowing purple icon feels very modern and high-techappropriate for AI and blockchain products. A "Forgot Password?" link and "Sign Up" option indicate support for account recovery and new user onboarding. The footer text referring to Terms and Privacy Policy signals compliance and trust for data-sensitive AI assets. Overall, the screen was designed to make it easy for users to access their tokenized AI models and datasets while connecting traditional login methods with decentralized wallet connections.

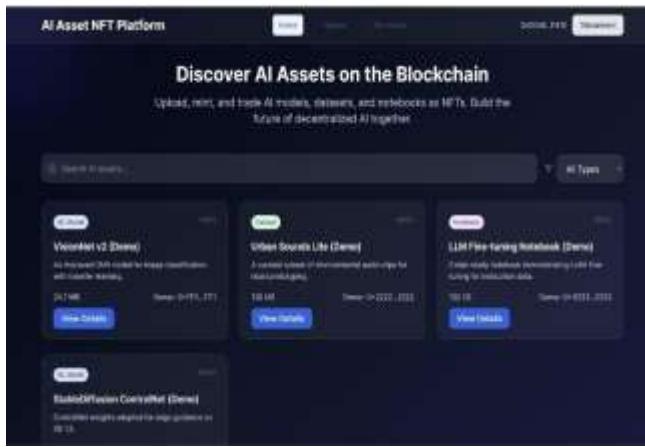


Fig:4 → Home Interface

innovations within the community. The "Upload AI Asset" button enables contributors to upload their machine learning models and datasets with ease. Every asset is safely stored, verifiable, tamper-proof, and hosted on a blockchain. The result is an open and cooperative AI marketplace where creators get fair compensation for their contributions. Generally, the page design meets the missions of the project in constructing a decentralized trust-based ecosystem with regard to AI innovations and digital assets.

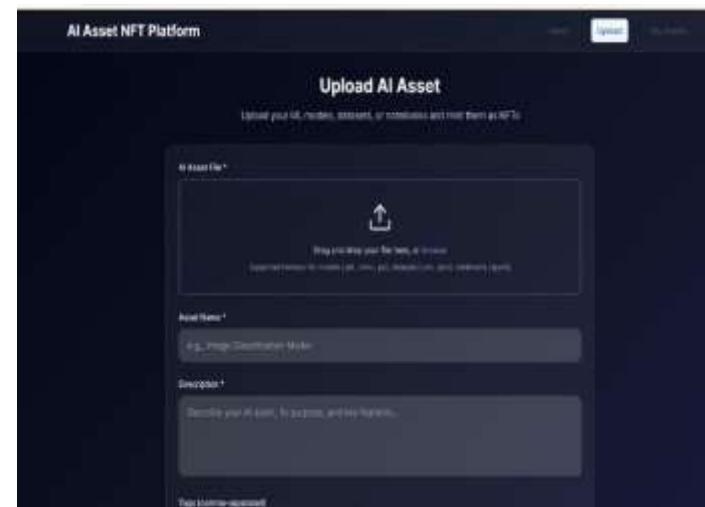


Fig:5 → Upload AI Asset

• The picture depicts the "Upload AI Asset" window of a Decentralized Platform for AI Assets-just what a project dealing with Blockchain and NFTs would require. This allows users to upload and mint the following AI-related files as Non-Fungible Tokens: ML models (.pkl, .onnx, .pb), datasets (.csv, json), and notebooks (.ipynb). The goal is to tokenize intellectual property in AI so that decentralized ownership, trading, and licensing are

possible. The user must provide an Asset Name and a Description with regard to explaining the purpose and

Future Work:

• Future improvements to this project can make this platform much more powerful and practical for everyday AI creators and users. First, implementing a reputation and review system for the models, creators, and buyers will enable users to quickly assess asset quality and trust beyond just ownership that is checked on-chain. Second, richer monetization options can be supported in this marketplace, such as subscriptions, pay-per-use API access, and rentals of models, rather than just one-time sales. Third, some basic evaluation tools can be integrated, enabling creators to attach benchmark scores, datasets used, and simple "model cards." These give buyers a clearer idea of performance and limitations. Finally, interoperability with external ML platforms-say Hugging Face or Cloud ML services-means that minted models can be deployed or tested directly from this marketplace, avoiding friction to real-world adoption.

Conclusion:

The project "Decentralized Platform for AI Assets using Blockchain and NFTs" very effectively shows how emerging Web3 technologies can solve long-standing challenges around ownership, provenance, and monetization of AI models and datasets. By representing

each AI asset as a unique NFT and recording all related events on a blockchain, the system ensures transparent provenance tracking, tamper-proof ownership history, and verifiable authenticity. Smart contracts automate minting, transactions, and royalty distribution by reducing the intermediaries' involvement as much as possible and minimizing the risk of fraud or disputes. This architecture protects not only the intellectual property but also lowers entry barriers for independent developers and smaller organizations.

Beyond the establishment of secure trading of AI assets, the platform provides a foundation for a collaborative AI ecosystem where contributors, model owners, and consumers interact within a trustless environment. Decentralized storage and wallet-based access, coupled with user-friendly flows like sign-up, wallet connection, asset upload, and automated minting, make it practical for real-world adoption. This design allows extensibility toward dynamic pricing, reputation systems, and integration with external AI execution environments. All in all, this project proves to be an example of how, if used right, blockchain and NFTs can be utilized to democratize AI, enabling fair value sharing while fostering innovation and reuse of AI assets at scale.

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