Title: GenAI NFT Minting DApp

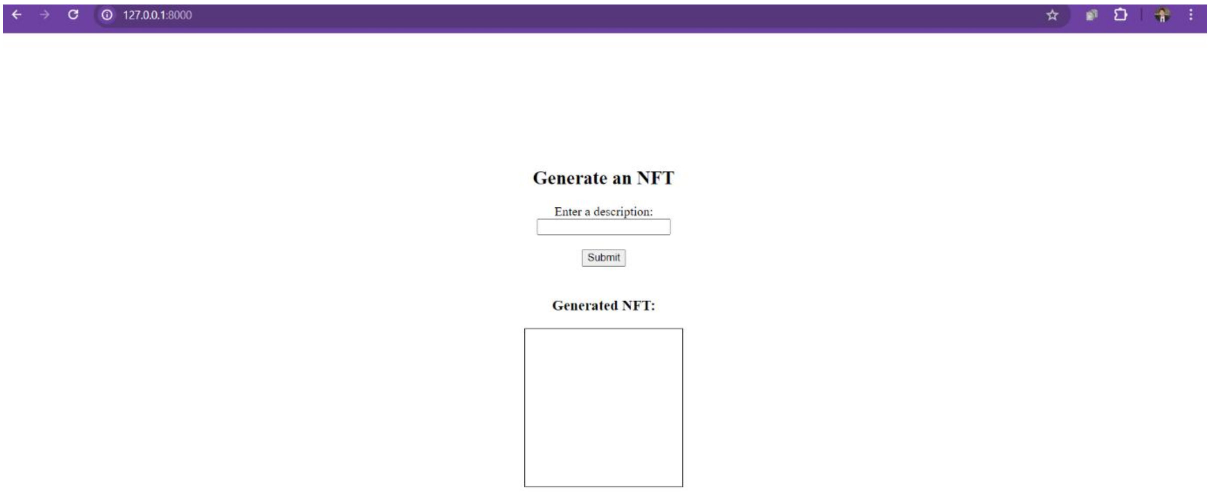
Introduction:

The GenAI NFT Minting project aims to empower users to mint their own non-fungible tokens (NFTs) generated by artificial intelligence (AI) algorithms. Leveraging blockchain technology, specifically the Ethereum network, users can create unique digital assets directly from AI-generated content. This project explores the intersection of AI, blockchain, and digital art, providing a platform for users to participate in the emerging NFT market.

Key Features:

1. AI-Generated Content: The project integrates AI algorithms to generate unique digital content, such as images, artwork, or other media files.
2. Smart Contract Deployment: Smart contracts written in Solidity are deployed on the Ethereum blockchain to facilitate the minting and ownership of NFTs.
3. Decentralized Ownership: NFTs minted through the platform are stored on the Ethereum blockchain, ensuring decentralized ownership and immutable provenance.
4. IPFS Integration: InterPlanetary File System (IPFS) is used for decentralized storage of media files associated with NFTs, enhancing data availability and resilience.
5. Web3 Interaction: Web3.js is utilized for interaction with the Ethereum blockchain, enabling seamless integration with blockchain functionalities.
6. User Interface: A user-friendly web interface built with Django, JavaScript, HTML, and CSS allows users to interact with the platform, mint NFTs, and manage their digital assets.

Workflow:

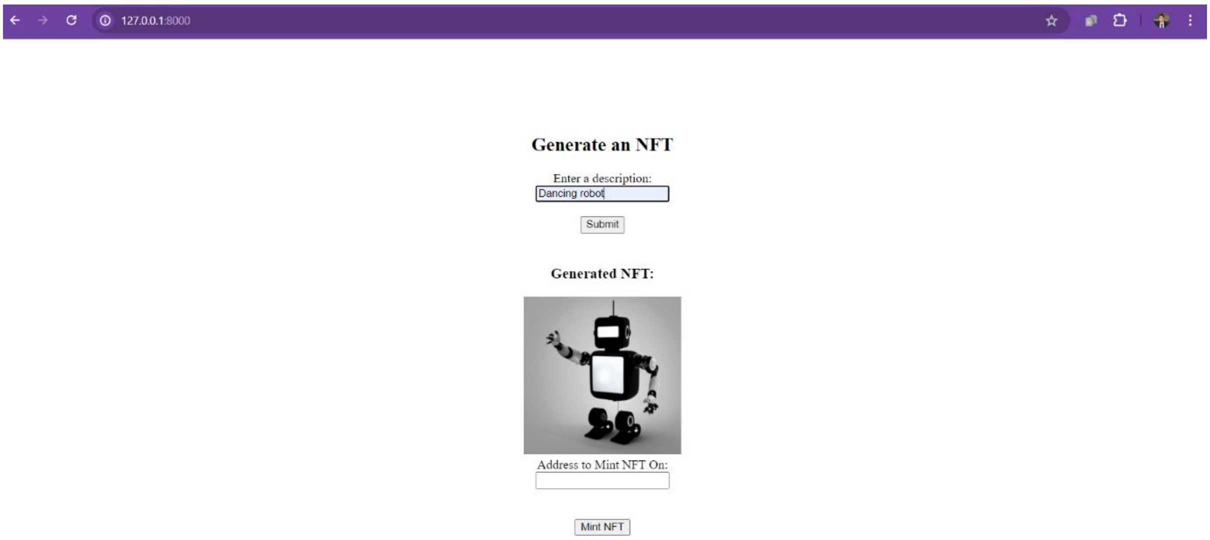


Generate an NFT

Enter a description:

Generated NFT:

Fig 1: Home Page



127.0.0.1:8000

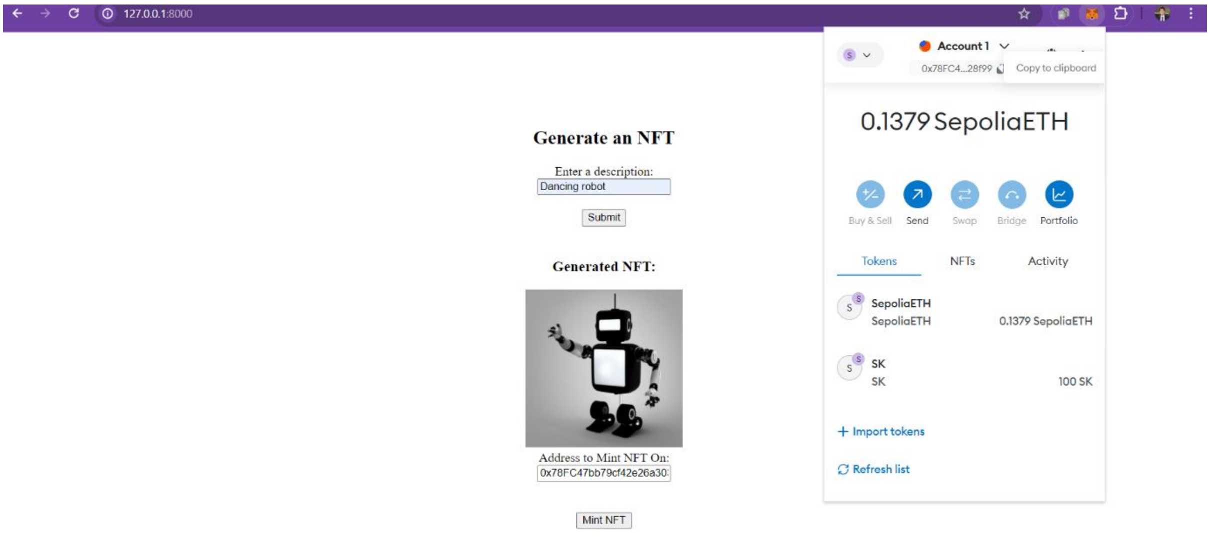
Generate an NFT

Enter a description: Dancing robot

Generated NFT:

Address to Mint NFT On:

Fig 2: Users input descriptions to generate AI-generated content.



127.0.0.1:8000

Generate an NFT

Enter a description: Dancing robot

Generated NFT:

Address to Mint NFT On: 0x78FC47bb79cf42e26a30

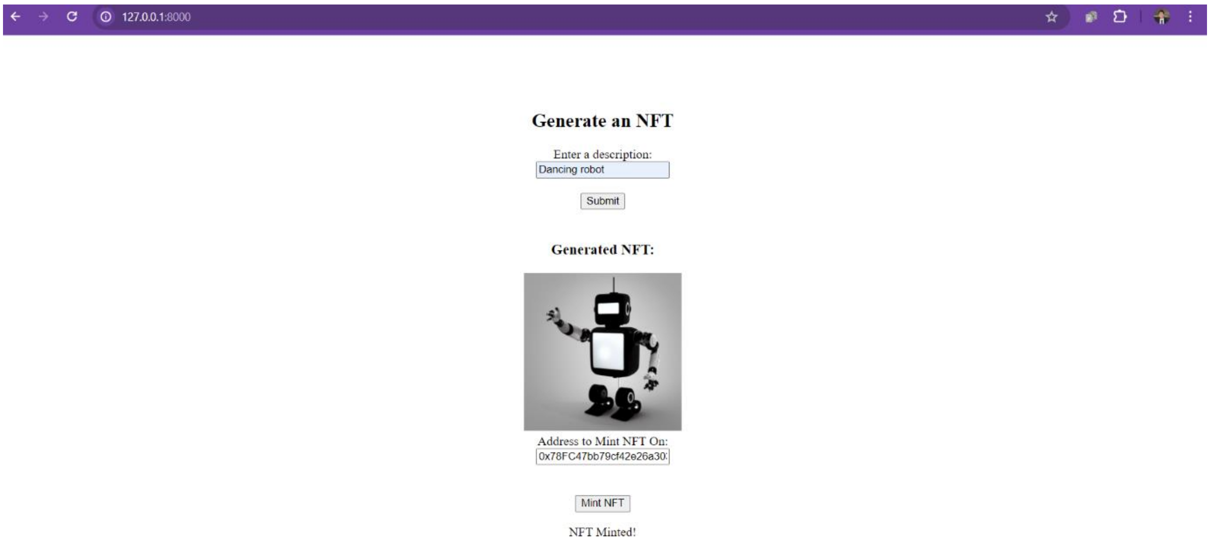
Account 1

0x78FC4...28f99

0.1379 SepoliaETH

SepoliaETH SepoliaETH	0.1379 SepoliaETH
SK SK	100 SK

Fig 3: Copy public address to mint NFT on



Generate an NFT

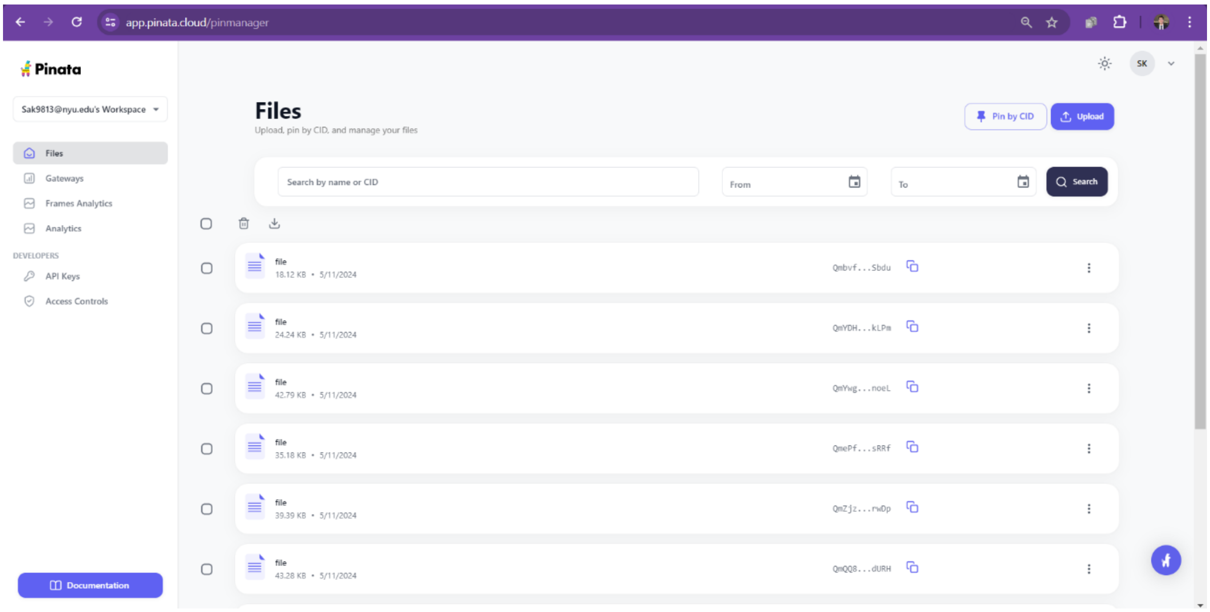
Enter a description: Dancing robot

Generated NFT:

Address to Mint NFT On: 0x78FC47bb79cf42e26a30

NFT Minted!

Fig 4: NFT Successfully Minted



Files

Upload, pin by CID, and manage your files

file	18.12 KB • 5/11/2024	Qmbvf...Sbdu
file	24.24 KB • 5/11/2024	QmYDH...kLPm
file	42.79 KB • 5/11/2024	QmYwg...noeL
file	35.18 KB • 5/11/2024	QmePf...sRRf
file	39.39 KB • 5/11/2024	QmZjz...rwDp
file	43.28 KB • 5/11/2024	QmQQ8...dURH

Fig 5: NFTs stored on IPFS

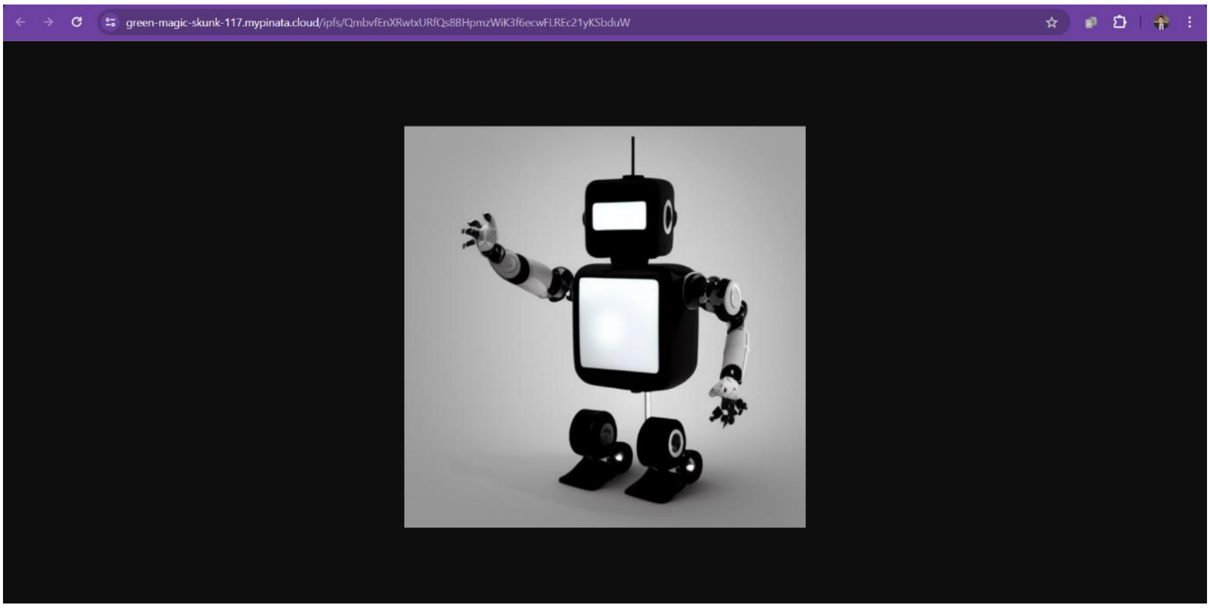
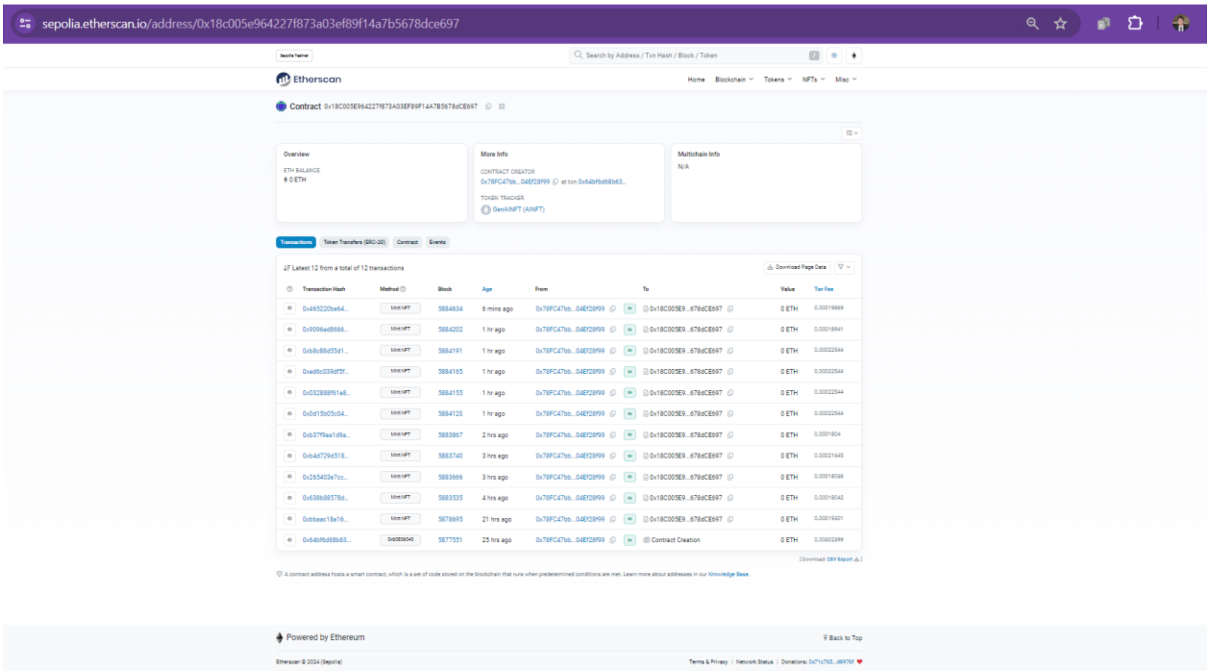

green-magic-skunk-117.mypinata.cloud/ipfs/QmbvfEnXRwtxURfQs88HpmzWiK3f6ecwFLREc21yKSbduW

Fig 6: Sample NFT on IPFS



Contract 0x18C005E964227f873A03EF89F14A7B5678dCE697

Overview

ETH BALANCE
0 ETH

More Info

CONTRACT CREATOR
0x78FC47bb...04Ef28f99 at txn 0x64bf6d68b63...

TOKEN TRACKER
GenAINFT (AINFT)

Multichain Info
N/A

Latest 12 from a total of 12 transactions

Transaction Hash	Method	Block	Age	From		To	Value	Txn Fee
0x465220be64...	Mint NFT	5884634	6 mins ago	0x78FC47bb...04Ef28f99	IN	0x18C005E9...678dCE697	0 ETH	0.00019869
0x9096ed8666...	Mint NFT	5884202	1 hr ago	0x78FC47bb...04Ef28f99	IN	0x18C005E9...678dCE697	0 ETH	0.00019941
0xb8c88d55d1...	Mint NFT	5884191	1 hr ago	0x78FC47bb...04Ef28f99	IN	0x18C005E9...678dCE697	0 ETH	0.00022544
0xed6c039df5f...	Mint NFT	5884165	1 hr ago	0x78FC47bb...04Ef28f99	IN	0x18C005E9...678dCE697	0 ETH	0.00022544
0x032888f61e8...	Mint NFT	5884155	1 hr ago	0x78FC47bb...04Ef28f99	IN	0x18C005E9...678dCE697	0 ETH	0.00022544
0x0d15b05c04...	Mint NFT	5884120	1 hr ago	0x78FC47bb...04Ef28f99	IN	0x18C005E9...678dCE697	0 ETH	0.00022544
0xb37f9ea1d9a...	Mint NFT	5883867	2 hrs ago	0x78FC47bb...04Ef28f99	IN	0x18C005E9...678dCE697	0 ETH	0.0001904
0xb4d729d518...	Mint NFT	5883740	3 hrs ago	0x78FC47bb...04Ef28f99	IN	0x18C005E9...678dCE697	0 ETH	0.00021645
0x265403e7cc...	Mint NFT	5883666	3 hrs ago	0x78FC47bb...04Ef28f99	IN	0x18C005E9...678dCE697	0 ETH	0.00019036
0x638b88578d...	Mint NFT	5883535	4 hrs ago	0x78FC47bb...04Ef28f99	IN	0x18C005E9...678dCE697	0 ETH	0.00019042
0xbbaac18a16...	Mint NFT	5878695	21 hrs ago	0x78FC47bb...04Ef28f99	IN	0x18C005E9...678dCE697	0 ETH	0.00019301
0x64bf6d68b63...	0x60806040	5877551	25 hrs ago	0x78FC47bb...04Ef28f99	IN	Contract Creation	0 ETH	0.00302399

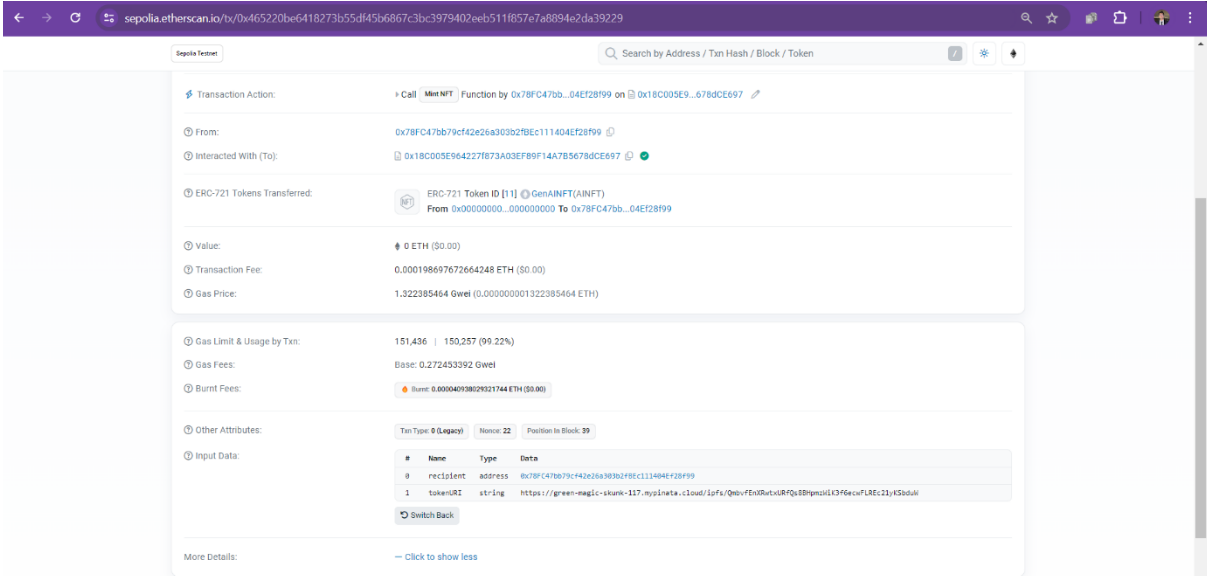
[Download: CSV Export]

A contract address hosts a smart contract, which is a set of code stored on the blockchain that runs when predetermined conditions are met. Learn more about addresses in our Knowledge Base.

Etherscan © 2024 (Sepolia)

Donations: 0x71c765...d8976f

Fig 7: NFT Smart Contract dashboard on Ethereum network.



sepolia.etherscan.io/tx/0x465220be6418273b55df45b6867c3bc3979402eeb511f857e7a8894e2da39229
Sepolia Testnet
Search by Address / Txn Hash / Block / Token

Transaction Action:	Call Mint NFT Function by 0x78FC47bb...04Ef28f99 on 0x18C005E9...678dCE697
From:	0x78FC47bb79cf42e26a303b2fBEc111404Ef28f99
Interacted With (To):	0x18C005E964227f873A03EF89F14A7B5678dCE697
ERC-721 Tokens Transferred:	ERC-721 Token ID [11] GenAINFT(AINFT) From 0x00000000...000000000 To 0x78FC47bb...04Ef28f99
Value:	0 ETH ($0.00)
Transaction Fee:	0.000198697672664248 ETH ($0.00)
Gas Price:	1.322385464 Gwei (0.000000001322385464 ETH)
Gas Limit & Usage by Txn:	151,436 | 150,257 (99.22%)
Gas Fees:	Base: 0.272453392 Gwei
Burnt Fees:	Burnt: 0.000040938029321744 ETH ($0.00)
Other Attributes:	Txn Type: 0 (Legacy) Nonce: 22 Position In Block: 39
Input Data:	

#	Name	Type	Data
0	recipient	address	0x78FC47bb79cf42e26a303b2fBEc111404Ef28f99
1	tokenURI	string	https://green-magic-skunk-117.mypinata.cloud/ipfs/QmbvfEnXRwtxURfQs8BHpmzWiK3f6ecwFLREc21yKSbduW

Fig 8: Sample NFT transactions containing NFT's IPFS location.

Installation

1. Clone the repository:

```
git clone https://github.com/Sitanshuk/GenAI_NFT_Minting.git
```

2. Navigate to the project directory:

```
cd GenAI_NFT_Minting
```

3. Install dependencies:

```
pip install -r requirements.txt
```

4. Run migrations:

```
python manage.py migrate
```

5. Start the development server:

```
python manage.py runserver
```

6. Access the application in your web browser at `http://localhost:8000`

Usage

1. Open the application in your web browser.
2. Enter a description in the provided input field.
3. Click the "Submit" button to generate an AI-generated image based on the description.
4. Review the generated image.
5. If satisfied, enter an Ethereum wallet address in the "Address to Mint NFT On" input field.
6. Click the "Mint NFT" button to upload the image to IPFS and mint the NFT.
7. Once the NFT is successfully minted, you will see a confirmation message.

Technologies Used

- Solidity: Smart Contracts
- IPFS (InterPlanetary File System)
- Web3 (Ethereum blockchain interaction)
- Python (Django)
- JavaScript (AJAX)
- HTML/CSS

Smart Contract

The NFT smart contract used in this project has been deployed on the Ethereum blockchain. You can find the source code for the smart contract in the `contracts` directory of this repository.

Future Enhancements

- **Enhanced AI Algorithms**: Continuously improving AI algorithms to generate more diverse and high-quality digital content.
- **Customizable Metadata**: Providing users with options to customize metadata associated with their NFTs, such as descriptions, attributes, and provenance.
- **Community Marketplace:** Implementing a decentralized marketplace where users can buy, sell, and trade NFTs created on the platform.
- **Scalability:** Optimizing smart contracts and infrastructure for scalability to support a larger user base and increased transaction volume.
- **Integration with External Platforms**: Integrating with external platforms and services to expand the reach and functionality of the platform.

Contributors

- Sitanshu Kushwaha
- Yash Amin

Useful Links:

https://sepolia.etherscan.io/address/0x18c005e964227f873a03ef89f14a7b5678dce697

https://sepolia.etherscan.io/tx/0x465220be6418273b55df45b6867c3bc3979402eeb511f857e7a8894e2da39229

https://testnets.opensea.io/collection/genainft-57

https://github.com/Sitanshuk/GenAI_NFT_Minting/tree/master

References

https://web3py.readthedocs.io/en/v5/web3.eth.html

https://docs.alchemy.com/docs/how-to-create-an-nft

https://docs.pinata.cloud/api-reference/endpoint/pin-file-to-ipfs

https://medium.com/@muller.ismail/upload-to-pinata-with-python-603788af76b1

https://metamask.zendesk.com/hc/en-us/articles/360015289632-How-to-export-an-account-s-private-key