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# FINDING NFTS (NON-FUNGIABLE TOKENS) USING A GIVEN ETHEREUM WALLET ADDRESS AN OPEN SEA STUDY

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**AUTHORS' CONTRIBUTIONS**

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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## ABSTRACT

Block-chain- is a database that stores information in blocks or small segments. The current example of this method is about the newly digitalized form of currency called crypto-currency e.g., Bitcoin. In Bitcoin Blockchain plays a significant role by making transections in an extremely secure way. Blockchain eliminated the need for 3rd party and secure the data and other related information of the transaction. Blockchain makes the world less vulnerable to fraud by tokenizing the world. NFTs are the tokens of Blockchain which cannot b replicated. Tokens of Blockchain provide the service in the domain of real estate and artwork thus the art of selling, buying, and trading is accessible to all world.

This paper aims to demonstrate how NFTs are stored on the Ethereum blockchain and how we can access/view it for any given Ethereum address. For my research on NFTs, we will use OpenSea a gas-free marketplace for NFTs on Polygon. On OpenSea we can create, buy, sell, and auction NFTs on the Polygon blockchain without paying any gas fees. The software I created will render the NFTs from extracting the media from OpenSea servers which are hosted on Google server farms, which ultimately will extract the NFTs for any given Ethereum blockchain wallet Address.

**Keywords:** Blockchain; decentralized; NFTs; cryptographic; tokenizing; gas fees.

## 1. INTRODUCTION

Non-Fungible tokens are the novel asset class and are cryto-graphically unique which can note be replicated or copied. A web of public ledgers known as block-chain is the hub of NFTs which handles transactions as well as provenance. As blockchain is a trustless, decentralized platform, no one can own or have hold on them. Because their records are public, anyone can finds out who owned the non-fungible tokenswhich helps anyone to determine what is accurate and what is fake. Another important property of NFTs ismeta-data which allows information to be added into NFT for example descriptions, images and names [1].

When purchasing NFTs, you have to have the required number of tokens in your wallet. When the payment is successful a series of blockchain transactions will occur in your blockchain wallet. The unique Contract Address will be stored in your blockchain wallet/address. This paper will show you how to analyze the Ethereum blockchain network for

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NFTs and show you our software which is built in order to find the NFTs of a given Ethereum wallet address. What can be the use case for this? You could check if the NFT you bought from a different marketplace is valid or fraudulent. There are various uses of NFTs such as in games, videos, money laundering, digital art, music and films [2-5].

Blockchain is a new type of database introduced that is different from the conventional forms of databases. Blockchain stores data in small patches or blocks which makes it different from other conventional forms of databases. When the new information is created or obtained then its id is added as a new block. This method is showing an extremely effective way of storing a large quantity of data. Blockchain technology is being used by a big number of people working on several domains like transactions. The technique involves the network protection [6,7].

There are various limitations associated with NFTs such as storage off chain, environmental issues, artist and buyer's fees, fraud, plagiarism and security issues. Among all of them the most important are discussed in the next section.

### 1.1 Background Knowledge

Non-fungible tokens are saved on blockchain platform and they have well defined owners. Additionally on this platform everyone have the access to purchase ownership of digital asset. Being a true ownership, not only has everyone has access to purchase but also to transfer the NFTs to others without the threat of centralized platforms or third parties [1].

NFTs are the non-exchangeable part of information or data which is stored on a platform of block-chain. Block-chian is a form of platform of digital ledger, which can be used for trading (buying and selling). There are various types of NFTs depending on the digital files such as images, audios and videos. In case of NFTs each token is unique so in this case it differs from other blockchain cryptocurrencies for examples Bitcoin. NFT owner's claims to give authenticity certificate and proof of ownership but legal rights can be uncertain. NFTs can be used as supposed asset and they have been highly criticized for the cost of energy [8].

Non-Fungible token is a set of data which is stored on a variety of digital sites on block-chain which can be used for trading [9]. NFTs are associated with specific digital or physical asset. A specific license is provided to use the asset for a particular purpose [10]. NFTs can be used as trading and selling purposes on digital markets [11]. NFTs behaves like cryptographic tokens, but different from other crypto-currencies such as Bitcoin or ethereum. NFTs are not fungible while all other crypto-currencies are fungible [12,13].

Till date the first ever created NFT was Quantum which was generated by Kevin McCoy and Anil Dash in May 2014. This NFT contains a video clip which was made by NcCoy's wife. Later, Jennifer McCoy registered that video clip on the NAME-COIN on blockchain platform and then sold it while giving a live presentation in the conference at the New Muslim in Newyork city. This technology of selling the video was referred to as monetized graphics [14]. This feature was termed as non fungible trade. Later on in October 2015, the first non fungible token project named as Etheria was created and launched at DEVCON 1 in London. Most of the Etheria's both purchasable and tradable tiles remained unsold for about more than five years. In march 2021 renewed interest in NFTs goes for purchasing frenzy. In less than 24 hours all tiles of all versions were sold for a total cost of about 1.4 million [15]. There were as rapid growth in NFT market during 2021 with its values reaches up to 250 millions [16].

There are various concerns about the NFTs and the most important one is the fraud and not recognizing the owner and its validation. Because of this issue buyers face some difficulties and frauds. To minimize this difficulty we created a software which will help buyers in future in determining reorganization and validation of owners.

### 1.2 Aim of this Study

Till now there was limitation in certain aspects of NFTs such as the reorganization and validation of the owner of NFTs on blockchain. So this study was conducted with the aim to generate a software that was to be used to validate the ownership of NFTs in a given blockchain address.

## 2. METHODOLOGY

### 2.1 How is a Ethereum Blockchain Wallet Address Defined and Generated?

Ethereum addresses are composed of the prefix "0x", a common identifier for hexadecimal, concatenated with the rightmost 20 bytes of the Keccak-256 hash of the ECDSA public key (the curve used is the so-called secp256k1) [17]. In hexadecimal, two digits represent a byte, meaning addresses contain 40 hexadecimal digits, e.g., 0xb794f5ea0ba39494ce839613fffba-74279579268. Contract addresses are in the same format; however, they are determined by sender and creation transaction nonce [18,19].

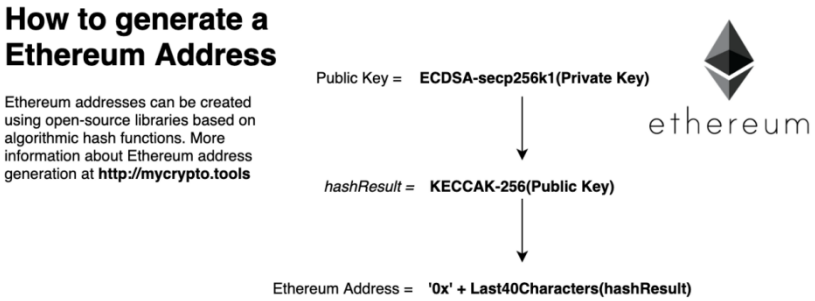


**Fig. 1. How to generate a Ethereum Address [20]**

### 2.2 When You Get Onto the Ethereum Blockchain you Normally have to Create a Ethereum Wallet

These are some of the best wallets out there for Ethereum: Trezor One, Metamask, Ledger Nano S, Exodus and Mist. The wallets on this list are software and hardware-based wallets. Once you have created a wallet. You have successfully generated one of these wallet blockchain addresses for the given blockchain network you have chosen.

### 2.3 Storage of NFTs

If you look at OpenSea they use Google Storage for the NFT's and their own personal server storage for the video NFTs.

**Let's Look at this NFT in OpenSea so I can Validate my Point Above:**

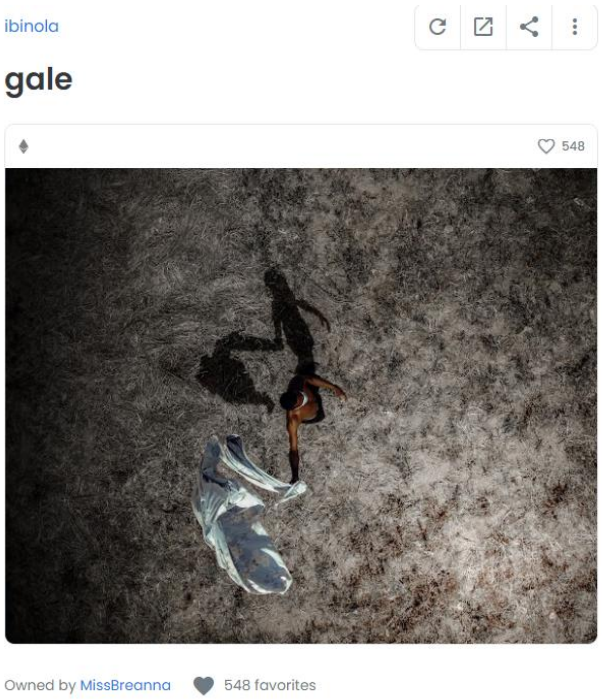


**Fig. 2. NFT of ibinola gale [21]**

If we just right click the NFT photo we can easily get the link for the NFT.

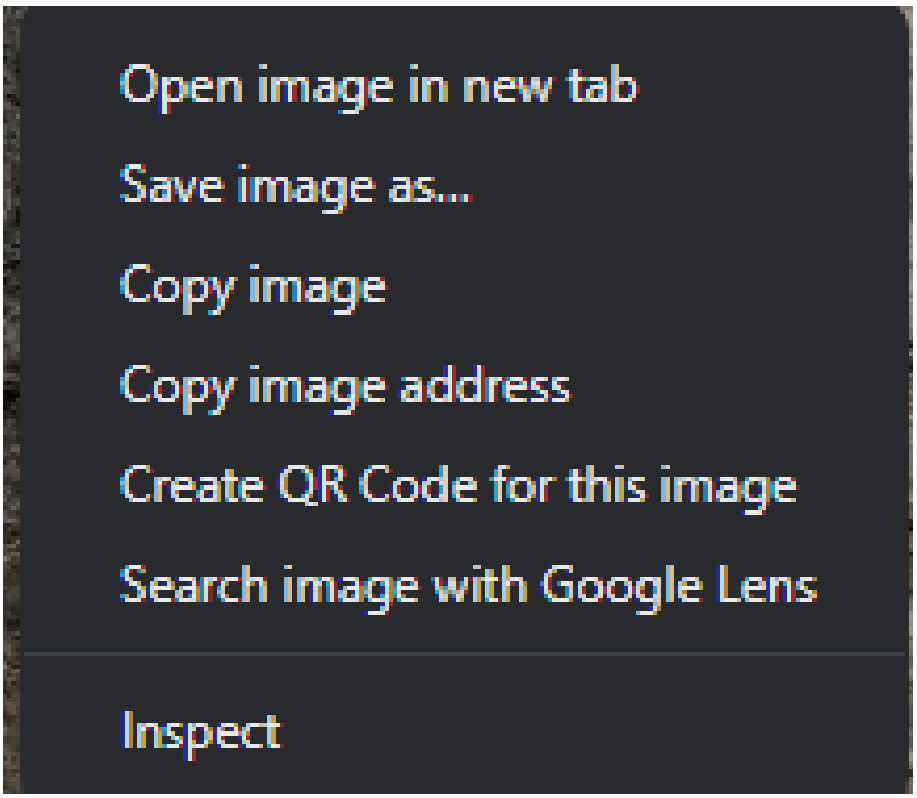


**Fig. 3. Getting NFT raw image link**

We could easily download the NFT or copy and paste the image at will.

Well, this is the link we have obtained for the NFT.

https://lh3.googleusercontent.com/cZHLd-BI6teXHbyjmQmhX7zfjnCwFnvcpsvL4GOThTffvZcZbfUIIjgU6E-GnMkfPT56Gq3XBuDdH_9fgQyDet6FgLNesZYRVxzrXy4=w600 (運動器分科会, n.d.)

You could clearly find the see that its stored-on Google Servers. Thus, same can be done for NthAmount of NFTs out there. As you can see anyone can basically get the NFT media as they want. One guy even went as far as downloading all the NFTs on the two blockchain networks.

"An Australian artist and programmer have created a website that claims to let people download "every NFT" on the Ethereum blockchain in one go."

https://www.bbc.com/news/technology-59262326 [22]

## 3. RESULTS AND DISCUSSION

### 3.1 Production of Software and How it Works Step by Step

Describing an NFT on the blockchain network

Firstly, what describes an NFT on the blockchain network?

1) TokenID – the ID of the NFT

2) ContractAddress – the contract address of the NFT

### 3.2 In the Wallet these Parameters are Stored in Someone's Wallet

The first step in producing our software is to create/use an API to extract these metadata from the blockchain wallet. In the production I used etherscan.io Rest API (The Ethereum Blockchain Explorer). By using the API in Python, it returned a .json response which I had to clean to filter out the parameters needed above.

### 3.3 Rendering an NFT on the Blockchain Network

Let's take a look at a random NFT.

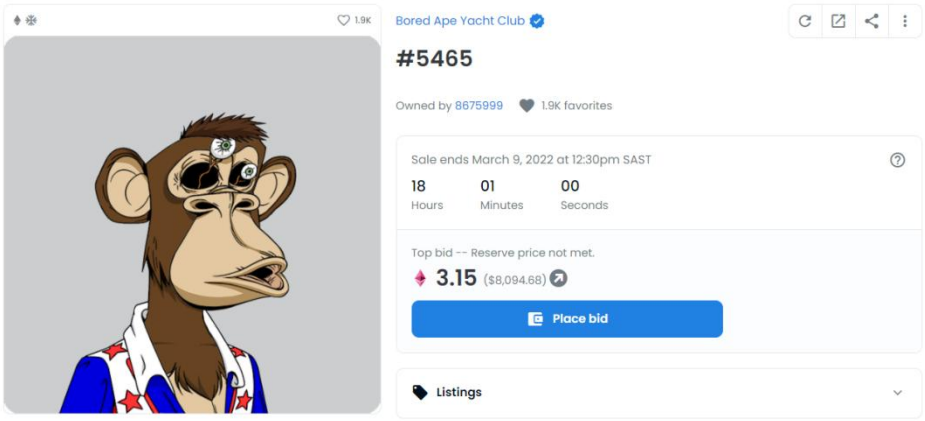


**Fig. 4. Bored Ape NFT**

Let's take a close look at this URL
https://opensea.io/assets/0xbc4ca0eda7647a8ab7c2061c2e118a18a936f13d/5465
Notice you can see after the /assets in the URL
The first parameter in the URL is the <contractAddress> and then the <tokenID>
Can you see the template we have now to gather information of an NFT? It is
https://opensea.io/assets/<contractAddress>/<tokenID>
We can just use Regex, BeautifulSoup and one of our favorite programming languages which is python to write an algorithm to scrape the media of the NFT and return the media link for the asset.

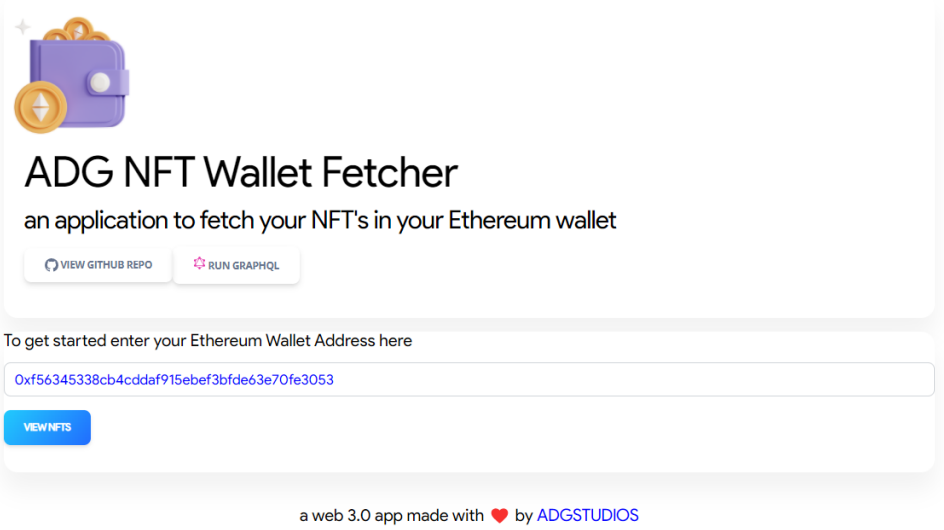


**Fig. 5. My NFT Wallet Fetcher App**

This is the final product we came up with. You can view the source code @
https://github.com/adgsenpai/NFTWalletScanner
and play with the application at https://nftwallet.adgstudios.co.za
A problem with the application I might fix in the future. Nnft $\propto 1/t$ where t is processing speed. Works well with Nnft<10
The application is stored on Heroku (Cloud Hosting Software). The application will timeout where t in seconds $\geq 3000$

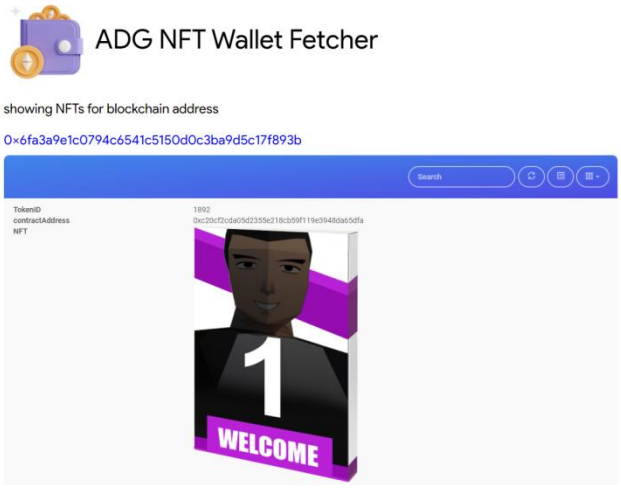


**Fig. 6. Showing NFTs of blockchain address 0x6fa3a9e1c0794c6541c5150d0c3ba9d5c17f893b**

## 4. CONCLUSIONS

Non-Fungible tokens are the novel asset class and are cryto-graphically unique which can note be replicated or copied. A web of public ledgers known as block-chain is the hub of NFTs which handles transactions as well as provenance. As blockchain is a trustless, decentralized platform, no one can own or have hold on them. Because their records are public, anyone can finds out who owned the non-fungible tokenswhich helps anyone to determine what is accurate and what is fake. Another important property of NFTs ismeta-data which allows information to be added into NFT for example descriptions, images and names. Block-chain- is a database that stores information in blocks or small segments. The current example of this method is about the newly digitalized form of currency called crypto-currency e.g., Bitcoin. In Bitcoin Blockchain plays a significant role by making transections in an extremely secure way. Blockchain eliminated the need for 3rd party and secure the data and other related information of the transaction. Blockchain makes the world less vulnerable to fraud by tokenizing the world. NFTs are the tokens of Blockchain which cannot b replicated. Tokens of Blockchain provide the service in the domain of real estate and artwork thus the art of selling, buying, and trading is accessible to all world.

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## LIMITATIONS

Overall this software proves to be satisfactory, but there are certain limitations regarding this software and most important of them is the processing speed. We are looking forward to fix in the future. Nnft $\propto 1/t$ , where t is processing speed. Works well with Nnft<10

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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