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A Brief Introduction to Metaverse

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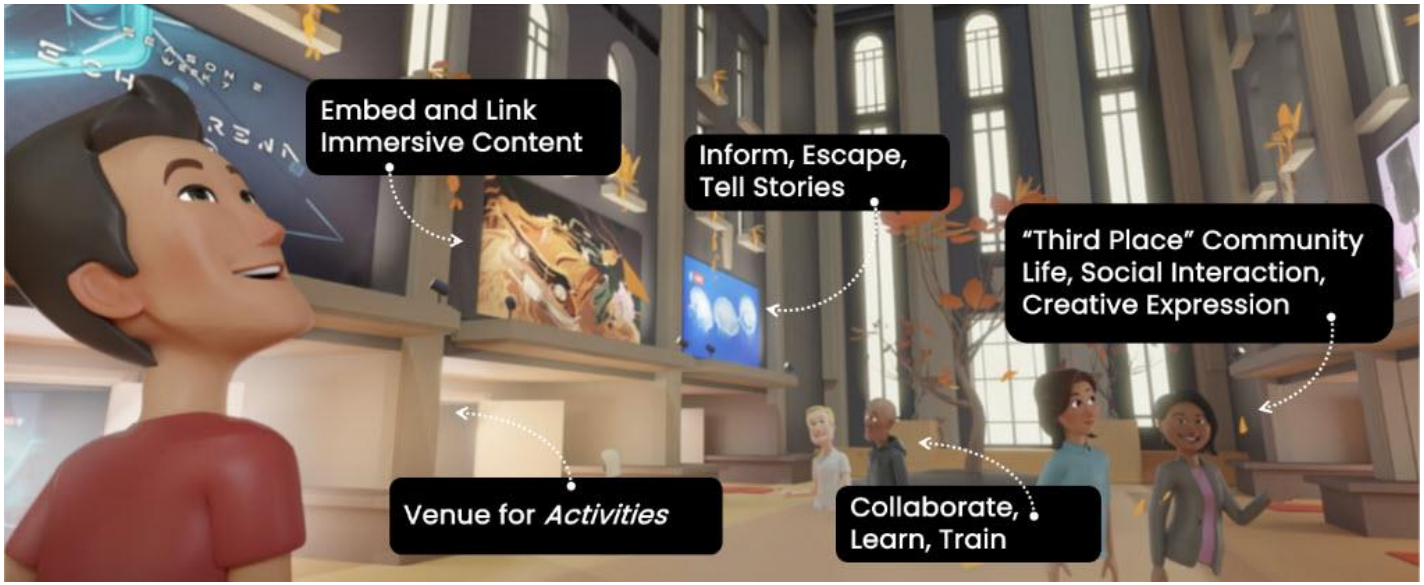
Welcome to Metaverse

❑ What is **Metaverse**?

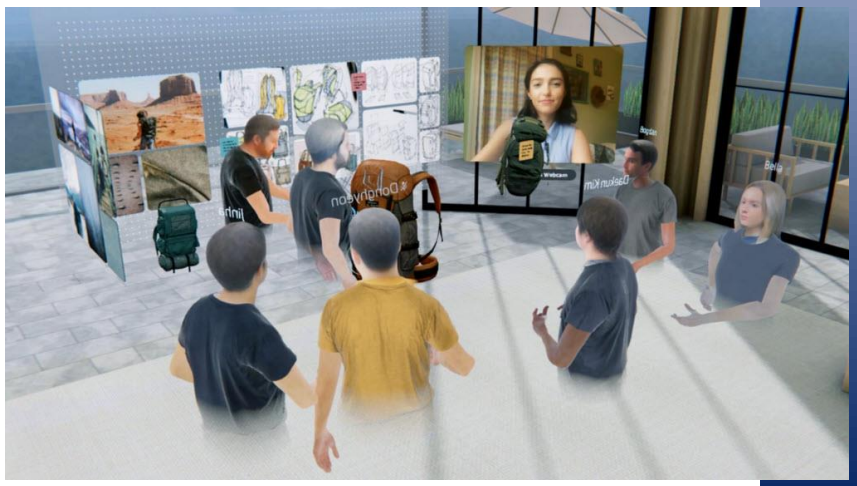
Metaverse is an **embodied Internet** that enriches users' experiences with content. Simply put, Metaverse is a new technological space that **merges the digital and physical worlds together**.



https://medium.com/building-the-metaverse/the-experiences-of-the-metaverse-2126a7899020

Metaverse is the Future

- Researchers believe that Metaverse is what the Internet will look and feel like in the next ten to 15 years.



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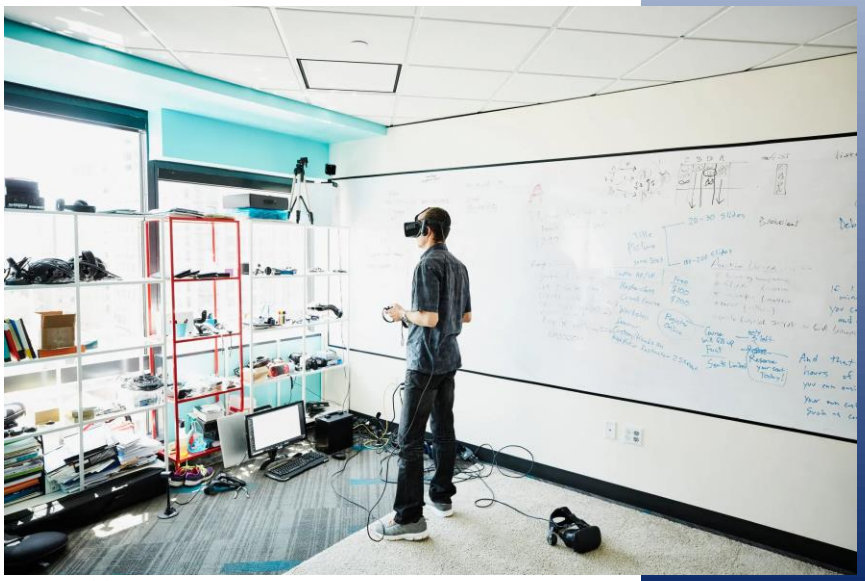
Core Principles of Metaverse (I)

- **Persistent**: Metaverse will continue to exist, it will not reset, pause, or end. It will just be there.
- **Synchronous and live**: Metaverse will continue as a lived ongoing experience that can be accessed at any time.
- **More experience:** Users will have their own unique experiences, and they can interact with other people and objects to expand their experiences.
- **A fully functional economy:** Virtual money will be exchanged and traded. Assets will be bought and sold. Virtual work will be carried out in exchange for value that is recognized by others.

Core Principles of Metaverse (II)

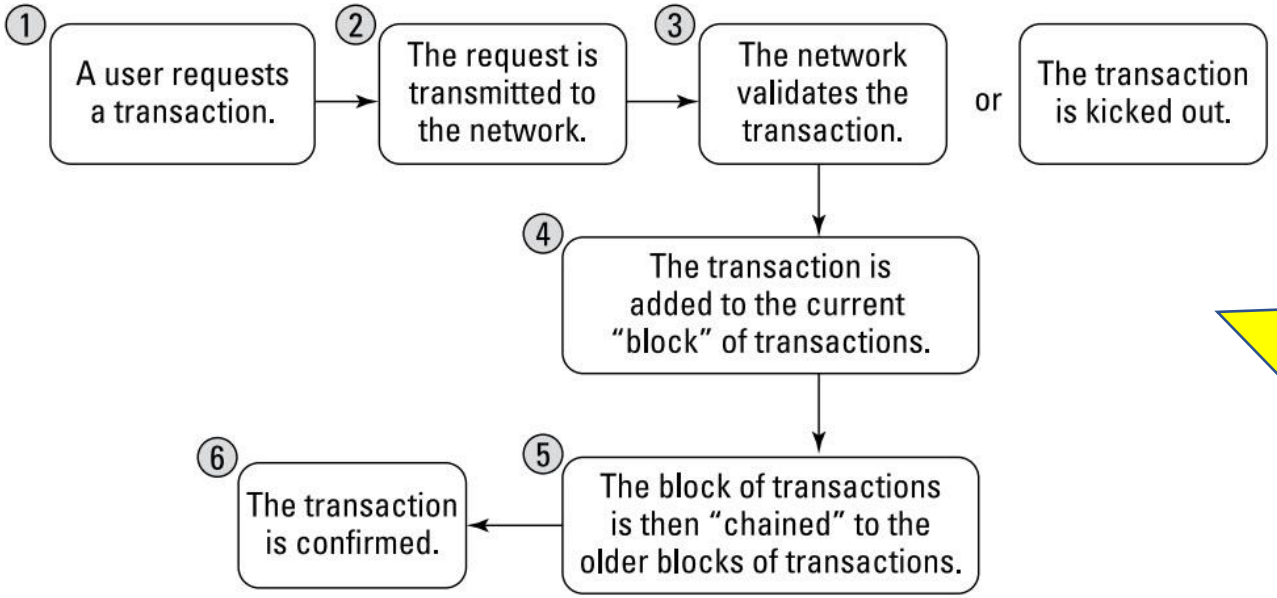
- **Will span the real and digital world:** Metaverse is not an online experience only. It will interact with the real world, influencing and being influenced by what is happening offline.
- **Offer unprecedented interoperability:** Companies, designers, individuals, and users will work together and interact together to build and experience the new universe.



https://www.nytimes.com

Economy in Metaverse (Blockchain)

- Blockchain creates a fully functional economic system that connects the real world in the virtual world.
- A blockchain is a data structure that makes it possible to create a digital ledger of data and share it among a network of independent parties. It works simply as follows:



You might already know this process if you have worked with *Bitcoin*

Economy in Metaverse (NFT)

- A non-fungible token (NFT) is a unique digital identifier that is secured and stored on a public blockchain. One token is not interchangeable for another, and a token cannot be further divided.
- Difference between *fungible* and *non-fungible* tokens:

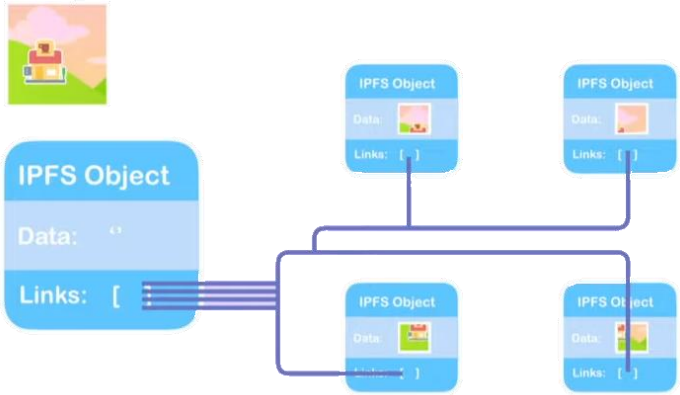
Parameters	Fungible (e.g., a dollar)	Non-fungible (e.g., a piece of art)
Exchangeability	Yes	No
Uniformity	All fungible tokens are identical	NFTs are unique and not similar
Fractionalization	Can be divided	Cannot be divided

Toward Metaverse: Decentraland (DCL)

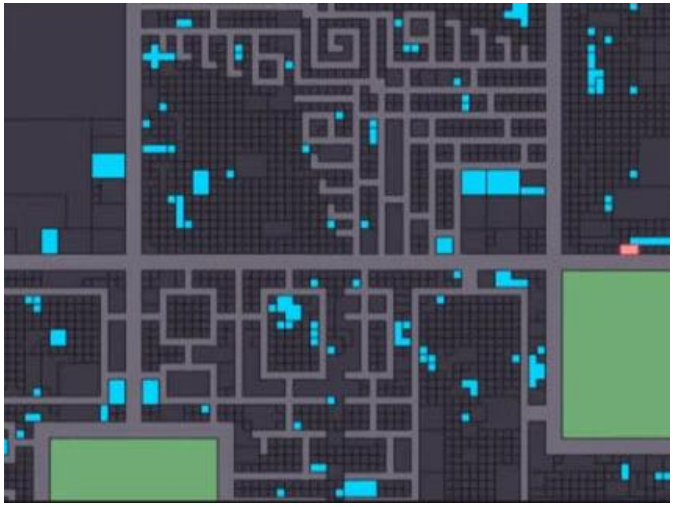
- Decentraland (DCL) is a virtual world platform built on the Ethereum blockchain.
- The virtual world is powered by *Mana*, an *ERC-20 token* with a capped supply.
- With *Mana*, users can purchase *Land*. Lands are owned directly by members of the community, not one big company.
- With *Land*, developers can create amazing experiences.
- The world will eventually be governed in a decentralized manner. That is, no particular person or company will be the boss of all.
- The content in the world is stored on IPFS

IPFS: InterPlanetary File System (For Your Information Only)

- IPFS (InterPlanetary File System) is a *decentralized* filesystem.
- IPFS uses DHT (distributed hash table) and Merkle DAG (directed acyclic graph) data structures.
- It uses a protocol similar to BitTorrent to decide how to move data around the network.
- One of the advanced features of IPFS is that it supports file versioning. To achieve file versioning, it uses data structures similar to Git.



Sample Land Scenes from Decentraland (DCL)



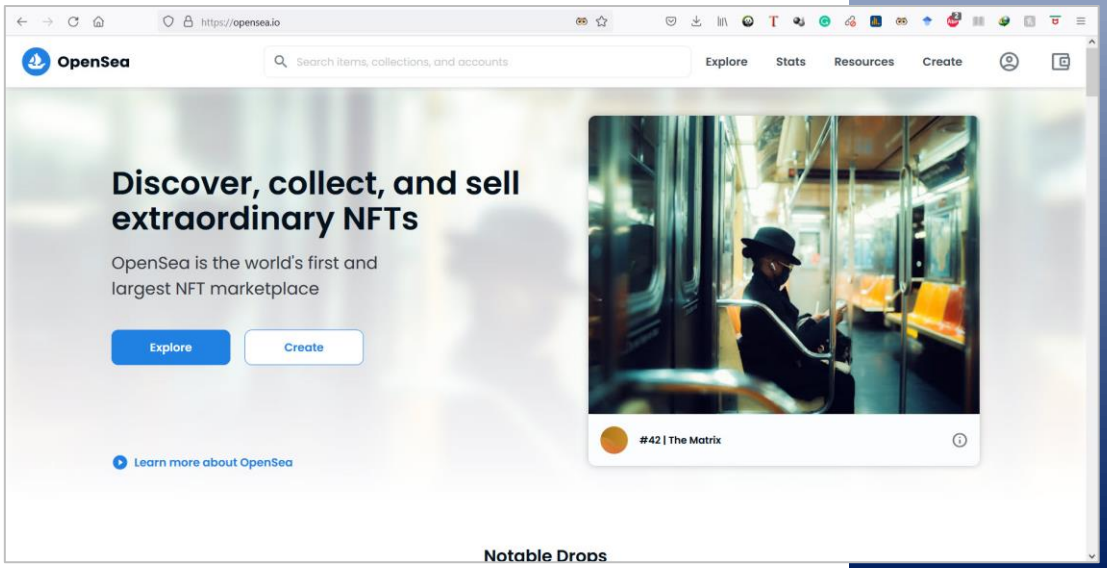
Toward Metaverse: Sandbox

- The Sandbox is a unique virtual world where players can build, own, and monetize their gaming experiences using its utility token SAND, the governance token of the platform.
- The sandbox platform comprises five main components:
  - **VoxEdit:** allows users to easily create 3D objects like people, animals, and foliage
  - **Marketplace:** allows users to upload, publish, and sell their NFTs made in VoxEdit
  - **Sand**: an ERC-20 token with a capped supply that exists on Ethereum
  - **Land**: the location where the virtual world or game is built
  - **Game maker:** Anyone with a piece of land and NFTs made in VoxEdit or bought from Marketplace, can use game maker to build a game.

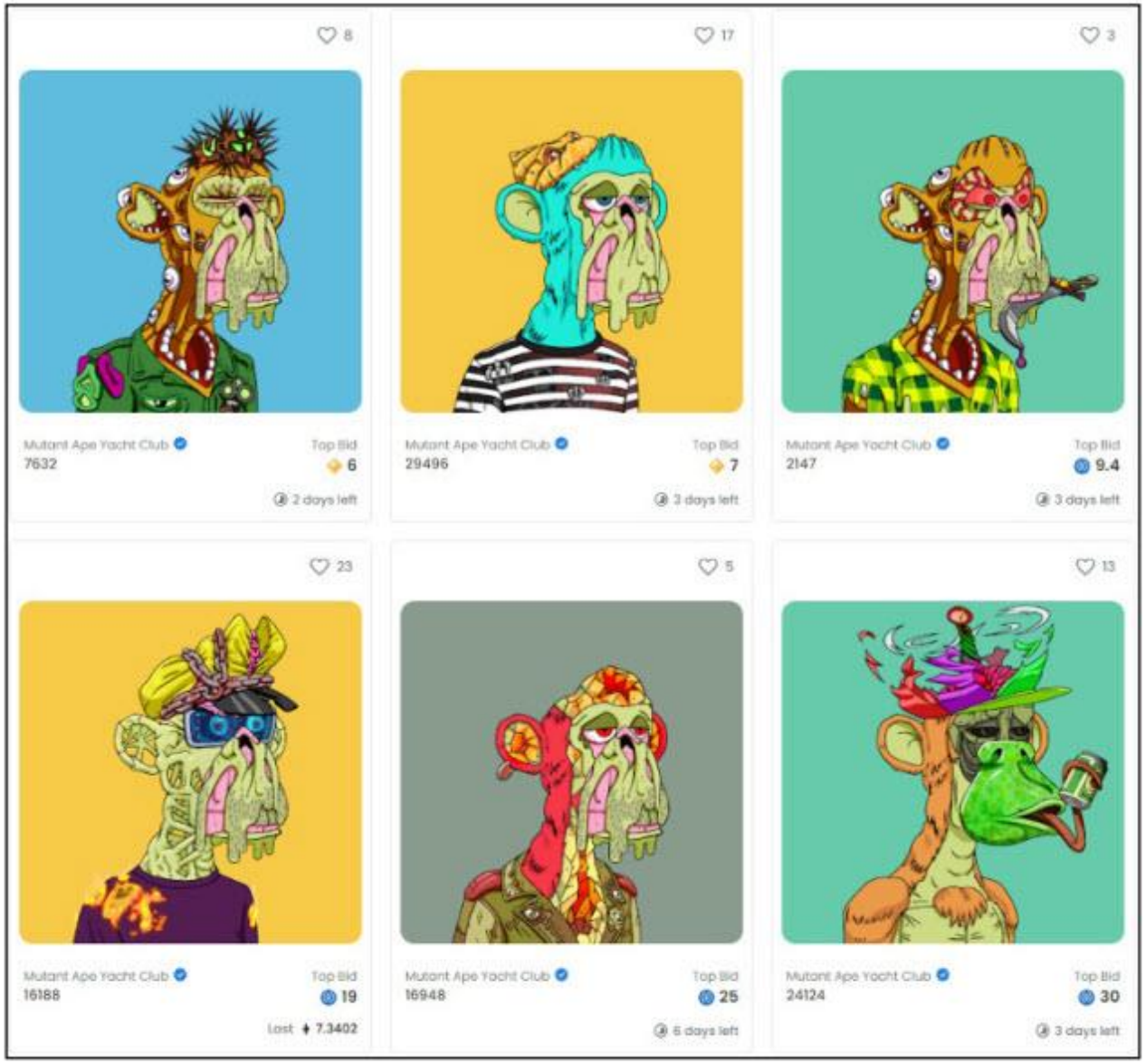
Sample Land Scenes from Sandbox

Navigating the OpenSea of NFTs

- The large peer-to-peer marketplace for user-owned digital assets, OpenSea, offers collectibles, domain names, digital art, games, and other assets - all backed by blockchains.
- OpenSea lets users buy, sell, create, transfer, and browse NFTs in a user-friendly marketplace. The platform has a large community of passionate users, developers and creators that lets it grow very fast.



Purchase Your Favorite Art Piece (NFT) from OpenSea



Token Types Available in OpenSea (I)

- Several important token types are available on OpenSea. These include token standards, such as ERC20, ERC1155, and ERC721. These different standards allow users to program their assets in distinct ways.
- ERC20 is a fungible token that is created with a smart contract. An ERC20 token contract keeps track of fungible tokens. Fungible in this context means that any single token is precisely equal to any other token. The ERC20 tokens have no special rights or behaviors associated with them. ERC20 tokens are useful for tasks such as creating a cryptocurrency and securing voting rights.
- The ERC1155 is a token standard used to create fungible and non-fungible (unique) assets, such as digital cards, pets, and in-game skins. A more complex standard than ERC20, it allows developers to use a single smart contract to represent multiple tokens at once.

Token Types Available in OpenSea (II)

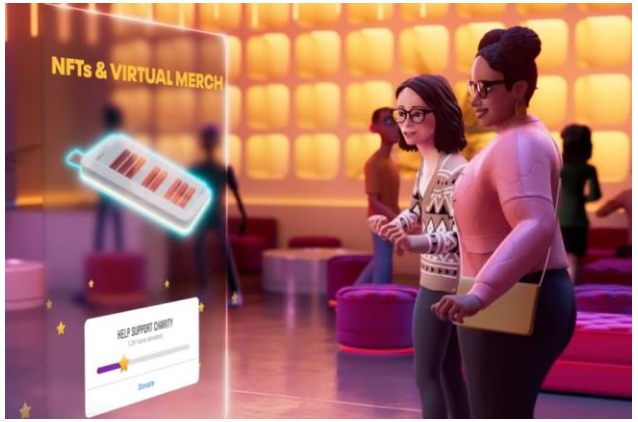
- ERC721 represents ownership of tokens — ERC721 tokens are used to track items, each of which has unique attributes. ERC721 is an older standard for non-fungible digital assets. Though similar to ERC1155, ERC721 does differ in that it has no concept of a balance. Each token created as an ERC721 is unique and nonfungible, and it either exists or it does not.

ERC-1155 Token

- Developers created the ERC1155 to help them manage the fees tokens incurred on their blockchain.
- This token standard leads to massive savings for projects that require multiple tokens.
- Rather than deploying a new contract for each token type using an ERC721, a single ERC1155 token contract can represent multiple tokens, reducing deployment costs and complexity.

OpenSea Marketplace (I)

- The OpenSea marketplace (https://opensea.io) is the first and largest peer-to-peer platform for crypto collectibles. Active since 2018, it's one of the world's most popular NFT markets.
- OpenSea has many tools that allow:
  - Consumers to trade their assets freely
  - Creators to launch new digital works
  - Developers to build rich, integrated marketplaces for their digital assets

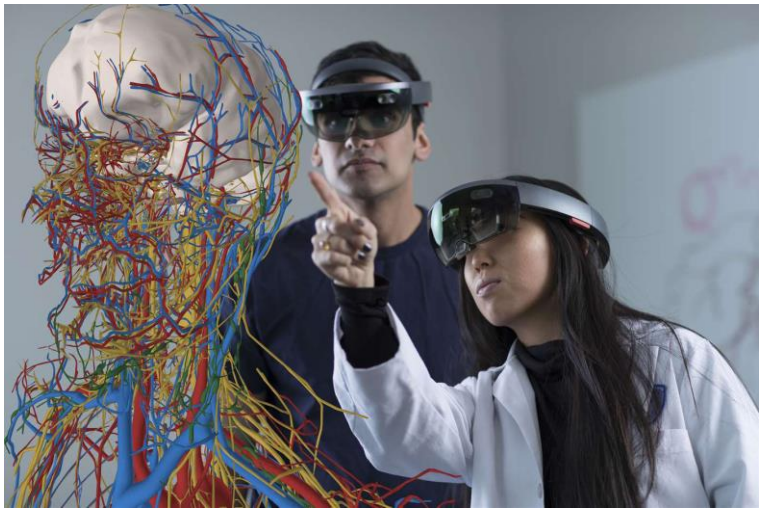


OpenSea Marketplace (II)

- Whenever someone buys an NFT on OpenSea, the company gets a cut of 2.5 percent of the NFT's sale price. The original creator of the NFT can also choose to take a fee on subsequent sales of their artwork.
- The downside of OpenSea is that it doesn't allow purchases by credit card or PayPal. You need to own crypto already, or purchase some, to be able to use the marketplace.
- The upside is that OpenSea has a referral affiliate program: If you refer a friend to OpenSea who makes a purchase, you can earn between 40 percent and 100 percent of the fee that OpenSea receives for that sale.

Many Other Applications of Metaverse: Meta Campus

- Metaverse can help improve students' learning experiences as well.



Social and Complex Network Analysis can be Useful

- We believe that the importance of social and complex network analysis will continue to grow in the metaverse era.
  - The need to understand users and manage their behavior will continue to grow, e.g., crowdsourcing, smart advertisement, etc.
  - The unprecedented access to user data would help build more accurate models for very complex networks. We will also be able to infer or stimulate very subtle user experiences.
  - The need to detect criminal and fraudulent user activities will also increase, and social network techniques could help.
- We will also be able to:
  - Predict users' investment patterns, detect their shared interests or dislikes, predict users' next NFT or maybe their next digital land. Finally, we can uncover subtle user relationships like detecting potential coalitions, friendships, and enmities among users.


Q&A