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Environmentally Smart Contracts for Artists Using Non-Fungible Tokens

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Set up

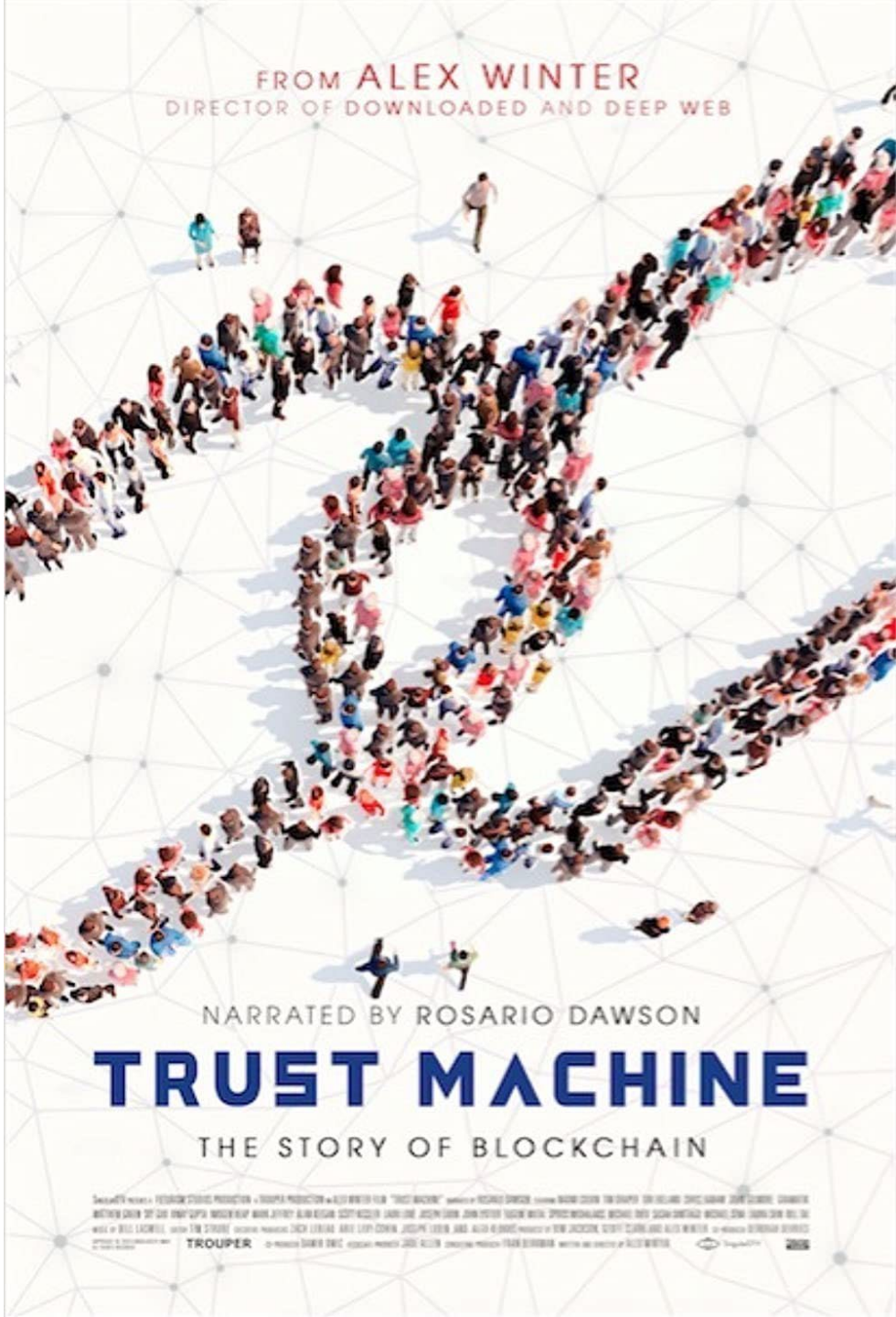
- Crypto and NFTs are growing
  - Total value of NFTs on Ethereum is US$14+billion (DappRadar)
- Huge implications especially for digital artists
  - Everydays—The First 5000 Days, by Beeple, sells for US$69 million [1]
  - Many want exposure and sales – finally a way to do it!
  - Many are also socially conscious ethical antagonists and crypto is bad for the environment
- What should they do?

Plan

- The relevant technologies
- The environmental problem
- The artists dilemma
- What artists can do
- Environmentally Smart Contracts for non-fungible tokens

The tech: NFTs, blockchain

- A non-fungible token (NFT) is a small amount of data that certifies something as literally unique
- NFTs exist as an entry on a blockchain—a digital ledger—that all but completely ensures the entry remains discoverable and unaltered *for the life of the blockchain*



The tech: NFTs, blockchain - implications

- NFTs seem well disposed to use for items that gain a lot of value from their rarity (like art)
- Marketplaces for NFT digital art, such as Opensea, Rarible, and SuperRare, can democtratise art by bypassing traditional gatekeepers
- Minting an NFT incurs a fee, payable in the native currency of that blockchain.
- In 2021 ETH prices ranged around US$100 for minting [2]

His Royal Airness
by Vakseen

Environmental cost

- Ethereum is proof-of-work, ETH has to be “mined” by powerful computers
- **Ethereum miners estimated to use the same amount of energy as Greece** [3].
- Minting and trading NFT art on the Ethereum blockchain increases demand for ETH and the price, and incentivises more mining

Bad for the environment, but a potential solution to the housing crisis

Unnecessary environmental cost

- In **proof-of-stake** systems, the network is secured by validators that have some of the cryptocurrency “locked up” in the network
- Since proof-of-stake blockchains don’t require computers to do much extra work in the validation process, this method has something like **99.9% less environmental impact** than the proof-of-work method currently used by Ethereum [4]

The mining rigs worked much harder after a quick pep talk

The ethical-prudential dilemma for artists

- Artists tend to like selling their work for big money
- They also tend to see themselves as positive forces in society that spur others into positive behaviours and states of mind
- Big NFT-art sales are only likely if they mint and sell on Ethereum

Choose either:

- **Selling their soul to make a crust:** Contributing to the degradation of the environment for higher profits
- **Pontificating on a soap box while the world burns:** Missing out on the opportunity for higher profits while watching others degrade the environment

Ten Hundred was going to mint NFTs for his art, until he discovered the environmental costs

Weak current solution 1

- **Mainchaining with carbon offsetting** (e.g., Beeple):
- Most carbon-offsetting schemes are not helpful in the long-run [4]
- Paying the schemes in a proof-of-work cryptocurrency or paying to cash out of the cryptocurrency causes more pollution
- Resales cause more pollution
- **Sheeple worry:** Famous artists presence and big sales on a proof-of-work blockchain bring more buyers and more artists to that blockchain, encouraging the growth and entrenchment of an unnecessarily wasteful and polluting system

Attached String
by Beeple

Weak current solution 2

- Sidechaining: minting on smaller environmentally less problematic blockchains
- Unproblematic, but not on Etherium: Tezos, Phantasma
- Ethereum sidechains with lower fees: xDai, Polygon, Arbitrum
- Ethereum sidechain with small carbon offset built in: Palm
- 8 of the top 10 NFT marketplaces by sales volume are on Ethereum [5].
- None of these avoid the **bridged resale problem** that is important because art is often an investment
- So, sidechaining risks substantially reducing the prudential benefits while not necessarily decreasing the environmental costs of mainchaining

Foregoing higher profits for their ethical principles, artists outside the Ethereum chain may be hoping that their ethical principles sustain them through winter.

William Kurelek

Immediate actions for artists

- Ethereum plans to move to a proof-of-stake system [4], but it will take a while
- Artists can encourage this in several ways:
  - **Refuse to mint** or sell their art on any proof-of-work blockchain and let the foundation team at Ethereum know why
  - **Create** anti proof-of-work art
  - Support the trial and development of Ethereum's proof-of-stake chain, **Beacon**, including locking in some of the associated cryptocurrency if they can
- Bridging resale problem remains

A *#PosterByDesign* poster

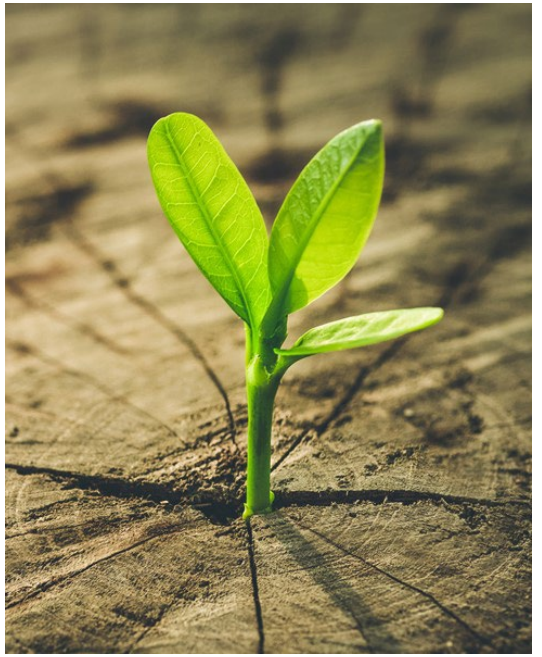
Environmentally smart contracts

CLEAN AIR TASK FORCE

- Smart contracts, originally proposed by Szabo [6], are: irreversible, unblockable, and openly trackable [7].
- Currently, most sites that allow you to mint NFTs also allow you to specify a certain percentage of any sales or resales to go to the original artist (some artists are not the minters) in perpetuity [7]
- Several people have suggested smart contracts use rules like this to apportion some of the sale price of NFTs to go to charities [8][9]
- By including contributions to climate focussed (effective; e.g., [10]) not-for-profits, the tiny environmental costs of minting and selling on a proof-of-stake blockchain can be fully redressed or even **overcompensated** for
- Dealing with the threat of bridging would require a new kind of smart contract

Environmentally smart anti-POW contracts

- Smart contracts could be coded to either prevent, or add conditions to, bridging the associated NFT to a proof-of-work blockchain
- Because freedom, we recommend conditions rather than a prohibition
- Add a tax to bridging and subsequent trades that is large enough to be sure that the environmental costs are completely redressed and that an additional “punitive damages” amount is added to the tax to further dissuade use of wasteful and polluting blockchains
- Directly linking the tax to the transaction fee at the time of sale or movement seems the best way to achieve this
- This leaves artists and the market somewhat free to pursue profits, but not at the cost of the environment (**avoids bridging problem**)



Conclusion and implications

- Progress requires the crypto idealists to outweigh the profiteers or multilateral international regulations to enforce environmental responsibility
- Not just artists want to harness NFTs without causing unnecessary damage to the environment
- But artists are skilled in communicating and so may play a special role

Part of *The First 5000 Days* by Beeple

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