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Tokenize yourself!

Will NFTs change the concept of digital ownership?

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Abstract. This essay introduces the technology of non-fungible tokens. I outline the current methods of securing ownership of abstract information and distinguish them from NFTs in terms of their mode of operation and motivation. In this context, I explain the hype generated by NFTs in the summer of 2021, in which the technology attracted attention through sales in the millions at classic art auctions, and describe alternative application scenarios that are only indirectly affected by the hype, but better illustrate the creative potential of NFTs. Finally, I venture a prognosis on how the technology could change our understanding of digital ownership.

What makes a thing a thing? Ever watched an episode of Star Trek? Probably the most famous science fiction series in television history had a very limited budget when it started. Expensive special effects, e.g. for landing spaceships on foreign planets, were simply not possible. Gene Roddenbery, the creator of Star Trek, therefore used a special trick: beaming. Beaming means not to transfer the matter but only the information of an object. The atoms of the traveler are first stored in their arrangement and then destroyed, only to reassemble other atoms in the same arrangement at a second location. Are you still you if all your atoms have been replaced and only their arrangement has been preserved? What if the transporter constructs you twice, in two different places or at two different times? Which of the two is you then? Or are you both? If you find it difficult to answer these questions, you are not alone. These thought experiments were first described by the famous science fiction author Stanislaw Lem as the Teletransportation Paradox. However, the question of identity in things has bothered people for much longer. As early as antiquity, Plutarch describes the ship of Theseus, which was repaired so often during a long voyage that philosophers argue whether it is actually still the same ship. All these paradoxes are based on the simple equation of identity and entity that we are used to in the material world. An object derives its uniqueness precisely from the uniqueness of its components. In the last century, however, people have built a space to which this logic cannot be applied: digital space.

There is no uniqueness in data. Files are copied and distributed without their identity being questioned. My selfie in front of the Brandenburg Gate remains the selfie in front of the Brandenburg

Gate, regardless of whether I call it up from my mobile phone or from the cloud. Digital information is inherently detached from its material presence in the circuits of our computers. *Non-fungible tokens* are a technology that makes it possible to give uniqueness to digital objects.

We can't transfer the logic of property to the digital world Property ¹ means the power of possession and usage over a thing. This definition arises quite naturally from the logic of owning material goods. If I own an object, I automatically have power over its use. This is because it is unique and only the owner controls access to the object. Even information acquires a uniqueness in this way, because the medium on which it is impressed, such as a handwriting, or a canvas, makes the information unique. At the same time, how difficult a piece of information is to copy depends also on the medium. Copying a picture with a second canvas requires a lot of work. Taking a photo with a smartphone is easy, because in the digital space things are different. The identity of a piece of information is no longer tied to the entity of its file, so access to it can no longer be controlled by ownership. People need other strategies to defend their ownership of digital information.

Owning things in the digital world is complicated Strategies to protect ownership of digital information are complicated. One possible strategy is to isolate the information, because without access to the information it cannot be copied or used. However, it is a challenge to isolate information in a connected world and the use of information, i.e. its impact on the actions of others (keyword open source), is also increasingly becoming its capital. So a better option would be controlled access to information, such as a digital subscription to a newspaper or a streaming service, right? To control access, the newspaper needs a powerful digital infrastructure. Users have to authenticate themselves to a central authority and depend on it. On the other hand, users have to accept that they only pay for access to a resource. Otherwise, users will also be able to copy the information and make it available on the network outside the control of the owner. The development of copy protection is costly and must always stand up to counter-development. Digital property can only be protected by law to a limited extent. Sure, you can prohibit copying of information or regulate it through copyright law, but that only works as long as the law is respected by all parties. Moreover, even our own law ² still deals with property only in physical things. (cf. BGB §90, „Sachen im Sinne des Gesetzes sind nur körperliche Gegenstände“). All the attempts outlined here to transfer the logic of ownership to digital goods obstruct the nature of information from being absorbed by others and are often over-engineered solutions that depend in part on external systems such as the legal system.

NFT is a different kind of ownership Instead of trying to claim ownership of information by controlled access, the information could also be made public and the possession of the information could be withdrawn. The prerequisite for this is to be able to prove ownership of the information at any point in time. But how could ownership be verified?

One would need a fake-proof register in which each piece of information is assigned to an owner. Anti-forgery is a particularly important requirement here. A central register can be manipulated very easily by the administrator. A good alternative is the *blockchain*, a decentralised register that is managed collaboratively and democratically by many parties. The rules of administration are determined for all parties and are embedded in the algorithm of the blockchain. The mixture of bindingness and mutual dependence makes the blockchain a very forgery-proof technology. This is also why it was originally conceived in connection with a decentralised monetary system. Each participant receives an address in the sense of a private wallet. The money here corresponds to so-called tokens, small pieces of code in the register. The register is then formed by the tokens and their transaction history between the addresses in the network. This is an incredibly large database. Just imagine the central bank keeping a record of every owner of every single cent it has distributed. To securely incorporate

¹<https://www.duden.de/rechtschreibung/Eigentum> (September 13, 2021 8:00 am)

²<https://dejure.org/gesetze/BGB/90.html> (September 13, 2021 8:00 am)

this flood of data into the register, transactions are collected and attached to the register in the form of completed blocks. This approach gives the technology its name: Blockchain.

Instead of treating tokens only as exchangeable/fungible, information can also be encoded in them. Because a certain token can only be stored once in the network, the information is forgery-proof and unique within the network. These tokens are then called *non fungible tokens* and can be sent between users' addresses in exactly the same way. Are NFTs now the alternative for our streaming service? No, within the network it is only possible to verify who owns the information. The information itself is freely accessible and can be reproduced and distributed outside the network. NFTs do not guarantee copyright compliance. Furthermore, ownership cannot be equated with authorship. The person who introduces information into the network as an NFT, i.e. „*tokenises*“ it, does not necessarily have to be involved in its creation. Not only static data can be stored in the blockchain, but also programmes, so-called *DAPPs*, i.e. decentralised apps, which are then executed by all computers in the network.

NFT is just an art hype Even though NFTs have been a familiar term in the crypto scene since 2017, awareness about NFTs increased drastically last summer due to an art hype. The summer of 2021 is marked by the Corona pandemic. The pandemic, which is still not over in autumn 2021 when this essay was written, partially shuts down the economy but also acts as a catalyst for global digitalisation. The cultural scene in particular has to reinvent itself during this time; classic theatre productions, concerts or art exhibitions are no longer possible. In this thirst for innovation, a perfect development environment is created for the disruptive technology of NFTs. A single grey pixel by the digital artist Pak is being sold at a Sotheby's auction for 1.7 million dollars, citing a debate about the essence of art that was triggered in a similar way as early as 1915 by Kazimir Malevich's Black Square.³ One NFT has even become the third most expensive artwork by a living artist: „Everydays: the First 5000 Days“ by American graphic designer Beeple.⁴ Also non-digital artists like Damien Hirst or Erwin Wurm use NFTs to sell their physical art. NFTs offer many advantages. Firstly, the art can be sold directly from the artist to the collector without intermediaries on the blockchain, and secondly, *smart contracts*, small algorithms that can be encoded into the NFT, allow the artist to be paid a fixed margin each time the artwork is resold.⁵

However, it is not necessarily always the creator of an artwork who *tokenises* it into an NFT. An alleged NFT by the street artist Banksy was auctioned on the net for \$300,000. After the scam was discovered, the bidder got his money back. Apparently, the intention of the anonymous copycat was rather to draw attention to this problem than to enrich himself financially from it.⁶

The NFT hype irresponsibly capitalizes on speculation It is not only art that is tokenised. Tweets, for example, are sold on the platform *valuable*⁷. The New York Times has promptly turned its column on NFTs into an NFT itself.⁸ Many digital objects, often very trivial ones, are made unique in order to sell them as speculative objects. These can include tweets and other documents of contemporary history that are understood as an investment, digital art that can be bought and passed on, and even in the crypto community the first NFTs, the CryptoPunks from 2017, are digital collectors' items whose value is determined solely by their demand, since they are themselves unique. The same year brought the Dapp CryptoKitties, a kind of Pokemon in the cryptocommunity. Within the game, digital kittens can be collected as a form of NFTs. Two kittens can be crossed to create a new NFT in the form of a kitten. Each kitten has random or parent-dependent status values that determine the

³<https://www.abc.net.au/news/2021-04-15/digital-art-single-pixel-nft-sold-more-1-million/100070810> (September 13, 2021 8:00 am)

⁴<https://www.bbc.com/news/entertainment-arts-56368868> (September 13, 2021 8:00 am)

⁵https://www.deutschlandfunkkultur.de/erwin-wurms-fat-car-als-digitale-signatur-get-rich-or-die-3717.de.html?dram:article_id=502538 (September 13, 2021 8:00 am)

⁶<https://www.tagesanzeiger.ch/kunstsammler-kauft-falschen-banksy-fuer-300000-franken-438668635367> (September 13, 2021 8:00 am)

⁷<https://v.cent.co/> (September 13, 2021 8:00 am)

⁸<https://nftplazas.com/ny-times-article-nft/> (September 13, 2021 8:00 am)

value of the cat within the game. Again, this game capitalises on speculation in the uniqueness of the NFTs. This flood of tokens requires an extreme amount of computing intensity and is consequently a major climate problem. The digital artist Memo Akten criticises this disproportionately huge ecological footprint and calculates that one artist's NFT series alone generates emissions equivalent to 1500 hours on a plane. That's why I probably won't sell my essay about NFTs as an NFT for the present.⁹

NFT is also a legitimization for digital participation But there are also approaches to consider NFTs not only as claiming/securing ownership of abstract ideas, but also as access at the same time. In this context, the metaverse needs to be addressed. The metaverse is an open virtual space that is collaboratively designed by its users and forms its own social space over the presence of avatars. The vision of the metaverse first appeared in 1992 in Neal Stephenson's science fiction novel *Snow Crash*. There, the metaverse is an omnipresent space with partly dystopian features, which is also criticised by the author. As an omnipresent space but without the dystopian features, the tech world picks up on this vision in the mid-2000s. Initial efforts such as the comprehensive online role-playing game *Second Life* do not make it to mass popularity, but meanwhile cross-platform video games such as *Roblox* or *Fortnite* are increasingly transformed into metaverses. Mark Zuckerberg and Tim Sweeney, the CEO of *Fortnite*'s developers Epic Games, believe the metaverse is the future of the internet, replacing the World Wide Web. This future idea of a metaverse became known to a wide audience under the name the oasis through the science fiction film *Ready Player One* by Steven Spielberg.¹⁰ Sweeney's company and other tech giants want to build an open metaverse. Personally, I am very sceptical about these plans for the future. The World Wide Web was a truly open and free revolution, in whose development every person could have a part, until the very internet oligopoly of Google, Amazon, Apple and Facebook was able to develop in this environment that now dominates the development of web standards. I cannot imagine how a centralised development of the next decentralised evolution is supposed to succeed. More thoughtful in their development philosophy are projects like *Decentraland*. A decentralised metaverse based on the blockchain. It is interesting that in both the centralised and decentralised development approaches of the metaverse, NFTs are supposed to play an important role. In games like *Fortnite*, there are already cosmetic accessories with different rarities, but these are only guaranteed by a central authority. In an open metaverse, however, the identity of a unique item must be maintained across multiple worlds. This means, for example, that my unique pet should later be transferable to Facebook's metaverse as well as Epic Games'. The most promising solution for this is a shared blockchain in which these crypto-collectables are managed. Soon, the *CryptoKitty* that I own as NFT can be transferred to the decentralised Metaverse *Decentraland* via a common open token standard.¹¹ In *Decentraland*, I can also obtain ownership of virtual land via NFTs and only then gain access to its design. The NFTs thus become part of my virtual identity.

How we will use NFT to encode our identity I talked a lot about entity and identity of things in the beginning of my essay. This is no coincidence. I think our own human identity is threatened by the digital world as well. On the one hand because we are just anonymous avatars in the web, which has of course its benefits, but also may prevent us from building a sustainable social environment. Crypto-collectables will play a huge role in shaping our own virtual identity.

On the other hand we may also will use NFTs to secure our own personal information. The Geneticist George Church tokenized his own DNA. Although he put the NFT later for sale this may be an interesting approach to take care of genetic code. In the future we may use genetic therapies to change our own code and live healthier, but if errors occur we need to be able to turn back the clock. Since NFTs are forgery-proof, unique and independent of central authorities, they would probably be the best option if we want to digitally secure our analogue code. But other biometric features can also

⁹<https://memoakten.medium.com/the-unreasonable-ecological-cost-of-cryptoart-2221d3eb2053> (September 13, 2021 8:00 am)

¹⁰<https://www.br.de/nachrichten/netzwelt/was-ist-das-metaverse,SdzhhpG> (September 13, 2021 8:00 am)

¹¹<https://bit.ly/396wsKZ> (September 13, 2021 8:00 am)

be secured in encrypted form via NFTs. In combination with a private key, one could build scanners that identify people without having to store their characteristics in a large database. Unauthorised access by third parties could in this way be made massively more difficult. Not only biometric data, but also important documents such as a birth certificate, school graduation or microcredentials such as the grade of this essay could be encoded in a blockchain via NFTs.

Because this data rarely needs to be transferred, this form of use, together with more efficient algorithms for the blockchain, converges into a climate-friendly technology. We can even store our private information unencrypted as an NFT if we ensure that algorithms that process our information not only need the information itself, but also query via the NFT if the user of the software is the owner of the private information. I see this as the future of a digital, high-performance and trustworthy bureaucracy. In the best case, the software itself would then be executed decentrally on the blockchain. In summary, instead of „Broadcast yourself! “might be „Tokenize yourself! “become the motto of the next digital generation.

NFTs already change the concept of digital ownership Digitalisation brings us to a turning point in both the philosophical consideration and the everyday value of the concept of property. We can awkwardly transpose old paradigms and notions of ownership into the digital world or more promisingly we can accept that ownership is not primarily about regulating access, but rather it identifies us and entitles us to understand ownership as an aspect of our own identity. Virtual goods without material substance are not of less value because of that. It makes sense to own digital information and in this quality lies the essence of the development of a new digital space, the metaverse. This social and cross-platform space has the potential to develop with its goods and services into an independent economic sector without resource and growth limitations. If, in the philosophical tradition of Aristotle, Thomas Aquinas and David Hume, property is indeed a natural right and thus a fundamental human necessity, then digital ownership offers hope for life in a world whose resources can no longer meet our demand.