

Head in the BitCloud:

A Discussion on the Copyrightability and Ownership Rights in Generative Digital Art and

Nonfungible Tokens

(purely informational, non-legal version)

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Preface—An Introductory Discussion on the Rights of Digital Art Purchasers and Digital Art Creators

The year is 2022 and a new art phenomenon is sweeping the nation—nonfungible tokens (hereinafter “NFTs”). Nonfungible assets are unique and cannot be replicated.¹ While the word token might suggest NFTs are associated with a physical coin, NFTs are simply unique data strings that provide public proof of asset ownership.² NFTs track a digital asset’s possession on a phenomenon called a blockchain.³ Similar to how a barcode on an item of clothing marks the clothing’s price, tracks inventory of that item, and can be referenced to verify an authentic purchase occurred, NFTs can track digital asset ownership and verify a transaction’s authenticity.⁴ NFTs are commonly used to track the transfer, trade, and sale of digital artworks; however, NFTs have also been associated with songs, movies, and other creative and non-creative works.⁵

Aspiring art collector Hunter Shields (“Shields”) decides to invest in this new market by purchasing an original CryptoBear NFT (“original CryptoBear”) as seen in Figure 1.A on UberUnique—an NFT-exclusive marketplace.⁶ CryptoBears is a collection of digital images created by world renowned digital artist Bisco Dickson (“Dickson”).⁷ The CryptoBear collection

¹ Crypto Dukedom, *The NFT Revolution Music Edition* 7–8 (2021); see Besancia, *The Art of NFTs*, NONFUNGIBLE (Oct. 1, 2019) <https://nonfungible.com/blog/art-of-nfts> [<https://perma.cc/89JF-6GVZ>].

² Georgina Adam, *But is it legal? The baffling world of NFT copyright and ownership issues*, THE ART NEWSPAPER (Apr. 6, 2021), <https://www.theartnewspaper.com/2021/04/06/but-is-it-legal-the-baffling-world-of-nft-copyright-and-ownership-issues> [<https://perma.cc/R5T5-RFRG>] (discussing how NFTs track the media that is purchased but are not actually the media themselves).

³ See *infra* Part I.A.

⁴ Dukedom, *supra* note 1, at 7 (2021).

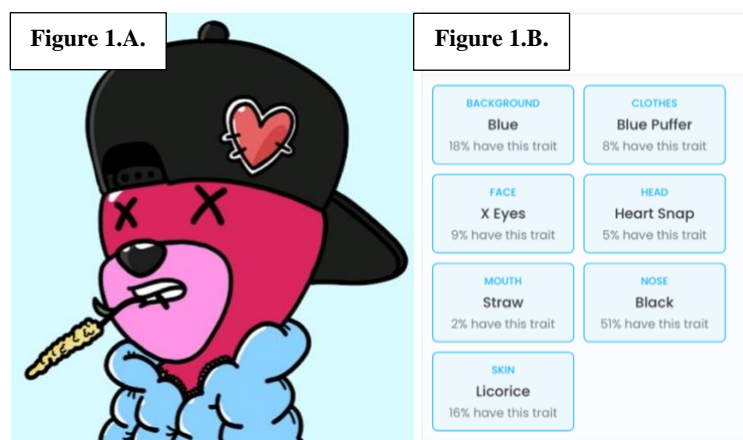
⁵ See *infra* Section I.C.v.

⁶ Shields is a fictional NFT image purchaser and UberUnique is a fictional NFT platform.

⁷ Dickson is a fictional NFT image artist. See *infra* Section I.C.i.

is made up of 10,000 unique, nonmoving generative bear images. Each bear has randomized traits referred to as properties.⁸

Each original CryptoBear's properties were randomly generated from specifications Dickson programmed into an artificial intelligence algorithm he created (hereinafter "AI").⁹ There are seven CryptoBear properties: background color, clothes, face traits, head accessories, mouth shape, nose color, and fur color.¹⁰ Each CryptoBear's properties are unique, but some have traits that are rarer. Shields' original CryptoBear has the following properties: licorice colored fur, a clinched jaw with straw hanging out of its mouth, an "X" for eyes, a heart snapback on its head, a light blue background, and a blue puffer jacket. Given the rarity of these traits (outlined in Figure 1.B.) Shields believes her original CryptoBear is quite valuable.



⁸ CryptoBears is a fake NFT collection created for the purpose of showing how an NFT interacts with the blockchain, copyright law, and smart contracts. The actual image used is owned by this Comment's author and is an actual NFT from the InBetweeners NFT project. See ItsMeGianPiero, *inBetweeners #3166* (illustration), <https://opensea.io/assets/0x94638cbf3c54c1f956a5f05cbc0f9afb6822020d/3166> [<https://perma.cc/42FA-27QF>] to view the actual NFT. See *infra* Section I.C.ii.

⁹ The type of AI relevant to this paper is basic AI. See Tal Vigderson, *Hamlet II: The Sequel? The Rights of Authors vs. Computer-Generated "Read-Alike" Works*, 28 LOY. L.A. L. REV. 401, 416 (1994) (discussing the three main types of AI—(1) applied AI: commercial products use or are produced using AI; (2) cognitive science: AI solves questions about the nature of intelligence; and (3) basic AI: uses computer-based techniques to simulate intelligent behavior). For a more in-depth discussion on the process of using advanced machine learning models, see generally David Lehr & Paul Ohm, *What Legal Scholars Should Learn About Machine Learning*, 51 U.C. DAVIS L. REV. 653 (2017) (defining the difference between a "learning" machine and programmed machine as the fact the learning machine can develop its own processes and procedures).

¹⁰ See *infra* Section I.C.ii.

Shields anonymously purchased the original CryptoBear through her public digital address (“digital address”). A digital address is like a more secure version of a social media username. While the address links to a user’s transaction history, cryptocurrency balance, and NFT image collection, it does not give any identifying information regarding the person who owns the attached assets.¹¹ The original CryptoBear is now linked to Shields’ digital address and resides within her digital wallet (“wallet”). A wallet acts as a digital gallery showcasing all the NFT images a digital address has purchased.¹²

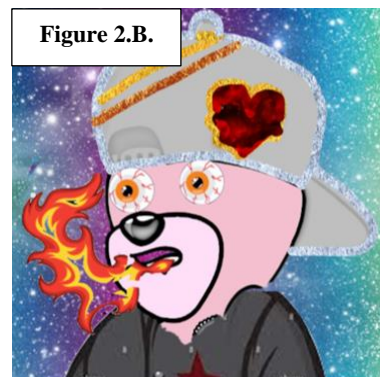
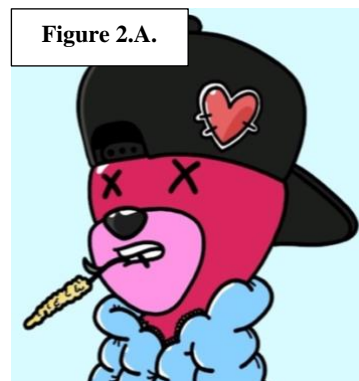
Shields notices that there is an icon next to her original CryptoBear displaying the words, “Click this button to start bear mutation!” The button is connected to the AI Dickson inserted into the original CryptoBear, and when clicked, the AI creates a mutated version of the original NFT image and adds it to the NFT purchaser’s wallet.¹³ Curious, Shields clicks the button and a second CryptoBear image appears—seen in Figure 2.B. below. This CryptoBear is a mutated

¹¹ To determine the owner of a digital wallet, someone must have both the public key and the private key. *See NFT Wallet*, TRUST WALLET, <https://trustwallet.com/collectibles-wallet/> [<https://perma.cc/UG28-WC7W>] (last visited Jan. 18, 2022) (“[NFTs] are secured on the blockchain and associated with a public address.”). To learn more about the different digital wallets available, *see* Adam Levy, *5 Best NFT Wallets*, MOTLEY FOOL (Nov. 8, 2021, 2:39 PM) <https://www.fool.com/investing/stock-market/market-sectors/financials/non-fungible-tokens/nft-wallet/> [<https://perma.cc/T72N-LB3V>].

¹² A digital wallet is like a personal art gallery, but instead of housing physical artwork within a tangible space, the NFTs are connected to a digital account that showcases all the NFTs a user has purchased. *See* Levy, *supra* note 11.

¹³ *See infra* Section I.B.i. for a discussion on how smart contracts use AI to facilitate certain actions.

version of her original CryptoBear (“mutated CryptoBear”) and has inverted colors, zombie eyes, fire coming out of its mouth, and a galactic background.¹⁴



For the remainder of this discussion, the word “NFT” by itself will refer to the code that tracks the digital images referenced above, while the term “NFT image” will represent all digital images that NFTs can track—encompassing both generative and derivative NFT images. Finally, “NFT project” will refer to the conceptual planning, execution, and works that are created in conjunction with an artist’s specific NFT image collection.

I. Blockchain Technology, Cryptocurrency, Smart Contracts, and NFTs

A. Introduction to Blockchain

NFTs are recorded on blockchain technology.¹⁵ A blockchain is a digital record that tracks peer-to-peer transactions on an unregulated (often referred to as decentralized) network.¹⁶ Blockchain technology allows individuals to anonymously transmit information, currency, or assets, over the internet in a transparent and secure manner without an intermediary.¹⁷ Three

¹⁴ The AI within the frame utilized the advanced algorithm Dickson created to generate this new CryptoBear.

¹⁵ Dukedom, *supra* note 1, at 20.

¹⁶ *Id.*; see generally Niaz Chowdhury, Inside Blockchain, Bitcoin, and Cryptocurrencies 201 (2020).

¹⁷ An example of an intermediary mentioned above would be a bank acting as an intermediary between the federal reserve that mints the currency and the individuals who end up depositing it into their bank accounts. See Daniel Kraus, Thierry Obrist, & Olivier Hari, *Blockchains, Smart Contracts, Decentralised Autonomous Organisations and the Law* 1 (2019).

pillars are fundamental to blockchain technology: decentralization, transparency, and immutability.¹⁸

(i) Blockchain: Decentralization

Blockchain technology is unique because it is decentralized.¹⁹ Instead of storing all the information related to an NFT image's transfer within one central computer, like most websites do, a blockchain network sends the information to multiple computers across the blockchain.²⁰ Depending on the project's scope and success, the number of computers tracking these transfers can vary from just a few to thousands.²¹ Having the same information dispersed across multiple computers makes it harder for data to be compromised via hackers or other unforeseen technology malfunctions.²² This security method is like using a dozen pillars to support a house instead of a singular, large post. The multiple points of contact provide additional support,

¹⁸ Dukedom, *supra* note 1, at 21 (discussing the benefits of these pillars with a focus on how there are no intermediaries between actions, users' privacy is absolutely protected from theft, and the data stored within the blockchain is unalterable); *see also* Chowdhury, *supra* note 16, at 9 (discussing the other key properties that are considered hallmarks of blockchain properties).

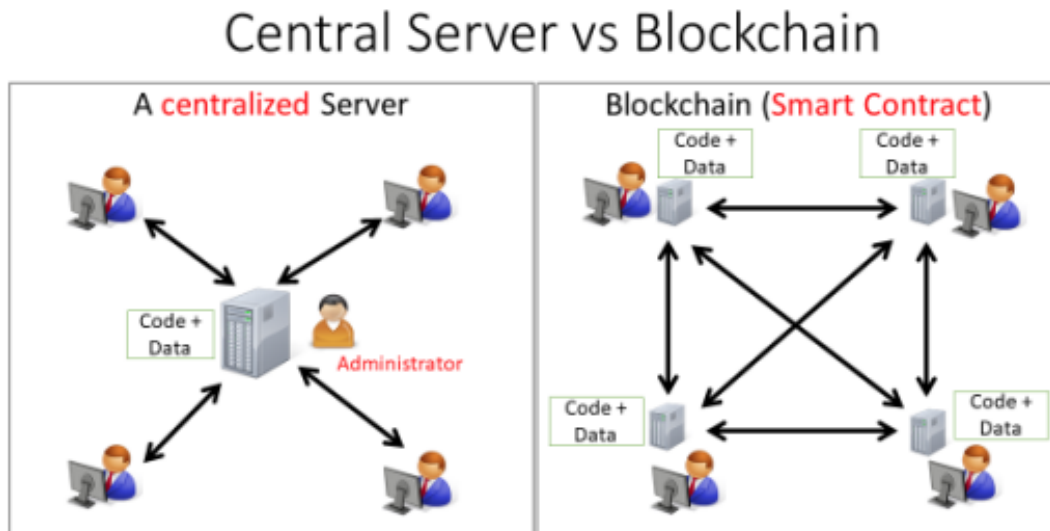
¹⁹ The data within a decentralized system is housed on multiple computers called "full nodes" that run the platform's algorithms on a peer-to-peer network with voting power to implement updates and procedural changes. *See* Chowdhury, *supra* note 16, at 4–5 ("For example, if Bob[] sends \$100 to Alice using his mobile banking app, Alice will settle this payment later. What makes Bitcoin a groundbreaking invention is its ability to virtually move the money over a digital medium and settle the payment almost immediately without the need for a central body").

²⁰ Centralization relies heavily on a small number of nodes but can become unstable if the nodes are mismanaged. *What is Decentralization*, WE TEACH BLOCKCHAIN <https://weteachblockchain.org/faq/what-is-decentralization/#:~:text=Decentralized%20networks%20are%20made%20up,copy%20of%20all%20recorded%20data> [<https://perma.cc/GTP7-LZKT>] (last visited Jan. 18, 2022); *see* Chowdhury, *supra* note 16, at 13–4 ("There is no dependence on a single serve; hence blockchain does not have a central point of failure"). On a decentralized blockchain, the "death" of one computer does not negatively affect the system, because the other computers continue supporting it. *See* Jimi S., *Blockchain: What are nodes and masternodes?*, COINMONKS (Sep. 5, 2018) <https://medium.com/coinmonks/blockchain-what-is-a-node-or-masternode-and-what-does-it-do-4d9a4200938f> [<https://perma.cc/26KU-RPF6>]. This ensures that the information used to trace the transactions can be recovered by another computer on the blockchain if one of the nodes "die." Chowdhury, *supra* note 16, at 13–4; *see also* John Evans, *What is a Node in a Blockchain Network*, NODES.COM <https://nodes.com/> [<https://perma.cc/RA5Q-74WW>] (last visited Jan. 18, 2022).

²¹ Chowdhury, *supra* note 16, at 26.

²² *Id.* at 317 ("Blockchain technology effectively relies on a collective commitment . . ." and while "the level of commitment may vary from one user to the other, entering the system means participating in the system.").

acting as a fail-safe should a supporting pillar break.²³ Decentralization ensures that one computer failure does not threaten the entire blockchain's integrity.²⁴



While decentralization offers the ability to track asset ownership transparently, the anonymity it facilitates hinders attempts to recover damages from people transferring the rights to NFT images they may not actually own.²⁵ To completely stop illegal activity occurring on the blockchain, all computers circulating the inaccurate information must be found and shut down.²⁶ This becomes increasingly difficult when these computers operate under anonymous usernames, and their transactions are recorded with placeholders that symbolize, but do not disclose, the buyer or seller's identity.²⁷

²³ Kraus, *supra* note 23, at 1 (Transactions are to blockchain what information is to the Internet, “its qualities are attributed to it by its applications.”); see Evans, *supra* note 26.

²⁴ The reason decentralization is becoming so popular is because a site running through one central server allows a hacker to easily compromise the data and security of the site, but blockchain technology circumvents this issue by spreading the information across the network. See Chowdhury, *supra* note 16, at 13–4.

²⁵ See Cryptopedia Staff, *What are Public and Private Keys?*, CRYPTOPEDIA (Sep. 8, 2021)

<https://www.gemini.com/cryptopedia/public-private-keys-cryptography#section-what-is-public-key-cryptography> [<https://perma.cc/M75P-APK8>] (“In a digital world where bits are easy to copy and modify, how cryptography institutes such a challenging job of making blockchain immutable is yet to be seen.”); see also *infra* Part .II.B.

²⁶ See Chowdhury, *supra* note 16, at 33.

²⁷ To access the identity of a blockchain account, one must first acquire a private key, like a pin for a bank account, which is only held by the full node operators and those transacting on the network. *Id.* (“[T]he public key verifies that a holder of the paired private key sent the message . . . where only the paired private key holder can decrypt the message encrypted with the public key.”).

(ii) Blockchain: Transparency and Immutability

Blockchain technology is also known for its transparent and immutable digital asset tracking.²⁸ Blockchains can “track possession, history and the whereabouts of [digital] art” just as an auction house tracks who owns each art piece up for auction.²⁹ This process creates transparency because all virtual asset transactions are recorded and accessible to anyone with internet access, while the record’s immutability ensures all on-chain NFT images are accounted for, unlike physical art which can be lost, stolen, or damaged upon transfer.³⁰

Blockchain advocates argue that blockchain technology is 100 percent reliable, because the automated nature of the blockchain ensures that accurate transfer information is recorded.³¹ But while this technology sounds fantastic in theory, “the information contained in the [blockchain] ledger is only as accurate as the information recorded to the blockchain.”³² Thus, a technology malfunction could cause inaccurate information to enter the record, and the technology’s immutability could hinder any attempts to correct that error.³³

In concept, a blockchain record “cannot be altered or disappear after its creation and acceptance by the blockchain.”³⁴ However, the NFT itself only provides a link to the asset being sold, so it is possible that the purchased asset is not actually secured on the decentralized

²⁸ Dukedom, *supra* note 1, at 21.

²⁹ Alexandra Bear, *The Hammer Falls on the First Major Blockchain-Based Art Auction*, JDSUPRA (Nov. 15, 2018) <https://www.jdsupra.com/legalnews/the-hammer-falls-on-the-first-major-95703/> [<https://perma.cc/CCQ3-MVRA>].

³⁰ Dukedom, *supra* note 1, at 20; *see generally* Chowdhury, *supra* note 16. Luxury brands, such as Louis Vuitton, that have historically issued unique serial numbers to ensure product authenticity, have also started using NFTs to provide authentication services, allowing consumers the ability to trace the good’s authenticity digitally. LVMH, *LVMH partners with other major luxury companies on Aura, the first global luxury blockchain*, LVMH (Apr. 20, 2021) <https://www.lvmh.com/news-documents/news/lvmh-partners-with-other-major-luxury-companies-on-aura-the-first-global-luxury-blockchain/> [<https://perma.cc/C83U-H98R>]. *See supra* Section I.B.i. for a discussion on on-chain v. off-chain transactions.

³¹ Dukedom, *supra* note 1, at 20.

³² Kraus, *supra* note 23, at 72; *see also* Bear, *supra* note 35.

³³ *See* Bear, *supra* note 35.

³⁴ Kraus, *supra* note 23, at 84.

blockchain at all.³⁵ If the website storing the NFT image goes offline, like how social media sites Myspace or Vine were shutdown, the NFT could become “broken” and it would only link to a blank screen or error message.³⁶

This technology’s complexity, paired with the potential for inaccurate data to be recorded and transmitted across the blockchain, threaten to eradicate its transparency and immutability.³⁷ Hypothetically, the blockchain provides users a record to track ownership of a particular asset from its inception to its current location, but decentralization means only the digital address purchasing that asset, and no identifying information about who actually owns that wallet, is recorded.³⁸ This creates a complex question about whether transparency really is increased through this new form of asset tracking.

B. Introduction to Cryptocurrency

Cryptocurrency refers to fungible digital currency stored on the blockchain that can be used to purchase goods, such as NFT images.³⁹ Fungible assets can be replicated, exchanged,

³⁵ Adam, *supra* note 2; see *infra* Section I.B.i. for a discussion on smart contracts regulating blockchain transactions.

³⁶ Adam, *supra* note 2 (“NFT’s are built on an absolute house of cards constructed by the people selling them. It is likely that every NFT sold so far will be broken within a decade. Will that make them worthless? Hard to say.”). This type of loss can be mitigated by storing images on a more secure wallet called a cold, or hard, wallet. See Ryan Haar, *How to Decide on a Hot Wallet or Cold Wallet for Your Crypto, and Whether You Need One at All*, NEXTADVISOR (Sep. 23, 2021) <https://time.com/nextadvisor/investing/cryptocurrency/hot-wallet-vs-cold-wallet/> [<https://perma.cc/7XFM-KBXG>] (discussing the intricacies of digital wallets and what the difference is between a cold and hot wallet).

³⁷ See Chowdhury, *supra* note 16, at 18 (“A fundamental problem in distributed systems is achieving overall system reliability in the presence of some faulty nodes. . . [b]lockchain being a distributed system requires its nodes to reach a consensus while running the system and keeping its data secure.”). When nodes within the blockchain become faulty, whether through malicious intent or accidental malfunction, this is known as the Byzantine Fault Tolerance (“BFT”). *Id.* at 55. This BFT is what enables a system to continue operating properly in the event of the failure of some of its components. *Id.* at 55–6.

³⁸ See *supra* notes 11–12 for a discussion of what a digital wallet is.

³⁹ 2 GREGORY J. BATTERSBY & CHARLES W. GRIMES, MULTIMEDIA AND TECHNOLOGY LICENSING AGREEMENTS § 14.1 (2021) (discussing cryptocurrency). Cryptocurrency and its relation to the blockchain is only briefly discussed in this Comment to lay a framework for any blockchain references. There are many great resources that explain this subject in depth. See Matthieu Nadini, et al., *Mapping the NFT Revolution: Market Trends, Trade Networks and Visual Features*, EBSCOHOST (Sep. 20, 2021) <https://arxiv.org/pdf/2106.00647.pdf> [<https://perma.cc/TB63-6W37>]; see also *Token Standards*, CRYPTO.COM <https://crypto.com/us/university/article?category=crypto101&page=token-standards> [<https://perma.cc/6PV5-YGG6>] (last visited Jan. 18, 2022); see Adam Hayes et al., *Blockchain Explained*, INVESTOPEDIA (Jan. 7, 2022) <https://www.investopedia.com/terms/b/blockchain.asp>

and interchanged freely—such as United States dollars.⁴⁰ Thousands of different cryptocurrencies have been created over the last few years, but most of these tokens currently have limited real-world use because their value is not acknowledged as real currency by traditional retailers.⁴¹ While cryptocurrency has received a lot of attention lately, its prices are volatile. Unlike the United States dollar, whose value is directly measured by exchange rates, treasury notes, and foreign exchange reserves, cryptocurrency's value is not attached to a tangible measurement.⁴² Most cryptocurrencies are like casino chips. While these tokens have substantial value inside whatever platform “created” them, they would be rejected if presented to an outside retailer, because their value only exists within the platforms that accept them.

(i) Smart Contracts Regulating Blockchain Transactions

Cryptocurrencies and NFTs are built on smart contracts which are not really contracts at all. The term “smart contract” references the NFT code containing a detailed description of the

[<https://perma.cc/DV4P-3742>]; see generally Roe Sarel, *Property Rights in Cryptocurrencies: A Law and Economics Perspective*, 22 N.C. J.L. & TECH. 389 (2021) (discussing the difference between liability rule and property rule); see also Rebecca M. Bratspies, *Cryptocurrency and the Myth of the Trustless Transaction*, 25 MICH. TECH. L. REV. 1 (2018) (discussing the ramifications of Bitcoin entering onto the scene and how it may or may not outlast the hype around it); see Aaron Mak, *What is Web3 and Why are All the Crypto People Suddenly Talking About It?*, SLATE (Nov. 9, 2021, 5:45 AM) <https://slate.com/technology/2021/11/web3-explained-crypto-nfts-bored-apes.html> [<https://perma.cc/FEL4-36AG>] for an in-depth discussion on the concept of Web3.

⁴⁰ Dukedom, *supra* note 1, at 7.

⁴¹ *Id.* at 20; see Gavin Brown and Richard Whittle, *Algorithms, Blockchain and Cryptocurrency: Implications for the Future of the Workplace* 1, 17 (2020).

⁴² BITCOIN, <https://bitcoin.org/en/> [<https://perma.cc/NF4V-2CA3>] (last visited Jan. 18, 2022); ETHEREUM, <https://ethereum.org/en/> [<https://perma.cc/76HX-EXKP>] (last visited Jan. 18, 2022); see also Dukedom, *supra* note 1, at 20; see also Kimberly Amadeo & Michael J. Boyle, *US Dollar Value Measured 3 Different Ways*, THE BALANCE (Apr. 29, 2021) <https://www.thebalance.com/value-of-us-dollar-3306268#:~:text=The%20value%20of%20the%20U.S.,notes%2C%20and%20foreign%20exchange%20reserves> [<https://perma.cc/2JGY-CR8H>] (discussing how the dollar's value is measured). Mark Cuban has warned that shutting down bitcoin would be like “stopping e-commerce in 1995.” Billy Bambrough, *Billionaire Mark Cuban Issued a Serious Crypto Warning Even As Bitcoin Nears a \$50,000 Price*, FORBES (Apr. 10, 2021, 7:50 PM) <https://www.forbes.com/sites/billybambrough/2021/08/10/billionaire-mark-cuban-issued-a-serious-bitcoin-and-crypto-warning-even-as-bitcoin-nears-a-50000-price/?sh=d5b6d2e497b4> [<https://perma.cc/C9AV-HNM2>]. Apple co-founder Steve Wozniak has also said that bitcoin is “better than gold.” Adam Smith, *Apple Co-Founder Steve Wozniak Says Bitcoin is “Mathematical Miracle” and Better Than Gold*, INDEPENDENT (July 12, 2021, 12:53 PM) <https://www.independent.co.uk/life-style/gadgets-and-tech/apple-steve-wozniak-bitcoin-gold-crypto-b1882526.html> [<https://perma.cc/T6JF-84CR>].

functions each NFT must “obey” to enable certain actions to occur.⁴³ A simplified example of how smart contracts work would be (a) an NFT image is sold so (b) the NFT image seller is paid.

Smart contracts streamline the purchase process by ensuring that all asset transfers are accurately recorded to the blockchain. They also make it easier for artists to sell their digital works to collectors by operating without intermediaries, such as banks or art galleries.⁴⁴

Additionally, smart contracts help speed up the payment transfer process and provide greater royalty transparency by automatically sending a percentage of a work’s future sales to the wallet of that work’s creator.⁴⁵

Each smart contract operates under “standards” that can prevent or induce certain actions. The most common standards are ERC–20 for cryptocurrency and ERC–721 or ERC–1155 for NFTs.⁴⁶ Additionally, an NFT’s smart contract can be written using on–chain or off–chain

⁴³ *Non-Fungible tokens (NFT)*, ETHEREUM <https://ethereum.org/en/nft/> [<https://perma.cc/HXH9-8S2C>] (last visited Jan. 18, 2022) (“An NFT can only have one owner at a time. Ownership is managed through the unique ID and metadata that no other token can replicate. NFTs are minted through smart contracts that assign ownership and manage the transferability of the NFT's.”). Tokens that live on the blockchain, like cryptocurrency and NFTs, consist of smart contracts storing digital information that is recorded and placed on the blockchain to trace the ownership of an object. See Chainlink, *The Future of Asset Management Using Smart Contracts and Blockchain Oracles*, CHAINLINK (Mar. 3, 2021) <https://blog.chain.link/the-future-of-asset-management-using-smart-contracts-and-blockchain-oracles/> [<https://perma.cc/89NE-PK75>].

⁴⁴ See Qin Wang, et al., *Non-Fungible Token (NFT): Overview, Evaluation, Opportunities and Challenges*, EBSCOHOST (Oct. 25, 2021) <https://arxiv.org/pdf/2105.07447.pdf> [<https://perma.cc/T86M-ULZX>]. By establishing standards, the code within each smart contract defines the rules within the blockchain network and facilitates easier engagement and communication between different smart contracts on the same blockchain. See *id.* Through smart contracts, intermediaries within the transactional world (banks, art galleries, etc.) are no longer necessary actors making it easier to buy and sell digital artwork. See *id.*; see e.g., Daniel S. Nuñez Cohen et al., *The Coming Blockchain Revolution in Consumption of Digital Art and Music: The Thinking Lawyer’s Guide to Non-Fungible Tokens (NFTs)*, K&L GATES (Mar. 25, 2021) <https://www.klgates.com/The-Coming-Blockchain-Revolution-in-Consumption-of-Digital-Art-and-Music-The-Thinking-Lawyers-Guide-to-Non-Fungible-Tokens-NFTs-3-25-2021> [<https://perma.cc/7UW5-VMDM>]. Creatives can now earn “pseudo-moral rights” through smart contract options that trigger royalty kickbacks when an NFT resells on a secondary market. Zhao Zhao, *Fulfilling the Right to Follow: Using Blockchain to Enforce the Artist’s Resale Right*, 39 CARDOZO ARTS & ENT. L. J. 239 (2021); see also Besancia, *Taking Part in the NFT Revolution is Accessible to Everyone!*, NONFUNGIBLE (Jan. 28, 2020) <https://nonfungible.com/blog/some-popular-nft-use-case> [<https://perma.cc/8NTN-EB7K>]; see also *supra* note 45 and *infra* note 52 (discussing token standards).

⁴⁵ Dukedom, *supra* note 1, at 64.

⁴⁶ Cryptocurrency runs on the ERC–20 standard which provides basic functionality for the transfer of tokens from one individual to another. See Wang, *supra* note 44. Unlike cryptocurrency, most NFTs are built on ERC–721 token standard. *Id.* The ERC–721 standard defines all functions required of the token for a certain action to

transactions.⁴⁷ On-chain transactions are the most secure because both the NFT and the NFT image are recorded and housed on the blockchain record. This ensures that the NFT image attached to the NFT cannot be deleted, altered, or copied in the future.⁴⁸ A smart contract can also be drafted using off-chain transactions. While these transactions are cheaper and faster, they store the NFT image associated with the NFT off the blockchain.⁴⁹ This allows for the NFT's metadata to be altered by the original creator, or a third party at any time.⁵⁰ Off-chain transactions put the NFT and the NFT image at risk for destruction, mutilation, or alteration.⁵¹

The difference between on-chain and off-chain NFT projects can be illustrated via analogization to a common scenario—travelers and their luggage. When an individual travels on an airline, they often bring with them both a carry-on bag (“carry-on bag”) that will stay within

automatically execute (such as paying a seller) when a certain action occurs (such as buying an NFT on a platform); see Dukedom, *supra* note 1, at 12.

⁴⁷ William M. Peaster, *Raccoon Rugged Society?*, BANKLESS (Sep. 9, 2021) <https://metaversal.banklessHQ.com/p/raccoon-rugged-society> [<https://perma.cc/PFB9-SE96>] (“[O]n-chain projects fetch a premium in the NFT ecosystem in part . . . because they’re on chain. . . [so] their design offers users superior accessibility and durability guarantees for the long term.”); William M. Peaster, *NFTs and the On-Chain Spectrum*, BANKLESS (Feb. 4, 2021) <https://metaversal.banklessHQ.com/p/nfts-and-the-on-chain-spectrum> [<https://perma.cc/W3RH-FURJ>]; Jake Frankenfield, et al., *On Chain Transactions (Cryptocurrency)*, INVESTOPEDIA (Aug. 24, 2021) <https://www.investopedia.com/terms/c/chain-transactions-cryptocurrency.asp> [<https://perma.cc/HTJ6-4ZW7>].

⁴⁸ See generally Rohan Pinto, *On-Chain Versus Off-Chain: The Perpetual Blockchain Governance Debate*, FORBES (Sep. 6, 2019, 8:00 AM) <https://www.forbes.com/sites/forbestechcouncil/2019/09/06/on-chain-versus-off-chain-the-perpetual-blockchain-governance-debate/?sh=525fc1a61f5e> [<https://perma.cc/DUT3-DZEA>].

⁴⁹ Del Wright, *A Short & Happy Guide to Bitcoin, Blockchain, and Crypto*

Guest 1, 52 (2020) (“The benefits include lower transactions costs, as the entire network does not need to handle each transaction, and greater network capacity, as these off-chain transactions will not clog up the network and allow more transactions to be processed.”); see also Moxie Marlinspike, *My First Impressions of Web3*, MOXIE <https://moxie.org/2022/01/07/web3-first-impressions.html> [<https://perma.cc/S9U9-E2PB>] (Jan. 7, 2022) (“Anyone with access to that machine, anyone who buys that domain name in the future, or anyone who compromises that machine can change the image, title, description, etc. for the NFT to whatever they’d like at any time (regardless of whether or not they ‘own’ the token.)”).

⁵⁰ *Id.* (“In an off-chain structure, individuals entrusted by the community come together and form a group responsible for blockchain’s governance and well-being. That group is tasked with fixing bugs and security vulnerabilities, adding features and improving scalability, representing the blockchain in public discussions, and maintaining the right balance of power among users, developers, miners, and other stakeholders.”).

⁵¹ The NFT Project Raccoon Secret Society is a perfect example of this concept. The creators of this project turned all the purchasers’ NFTs from “live” raccoon characters to “dead” just because they could. See RACCOON SECRET SOCIETY <https://raccoonsecretociety.com/> [<https://perma.cc/HP6N-6DYF>] (last visited Jan. 18, 2022). This destroyed all the raccoon NFTs and simply left bones in their place. Princess, *Developers Behind Raccoon Secret Society Turns NFTs Into Bones*, NFT EVENING (Sep. 8, 2021) <https://nftevening.com/developers-behind-raccoon-secret-society-to-turns-nfts-into-bones/> [<https://perma.cc/5GF3-45JY>].

their possession, and another bag they will store underneath the plane (“checked bag”). On-chain transactions are like the carry-on bag because the bag and its owner stay together during the flight. It would be very difficult, if not impossible, for the traveler to lose their carry-on bag because it is consistently accessible, making theft or damage unlikely. By contrast, off-chain transactions are like the checked bag. While the traveler has a baggage claim ticket that proves ownership of that luggage, anything can happen between an individual giving the checked bag to the airport attendant and claiming that bag upon reaching their destination. Checking a bag can make a traveler’s navigation through the airport more efficient and reduce the hassle potentially caused by lugging around more bags, but while this option provides benefits, it also increases the chance the checked bag will be lost, stolen, or damaged while out of the traveler’s possession. While not a perfect analogy to the security, or lack thereof, provided by certain blockchain transaction types, this metaphor helps to highlight the disconnect that can exist between an NFT and the NFT image it tracks. Purchasers must be familiar with the risks associated with off-chain transactions before purchasing new NFT images.

C. Introduction to NFTs

(i) NFT Creation and Storage

NFT images are controlled by smart contracts, tracked using blockchain technology, purchased using cryptocurrency, and created through a process called “minting.”⁵² To mint an image into an NFT, an artist will first have to create the image. Typically artists wishing to create their own NFT images will create the underlying image using computer software, real–

⁵² For purposes of this Comment, we will focus solely on how to mint a utility NFT tracking digital art ownership. As we will discuss in subsequent portions of the paper, there are many applications for NFTs and tracking digital art ownership is just one way NFTs are utilized today. *See infra* Section I.C.v.

world art techniques, or a combination of both.⁵³ Once the image has been created, and if it is not already in digital format, the artist will upload the finished image to her computer and will choose which blockchain she wants to mint the NFT on.⁵⁴ The artist will then follow that specific blockchain's instructions to mint an NFT to track that image.⁵⁵

Once the NFT image has been minted, the NFT will be logged on the blockchain via a complex set of numbers called a transaction hash.⁵⁶ The artist will then post the NFT image for sale on an NFT platform.⁵⁷ NFT platforms are online marketplaces that facilitate the transfer, sale, collection, distribution, and sometimes the creation of NFT images.⁵⁸ After an NFT image is sold, its image is transferred from the seller's wallet to the purchaser's wallet, and a new transaction hash is added to the NFT's blockchain record that contains both the sale price and the

⁵³ Hugo P., *Physical NFT Art, or physical Art NFT?*, NONFUNGIBLE (June 21, 2021) <https://nonfungible.com/blog/physical-nft-art-or-physical-art-nft> [<https://perma.cc/R9BK-33FT>]; see generally *List of Art Techniques*, WIKIPEDIA, https://en.wikipedia.org/wiki/List_of_art_techniques [<https://perma.cc/L2FW-KTBU>] (last visited Jan. 18, 2022).

⁵⁴ NFTs have historically been minted using the Ethereum blockchain, but there are other issuing blockchains including: Polygon, Solana, Binance Smart Chain, Flow by Dapper Labs, Polkadot, and Cosmos. See Benjamin Bedrava, *Complete Guide to NFT's and Intellectual Property*, RAPACHE L. GRP. (Apr. 23, 2021) <https://arapackelaw.com/patents/softwaremobile-apps/nft-intellectual-property/> [<https://perma.cc/TN6C-XR88>].

Some marketplaces allow users to create NFTs right on their platform, while others do not.

⁵⁵ The steps were not included because of brevity. But see Natalee, *The Complete Guide to Minting NFTs on OpenSea*, NFT CULTURE (Dec. 6, 2021) <https://www.nftculture.com/guides/the-complete-guide-to-minting-nfts-on-opensea/> [<https://perma.cc/A74R-PMES>] to learn more about minting NFTs on the most popular NFT marketplace—OpenSea; see also Harry Denley, *So You Wanna Build Your Own PFP NFT Project?*, MYCRYPTO.COM (Sep. 23, 2021) <https://blog.mycrypto.com/so-you-wanna-build-your-own-pfp-nft-project> [<https://perma.cc/8M8P-GCWX>].

⁵⁶ *Cryptographic hash function*, WIKIPEDIA, https://en.wikipedia.org/wiki/Cryptographic_hash_function [<https://perma.cc/RA6D-M5P9>] (last visited Jan. 18, 2021); see also *What is a Hash Function in a Blockchain Transaction*, BITPANDA <https://www.bitpanda.com/academy/en/lessons/what-is-a-hash-function-in-a-blockchain-transaction/> [<https://perma.cc/A36B-AQKE>] (last visited Jan. 18, 2022).

⁵⁷ Within the past two years dozens of websites have been created to sell NFTs, address unique NFT market metrics, facilitate NFT gameplay, and give out general NFT information. See Besancia, *supra* note 44.

⁵⁸ Some of the most popular NFT platforms are OpenSea, SuperRare, Nifty Gateway, Rarible, and Makersplace. See Oliver Alan, *Top 5 Best NFT Marketplaces*, DATA DRIVEN INVESTOR (Dec. 13, 2021) <https://medium.datadriveninvestor.com/top-5-best-nft-marketplaces-c57871a9d315> [<https://perma.cc/GET5-GRKC>].

purchaser and seller's digital addresses.⁵⁹ Using the blockchain to mint NFT images ensures there is a record of sale authenticity and valid asset ownership for future transactions.⁶⁰

(ii) NFTs and Generative Digital Art

Currently, most NFT projects involve generative digital artwork.⁶¹ When creating traditional artwork, artists make unilateral decisions dictating what features are attributed to the resulting work. For example, when Leonardo da Vinci created the Mona Lisa, he had to determine what attributes he wanted the image to display—like what her hair color would be and what background she was positioned against.⁶² Generative art is different than traditional art, because it is created in whole, or part, by a non-human, automated system that independently decides the features attributed to each art piece.⁶³

In generative art, an artist does not have to meticulously craft each attribute of the artwork, instead he creates a general description on the limitations he imagines for each design

⁵⁹ *What is a Transaction Hash/Hash ID?*, COINBASE <https://help.coinbase.com/en/coinbase/getting-started/crypto-education/what-is-a-transaction-hash-hash-id> [<https://perma.cc/THB4-JFUJ>] (last visited Jan. 18, 2022) (“A transaction hash/id is a unique string of characters that is given to every transaction that is verified and added to the blockchain.”).

⁶⁰ See *supra* Part I.A. for a discussion of blockchain.

⁶¹ For this Comment, the only type of digital art we will discuss is generative art as it relates to NFTs, because this type of art is heavily influenced by AI-generated algorithms; however, there are four main art types attached to NFTs: layered art, programmable art, collaborative art, and generative art. Layered art consists of multiple artists working on each layer which can be tokenized and owned by different individuals. See James Gatto, *Protecting IP and Limiting Liability When Licensing IP for Digital Art and NFTs*, JDSUPRA (Mar. 25, 2021) <https://www.jdsupra.com/legalnews/protecting-ip-and-limiting-liability-4454137/> [<https://perma.cc/7MJQ-2WPN>]. Each owner can provide input and change the artwork over time. *Id.* Programmable art is programmed to change based on certain factors occurring. See *id.* Collaborative art is like a compilation or collective work under 17 U.S.C. § 103. See also Peter Menell, et. Al., *Intellectual Property in the New Technological Age*: 2019 1, 540 (2019).

⁶² There is a possibility that da Vinci did not “create” the Mona Lisa but instead painted the exact image of female subject. See *Lisa Del Giocondo*, WIKIPEDIA https://en.wikipedia.org/wiki/Lisa_del_Giocondo [<https://perma.cc/LS5N-W472>] (last visited Jan. 18, 2022). While this could mean he didn’t “create” the entire painting, he did have to make the creative decisions as to how realistic he wanted the painting to be to his subject and had creative freedom to pursue his desires without input from others around him which arguably requires originality. See *Mona Lisa*, WIKIPEDIA https://en.wikipedia.org/wiki/Mona_Lisa [<https://perma.cc/3F4H-7JJJ>] (last visited Jan. 18, 2022) (discussing the creation, history, and relevance of the Mona Lisa to modern day art).

⁶³ *Generative Art*, WIKIPEDIA https://en.wikipedia.org/wiki/Generative_art [<https://perma.cc/4T5C-BGAX>] (last visited Jan. 18, 2022).

and outsources the final application of these designs to AI.⁶⁴ For example, if Bisco Dickson wanted 10 of his 10,000 CryptoBears to have a pink background, he would create that background and then program that specification into the AI and let it decide which 10 of the 10,000 CryptoBears were assigned this property. It is vital to know that most NFT projects are selling generative digital artwork created using AI, because this process raises complex copyright issues regarding the actual author of these NFT images.

(iii) The Value in Purchasing an NFT image

NFT images derive value from “scarcity, collectability, and authenticity.”⁶⁵ NFT projects achieve scarcity by limiting the amount of NFT images created for each project—typically 10,000 or fewer.⁶⁶ The limited number of NFT images, along with the blockchain’s ability to ensure all on-chain images remain unmodified once minted, guarantee that as the demand for the NFT images increases, the supply remains static.⁶⁷ NFT images are also desirable because they often come with exclusive benefits only accessible to those who have one in their wallet.⁶⁸

⁶⁴ *Id.*

⁶⁵ Dukedom, *supra* note 1, at 59–60. Additionally, NFTs create value through their ability to anticipate future value speculation, provide liquidity premiums to those their owners, and contain an ownership lineage that is easily trackable. Kenneth Rapoza, *NFTs are Increasingly Taking Us Into a World of Make Believe*, FORBES (May 2, 2021, 8:00 AM) <https://www.forbes.com/sites/kenrapoza/2021/05/02/nfts-are-increasingly-taking-us-into-a-world-of-make-believe/?sh=36f6d08a6ccf> [<https://perma.cc/2A7R-MF9N>].

⁶⁶ *1c 2021 NFT Year in Review*, 1CONFIRMATION <https://drive.google.com/file/d/119deH7XuGsNbltAtir6C9LvR7FAbeZ5R/view> [<https://perma.cc/94EM-JWRC>] (last visited Jan. 18, 2022) (“These [PFP] are collections of a fixed number (most commonly 10,000) of digital characters that all have a similar artistic style but variations in traits.”).

⁶⁷ Some of the first NFT collections created were a series of PFPs, or profile pics, designed to be used as avatars for social media accounts. Shanti Escalante–De Mattei, *The Future of NFTs: How PFP–Based Projects Took Over the Market*, ARTNEWS (Aug. 25, 2021, 4:12 PM) <https://www.artnews.com/art-news/news/pfp-nfts-future-market-1234602384/> [<https://perma.cc/6NRM-FBQ8>]. These projects are often referred to as PFP projects, or profile picture projects. Besancia, *Saatchi Art and the Other Avatars*, NONFUNGIBLE (Jan. 4, 2022) <https://nonfungible.com/blog/saatchi-art-and-the-other-avatars> [<https://perma.cc/D67H-R2MM>].

⁶⁸ NFT’s Street, *Benefits of Non–Fungible Tokens (NFTs)*, NFT’S STREET (Oct. 13, 2021) <https://www.nftstreet.com/benefits-of-non-fungible-tokens-nfts/> [<https://perma.cc/FT3V-9NLZ>].

The tangible value and collectability of certain NFT images is evident when looking at the first digital NFT project—CryptoPunks.⁶⁹ In June of 2017, when cryptocurrency and NFTs were in their infancy, a group of creators came together to create 10,000 pixelated original NFT images dubbed CryptoPunks, seen in Figure 3. CryptoPunks were created as a pseudo “reward” to early adopters of the cryptocurrency Ethereum, and anyone who had Ethereum in their wallet could mint a CryptoPunk for free. The CryptoPunks’ intentional scarcity, their collectability as the honorary “first NFT project,” and the fact that they are reselling for millions of dollars, shows how valuable NFT images can be.⁷⁰



NFT image advocates see purchasing original NFT images as the digital equivalent of real-world art ownership. There are those who argue there are minimal benefits in purchasing something that other people can view, download, and use for free.⁷¹ NFT image collectors argue

⁶⁹ Andrew Steinwold, *The History of Non-Fungible Tokens (NFTs)*, MEDIUM (Oct. 7, 2019) <https://medium.com/@Andrew.Steinwold/the-history-of-non-fungible-tokens-nfts-f362ca57ae10> [<https://perma.cc/CXY3-YTUN>].

⁷⁰ Prabhjote Gill, *Zombie CryptoPunk sells for over \$5 million to become the Fourth Most Valuable CryptoPunk NFT on the Market*, BUS. INSIDER INDIA (Aug. 25, 2021, 14:23 IST) <https://www.businessinsider.in/investment/news/nft-zombie-cryptopunk-7252-just-sold-for-5-billion-doubling-value-in-less-than-one-month/articleshow/85594193.cms> [<https://perma.cc/Y53Q-TM64>] (CryptoPunk sold for \$5.3 million in August 2021); see Steinwold, *supra* note 69. Not only have normal consumers purchased these Punks, but large name-brand companies, like Visa, have also ventured into the NFT game by buying Punks. Ryan Browne, *Visa Jumps into the NFT Craze, Buying a ‘CryptoPunk’ for \$150,000*, CNBC (Aug. 23, 2021, 10:11 AM) <https://www.cnbc.com/2021/08/23/visa-buys-cryptopunk-nft-for-150000.html> [<https://perma.cc/9JBD-Y6TU>] (discussing how Visa paid \$150,000 for a CryptoPunk in August 2021).

⁷¹ Aaron Patrick, *Is the World’s Hottest Asset Class Pointless?*, FIN. REV. (Sep. 24, 2021, 5:00 AM) <https://www.afr.com/technology/is-the-world-s-hottest-asset-class-pointless-20210923-p58u58> [<https://perma.cc/KF68-8AS9>] (discussing whether NFTs are pointless as an asset class); see also Sissi Cao, *90% of NFTs Will Be Worthless in 3 to 5 years, Coinbase Co-founder Warns*, OBSERVER (June 18, 2021, 12:13 PM)

that purchasing a rare original NFT image is just as valuable as owning an original Picasso.⁷²

Despite the fact millions can download a copy of the work for free, purchasing the NFT image comes with the ability to have certain rights in, not just access to, the displayed work. In the same way that purchasing a reproduction of the Mona Lisa does not hold the same value as the actual Mona Lisa, taking a screenshot of an NFT image does not grant someone the same opportunities purchasing that NFT image does.⁷³

NFT projects took off in 2021, with thousands of projects launching and over \$9 billion in secondary sales occurring on NFT-exclusive marketplaces.⁷⁴ Each NFT image purchaser is looking for something from their purchase: monetary value, social clout, adoption into a pseudo-community, etc. Like shopping for a car, each NFT project must convince potential purchasers that their original NFT image is worth purchasing. This has led to the publication of project-specific “roadmaps.”⁷⁵ Each roadmap outlines the unique benefits that come from purchasing an NFT image associated with that NFT project. These benefits include membership into exclusive virtual communities, first access to real-world events, and the chance to purchase limited edition merchandise.

<https://observer.com/2021/06/coinbase-cofounder-warn-nfts-worthless-interview/> [<https://perma.cc/MC43-72HT>] (claiming that 90% of NFTs will be worthless in 3 to 5 years).

⁷² Another example is owning an autographed version of a CD that millions of people have bought. While each CD will play the same songs in the same order, the added value is in the scarcity of CDs with actual autographs. See Michael A. Tomasulo, *Understanding the Intellectual Property Value of NFTs*, WINSTON & STRAWN LLP (May 25, 2021) <https://www.winston.com/en/the-playbook/understanding-the-intellectual-property-value-of-nfts.html> [<https://perma.cc/X8LC-D8LT>].

⁷³ Dukedom, *supra* note 1, 59–60.

⁷⁴ See *id.* at 8 (“In 2020, the trading volume of the NFT market exceeded \$250 million, a four-fold increase over 2019 . . .”).

⁷⁵ See BORED APE YACHT CLUB, <https://boredapeyachtclub.com/#/home#roadmap> [<https://perma.cc/D8Y9-PY5Y>] (last visited Jan. 18, 2022); INBETWEENERS, <https://www.inbetweeners.io/#roadmap-section> [<https://perma.cc/YK2K-NG2B>] (last visited Jan. 18, 2022); LAZY TIGER WOOD CLUB, <https://www.lazytigerwoodclub.com/> [<https://perma.cc/238U-5JPU>] (last visited Jan. 18, 2022) for examples of different NFT project roadmaps.

A great example of effective roadmap execution is the Bored Ape Yacht Club (“BAYC”)—an example of which is displayed in Figure 4.⁷⁶ The BAYC project is a collection of 10,000 original ape NFT images whose roadmap promised BAYC NFT image purchasers entrance to exclusive in-person events, limited digital and physical merchandise drops, and first access to subsequent NFT projects whose value was tied to the original BAYC NFTs’ value.⁷⁷ The successful execution of this roadmap resulted in the BAYC NFTs’ value increasing exponentially—going from an initial mint price of 0.08 ETH (\$306.46 as of Jan. 2, 2022) to a resale average of 78.35 ETH (\$300,000 as of Jan. 2, 2022) – a 1000% return on their investment.⁷⁸



The Bored Ape Yacht Club’s Mutant Ape Yacht Club (“BAYC MAYC”)

shows another cool trait of NFT projects—derivative works created from the original NFT image.⁷⁹ The BAYC MAYC was a subsequent NFT project spawned from the success of the BAYC NFT collection and is illustrated in Figure 5 below. The BAYC creators placed a “serum” into each BAYC NFT holder’s wallet that their BAYC NFT could “ingest.” Each

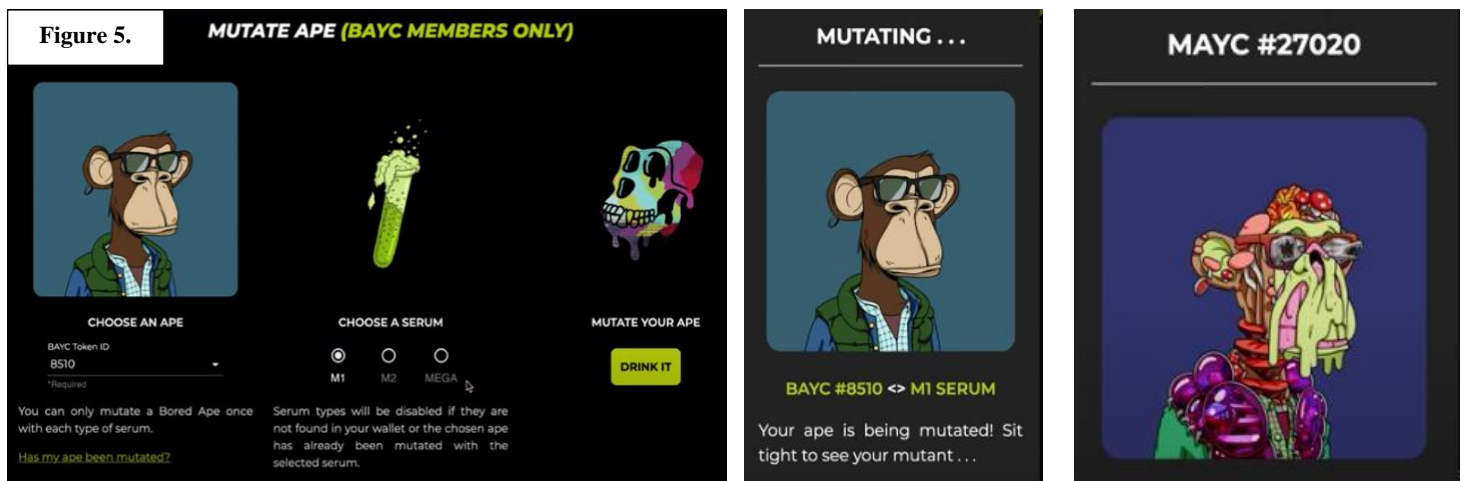
⁷⁶ BORED APE YACHT CLUB, <https://boredapeyachtclub.com/#/> [<https://perma.cc/NB2X-6PAY>] (last visited Jan. 18, 2022); *see also* BORED APE YACHT CLUB, *supra* note 75.

⁷⁷ *See The MAYC*, BORED APE YACHT CLUB, <https://boredapeyachtclub.com/#/mayc> [<https://perma.cc/XNM8-QDNJ>] (last visited Jan. 18, 2022); *see also Kennel Club*, BORED APE YACHT CLUB, <https://boredapeyachtclub.com/#/kennel-club> [<https://perma.cc/RWH3-FFY8>] (last visited Jan. 18, 2022).

⁷⁸ ETH standards for Ether which is a cryptocurrency facilitated on the Ethereum blockchain. *Bored Ape Yacht Club*, OPENSEA, <https://opensea.io/collection/boredapeyachtclub?tab=activity> [<https://perma.cc/SWB3-6AV6>] (last visited Jan. 18, 2022).

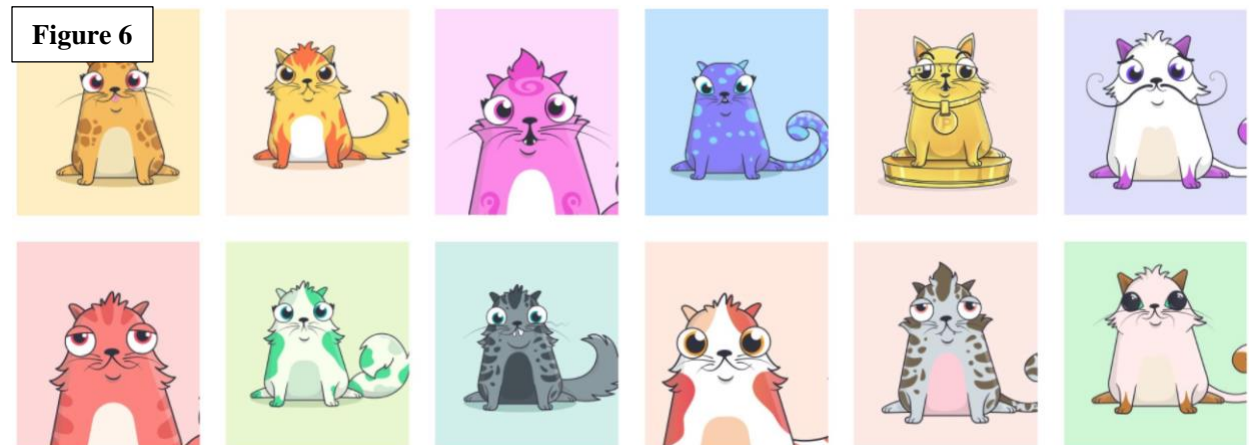
⁷⁹ *See supra* note 77 and Section I.C.iii.; *see also* BORED APE YACHT CLUB, *supra* note 75.

BAYC NFT holder then had the option to command their original BAYC NFT image to merge with the serum and create a mutant version—the MAYC NFTs.⁸⁰



(iv) Other Mentionable NFT Projects

CryptoKitties



In October 2017, what have been called the digital version of beanie babies was created—CryptoKitties (pictured in Figure 6).⁸¹ CryptoKitties allow users to partake in a virtual

⁸⁰ Reethu Ravi, *The Mutant Ape Yacht Club: BAYC's Mutant Apes are a Roaring Success*, NFT EVENING (Aug. 29, 2021) <https://nftevening.com/the-mutant-ape-yacht-club-baycs-mutant-apes-are-a-roaring-success/> [<https://perma.cc/U6DS-NGBP>]. The MAYC website states, “nobody knows what will happen when an ape is introduced to M3 serum.” See BORED APE YACHT CLUB, *supra* note 75. This phrasing would seem to allude to a force beyond the creator or purchaser’s control determining the mutated NFT’s outcome.

⁸¹ Evelyn Cheng, *Meet CryptoKitties: the \$100,000 digital beanie babies epitomizing the cryptocurrency mania*, CNBC (Dec. 6, 2017, 12:42 PM EST); see also CRYPTOKITTIES <https://www.cryptokitties.co/> [<https://perma.cc/L8FX-AVJ4>] (last visited Mar. 6, 2022); see also James, *How to Code Your Own CryptoKitties-Style Game on Ethereum*, MEDIUM (Dec. 4, 2017) <https://medium.com/loom-network/how-to-code-your-own->

game that enables players to adopt, raise, and trade virtual kittens and cats.⁸² This game was unique because it allowed users to not only take care of their virtual kittens, but those who owned a CryptoKitty could breed their cat with someone else's, creating a third, unique kitten.⁸³ From this widely successful venture, the creators of CryptoKitties spawned a company called Dapper Labs which runs the popular NFT sports platform, NBA TopShot.⁸⁴

Memes

Memes have become popular NFT image goldmines as well.⁸⁵ In 2016 the Pepe the Frog meme spurred an onslaught of Pepe NFTs called Rare Pepes—shown in Figure 7.⁸⁶



cryptokitties-style-game-on-ethereum-7c8ac86a4eb3 [<https://perma.cc/QUU3-CDT4>] (teaching users how to code their own kitty).

⁸² Andrew Steinwold, *The History of Non-Fungible Tokens (NFTs)*, MEDIUM (Oct. 7, 2019) <https://medium.com/@Andrew.Steinwold/the-history-of-non-fungible-tokens-nfts-f362ca57ae10> [<https://perma.cc/H2B4-S337>].

⁸³ *Id.*

⁸⁴ DAPPER LABS <https://www.dapperlabs.com/> [<https://perma.cc/97NZ-ZLEQ>] (last visited Mar. 6, 2022).

⁸⁵ CHARLIE BIT ME! NFT AUCTION <https://www.charliebitme.com/#/> [<https://perma.cc/X2QL-28HF>] (last visited Mar. 6, 2022).

⁸⁶ RARE PEPE DIRECTORY <http://rarepepedirectory.com/> [<https://perma.cc/S5L7-XQKV>] (last visited Mar. 6, 2022); see also RARE PEPE, THE BEST COLLECTION OF RARE PEPEs!! <https://rare-pepe.com/> [<https://perma.cc/GS3L-UXB6>] (last visited Mar. 6, 2022).

In April 2021, the Disaster Girl (burning house) NFT image sold for \$650,000—depicted in Figure 8.⁸⁷ In May 2021, Nyan Cat NFT, a popular meme depicting a cat face floating through the air with a PopTart-shaped body (seen in Figure 9), was sold for almost \$580,000,⁸⁸ and the “Charlie Bit my Finger” NFT video sold for \$761,000.⁸⁹

Figure 8



A five-year-old Zoe Roth shot to internet fame after her father took this image of her smiling in front of a controlled burn of a house in her North Carolina neighbourhood. (Supplied)

Figure 9



(v) NFT Barriers and Benefits

NFT images offer benefits to art collectors and artists that physical art never could.⁹⁰

While the digital nature of NFT images can pose as an entry barrier for older artists unfamiliar with blockchain technology, its digital component is helping to expose an entire segment of the population to the art world.⁹¹ High-quality, physical art can be expensive and hard to purchase

⁸⁷ Jacqueline Howard, ‘Disaster girl,’ whose real name is Zoe Roth, sells original meme photo as an NFT for \$650,000, ABC NEWS (Apr. 28, 2021, 5:35 PM) <https://www.abc.net.au/news/2021-04-30/disaster-girl-meme-sells-for-500-000/100106366> [<https://perma.cc/G3VN-RGRQ>].

⁸⁸ Erin Griffith, *Why an Animated Flying Cat With a Pop-Tart Body Sold for Almost \$600,000*, THE NEW YORK TIMES (Feb. 22, 2021) <https://www.nytimes.com/2021/02/22/business/nft-nba-top-shot-crypto.html> [<https://perma.cc/YG7K-Y2GV>].

⁸⁹ Emma Bowman, ‘Charlie Bit Me’ Will Remain on YouTube After NFT Auction Switcheroo, NPR (May 30, 2021, 6:24 AM) <https://www.npr.org/2021/05/30/1001627869/charlie-bit-me-will-remain-on-youtube-after-nft-auction-switcheroo> [<https://perma.cc/D2VV-DFYF>].

⁹⁰ Dukedom, *supra* note 1, at 59.

⁹¹ *See id.* at 61 (commenting on how the hyper production and hyper consumption of NFTs over the last few years has led to difficulty for emerging artists trying to enter the market); *see* Anil Dash, *NFTs Weren’t Supposed to End Like This*, THE ATLANTIC (Apr. 2, 2021) <https://www.theatlantic.com/ideas/archive/2021/04/nfts-werent-supposed-end-like/618488/> [<https://perma.cc/8QTP-V24E>] (discussing the negative efforts on artists of the current state of blockchain and NFTs); *see also* Tomasulo, *supra* note 72.

without access to an auction house, but high-value, high-quality NFT images are accessible to everyone with a digital address and wallet.⁹²

NFT projects are also helping to redistribute economic power within the art world by giving more autonomy to the artist and collectors making the once exclusive services of galleries and auction houses unnecessary.⁹³ Although off-chain NFT images can be lost, altered, or destroyed, on-chain NFT projects allow valuable, unseen art to be showcased to the public without concern of theft or tampering.⁹⁴ Physical art that may have been hidden away in a vault can now be minted into an NFT image and showcased via a high-definition screen.⁹⁵ This enhances the public's exposure to exquisite art collections while bypassing the safety concerns associated with displaying physical works.

(vi) Value to Other Professional Industries

NFTs contribute to a multitude of industries beyond just the digital art world.

Digital Real Estate

The digital realm has embraced physical real estate via programs that allow you to buy digital property that mimics that found in the real world.⁹⁶ The Sandbox and Cryptovoxels are virtual worlds where users can build things and interact with each other while offering software

⁹² See CJEN, *4 Benefits of NFTs for Creators and Artists*, DGEN (Oct. 27, 2021) <https://dgen.network/4-benefits-of-nfts-for-creators-and-artists/> [<https://perma.cc/3YG3-49GS>].

⁹³ *Id.*

⁹⁴ The security of images on the blockchain depends on what standard smart contract the NFT is written with and what type of blockchain the information is stored on. See *supra* note 51 (discussing the Raccoon Secret Society); see also *supra* Section I.B.i. (discussing the different security protocols attached to on-chain and off-chain transactions).

⁹⁵ Dukedom, *supra* note 1, at 59. The example of physical art being minted into an NFT requires a deeper discussion on whether the creation of physical art into an NFT is allowed under the first sale doctrine. See C-419/13Art & Allposters Int'l BV v. Stichting Pictoright, 2015 E.C.R. 27 (Jan. 22, 2015) (ruling that an artwork may not be transferred from a poster to canvas print without the author's permission) (CJEU case).

⁹⁶ The Sandbox is a virtual world where users can build things and interact with each other while offering software to allow users to create elements within this realm and monetize them. *THE SANDBOX*, <https://www.sandbox.game/en/about/> [<https://perma.cc/375A-PMK8>] (last visited Jan. 19, 2022); see also CRYPTOVoxelS, <https://www.cryptovoxels.com/about> [<https://perma.cc/M8LB-XN4F>] (last visited Jan. 19, 2022).

to allow users to create elements within this realm and monetize them.⁹⁷ Another platform, Decentraland, focuses on the fact “it is a fully decentralized and open market where you can discover, buy, sell, and manage your parcels of land, build on that land, and generate revenue from your efforts.”⁹⁸ Other platforms operate in a similar manner to Facebook’s Farmville in that they focus on NFT farming, the types of creatures present within the digital realm, and the level of rarities of those creatures.⁹⁹

Fashion

The fashion industry has utilized NFTs in a unique way as well. Famous shoe brand Fewocious collaborated with NFT-brand RTFKT to create an NFT image that users could purchase and then redeem for a physical pair of shoes in stores (Figure 10).¹⁰⁰



Figure 10

⁹⁷ *Id.*

⁹⁸ See Debra Cassens Weiss, *Major Law Firm Buys Property in the Metaverse and Opens Virtual Office*, ABA JOURNAL (Feb. 17, 2022, 9:38 AM) <https://www.abajournal.com/news/article/major-law-firm-buys-property-in-the-metaverse-and-opens-virtual-office> [<https://perma.cc/E43C-VK6A>] (“Arent Fox is opening a virtual office in the metaverse in the fashion and retail district of browser-based 3D platform Decentraland[,]” describing the metaverse as “the combined network of 3D virtual worlds in which people work, play and socialize,” and where lawyers can meet with clients for business or socializing.”); see also Michelle Shen, *JP Morgan is First Bank to Enter the Metaverse with a Virtual ‘Onyx Lounge’*, USA TODAY (Feb. 15, 2022, 6:33 PM) <https://www.usatoday.com/story/money/2022/02/15/jp-morgan-bank-joins-metaverse/6803137001/>

[<https://perma.cc/P5M8-WNAU>] (“Similar to its role as a bank, [JP Morgan] can facilitate cross border payments, foreign exchange, financial assets creation, trading and safekeeping” within the metaverse).

⁹⁹ Besancia, *Slightly more than 10,000 profile pictures collection*, NONFUNGIBLE (Aug. 3, 2021) <https://nonfungible.com/blog/slightly-more-than-10000-profile-picture-collection> [<https://perma.cc/MFF3-6UK4>] (creating 20 types of creatures that exist and three levels of rarity – Normies, Chads, and Degens. “Farming” consists of putting “one land and one Normie” into a “farming cabinet” and coming back in a week. Either more portions of \$DUNG or a rare Chad will be created).

¹⁰⁰ Charlie Kolbrener, *The FEWOCIOUS x RTFKT Sneaker Project is Paving the Way for NFT Collaborations*, ONE37PM (Apr. 2, 2021) <https://www.one37pm.com/nft/fashion/fewocious-rtfkt-collaboration-sneakers> [<https://perma.cc/7SLJ-AMZH>].

In utilizing this tactic, “physical collectibles can be released with a corresponding digital collectible, further amplifying the value of an asset.”¹⁰¹ High-end luxury brands that have historically issued unique serial numbers to ensure product authenticity have started using NFTs to provide authentication services, allowing consumers the ability to trace the authenticity of any goods they purchase.¹⁰² Louis Vuitton, Tiffany, and Dom Perignon partnered with blockchain platform AURA to match a product’s ID with a client’s ID to create an secure chain of non-reproducible, digital blocks that enable consumers to access the history of a product and proof its authenticity at every step of the value chain.¹⁰³ This allows “more transparency in traceability, sustainability, and authenticity among these brands and the goods they sell.”¹⁰⁴ Other groups have created digital e-warranties that are stored on a blockchain and allow customers to verify the authenticity of the good via a simple photo taken with a mobile phone.¹⁰⁵

¹⁰¹ *Id.*; see Danny Parisi, *Beyond the Hype: How NFTs Stand to Benefit Fashion Brands*, GLOSSY (Mar. 24, 2021) <https://www.glossy.co/fashion/beyond-the-hype-nfts-stand-to-benefit-fashion-brands-in-the-future/> [<https://perma.cc/4M9E-VV22>].

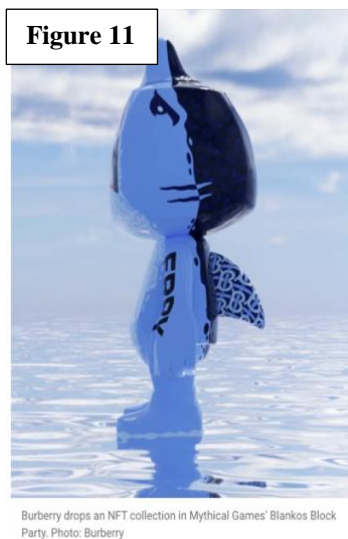
¹⁰² Companies have used NFTs to verify the authenticity of a physical collectible in a “simple, secure and immutable” way. Dukedom, *supra* note 1, at 58 (discussing the Codex Protocol); see also LVMH, *supra* note 30. This allows for “more transparency in traceability, sustainability, and authenticity among these brands and the goods they sell.” *Id.*; see also Nicky Diamonds and Wale collaborate for NFT release on ArtGrails, ART PLUGGED <https://artplugged.co.uk/nicky-diamonds-and-wale-collaborate-for-nft-release-on-artgrails/> [<https://perma.cc/C29K-D5AV>] (last visited Jan. 19, 2022).

¹⁰³ LVMH (Apr. 20, 2021) <https://www.lvmh.com/news-documents/news/lvmh-partners-with-other-major-luxury-companies-on-aura-the-first-global-luxury-blockchain/> [<https://perma.cc/SH59-Z38K>] (last visited Mar. 6, 2022); see also Reggie Wade, *ArtGrails debuts NFT of Diamond Supply Co. & Nike Tiffany SB Dunks*, YAHOO!NEWS (Mar. 31, 2021) <https://news.yahoo.com/art-grails-debuts-nft-of-diamond-supply-co-nike-tiffany-sb-dunks-200111399.html> [<https://perma.cc/F3XB-GZRN>].

¹⁰⁴ LVMH, *supra* note 103; see also Art Plugged, *supra* note 102.

¹⁰⁵ See LVMH, *supra* note 30 (discussing Hublot’s use of this new technology to authenticate its watches).

In July 2021, Louis Vuitton announced it would be creating 30 NFT images (10 designed by Beeple) to be offered in the new game it is creating - 200 Anecdotes.¹⁰⁶ This venture shows just how far the luxury fashion industry has started to experiment “with the role NFTs can play as product entities in their own right.”¹⁰⁷ Gucci recently auctioned off a four-minute NFT video that sold for \$25,000,¹⁰⁸ and Burberry partnered with a popular game company to create NFT vinyl toys that can be collected, upgraded, and sold within the game company’s new franchise—Blankos Block Party (examples of which are featured in Figure 11).¹⁰⁹



¹⁰⁶ Charlene Prempeh, *Louis Vuitton gets its Game Face On*, FIN. TIMES (July 29, 2021) <https://www.ft.com/content/e21a8cf6-5ad0-4245-a656-8ca74787d40a> [<https://perma.cc/WH5Z-XQKU>].

¹⁰⁷ *Id.*

¹⁰⁸ Camila Brooks, *Gucci Closes First NFT Sale Via Christie's Auction*, GOTHAM (June 3, 2021) <https://gothammag.com/gucci-nft-aria-christies-auction> [<https://perma.cc/2XAY-XV9M>].

¹⁰⁹ *Burberry Drops NFT Collection in Mythical Games' Blankos Block Party*, BURBERRY, <https://www.burberryplc.com/en/news/brand/2021/Blankos.html> [<https://perma.cc/CMP5-UKGU>] (last visited Jan. 19, 2022).

Traditional Art

Recently, physical art galleries and auction houses have started to venture into this space. NFTs really became mainstream in 2019, when Beeple, now the LeBron James of the crypto world, sold his Everydays collection (5,000 digital creations) for \$69 million (pictured in Figure 13).¹¹⁰ Not only did this sale put NFTs on the radar for mainstream commerce but it also facilitated the first collaboration between a traditional, well-respected auction house, Christies, and a little-known artist minting NFTs called Beeple. Sotheby's also ventured into this space with The Fungible, a collection of digital art by renowned creator Pak, seen in Figure 12.¹¹¹



Figure 12



Figure 13

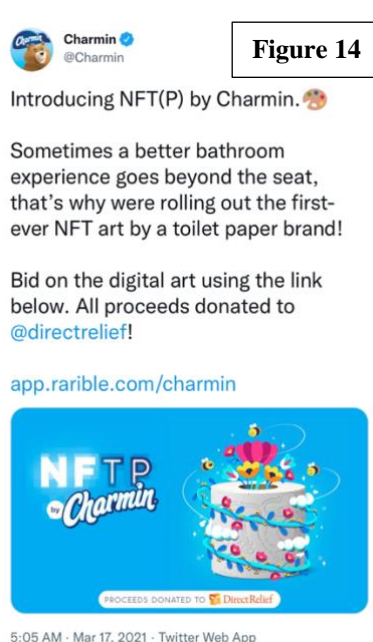
Beeple's collage, *Everydays: The First 5000 Days*, sold at Christie's. 1 Image: Beeple

¹¹⁰ *Id.*; see also Jacob Kastrenakes, *Beeple sold an NFT for \$69 million*, THE VERGE (Mar. 11, 2021, 10:09 AM) <https://www.theverge.com/2021/3/11/22325054/beeple-christies-nft-sale-cost-everydays-69-million>; [\[https://perma.cc/273A-CSM5\]](https://perma.cc/273A-CSM5); see also *Beeple Everydays: The First 5000 Days*, CHRISTIES https://onlineonly.christies.com/s/beeple-first-5000-days/beeple-b-1981-1/112924?ldp_breadcrumb=back [\[https://perma.cc/R2MP-M879\]](https://perma.cc/R2MP-M879) (last visited Mar. 6, 2022).

¹¹¹ *NFTs: Redefining Digital Ownership and Scarcity*, SOTHEBY'S (Apr. 6, 2021) <https://www.sothebys.com/en/articles/nfts-redefining-digital-ownership-and-scarcity>.

Advertisement/Brand Promotion

One of the most exciting and unexplored applications for NFTs exists within the world of product placement and consumer advertisements. In March 2021, Charmin created an NFT to represent its toilet paper empire and encourage consumers to “Enjoy the Go” both in real life and virtually, with the NFT image sales proceeds being donated to DirectRelief (Figure 14).¹¹² Also in March, Pringles created a “CryptoCrisp” flavor NFT image that was exclusively available on Rarible with a starting price of \$2, the equivalent of a traditional can of Pringles (Figure 15).¹¹³ Taco Bell has also joined the frenzy, selling Taco Gif NFTs on Rarible (Figure 16).¹¹⁴



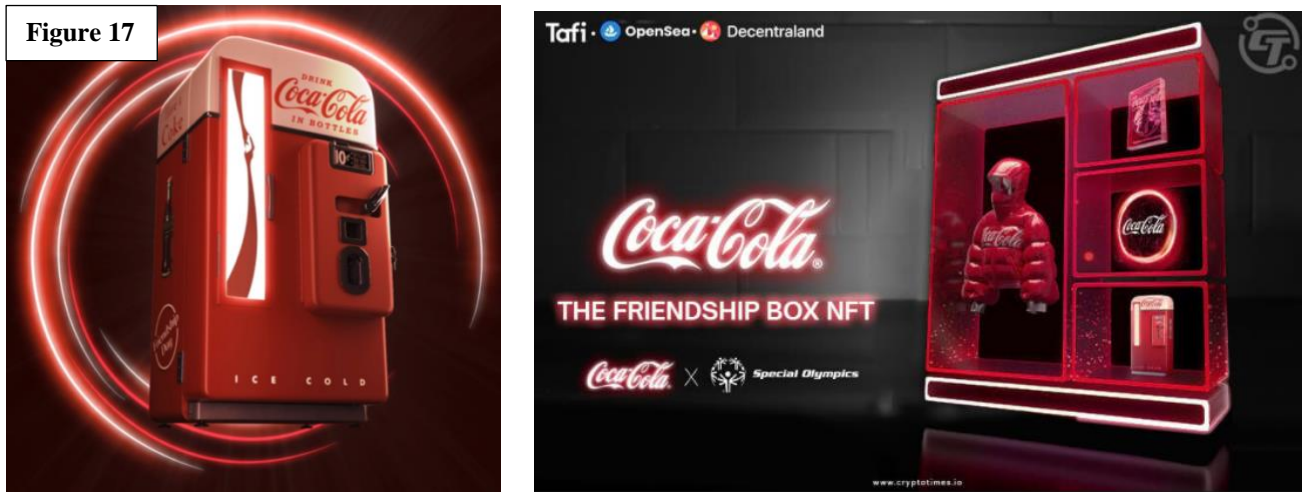
¹¹² Alan Danzis, *Charmin (r) Rolls Out First Ever NFT(P)*, P&G (Mar. 17, 2021) <https://news.pg.com/news-releases/news-details/2021/Charmin-Rolls-Out-First-Ever-NFTP/default.aspx> [<https://perma.cc/EBT6-JJUX>].

¹¹³ Nicolaus Li, *Pringles Joins NFT Craze with 'CryptoCrisp' Virtual Flavor*, HYPEBEAST (Mar. 18, 2021) <https://hypebeast.com/2021/3/pringles-cryptocrisp-nft-release-info> [<https://perma.cc/4TKG-3FX2>]; see also Jelisa Castrodale, *Why Pringles Is Selling a Can of Chips You Can't Eat for \$180*, FOOD & WINE (Mar. 18, 2021) <https://www.foodandwine.com/news/taco-bell-pringles-food-brands-nfts> [<https://perma.cc/KAB4-3XQ9>].

¹¹⁴ Taco Bell has sold Taco Gif NFTs. Mitchell Clark, *The Brands are at it Again—Taco Bell is Hopping on the NFT Train*, THE VERGE (Mar. 8, 2021, 3:45 PM) <https://www.theverge.com/2021/3/8/22319868/taco-bell-nfts-gif-tacos-sell> [<https://perma.cc/Y8UN-S3HN>].

Not only are brands getting involved in the real world, but some are even venturing into the digital one. Coca-Cola recently hosted an event in Decentraland where Coke-themed NFT images were given away via auction using OpenSea.¹¹⁵ During this event, wearable NFT images that can be dawned by players in the game were also available.¹¹⁶

Figure 17



Music

As one of the birth places of the NFT, the music industry has embraced NFTs more so than most industries. The streamlined process facilitated by smart contracts embedded in the NFTs is hoping to create an ecosystem that allows artists to receive fairer payments and greater royalty transparency than regular streaming platforms allow.¹¹⁷

¹¹⁵ Saniya More, *Coca-Cola creates its first collection of brand-inspired NFTs*, THE BLOCK (July 28, 2021, 10:10 AM) <https://www.theblockcrypto.com/post/112779/coca-cola-creates-its-first-collection-of-brand-inspired-nfts> [<https://perma.cc/5NBT-WKDG>].

¹¹⁶ *Id.*

¹¹⁷ Dukedom, *supra* note 1, at 64.

Artists themselves have also found ways to promote their new music or brand using crypto markets. Megan Thee Stallion teamed up with Cash App to explain cryptocurrency to her fans and the nuances of this often hard-to-understand market.¹¹⁸ Kings of Leon sold their most recent album with an NFT token attached and made \$1.45 million—an example of which is displayed in Figure 18.¹¹⁹ This NFT image came in three forms, with one providing the purchasers with a special album package and another offering live show perks, such as front-row seats for life, with a third type including an exclusive audiovisual art piece.¹²⁰



Figure 18

In March 2021, musical artist Grimes sold an NFT of her newest album for \$5.8 million.¹²¹ Additionally, a brand may license their branding or image to release exclusive

¹¹⁸ Kevin Helms, *Hip-Hop Star Megan Thee Stallion Creates ‘Bitcoin for Hotties’ Video to Educate Millions of Fans About Crypto*, BITCOIN.COM (Aug. 6, 2021) <https://news.bitcoin.com/hip-hop-star-megan-thee-stallion-creates-bitcoin-for-hotties-video-to-educate-millions-of-fans-about-crypto/> [<https://perma.cc/5JJD-JSEL>] (“Bitcoin is like a wild stallion that cannot be controlled by anyone. No one person can control how much is used, how much is in circulation, or what it’s worth.”).

¹¹⁹ Samantha Hissong, *Kings of Leon Will Be the First Band to Release an Album as an NFT*, ROLLING STONE (Mar. 3, 2021, 8:00 AM) <https://www.rollingstone.com/pro/news/kings-of-leon-when-you-see-yourself-album-nft-crypto-1135192/> [<https://perma.cc/BM6B-Y2XS>].

¹²⁰ *Id.*

¹²¹ Dukedom, *supra* note 1, at 57.

content to their fans or as a way to ensure ticket security.¹²² The Weeknd sold an NFT that contained new and unreleased songs and album artwork (examples pictured in Figure 19).¹²³

Figure 19



Sports

Perhaps no other industry has embraced NFTs more than sports. In July 2019, the NBA partnered with Dapper Labs to create NBA Top Shot on its own blockchain—Flow.¹²⁴ This season, the Golden State Warriors released their own NFT collection (depicted in Figure 20)

¹²² Dukedom, *supra* note 1, at 64.

¹²³ NIFTYGATEWAY <https://niftygateway.com/collections/theweeknd> [<https://perma.cc/ASR8-MQN2>] (last visited Jan. 19, 2022).

¹²⁴ NBA TOPSHOT, <https://nbatopshot.com/about> [<https://perma.cc/DE63-HABF>] (last visited Jan. 19, 2022); *see also* Ledger Insights, *Dapper Labs Shares NBA Top Shot Details, Future Plans*, LEDGER INSIGHTS (May 26, 2021) <https://www.ledgerinsights.com/dapper-labs-shares-nba-top-shot-details-future-plans/> [<https://perma.cc/R9RJ-RQWA>]. *But see* Jon Sarlin, *NBA Top Shot Customers Can't Get Their Money Out. Experts Are Confounded*, CNN BUS. (Apr. 27, 2021, 1:52 PM) <https://www.cnn.com/2021/04/27/investing/top-shot-withdrawal-nba-nft/index.html> [<https://perma.cc/UJ4R-XM2G>] (discussing how the unique aspects that make NBA Top Shot so desirable – its fast speeds due to performance on its own blockchain—also severely inhibit the ability of those who invest within NBA Top Shot to utilize these assets on other platforms . . . the assets are trapped within the blockchain they are created on and are not interoperable across other platforms).

while the Sacramento Kings partnered with Flow to create the first Smart Ticket NFT.¹²⁵

Leading college athletics into this digital frontier, the University of Miami turned its championship ring collection into an NFT image (seen in Figure 21).¹²⁶

Figure 20



CanesVault.com

Figure 21



During the Olympics, Great Britain was the first team to Launch an NFT collection and the International Olympic Committee shortly followed suit.¹²⁷ Multiple sports organizations have also partnered with crypto brands for sponsorship deals. Miami Heat and FTX signed a 19-year, \$135 million deal with FTX—an international cryptocurrency exchange,¹²⁸ while the NHL's Montreal Canadiens teamed up with Crypto.com to have the Crypto.com logo at center

¹²⁵ See *Warriors Announce Legacy NFT Collection*, NBA (Apr. 27, 2021) <https://www.nba.com/warriors/news/warriors-legacy-nft-collection-20210426> [<https://perma.cc/A3CN-RZNJ>]; see also *Kings Partner with LAVA and Flow to Release First-Ever Smart Ticket NFT Experience Pass Built on Blockchain*, NBA (July 26, 2021) <https://www.nba.com/kings/news/kings-partner-lava-and-flow-release-first-ever-smart-ticket-nft-experience-pass-built> [<https://perma.cc/7L4W-FTAE>] (discussing how 100 fans will receive exclusive privileges and an NFT digital poster with the California Classic logo on it; “with the Smart Ticket, you have the ability to assign more than just the rights to a seat but also the right to a variety of additional benefits”).

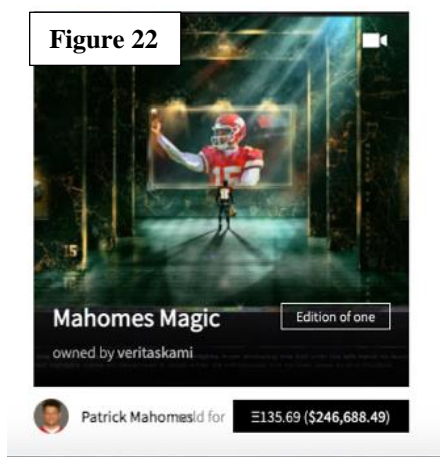
¹²⁶ Matthew De Saro, *Miami Hurricanes Become First University to Offer NFT Championship Rings*, ENTREPRENEUR (Aug. 13, 2021) <https://www.entrepreneur.com/article/380224> [<https://perma.cc/YE9J-QK5F>].

¹²⁷ Holly Hunt, *Team GB becomes first Olympic team to launch NFT collection*, INSIDER SPORT (July 23, 2021) <https://insidersport.com/2021/07/23/team-gb-becomes-first-olympic-team-to-launch-nft-collection/> [<https://perma.cc/77GL-YULP>]; see also *Officially Licensed Olympic NFT Pins Announced*, INTERNATIONAL OLYMPIC COMMITTEE (June 3, 2021) <https://olympics.com/ioc/news/officially-licensed-olympic-nft-pins-announced>.

¹²⁸ Jesse Pound, *Crypto industry to get first major U.S. stadium with Miami-Dade County approving FTX for Heat home*, CNBC (Mar. 26, 2021, 4:06 PM) <https://www.cnbc.com/2021/03/26/crypto-industry-to-get-first-major-us-stadium-with-miami-dade-county-approving-ftx-for-heat-home.html> [<https://perma.cc/B75Q-K3X9>].

ice for their home games.¹²⁹ The NFL also joined in with the New York Giants partnering with Grayscale to have the investment firm be the team's official digital currency asset management partner.¹³⁰

Not to be left behind, professional athletes have also started investing in this new space. In March of 2021, NFL wunderkind Patrick Mahomes partnered with NFT platform MakersPlace to release a series of digital collectible sets entitled "Museum of Mahomes"¹³¹ (Figure 22), while NFL G.O.A.T Tom Brady partnered with DraftKings to create Autograph, an NFT platform, which will house all the star's future NFT images (Figure 23).¹³²



Gaming

Normally, digital assets (such as game skins or weapons) within a game cannot be utilized outside of the game they are purchased on, but the "free to play" model encouraged by

¹²⁹ Jamie Crawley, *Crypto.com Signs Sponsorship Deal with NHL's Montreal Canadiens*, COINDDESK (Sep. 14, 2021, 5:28 AM) <https://www.coindesk.com/business/2021/03/17/cryptocom-signs-sponsorship-deal-with-nhls-montreal-canadiens/> [<https://perma.cc/8JDL-LLE7>].

¹³⁰ Patricia Traina, *New York Giants Team Up with Grayscale Investments For NFL's First Cryptocurrency Partnership*, FORBES (May 5, 2021, 12:57 PM) <https://www.forbes.com/sites/patriciatraina/2021/05/05/new-york-giants-team-up-with-grayscale-investments-for-nfls-first-cryptocurrency-partnership/?sh=5415b66d3c8c>.

¹³¹ MAKERSPLACE, <https://makersplace.com/patrickmahomes/drops/museum-of-mahomes/> [<https://perma.cc/N52E-38QE>] (last visited Jan. 19, 2022) (selling one of NFT for \$247,000).

¹³² Saniya More, *DraftKings Launches NFT Marketplace with First Drop Featuring Tom Brady*, THE BLOCK (Aug. 10, 2021, 11:38 AM) <https://www.theblockcrypto.com/linkedin/114064/draftkings-launches-nft-marketplace-with-first-drop-featuring-tom-brady> [<https://perma.cc/BQ8P-X9A4>].

NFTs changes this.¹³³ NFTs allow interoperability amongst gamers. The decentralization of these platforms allows all the data stored within one game to live on multiple servers. This means that the assets that used to be held on one server exclusively, and thus were incapable of transfer, are now transferable to realms outside the context of the game they were purchased in.¹³⁴ The digital assets purchased within the games used to be like chips at a casino or coins for an arcade game. While these assets have substantial value via their operability within the walls of the casino or arcade that created them, if you were to take them to the cashier at any other retailer, you would be unable to purchase things with them. Their value exists solely within the walls of the casino or arcade.

Before decentralized platforms and NFTs created the ability for interoperability within digital realms, gamers who purchased a game asset, such as basketball shoes, could only wear those shoes for a basketball game hosted within the “walls” of the game they were purchased for. Now, with new blockchain technology interoperability, users can transfer those shoes to a digital closet of sorts that allows the shoes to be worn in other games which provides the gamer with a broader well of resources to pull from when engaging in this realm.¹³⁵ For example, Cryptokitties not only look adorable, but they can be utilized within strategy games or chosen as a mode of transportation in head-to-head racing games. Additionally, games like Zed, a horse racing game, allow users to breed, buy, and race the horses they purchase.¹³⁶ The breeding

¹³³ “Free to play” means that the assets that used to be held on one server exclusively (and thus incapable of transfer) are now transferable to realms outside the context of the game they were purchased in. *See Interoperability Software*, WIKIPEDIA, <https://en.wikipedia.org/wiki/Interoperability#Software> [<https://perma.cc/44ZN-W4MH>] (last visited Jan. 19, 2022).

¹³⁴ *Id.*

¹³⁵ *See id.*

¹³⁶ ZED <https://guide.zed.run/> [<https://perma.cc/Z6QK-TB7J>] (last visited Mar. 6, 2022) (teaching users the five steps to become a “ZED RUN” expert: (1) creating a stable; (2) buying a racehorse; (3) racing the horse; (4) breeding the horse; and (5) understanding racing classes, progression and scarcity).

process (achievable via NFT algorithms) gives the consumer an added benefit to consumption—the chance to receive a return on their investment.¹³⁷

TV/Film

The most recent frontier to be conquered by NFTs has been the television and film industry. Not only is blockchain good for decentralization, but it also allows for film and television productions to receive outside support via crypto-crowdfunding.¹³⁸ Stoner Cats, a new animated NFT show produced by Mila Kunis starring Jane Fonda, Chris Rock, and Aston Kutcher, plans to exclusively offer its content to those who purchase an NFT to unlock all of the Stoner Cat episodes (seen in Figure 24).¹³⁹ This new way of offering content allows consumers and creators to cut out the middle man and actually contribute to the content they are producing and watching.¹⁴⁰



¹³⁷ *Id.*

¹³⁸ See Vitalik Buterin Joins Cast of Stoner Cats Mila Kunis' New Animated NFT Show, COINDESK (July 25, 2021, 2:01 PM) <https://www.coindesk.com/business/2021/07/25/vitalik-buterin-joins-cast-of-stoner-cats-mila-kunis-new-animated-nft-show/> [<https://perma.cc/FV9V-RSDF>] (discussing how producing a show through NFT funding prevents censorship and keeps creative control in the hands of the consumer and producer instead of the network);

¹³⁹ *Id.* This NFT will be both a physical way to access the show and a digital artwork representing one of the characters. It costs 0.35 ETH to watch.; see also Cheyenne Ligon, Vitalik Buterin is Involved in a New Documentary About Ethereum (July 13, 2021, 1:50 PM) <https://www.coindesk.com/markets/2021/07/14/vitalik-buterin-is-involved-in-a-new-documentary-about-ethereum/> [<https://perma.cc/K4KM-WXR3>] (using crypto-crowdfunding efforts to fund documentary - Ethereum: The Infinite Garden).

¹⁴⁰ *Id.*

In September 2021, United Talent Agency announced it had signed deals with CryptoPunks, Meebits, and Autoglyphs, all algorithmically generated NFT image creation collections valued at more than \$3 billion.¹⁴¹ In July 2021, Lionsgate announced it would start to mint NFTs of its entertainment franchises and signed a partnership with Autograph.¹⁴²

Fox also debuted its entrance into the NFT business by announcing the creation of its own NFT company and NFT animated comedy series.¹⁴³ Not only will this company be utilized for debuting the network's first NFT animated comedy series, Krapopolis (Figure 25), but it will also act to "help [] brands connect directly with fans and enthusiasts through NFTs."¹⁴⁴



These deals show the staying power of NFTs as they highlight the arts-meets-brands-meets-technology potential within this new space.

¹⁴¹ Alex Weprin, *UTA Signs NFT Art Projects CryptoPunks, Meebits and Autoglyphs (Exclusive)*, HOLLYWOOD REPORTER (Aug. 31, 2021, 8:30 AM) <https://www.hollywoodreporter.com/business/digital/uta-cryptopunks-nft-film-tv-vieo-games-1235005392/> [<https://perma.cc/6CNA-M9MP>].

¹⁴² See Alex Weprin, *'John Wick,' 'Mad Men' NFTs in the Works as Lionsgate Inks Deal With Tom Brady-Backed NFT Platform Autograph*, THE HOLLYWOOD REPORTER (July 21, 2021, 6:06 AM) <https://www.hollywoodreporter.com/business/digital/john-wick-mad-men-nfts-lionsgate-autograph-1234985794/> [<https://perma.cc/5EKL-N3SQ>] (creating NFTs of franchise hits like The Hunger Games, Mad Men, and Dirty Dancing).

¹⁴³ James Hibberd, *Dan Harmon Making First Blockchain Animated Series as Fox Embraces Crypto*, HOLLYWOOD REPORTER (May 17, 2021, 2:00 PM) <https://www.hollywoodreporter.com/tv/tv-news/dan-harmon-blockchain-nft-crypto-series-fox-1234954403/> [<https://perma.cc/3XVR-36CU>].

¹⁴⁴ *Id.*