Head in the BitCloud: A Discussion on the Copyrightability and Ownership Rights in Generative Digital Art and Non-Fungible Tokens

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TABLE OF CONTENTS

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I. INTRODUCTION: A 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—non-fungible tokens (NFTs). Non-fungible 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

1. CRYPTO DUKEDOM, THE NFT REVOLUTION: MUSIC EDITION 7–8 (2021); *see* Besancia, *How to Analyze NFT Art?*, NONFUNGIBLE (Oct. 1, 2019), https://nonfungible.com/blog/art-of-nfts [https://perma.cc/89JF-6GVZ].

2. *See* Georgina Adam, *But is it Legal? The Baffling World of NFT Copyright and Ownership Issues*, 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

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 that an authentic purchase has 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 decides to invest in this new market by purchasing an original CryptoBear NFT—the "original CryptoBear"—as seen in Figure 1.A. on UberUnique, an NFT-exclusive marketplace.[6] CryptoBears is a collection of digital images created by digital artist Bisco Dickson.[7] The CryptoBear collection 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, referred to as AI.[9] There are seven CryptoBear properties: background color, clothes, face traits, head accessories, mouth shape, nose

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[https://perma.cc/R5T5-RFRG] ("An NFT is just a link to a work of art stored on another platform . . . .").

3. *See infra* Section II.A.

4. DUKEDOM, *supra* note 1, at 7.

5. *See infra* Section II.C.5.

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

7. Dickson is a fictional NFT image artist.

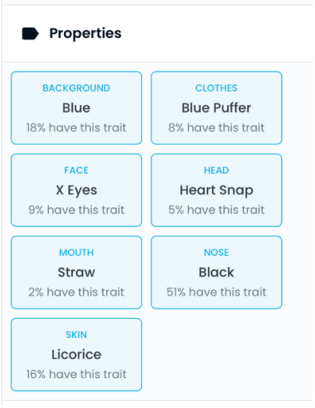
8. See *infra* Section II.C.2. for a brief discussion of properties of NFTs. CryptoBears is a fake NFT collection created for the purpose of showing how an NFT interacts with the blockchain, copyright law, and smart contracts. The actual image used is owned by this Comment's author and is an actual NFT 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.

9. The type of AI relevant to this paper is basic AI. *See* Tal Vigderson, Comment, *Hamlet II: The Sequel? The Rights of Authors vs. Computer-Generated "Read-Alike" Works*, 28 LOY. L.A. L. REV. 401, 416 (1994) ("AI can be broken down into three basic categories: (1) [a]pplied AI, where commercial products use or are produced with the use of AI; (2) cognitive science, where AI is used to solve questions about the nature of intelligence; and (3) basic AI, where AI uses computer-based techniques to simulate intelligent behavior."); *see generally* David Lehr & Paul Ohm, *Playing with the Data: What Legal Scholars Should Learn About Machine Learning*, 51 U.C. DAVIS L. REV. 653 (2017) (explaining that the difference between a "learning" machine and programmed machine is that the learning machine can develop its own processes and procedures).

color, and fur color. Each CryptoBear's properties are unique, but some have traits that are rarer. Shields's 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.

Figure 1.A.

Figure 1.B.



Shields anonymously purchased the original CryptoBear through her public "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.[10] The original CryptoBear is now linked to Shields's digital address and resides within her digital "wallet." A wallet acts as a digital gallery showcasing all the NFT images a digital address has purchased.[11]

10. To determine the owner of a digital wallet, someone must have both the public key and the private key. Henrique Centieiro, *All You Need to Know: NFT Wallets—Custodial vs. Non-Custodial*, MEDIUM: LEVEL UP CODING (Sept. 30, 2021), https://levelup.gitconnected.com/all-you-need-to-know-nft-wallets-custodial-vs-non-custodial-e4bdb0c50889 [https://perma.cc/Y8BH-UH5L]. See *Best NFT Wallets for 2022*, ASCENT (Aug. 1, 2022), https://www.fool.com/investing/stock-market/market-sectors/financials/non-fungible-tokens/nft-wallet/ [https://perma.cc/T72N-LB3V], to learn more about the different digital wallets available.

11. *See Best NFT Wallets for 2022*, *supra* note 10.

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.[12] Curious, Shields clicks the button and a second CryptoBear image appears—seen in Figure 2.B. below. This CryptoBear is a mutated version of her original CryptoBear —the "mutated CryptoBear"—and has inverted colors, zombie eyes, fire coming out of its mouth, and a galactic background.[13]

Figure 2.A.

Figure 2.B.

Shields wants to sell the mutated CryptoBear. Under the first sale doctrine, she believes her initial purchase gave her the ability to sell, privately display, or dispose of her CryptoBears without Dickson's consent.[14] But Dickson is certain that Shields does not have rights in either NFT image,

12. See *infra* Section II.B.1., for a discussion on how smart contracts use AI to facilitate certain actions.

13. The AI within the frame utilized the advanced algorithm Dickson created to generate this new CryptoBear. The author of this Comment created the mutated CryptoBear image above strictly to use as an example for this Comment and owns all intellectual property rights attached to it.

14. The first sale doctrine is a copyright doctrine that grants the purchaser of a copyrightable work limited rights to sell, privately display, or dispose of the purchased work that are typically restricted by the exclusive rights granted to the original copyright owner. 17 U.S.C. § 109; *see also infra* Section IV.A.

because the first sale doctrine does not apply to digital works.[15] Dickson argues he can stop Shields from selling the mutated CryptoBear, because his copyright in the original CryptoBear gives him the exclusive right to make derivative works of the image. Dickson believes the rights attached to the mutated CryptoBear, including the right to sell, belong to him because it is a derivative work of the original CryptoBear.[16]

Even if Dickson is correct that the first sale doctrine does not apply to a derivative NFT image, he may not have a copyright in either CryptoBear. A work is copyrightable only if it is protectable subject matter of original authorship fixed in a tangible medium, and Shields knows both CryptoBears were generated by AI.[17] This threatens to negate the authorship requirement needed for copyright protection.[18]

This Comment discusses three copyright questions raised by NFT image creation and distribution. First, how does employing AI in the creation of generative and derivative digital art and NFT images affect the copyright requirement of authorship? Second, who is the rightful owner of an NFT image pre- and post-purchase? Finally, how does the current first sale doctrine apply to NFT image purchases, and are those protections enough to resolve future copyright-specific NFT claims? There are two copyrights at play here: the first being the copyright over the actual code within the NFT and the second being the copyright in the NFT images. This Comment will focus on the copyrightability of the latter.[19]

For the remainder of this discussion, the term "original NFT image" will refer to the initial generative digital image attached to the NFT that was created by the artist and AI—like the original CryptoBear. The term

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15. *See infra* note 172 and accompanying text (discussing the Digital Millennium Copyright Act of 1998 Pub. L. No. 105–304, 112 Stat. 2860).

16. We will assume for purposes of this example that Shields and Dickson have been in contact and know each other's identities. In an actual NFT ownership dispute, the seller and purchaser's identities would only be accessible if both parties chose to disclose that information. *See* Section II.A. (discussing the difficulty of NFT ownership claim enforcement due to the anonymous nature of blockchain transactions); 17 U.S.C. § 106(2).

17. 17 U.S.C. § 102.

18. *See id.*

19. The copyrightability of digital code is outside the bounds of this Comment, but it is likely copyrightable as a literary work. *See* Comput. Assocs. Int'l, Inc. v. Altai, Inc., 982 F.2d 693, 702 (2d. Cir. 1992) ("It is now well settled that the literal elements of computer programs, i.e., their source and object codes, are the subject of copyright protection."); Paysys Int'l, Inc. v. Atos SE, 226 F. Supp. 3d 206, 216 (S.D.N.Y. 2016) (first citing 17 U.S.C. § 101; and then citing *Comput. Assocs. Int'l*, 982 F.2d at 693, 697–98); *see also infra* Section II.B.1.; Oracle Am., Inc. v. Google Inc., 750 F.3d 1339, 1355–56 (Fed. Cir. 2014); CMS Software Design Sys., Inc. v. Info Designs, Inc., 785 F.2d 1246, 1247–48 (5th Cir. 1986) (source code copyrightability); H.R. REP. NO. 94-1476, at 54 (1976).

"generated NFT image" will refer to the derivative NFT image created from the purchaser's engagement with that same AI—like the mutated CryptoBear created by Shields clicking the button. 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.

While NFTs are utilized in many industries, this Comment focuses on their role within the digital art world.[20] In Part II, a foundational knowledge of key topics is provided, and the intersection between blockchain technology, cryptocurrency, smart contracts, and NFTs is explored. Part III analyzes the arguments on both sides of the copyright debate regarding AI-generated creative works and valid authorship, concluding that the default rule should be that original and generated NFT images are copyrightable. It also discusses who the rightful owner should be when generative NFT image projects spawn derivative NFT images, determining the artist who created the derivative NFT project is likely the default owner of the resulting works. Part IV focuses on how the first sale doctrine applies to NFT images and argues that past legislative amendments, including the first sale doctrine, do not adequately protect NFT images. It proposes a first sale doctrine amendment that would grant NFT purchasers certain default rights in their purchased NFT images, and distinguishes NFT images from former digital goods by highlighting how blockchain's transparency and immutability have nullified the increased piracy risk and inadequate asset tracking protocols that previously hindered digital good protections. Finally, Part V concludes that an amendment would ensure NFTs continue providing value to the artistic community without diluting the creative rights they were created to track and protect.

20. *See infra* Section II.C.5.

II. BLOCKCHAIN TECHNOLOGY, CRYPTOCURRENCY, SMART CONTRACTS, AND NFTS

A. Introduction to Blockchain

NFTs are recorded on blockchain technology.[21] A blockchain is a digital record that tracks peer–to–peer transactions on an unregulated—often referred to as decentralized—network.[22] Blockchain technology allows individuals to anonymously transmit information, currency, or assets, over the internet in a transparent and secure manner without an intermediary.[23] Three pillars are fundamental to blockchain technology: decentralization, transparency, and immutability.[24]

1. Blockchain: Decentralization

Blockchain technology is unique because it is decentralized.[25] Instead of storing all the information related to an NFT image transfer within one central computer, like most websites do, a blockchain network sends the information to multiple computers across the blockchain.[26] Depending on

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21. DUKEDOM, *supra* note 1, at 19–20.

22. *Id.* at 20. *See generally* NIAZ CHOWDHURY, INSIDE BLOCKCHAIN, BITCOIN, AND CRYPTOCURRENCIES 215 (2020).

23. An example of an intermediary mentioned above would be a bank acting as a middleman between the federal reserve that mints the currency and the individuals who end up depositing it into their bank accounts. *See* Daniel Kraus & Charlotte Boulay, *Blockchains: Aspects of Intellectual Property Law*, *in* BLOCKCHAINS, SMART CONTRACTS, DECENTRALISED AUTONOMOUS ORGANISATIONS AND THE LAW 240, 244 (Daniel Kraus, Thierry Obrist & Olivier Hari eds., 2019).

24. 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 22, at 9 (discussing the other key properties that are considered hallmarks of blockchain properties).

25. 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 22, at 5, 13–14 ("For example, if Bob[] sends $100 to Alice using his mobile banking app, Alice's account could be debited instantly by her bank based on the trust that Bob's bank 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.").

26. 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/ [https://perma.cc/GTP7-LZKT]; *see* CHOWDHURY, *supra* note 22, at 13–14 ("There is no dependence on a single server; hence blockchain does not have a central point of failure."). On a decentralized blockchain, the failure 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?*,

the project's scope and success, the number of computers tracking these transfers can vary from just a few to thousands.[27] Having the same information dispersed across multiple computers makes it harder for data to be compromised via hackers or other unforeseen technology malfunctions.[28] This security method is similar to how the Macy's Day Parade deploys hundreds of individuals that each hold a rope connected to, and helping to control, a Macy's Day Thanksgiving balloon. The multiple points of contact with the balloon provide additional support and act as a fail-safe ensuring that if one of the individuals holding a tether should accidentally trip and let go of their rope, the balloon will remain on course and under control via the other individuals holding their own separate tethers.[29] Decentralization ensures that one computer failure does not threaten the entire blockchain's integrity.[30]

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.[31] To completely stop illegal activity occurring on the blockchain, all computers

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MEDIUM: COINMONKS (Sept. 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 fails. CHOWDHURY, *supra* note 22, at 13–14; *see also* John Evans, *What is a Node in a Blockchain Network*, NODES.COM, https://nodes.com/ [https://perma.cc/RA5Q-74WW].

27. *See* CHOWDHURY, *supra* note 22, at 13–14.

28. *See* Florence Guillaume, *Aspects of Private International Law Related to Blockchain Transactions*, *in* BLOCKCHAINS, SMART CONTRACTS, DECENTRALISED AUTONOMOUS ORGANISATIONS AND THE LAW, *supra* note 23, at 49, 72 ("Blockchain technology effectively relies on a collective commitment . . . . Although the level of commitment may vary from one use to the other, entering the system means participating in the system." (footnote omitted)).

29. *See* Vincent Mignon, *Blockchains—Perspectives and Challenges*, *in* BLOCKCHAINS, SMART CONTRACTS, DECENTRALISED AUTONOMOUS ORGANISATIONS AND THE LAW, *supra* note 23, at 1, 1 ("A Blockchain is to a transaction, as the Internet is to information; its qualities are attributed to it by its applications."); *see* Evans, *supra* note 26.

30. 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 22, at 13–14.

31. *See What are Public and Private Keys?*, CRYPTOPEDIA (Sept. 8, 2021), https://www.gemini.com/cryptopedia/public-private-keys-cryptography#section-what-is-public-key-cryptography [https://perma.cc/M75P-APK8]; CHOWDHURY, *supra* note 22, at 26 ("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.").

circulating the inaccurate information must be found and shut down.[32] 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.[33]

2. Blockchain: Transparency and Immutability

Blockchain technology is also known for its transparent and immutable digital asset tracking.[34] 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.[35] 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.[36]

Blockchain advocates argue that blockchain technology is 100% reliable, because the automated nature of the blockchain ensures that accurate transfer information is recorded.[37] 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."[38] 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.[39]

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32. See CHOWDHURY, *supra* note 22, at 295–316, for a more detailed discussion of crimes relating to cryptocurrencies.

33. 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.* at 33 ("[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.").

34. DUKEDOM, *supra* note 1, at 21.

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

36. *See* DUKEDOM, *supra* note 1, at 20. 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 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 infra* Section II.B.1., for a discussion on on-chain v. off-chain transactions.

37. *See* Marco Iansiti & Karim R. Lakhani, *The Truth About Blockchain*, HARV. BUS. REV. Jan.–Feb. 2017, at 2701, 2703.

38. Bear, *supra* note 35; *see also* Guillaume, *supra* note 28, at 72.

39. *See* Bear, *supra* note 35.

In concept, "a [blockchain] record cannot be altered or disappear after its creation and acceptance by the blockchain."[40] 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 blockchain at all.[41] 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.[42]

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.[43] 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. This creates a complex question about whether transparency really is increased through this new form of asset tracking.

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40. Panagiotis Delimatsis, *When Disruptive Meets Streamline: International Standardization in Blockchain*, *in* BLOCKCHAINS, SMART CONTRACTS, DECENTRALISED AUTONOMOUS ORGANISATIONS AND THE LAW, *supra* note 23, at 83, 84.

41. *See* Adam, *supra* note 2.

42. *See* Adam, *supra* note 2 ("NFTs 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."); *see also* Niraj Chokshi, *Myspace, Once the King of Social Networks, Lost Years of Data from Its Heyday*, N.Y. TIMES (Mar. 19, 2019, 4:22 PM), https://www.nytimes.com/2019/03/19/business/myspace-user-data.html [https://perma.cc/GD9X-M65L]; Seth Fiegerman, *Twitter Officially Shuts Down Vine*, CNN (Jan. 17, 2021, 10:01 AM), https://money.cnn.com/2017/01/17/technology/vine-shuts-down/index.html [https://perma.cc/9BFY-79L8]. 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 (Sept. 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).

43. *See* CHOWDHURY, *supra* note 22, at 18 ("A fundamental problem in distributed systems is achieving overall system reliability in the presence of some faulty nodes. . . . Blockchain 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. The BFT is what enables a system to continue operating properly in the event some of its components fail. *Id.* at 55–56.

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.[44] Fungible assets can be replicated, exchanged, and interchanged freely—such as United States dollars.[45] 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.[46]

While cryptocurrency has received a lot of attention, its prices are volatile.[47] 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.[48] Most cryptocurrencies

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44. 2 GREGORY J. BATTERSBY & CHARLES W. GRIMES, MULTIMEDIA AND TECHNOLOGY LICENSING AGREEMENTS § 14:1 (2022) (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. Matthieu Nadini et al., *Mapping the NFT Revolution: Market Trends, Trade Networks and Visual Features*, 11 SCI. REPS Article No. 20902 (2021); *see also* 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]; *Token Standards*, CRYPTO.COM, https://crypto.com/us/university/article?category=crypto101&page=token-standards [https://perma.cc/6PV5- YGG6]; Adam Hayes, *Blockchain Facts: What is It, How It Works, and How It Can Be Used*, INVESTOPEDIA (Sept. 27, 2022), https://www.investopedia.com/terms/b/blockchain.asp [https://perma.cc/PT3C-3PDW]; 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); Roee 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).

45. DUKEDOM, *supra* note 1, at 7.

46. *See* GAVIN BROWN & RICHARD WHITTLE, ALGORITHMS, BLOCKCHAIN AND CRYPTOCURRENCY: IMPLICATIONS FOR THE FUTURE OF THE WORKPLACE 18 (2020).

47. Nathan Reiff, *Why is Bitcoin Volatile?*, INVESTOPEDIA (June 4, 2022), https://www.investopedia.com/articles/investing/052014/why-bitcoins-value-so-volatile.asp [https://perma.cc/9JKL-EHH7].

48. *See* BITCOIN, https://bitcoin.org/en/ [https://perma.cc/NF4V-2CA3]; ETHEREUM, https://ethereum.org/en/ **[**https://perma.cc/76HX-EXKP**]**; *see also* DUKEDOM, *supra* note 1, at 20–21; Kimberly Amadeo, *U.S. Dollar Value Measured 3 Different Ways*, BALANCE (Jan. 21, 2022), https://www.thebalancemoney.com/value-of-us-dollar-3306268 **[**https://perma.cc/2JGY-CR8H**]**. *But see What is a Stablecoin?*, COINBASE, https://www.coinbase.com/learn/crypto-basics/what-is-a-stablecoin [https://perma.cc/TX3H-CQH8] ("A stablecoin is a digital currency that is pegged to a 'stable' reserve asset like the U.S. dollar or gold."). 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 (Aug. 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://

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.

1. Smart Contracts Regulating Blockchain Transactions

Cryptocurrencies and NFTs are built on smart contracts which are not really contracts at all.[49] The term "smart contract" references the NFT code containing a detailed description of the functions each NFT must obey to enable certain actions to occur.[50] 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.[51] Additionally, smart

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perma.cc/C9AV-HNM2]; *see also* 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] ("[B]itcoin is the digital equivalent of gold . . . .").

49. *See* AlexWGomezz*, NFT Smart Contracts Explained*, CYBER SCRILLA, https://cyberscrilla.com/nft-smart-contracts-explained/ [https://perma.cc/9QWB-C4QG].

50. *Non-Fungible Tokens (NFT)*, ETHEREUM, https://ethereum.org/en/nft/ [https://perma.cc/HXH9-8S2C] ("An NFT can only have one owner at a time. Ownership is managed through the uniqueID 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 [sic]."). 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 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].

51. *See* QIN WANG ET AL., NON-FUNGIBLE TOKEN (NFT): OVERVIEW, EVALUATION, OPPORTUNITIES AND CHALLENGES 2 (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.* at 7–8. Through smart contracts, intermediaries within the transactional world (banks, art galleries, etc.) are no longer necessary making it easier to buy and sell digital artwork. *See id.* at 12; *see also* Clifford C. Histed 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-

contracts can help speed up the payment transfer process and provide greater royalty transparency by sending a percentage of a work's future sales to the wallet of that work's creator automatically.[52]

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.[53] Additionally, an NFT's smart contract can be written using on-chain or off-chain transactions.[54] On-chain transactions are the most secure because both the NFT and the NFT image are recorded and housed on the blockchain record.[55] This ensures that the NFT image attached to the NFT cannot be deleted, altered, or copied in the future.[56] A smart contract can also be drafted using off-chain transactions.[57] While these transactions are cheaper and faster, they store the NFT image associated with the NFT off the blockchain.[58] This allows

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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 image resells on a secondary market. *See* Zhao Zhao, *Fulfilling the Right to Follow: Using Blockchain to Enforce the Artist's Resale Right*, 39 CARDOZO ARTS & ENT. L.J. 239, 262–63 (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].

52. DUKEDOM, *supra* note 1, at 64.

53. 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 51, at 7. 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 automatically execute, such as paying a seller, when a certain action occurs, such as buying an NFT on a platform. *See* DUKEDOM, s*upra* note 1, at 12–13. This standard may change or evolve, but as of the time of writing this Article, ERC-721 and ERC-1151 are the most popular NFT standards.

54. William M. Peaster, *Racoon Rugged Society?*, BANKLESS (Sept. 9, 2021), https://metaversal.banklesshq.com/p/racoon-rugged-society [https://perma.cc/PFB9-SE96] ("[O]n-chain projects fetch a premium in the NFT ecosystem in part . . . because 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, *On Chain Transactions (Cryptocurrency)*, INVESTOPEDIA (Aug. 24, 2021), https://www.investopedia.com/terms/c/chain-transactions-cryptocurrency.asp [https://perma.cc/HTJ6-4ZW7].

55. Frankenfield, *supra* note 54.

56. *See* Rohan Pinto, *On-Chain Versus Off-Chain: The Perpetual Blockchain Governance Debate*, FORBES (Sept. 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].

57. *See id.*

58. DEL WRIGHT JR., A SHORT & HAPPY GUIDE TO BITCOIN, BLOCKCHAIN, AND CRYPTO 53 (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-

for the NFT's metadata to be altered by the original creator, or a third party at any time.[59] Off-chain transactions put the NFT and the NFT image at risk for destruction, mutilation, or alteration.[60]

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 that will stay within their possession, and another bag they will store underneath the plane, a 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

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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 (Jan. 7, 2022), https://moxie.org/2022/01/07/web3-first-impressions.html [https://perma.cc/S9U9-E2PB] ("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).").

59. *See* WRIGHT, *supra* note 58 ("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.").

60. The NFT Project Raccoon Secret Society is a perfect example of this concept, also known as a "rug pull." Rosie Perper, *What is a Rug Pull? How to Protect Yourself From Getting 'Rugged'*, COINDESK (Aug. 30, 2022, 11:59 AM), https://www.coindesk.com/learn/what-is-a-rug-pull-how-to-protect-yourself-from-getting-rugged/ [https://perma.cc/4GQS-KGFD]. The creators of this project turned all the purchasers' NFT images from live raccoon characters to dead characters simply because they could. *See* RACCOON SECRET SOCIETY, https://racoonsecretsociety.com/ [https://perma.cc/HP6N-6DYF]. This destroyed all the raccoon NFT images and simply left bones in their place. Princess, *Developers Behind Raccoon Secret Society Turns NFTs into Bones*, NFT EVENING (Sept. 17, 2021), https://nftevening.com/developers-behind-raccoon-secret-society-to-turns-nfts-into-bones/ [https://perma.cc/5GF3-45JY].

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

1. NFT Creation and Storage

NFT images are controlled by smart contracts, tracked using blockchain technology, typically purchased using cryptocurrency, and created through a process called "minting."[61] 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-world art techniques, or a combination of both.[62] Once the image has been created, and if it is not already in digital format, the artist will upload the finished image to their computer and will choose which blockchain they want to mint the NFT on.[63] The artist will then follow that specific blockchain's instructions to mint an NFT to track that image.[64]

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.[65] The

61. For purposes of this Comment, we will focus solely on how to mint a utility NFT tracking digital art ownership.

62. *See* 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].

63. 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*, RAPACKE 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. *Id.*

64. The steps were not included because of brevity. To learn more about minting NFTs on the most popular NFT marketplace, OpenSea, 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]; *see also* Harry Denley, *So You Wanna Build Your Own PFP NFT Project?*, MYCRYPTO (Sept. 23, 2021), https://blog.mycrypto.com/so-you-wanna-build-your-own-pfp-nft-project [https://perma.cc/8M8P-GCWX].

65. *See 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].

artist will then post the NFT image for sale on an NFT platform.[66] NFT platforms are online marketplaces that facilitate the transfer, sale, collection, distribution, and sometimes the creation of NFT images.[67] 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 purchaser and seller's digital addresses.[68] Using the blockchain to mint NFT images ensures there is a record of sale authenticity and valid asset ownership for future transactions.

2. NFTs and Generative Digital Art

Currently, most NFT projects involve generative digital artwork.[69] 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 would be positioned against.[70] Generative art is different

66. 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, *How to Create Your First NFT?*, NONFUNGIBLE (Jan. 28, 2020), https://nonfungible.com/news/utility/some-popular-nft-use-case [https://perma.cc/S9PP-RQVH].

67. Some of the most popular NFT platforms are OpenSea, SuperRare, Nifty Gateway, Rarible, and Binance. David Rodeck, *Top NFT Marketplace of 2022*, FORBES (Nov. 1, 2022, 3:45 PM), https://www.forbes.com/advisor/investing/cryptocurrency/best-nft-marketplaces/ [https://perma.cc/8W9Q-QBFY].

68. *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] ("A transaction hash/id is a unique string of characters that is given to every transaction that is verified and added to the blockchain.").

69. 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 2 (2021). 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.* at 2. Collaborative art is like a compilation or collective work under 17 U.S.C. § 103. *See* 17 U.S.C. § 103(b).

70. There is a possibility that da Vinci did not create the Mona Lisa but instead painted the exact image of a female subject. *See* Jean-Pierre Isbouts, *The 'Earlier Version' of the* Mona Lisa *as the Portrait of Lisa Del Giocondo Described by Vasari*, MONA LISA FOUND., https://monalisa.org/2013/10/26/the-earlier-version-of-the-mona-lisa-as-the-portrait-of-lisa-del-giocondo-described-by-vasari/ [https://perma.cc/BY39-4EQB]. Although this

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.[71]

In generative art, an artist does not have to meticulously craft each attribute of the artwork, instead they create a general description on the limitations they imagine for each design and outsource the final application of these designs to AI.[72] For example, if Bisco Dickson wanted ten 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 ten 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.

3. The Value in Purchasing an NFT Image

NFT images derive value from "scarcity, collectability, and authenticity."[73] NFT projects achieve scarcity by limiting the amount of NFT images created for each project—typically 10,000 or fewer.[74] 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.[75] NFT images are also desirable

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could mean he did not 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 id.* (discussing the creation, history, and relevance of the Mona Lisa to modern day art).

71. Jessica Rizzo, *Generative Art is Challenging What it Means to be Human*, WIRED (June 23, 2022, 9:00 AM), https://www.wired.com/story/generative-art-intellectual-property-law/ [https://perma.cc/BE8Y-M57H].

72. *Id.*

73. 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]. Additionally, NFTs create value through their ability to anticipate future value speculation, provide liquidity premiums to 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].

74. 1CONFIRMATION, 2021 NFT YEAR IN REVIEW 5 ("[PFPs] are collections of a fixed number (most commonly 10,000) of digital characters that all have a similar artistic style but variations in traits.").

75. 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/

because they often come with exclusive benefits only accessible to those who have one in their wallet.[76]

The tangible value and collectability of certain NFT images is evident when looking at one of the first digital NFT projects—CryptoPunks.[77] 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.[78] CryptoPunks were created as a pseudo reward to early adopters of the cryptocurrency Ethereum, so anyone who had Ethereum in their wallet could mint a CryptoPunk for free.[79] The CryptoPunks' intentional scarcity, their collectability as the "OGs of the NFT world," and the fact that they have resold for millions of dollars, shows how valuable NFT images can be.[80]

[https://perma.cc/6NRM-FBQ8]. These projects are often referred to as PFP projects, or profile picture projects. *See id.*

76. *Benefits of Non-Fungible Tokens (NFTs)*, NFT'S STREET (Oct. 13, 2021), https://www.nftsstreet.com/benefits-of-non-fungible-tokens-nfts/ [https://perma.cc/FT3V-9NLZ].

77. 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].

78. Escalante-De Mattei, *supra* note 75.

79. *Id.*

80. *See* 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), 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] ("CryptoPunks are the OGs of the NFT world. It wasn't the first-ever NFT project, as commonly believed, but it is among the few that have survived since the days of yore."); *see also* Steinwold, *supra* note 77. 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, 8:37 PM), https://www.cnbc.com/2021/08/23/visa-buys-cryptopunk-nft-for-150000.html [https://perma.cc/9JBD-Y6TU].

Figure 3.

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.[81] NFT image collectors argue that purchasing a rare original NFT image is just as valuable as owning an original Picasso.[82] 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.[83]

NFT projects took off in 2021, with thousands of projects launching and over $25 billion in secondary sales occurring on NFT-exclusive marketplaces.[84] This trend has continued in 2022, as dozens of "unique" NFT projects are

81. *See* Aaron Patrick, *Is the World's Hottest Asset Class Pointless?*, FIN. REV. (Sept. 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]; *see also* Sissi Cao, *90% of NFTs Will Be Worthless in 3 to 5 Years, Coinbase Cofounder Warns*, OBSERVER (June 18, 2021, 12:13 PM), https://observer.com/2021/06/coinbase-cofounder-warn-nfts-worthless-interview/ [https://perma.cc/MC43-72HT].

82. 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* Tomasulo, *supra* note 73.

83. *See* DUKEDOM, *supra* note 1, 59–60.

84. 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].

announced every week.[85] 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."[86] Each roadmap outlines the unique benefits that come from purchasing an NFT image associated with that NFT project.[87] These benefits include membership into exclusive virtual communities, first access to real-world events, and the chance to purchase limited edition merchandise.[88]

A great example of effective roadmap execution is the Bored Ape Yacht Club (BAYC)—an example of which is displayed in Figure 4.[89] 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.[90] 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 January 2, 2022—to a resale average of 78.35 ETH—$300,000 as of January 2, 2022—a 1000% return on their investment.[91]

85. *See, e.g.*, Jay Leonard, *17 Best NFTs to Buy in 2022*, CRYPTONEWS (Nov. 11, 2022, 6:06 AM), https://cryptonews.com/news/best-nfts.htm [https://perma.cc/YUS8-5P9U].

86. *See* BORED APE YACHT CLUB, https://boredapeyachtclub.com/#/home#roadmap [https://perma.cc/D8Y9-PY5Y]; INBETWEENERS, https://www.inbetweeners.io/#roadmap-section [https://perma.cc/YK2K-NG2B]; LAZY TIGER WOOD CLUB, https://www.lazytigerwoodclub.com/ [https://perma.cc/238U-5JPU].

87. *See, e.g.*, BOARD APE YACHT CLUB, *supra* note 86.

88. *Id.*

89. *Id.*

90. *See The MAYC*, BORED APE YACHT CLUB, https://boredapeyachtclub.com/#/mayc [https://perma.cc/XNM8-QDNJ]; *see also Bored Ape Kennel Club Adoption Drive*, BORED APE YACHT CLUB, https://boredapeyachtclub.com/#/kennel-club [https://perma.cc/RWH3-FFY8].

91. *See Bored Ape Yacht Club*, OPENSEA, https://opensea.io/collection/boredapeyachtclub?tab=activity [https://perma.cc/SWB3-6AV6]. ETH stands for Ether, which is a cryptocurrency facilitated on the Ethereum blockchain. *What is Ether (ETH)?*, ETHEREUM, https://ethereum.org/en/eth/ [https://perma.cc/DL8Z-S945].

Figure 4.

4. NFT Barriers and Benefits

NFT images offer benefits to art collectors and artists that physical art never could.[92] 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.[93] High-quality, physical art can be expensive and hard to purchase without access to an auction house, but high-value, high-quality NFT images are accessible to everyone with a digital address and wallet.[94]

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.[95] 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.[96] Physical art that may have been hidden away in a vault can now be minted into an NFT image and showcased via

92. DUKEDOM, *supra* note 1, at 59–60.

93. *See id.* at 60–61; *see also* Anil Dash, *NFTs Weren't Supposed to End Like This*, 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).

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

95. *Id.*

96. 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 60 (discussing the Raccoon Secret Society); *see also supra* Section II.B.1. (discussing the different security protocols attached to on-chain and off-chain transactions).

a high-definition screen.[97] This enhances the public's exposure to exquisite art collections while bypassing the safety concerns associated with displaying physical works.

5. Value to Other Professional Industries

Ensuring adequate copyright protection and ownership standards exist for NFT images is imperative because of the vast application NFTs are poised to have on a myriad of industries. NFTs provide a new digital avenue for copyright owners to exercise their exclusive rights to distribute, copy, perform, display, or make derivative works of their pieces.[98] They allow a purchaser to buy digital land that mimics real-world real estate while offering fashion brands a new way to combine physical and digital pieces of clothing.[99] Musical artists have used NFTs to release special albums

97. *See* 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* HR 11 September 2014, NJ 2014, ECLI:EU:C:2014:2214 (Art & Allposters International BV/Stichting Pictoright) (Neth.) (ruling that an artwork may not be transferred from a poster to canvas print without the author's permission).

98. *See* 17 U.S.C. § 106; *see also* DUKEDOM, *supra* note 1, at 68 ("It could be an advantageous idea [for an artist] to sell part of the rights of the songs in [their] catalog. In this way, the artist receives immediate liquidity, remains the owner of part of the rights, while the buyer can increase their turnover depending on how much the song is listened to or used.").

99. 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. *See* The Sandbox, SANDBOX, https://www.sandbox.game/en/about/ [https://perma.cc/375A-PMK8]; *see also* CRYPTOVOXELS, https://www.voxels.com [https://perma.cc/SWA2-DJ8V]; 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]; 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]. Famous shoe brand, Fewocious, collaborated with NFT-brand RTFKT to create an NFT that users could purchase and then redeem for a physical pair of shoes in stores. Charlie Kolbrener, *The FEWOCiOUS x RTFKT Sneaker Project is Paving the Way for NFT Collaborations*, ONE37PM (Apr. 2, 2021, 10:24 AM), https://www.one37pm.com/nft/fashion/fewocious-rtfkt-collaboration-sneakers [https://perma.cc/7SLJ-AMZH]. In utilizing this tactic, "[p]hysical collectibles can be released with a corresponding digital collectible, further amplifying the value of an asset." *Id.*; *see also* 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-

that provide purchasers with live show perks, front row seats for life, or even exclusive audiovisual works, while athletes and sports teams have used NFTs to build their fanbase and offer exclusive digital content—like virtual bobbleheads or season tickets.[100] The blockchain technology underlying

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the-future/ [https://perma.cc/4M9E-VV22]. Other 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 Partners with Other Major Luxury Companies on Aura, the First Global Luxury Blockchain*, *supra* note 36. 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]. In July 2021, Louis Vuitton announced it would be creating 30 NFTs (10 designed by Beeple) to be offered in the new game it is creating—200 Anecdotes. 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]. Gucci recently auctioned off a four-minute NFT video that sold for $25,000. 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]. 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. *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]. Other fashion companies have created digital e-warranties that are stored on a blockchain and allow customers to verify the authenticity of the goods via a mobile phone photo. *See LVMH Partners with Other Major Luxury Companies on Aura, the First Global Luxury Blockchain*, *supra* note 36 (discussing Hublot's use of this new technology to authenticate its watches).

100. Megan Thee Stallion teamed up with Cash App to explain cryptocurrency to her fans. 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. It can't be controlled by anyone. . . . [N]o one person . . . gets to decide how much of it is used, how much of it is in circulation or what it's worth . . . ."). The Weeknd sold an NFT that contained new and unreleased songs and album artwork. *The Weeknd Releases Their Genesis Nifty Collection Acephalous on Nifty Gateway*, NIFTYGATEWAY, https://niftygateway.com/collections/theweeknd [https://perma.cc/ASR8-MQN2]. In March 2021, musical artist Grimes sold an NFT of her newest album for $5.8 million. DUKEDOM, *supra* note 1, at 57. Kings of Leon sold their most recent album with an NFT token attached and made $1.45 million. *Id.* The NFT 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. 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]. The University of Miami turned its championship ring collection into an NFT. 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]. In July 2019, the NBA partnered with Dapper Labs to create the Flow blockchain. *What is the Flow Blockchain: All About the Home of NBA Top Shot*, DAPPRADAR (Sept. 1, 2022), https://dappradar.com/blog/introducing-the-flow-blockchain-home-of-nba-top-

NFTs allows consumers to contribute to the content they are watching by using crypto crowdfunding to raise funds for new television productions.[101]

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shot [https://perma.cc/V6RK-A2RD]; *see also 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). In March of 2021, NFL star Patrick Mahomes partnered with NFT platform MakersPlace to release a series of NFTs titled the "Museum of Mahomes," MAKERSPLACE, https://makersplace.com/patrickmahomes/drops/museum-of-mahomes/ [https://perma.cc/N52E-38QE], while NFL star Tom Brady partnered with the daily fantasy and sports-betting company DraftKings to create Autograph, an NFT platform which will house all the star's future NFTs. Saniya More, *DraftKings Launches NFT Marketplace with First Drop Featuring Tom Brady*, BLOCK (Aug. 10, 2021, 11:38 AM), https://www.theblockcrypto.com/linked/114064/draftkings-launches-nft-marketplace-with- first-drop-featuring-tom-brady [https://perma.cc/BQ8P-X9A4].

101. In September 2021, the 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. Alex Weprin, *UTA Signs NFT Art Projects CryptoPunks, Meebits and Autoglyphs (Exclusive)*, HOLLYWOOD REP. (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]. In July 2021, Lionsgate announced it would start to mint NFTs of its entertainment franchises and signed a partnership with Autograph. Alex Weprin, *'*John Wick*,' '*Mad Men*' NFTs in the Works as Lionsgate Inks Deal With Tom Brady-Backed NFT Platform Autograph*, HOLLYWOOD REP. (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*). *Stoner Cats*, a new animated NFT show produced by Mila Kunis starring Jane Fonda, Chris Rock, and Aston Kutcher, plans to exclusively offer some of its content to those who purchase an NFT. Cheyenne Ligon, *Vitalik Buterin Joins Cast of '*Stoner Cats*,' Mila Kunis' New Animated NFT Show*, COINDESK (Sept. 14, 2021, 6:30 AM), 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]. This NFT will be both a physical way to access the *Stoner Cats* show and double as a digital art piece representing one of the characters. *Id.* (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); *see also* Cheyenne Ligon, *Vitalik Buterin is Involved in a New Documentary About Ethereum*, COINDESK (Sept. 14, 2021, 6:25 AM), https://www.coindesk.com/markets/2021/07/14/vitalik-buterin-is-involved-in-a-new-documentary-about-ethereum/ [https://perma.cc/KN4X-7TMY] (using crypto crowdfunding efforts to fund documentary—Ethereum: The Infinite Garden); Jason Hellerman, *Legendary is the First Studio to Release an NFT for a Movie*, NO FILM SCH. (Mar. 31, 2021), https://nofilmschool.com/nft-godzilla-kong [https://perma.cc/B239-SSB6]; James Hibberd, *Dan Harmon Making First Blockchain Animated Series as*

Brands are also utilizing NFTs to explore digital product placement and consumer advertisements, with Coca-Cola venturing into the digital realm to host pop-up events and sell digital goods, while Pringles created a "CryptoCrisp" flavor NFT image.[102] NFTs and decentralized blockchains have also created a "free to play" model focused on interoperability that allows gamers to use their digital assets within multiple games.[103]

NFT images must be copyrightable and given adequate protection under the first sale doctrine. The widespread adoption of NFTs, paired with the complex and innovative concepts underlying blockchain and smart contract technology, show how difficult claims involving NFT image ownership will be to resolve. Granting consistent default rights to every NFT image purchaser would ensure ownership disputes are uniformly resolved while providing adequate protections for both NFT image artists and purchasers.

Fox Embraces Crypto, HOLLYWOOD REP. (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].

102. Coca-Cola recently hosted an event in a virtual world, Decentraland, where Coke-themed NFTs were auctioned off. Saniya More, *Coca-Cola Creates Its First Collection of Brand-Inspired NFTs*, 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]. During this event, wearable Coca-Cola-themed NFTs that can be worn by players in the game were also available for sale. *Id.* Taco Bell has sold Taco Gif NFTs. Mitchell Clark, *The Brands are at It Again—Taco Bell is Hopping on the NFT Train*, 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]. In March 2021, Charmin created an NFT to represent its toilet paper and encouraged consumers to "Enjoy the Go" both in real life and virtually. Alan Danzis, *Charmin 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]. Also in March, Pringles created a "CryptoCrisp" flavor NFT with a starting price of $2, the equivalent of a traditional can of Pringles. 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].

103. Free-to-play means that the assets that used to be held exclusively on one server, and thus incapable of transfer, are now transferable to realms outside the context of the game they were purchased in. Abdulrasaq Ariwoola, *Best Free-to-Play NFT Games in 2022*, NFT PLAZAS (Aug. 27, 2022), https://nftplazas.com/best-free-to-play-nft-games/ [https://perma.cc/26WE-7P5B]; *see also Interoperability*, MERRIAM-WEBSTER, https://www.merriam-webster.com/dictionary/interoperability [https://perma.cc/7QMH-U2WM] ("[The] ability of a system . . . to work with or use the parts or equipment of another system.").

III. COPYRIGHT LAW AND THE RISE IN GENERATIVE DIGITAL ART AND NFTS

Establishing how copyright law applies to NFT images is vital if NFTs are to fulfil their potential as a facilitator of accurate, inexpensive, and secure digital asset tracking.[104] The copyright principles of protecting creative works and fostering innovation within new art forms must be remembered when making decisions regarding how—or if—current copyright laws sufficiently cover the questions NFT images raise.[105]

To fully assess the long-term value of NFTs, the question of whether original NFT images or generated NFT images are copyrightable must first be answered.[106] For decades it has been a common practice in the physical art space to use AI to help create artistic works.[107] Some artists have designed and "fed" algorithms to AI which translates that code into physical paintings on a real canvas; others have used AI as a tool to facilitate the creation of an image the artist created entirely on their own.[108] Other

104. To read more about copyright law basics see Jane C. Ginsburg, *Copyright*, *in* THE OXFORD HANDBOOK OF INTELLECTUAL PROPERTY LAW 487 (Rochelle C. Dreyfuss & Justine Pila eds., 2018).

105. IP rights serve two main functions: promotion of new ideas within the marketplace and promotion of integrity within that marketplace. *See* PETER S. MENELL, MARK A. LEMLEY & ROBERT P. MERGES, INTELLECTUAL PROPERTY IN THE NEW TECHNOLOGICAL AGE: 2018, at 16–17 (2018).

106. Owning a valid copyright grants the copyright owner the exclusive right to reproduce, prepare derivative works, distribute copies, and publicly perform or display the work. 17 U.S.C. § 106. NFTs consist of links to works of authorship, such as audiovisual works, pictorial works, and literary works. *See id*. Certain works of visual art (i.e. paintings and other physical artworks) are also granted moral rights under the Visual Artist Rights Act. *See* 17 U.S.C. § 106(a). *See generally* Amir H. Khoury, *Intellectual Property Rights for "Hubots": On the Legal Implications of Human-Like Robots as Innovators and Creators*, 35 CARDOZO ARTS & ENT. L.J. 635 (2017) (focusing on the legal implications of innovation and content generated by robots with artificial intelligence).

107. An artist spent four decades creating a painting machine (named AARON) that could use "lists of object/body elements and the relationships between them" and other fundamental rules of form fed to it by the artist to generate works of "still life and portraits of human figures without photos or other human input," which were not predictable by the programmer. *See* Richard Moss, *Creative AI: The Robots That Would Be Painters*, NEW ATLAS (Feb. 16, 2015), https://newatlas.com/creative-ai-algorithmic-art-painting-fool-aaron/36106/ [https://perma.cc/38E9-R8SH]; *see also* Matthew U. Scherer, *Regulating Artificial Intelligence Systems: Risk, Challenges, Competencies, and Strategies*, 29 HARV. J.L & TECH. 353, 354 (2016) ("The increasing ubiquity and rapidly expanding commercial potential of AI has spurred massive private sector investment in AI projects.").

108. *Interactive Robotic Painting Machine*, BEN GROSSER, https://bengrosser.com/projects/interactive-robotic-painting-machine/ [https://perma.cc/PV4Y-YV4S] (discussing the

artists have created AI that is so self-sufficient it spawns creative artwork completely on its own.[109]

A. Copyright Requirements for NFT Images

NFT images are copyrightable upon creation if they are an original work of authorship fixed in a tangible medium of expression.[110] All original and generated NFT images are copyrightable subject matter as pictorial or audiovisual works.[111] Additionally, when an author creates the underlying layers of art used by the AI to generate the final NFT image, the NFT image is arguably fixed in a tangible medium of expression—through either physical drawings or digital renderings.[112] The NFT image must also be

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complex software the "interactive robotic painting machine" utilizes when making choices about what it paints and how it paints it).

109. One computer program, The Painting Fool, has become so self-sufficient that it reads news articles and takes on the "mood" found within—producing "happy" works when it reads positive stories and "sad" works when it reads negative ones. *See The Painting Fool*, THE PAINTING FOOL, http://www.thepaintingfool.com/index.html [https://perma.cc/2Z27-DDHX] ("I'm The Painting Fool: a computer program and an aspiring painter. . . . I have been built to exhibit behaviours that might be deemed skillful, appreciative, and imaginative."); *see also* Kadhim Shubber, *Artifical Artists: When Computers Become Creative*, WIRED (July 8, 2013, 2:07 PM), https://www.wired.co.uk/article/can-computers-be-creative [https://perma.cc/YJ28-G6UH] ("The goal of [The Painting Fool] is not to produce software that can make photos look like they've been painted, Photoshop has done that for years . . . [t]he goal is to see whether software can be accepted as creative in its own right. . . . It sets itself a goal at the start, based on a mood that we don't give it, . . . [i]t then attempts to achieve that mood with the painting styles that it has."). Even more astounding is the self-assessment The Painting Fool performs after each piece is completed to determine if the goal it set for itself was achieved. *Id.* This self-assessment is performed by another AI-generated program named "Darci" that acts as an artificial art critic. *Id.*; *see also* Andres Guadamuz, *NFTs Could Have a Generative Art Copyright Problem*, TECHNOLLAMA (Feb. 19, 2022), https://www.technollama.co.uk/nfts-could-have-a-generative-art-copyright-problem [https://perma.cc/B9X7-E97Y] ("Just recently, the US Copyright Office refused an application by Dr Stephen Thaler . . . [who] applied for registration of a work generated using artificial intelligence agent called 'Creativity Machine.' The registration was denied as current practice is that authors have to be human, the decision was appealed, and the Review Board denied the appeal stating categorically that 'human authorship is a prerequisite to copyright protection in the United States and that the Work therefore cannot be registered.'").

110. There are eight categories of protectable subject matter: literary, musical, and dramatic works; pantomimes and choreographic works; pictorial, graphic, and sculptural works; sound recordings; motion pictures and audiovisual works; computer programs; compilation of works and derivative works; and architectural works. 17 U.S.C. § 102(a)(1)–(8).

111. However, there are other ways NFTs could link to a creative work that is copyrightable subject matter including sound recordings, motion pictures, or literary works. *See id.*

112. *See* 17 U.S.C. § 102 note (Fixation in Tangible Form) ("Under the bill it makes no difference what the form, manner, or medium of fixation may be—whether it is in

original.[113] Despite the fact that NFT images are often created using AI, courts have historically set the originality bar very low.[114] It is likely any NFT project that was created with human input would meet the originality requirement.[115]

B. NFT Images and the Authorship Requirement

To receive copyright protection, the work at issue must also be a work of authorship.[116] An author is one who creates original works.[117] When multiple individuals are involved in a work's creation, those individuals can qualify for joint authorship in the work and share the exclusive rights granted by copyright ownership.[118] The authorship requirement was created to induce artistic creation and encourage the dissemination of new creative works.[119]

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words, numbers, notes, sounds, pictures, or any other graphic or symbolic indicia, whether embodied in a physical object in written, printed, photographic, sculptural, punched, magnetic, or any other stable form, and whether it is capable of perception directly or by means of any machine or device 'now known or later developed.'").

113. *See id.*

114. A work can be copyrightable even if only a "modicum of creativity" is present. Feist Publ'ns, Inc. v. Rural Tel. Serv. Co., 499 U.S. 340, 346 (1991); *see also* Trade-Mark Cases, 100 U.S. 82, 94 (1879). See *infra* note 138, for a discussion on what public domain entails. But see Guadamuz, *supra* note 109, for a discussion on the implications of NFT images falling into the public domain upon creation ("The consequence could be that if all of these thousands and thousands of [NFT images] have no copyright, then anyone can do whatever they want with them, you can print them, put them on t-shirts, and even mint your own NFTs of the images without infringing any copyright.").

115. *See Feist Publ'ns*, 499 U.S. at 346 ("[O]riginality requires independent creation plus a modicum of creativity . . . .").

116. 17 U.S.C. § 102(a).

117. 2 WILLIAM F. PATRY, PATRY ON COPYRIGHT § 3:20 (2022) ("Authors are those who create original works.").

118. *See* 17 U.S.C. § 201(a) ("The authors of a joint work are coowners of copyright in the work."). In the hypothetical at the beginning of this Comment, it could be argued that both Dickson and Shields have joint ownership in the mutated CryptoBear under current copyright law precedent. See Jane C. Ginsburg & Luke Ali Budiardjo, *Authors and Machines*, 34 BERKELEY TECH. L.J. 343, 374–92 (2019) for a discussion about the authorship between upstream and downstream authors; *see also* Erickson v. Trinity Theatre, Inc., 13 F.3d 1061, 1069–70 (7th Cir. 1994) (discussing the joint authorship requirement); Childress v. Taylor, 945 F.2d 500, 507 (2d Cir. 1991) (determining that all authors must make copyrightable contributions to qualify for joint authorship in a work).

119. *See, e.g.*, Twentieth Century Music Corp. v. Aiken, 422 U.S. 151, 156 (1975) ("The immediate effect of our copyright law is to secure a fair return for an 'author's' creative labor. But the ultimate aim is, by this incentive, to stimulate artistic creativity for

There is no clear element of human authorship when AI creates original or generated NFT images, and it is currently unknown if an AI's creator can take credit for the resulting work without further evidence of creative input.[120] Additionally, it is unclear if the percentage of AI contribution to the NFT image matters—as some NFT projects are created almost entirely by the artist while others are created entirely by AI. To ascertain the copyrightability of NFT images, it must be determined if original NFT images represent an artist's actual artistic expression or are just automated, unoriginal facilitations of a data set.[121] The main question addressed in this section is: What degree of randomness will copyright law tolerate to encourage creativity within the digital art world?[122]

Courts have refused to allow computer programs, animals, or plants to qualify as authors.[123] The intersection between human and machine authorship was first explored when courts dealt with the question of whether photographs were valid works of authorship when a machine generated the image that the photographer captured.[124] The photos were copyrightable because cameras were determined to be mere tools that facilitated the creation of

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the general public good."); *see also* Harper & Row, Publishers, Inc. v. Nation Enters., 471 U.S. 539, 546 (1985) ("It is evident that the monopoly granted by copyright actively served its intended purpose of inducing the creation of new material of potential historical value.").

120. In one precedential case, the Court had to determine whether a photographer or the artist who printed a lithograph was the true owner. Burrow-Giles Lithographic Co. v. Sarony, 111 U.S. 53, 54–55 (1884). The Court held that an author is defined as a person who the work owes its origin, but in the case of NFTs, that origin is unclear. *See id.* at 59–60. Additionally, the NFT purchasers could argue (as the lithographer did) that they have contributed "substantial creative contribution[s]" by creating additional NFTs from the initial framework of the original NFT image but would likely still fail to see any protections under the current statute. *See* MENELL, LEMLEY & MERGES, *supra* note 105, at 601.

121. 1 JOHN W. HAZARD, JR., COPYRIGHT LAW IN BUSINESS AND PRACTICE § 2:7.50 (rev. ed. 2022) (discussing different situations where computer input within a work's creation could create questions of valid authorship).

122. Ginsburg & Budiardjo, *supra* note 118, at 362.

123. *See* Kelley v. Chi. Park Dist., 635 F.3d 290, 303–04 (7th Cir. 2011) ("A living garden like Wildflower Works is neither 'authored' nor 'fixed' in the senses required for copyright [protection]. . . . Simply put, gardens are planted and cultivated, not authored."); Naruto v. Slater, 888 F.3d 418, 426 (9th Cir. 2018) ("[T]he district court did not err in concluding that Naruto—and, more broadly, animals other than humans—lack statutory standing to sue under the Copyright Act."); *see also* Ginsburg & Budiardjo, *supra* note 118, at 362–63 (discussing the two versions of the controversy surrounding *Naruto v. Slater* and how each one impacts the authorship discussion); Dane E. Johnson, *Statute of Anne-imals: Should Copyright Protect Sentient Nonhuman Creators?*, 15 ANIMAL L. 15 (2008).

124. Christine Haight Farley, *The Lingering Effects of Copyright's Response to the Invention of Photography*, 65 U. PITT. L. REV. 385, 388 (2004) (discussing the technological challenges photography brought to the copyright realm).

creative works authored by the photographer.[125] However, when an artistic work's actualization does not owe its origin to the artist, but rather to a source outside the scope of the artist's control, the work is purely "conceptual art" and uncopyrightable.[126] For example, the courts have determined a living garden lacks authorship, because it is controlled by Mother Nature; but, a carefully crafted topiary of flowers is copyrightable, because the artist established authorship by hand picking the sculpture's flowers.[127]

The United States Copyright Office has stated it will not copyright works "produced by a machine or mere mechanical process that operates . . . automatically without any creative input or intervention from a human author."[128] The focus then turns to what "any creative input or intervention" really means. The amount of "creative input" sufficient to meet this requirement draws more questions when compared with the copyright language stating an artist can get copyright protection even if the work is created "with the aid of a machine or device."[129]

In the mid-1960s, Congress created a special task force directly tasked with answering the question as to where the line is drawn between human and computer authorship for a work partially generated by a computer—the National Commission on New Technological Uses of Copyrighted Works (CONTU).[130] In its 1978 report, CONTU compared computers

125. *See id. But see* Agnieszka Kurant, *Phantom Capital, Hybrid Authorship, and Collective Intelligence*, 39 COLUM. J.L. & ARTS 371, 371–72 (2016) (discussing an art project entitled "A.A.I.," standing for "Artificial Artificial Intelligence," that was conceptually created by Kurant but entirely executed by termites who were feed primary-colored crystals to eat and excrete in varying shapes); *see also* Nicole Walsh, *Meet the Woman Making Art with Termites; Polish Artist Agnieszka Kurant Outsources Her Labor to an Unsuspecting Insect Army*, VICE (Aug. 7, 2015, 9:45 AM), https://creators.vice.com/en_us/article/8qvmwz/meet-the-woman-making-art-with-termites [perma.cc/L647-LHXK].

126. *Kelley*, 635 F.3d at 304; *see also* Shyamkrishna Balganesh, *Causing Copyright*, 117 COLUM. L. REV. 1, 31 (2017) ("In situations in which the putative author has had insufficient creative control over the process . . . courts treat the causal nexus as insufficient to generate authorship.").

127. Ginsburg & Budiardjo, *supra* note 118, at 363–64 (comparing how the *Kelley* court determined the artist lacked control of the actual art's execution, but Jeff Koons' "Puppy," made up of flowers planted in the shape of a canine head, was protectable).

128. U.S. COPYRIGHT OFF., COMPENDIUM OF U.S. COPYRIGHT OFFICE PRACTICES § 313.2 (3d ed. 2021).

129. 17 U.S.C. § 102(a).

130. *See* U.S. COPYRIGHT OFFICE, SIXTY-EIGHTH ANNUAL REPORT OF THE REGISTER OF COPYRIGHTS 5 (1965), https://www.copyright.gov/reports/annual/archive/ar-1965.pdf [https://perma.cc/E55P-XEUF].

to cameras or typewriters in that they are only capable of functioning when activated directly or indirectly by a human; thus, the copyright in these works always belonged to the technology's user.[131]

But technology has changed dramatically since CONTU's decision. In fact, in 1986 the Office of Technology Assessment questioned CONTU's conclusion because there were issues as to whether the AI's involvement in a work's creation makes it a co-creator rather than purely an instrument of creation.[132] In 2017, Congress established the Artificial Intelligence Caucus "to inform policymakers of the technological, economic, and social impacts of advances in AI and to ensure that rapid innovation in AI and related fields benefits Americans as fully as possible," but it too has failed to address the copyrightability of AI-generated works.[133] In the past, scholars have outlined standards for assessing the human aspect of works created by AI.[134] These benchmarks were created for theoretical application and designed to see if AI-generated works were distinguishable from human-created works.[135] While remarkably relevant to their intended purpose, these factors were not created to determine the copyrightability of such works, and thus do little to rectify the question as to the amount of artist contribution necessary to satisfactorily establish the authorship requirement in an NFT image.

The Bored Ape Yacht Club's Mutant Ape Yacht Club (BAYC MAYC) shows how AI's involvement in NFT image creation blurs the line between sufficient human authorship and pure computer automation.[136] 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 BAYC NFT holder then had the option to

131. NAT'L COMM'N ON NEW TECH. USES OF COPYRIGHTED WORKS, FINAL REPORT OF THE NATIONAL COMMISSION ON NEW TECHNOLOGICAL USES OF COPYRIGHTED WORKS 44 (1978).

132. OFF. OF TECH. ASSESSMENT, OTA-CIT-302, INTELLECTUAL PROPERTY RIGHTS IN AN AGE OF ELECTRONICS AND INFORMATION 72 (1986); *see also* Victor M. Palace, Note, *What if Artificial Intelligence Wrote This? Artificial Intelligence and Copyright Law*, 71 FLA. L. REV. 217, 220 (2019) (discussing the reasons why CONTU's ruling was premature and outdated considering the massive technological leaps that have been made since then).

133. *See* CONG. A.I. CAUCUS, https://artificialintelligencecaucus-olson.house.gov/ [https://perma.cc/JBS6-TSF8].

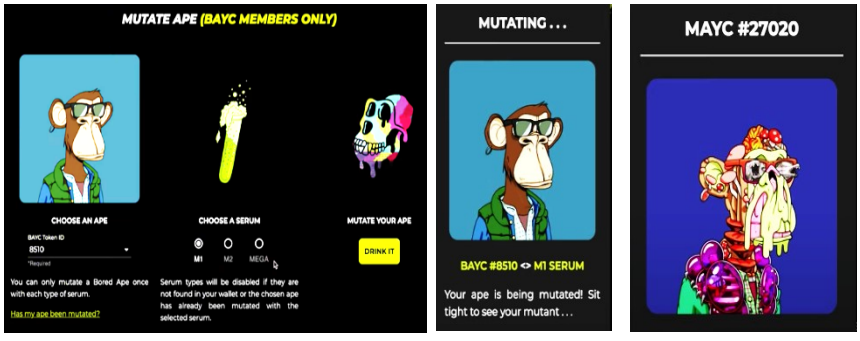
134. *See* Dan Rockmore, *What Happens When Machines Learn to Write Poetry*, NEW YORKER (Jan. 7, 2020), https://www.newyorker.com/culture/annals-of-inquiry/the-mechanical-muse [https://perma.cc/C27E-TW4H] (discussing The Turing Test, a test created to assess a machine's ability to exhibit intelligent behavior that is indistinguishable from a human).

135. *See id.*

136. *See The MAYC*, *supra* note 90.

command their original BAYC NFT image to merge with the serum and create a mutant version—the MAYC NFTs.[137]

Figure 5.



The BAYC MAYC creators could argue authorship is satisfied because of how much time and effort went in to creating the MAYC NFT images. Clearly significant human contribution was required because the creators had to think up, write the AI for, and execute an extensive project that resulted in the creation of 10,000 MAYC NFT images. But if a court found that the AI's contribution to the MAYC NFT images invalidated the authorship requirement, those images would enter the public domain.[138] There are arguments for and against AI-generated works entering the public domain, and a deeper analysis is required to understand the authorship nuances AI's contribution to an NFT image's creation presents.

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137. 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]. A Mutant Ape can be created when a Bored Ape ingests one of three mutant serums. *See The MAYC*, *supra* note 90. The results of two serums, M1 and M2, are known but "[i]f a Bored Ape ingests an M3 serum? Who knows." *Id.* This phrasing would seem to allude to a force beyond the creator or purchaser's control determining the mutated NFT's outcome.

138. *See* Naruto v. Slater, 888 F.3d 418, 426 (9th Cir. 2018). The public domain is a term used in copyright law to refer to works that are not protectable by copyright law and thus free for use by the public. *What is the Public Domain?*, COPYRIGHTLAWS.COM (Nov. 5, 2021), https://www.copyrightlaws.com/what-is-the-public-domain/ [https://perma.cc/X3HK-GWSW].

1. AI's Contribution Nullifies the Authorship Requirement

Utilizing AI in an artwork's creation could negate the copyright requirement of authorship.[139] It has been argued that AI needs no incentive to create the works it helps to generate, so the resulting work should not be copyrightable because the public should benefit freely from the AI's creation.[140] The rationale behind only attributing authorship to human beings is that association with copyrightable works is "both personal and immutable."[141] An author does not merely supply the direction or ideas for the project but "is the party who actually creates the work."[142] From a legal and economic standpoint, sending AI-generated works into the public domain maximizes the holistic benefit to society.[143] It has also been argued that the AI's automated nature takes on the role of creator with no originality contributed by the artist.[144] Another perspective is that projects using AI represent an artist's own artistic expression when the AI is directly created by the artist. The decision as to whether the authorship requirement is satisfied has often centered on whether the assisting party has exercised creative autonomy when helping bring the artist's ideas to life.[145]

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139. See *supra* Section III.A. for a discussion on original NFT images and the copyright requirements of originality and authorship.

140. Robert Yu, Comment, *The Machine Author: What Level of Copyright Protection is Appropriate for Fully Interdependent Computer-Generated Works?*, 165 U. PA. L. REV. 1245, 1270 (2017) ("[A]s a matter of public policy, machine-authored works should not be afforded any copyright protection."); *see also* Peter S. Menell, *Envisioning Copyright Law's Digital Future*, 46 N.Y. L. SCH. L. REV. 63, 163 (2002–2003) ("Copyright law has traditionally centered on economic interests—assuring content creators and distributors means of appropriating sufficient return in the marketplace in order to promote investment in creative endeavors.").

141. 2 PATRY, *supra* note 117, § 3:19.

142. 18 AM. JUR. 2D *Copyright and Literary Property* § 25, Westlaw (2021); *see also* Gaylord v. United States, 595 F.3d 1364 (Fed. Cir. 2010).

143. Atilla Kasap, *Copyright and Creative Artificial Intelligence (AI) Systems: A Twenty-First Century Approach to Authorship of AI-Generated Works in the United States*, 19 WAKE FOREST J. BUS. & INTELL. PROP. L. 335, 374 (2019) ("[A]nother argument is that the most efficient use of resources is to send AI-generated works straight into the public domain, thereby maximizing the benefit for society as a whole." (citing Mark Perry & Thomas Margoni, *From Music Tracks to Google Maps: Who Owns Computer Generated Works?*, 26 COMPUT. L. & SEC. REV. 621, 627–28 (2010)).

144. Rizzo, *supra* note 71; *see also* GATTO, *supra* note 69 ("Generative art uses AI or other algorithms to create or modify art. In some cases, an artist specifies some of the inputs or starting points for the art, then the algorithm takes over.").

145. *See* Andrien v. S. Ocean Cnty. Chamber of Com., 927 F.2d 132, 135–36 (3d Cir. 1991) (determining that when a third party draws a map that an artist described "in specific detail," and that the third party made no alterations to, the third party was an agent and sole authorship in the resulting copyright vests in the artist).

AI's objectivity also creates the chance for the AI to output more possibilities than the programming artist initially accounted for.[146] While Dickson created each underlying CryptoBear layer that would be randomly assigned, the AI's execution of that plan could result in a CryptoBear combination that Dickson never considered. Perhaps this shows the AI's efficiency, but it also showcases a disconnect between the artist's intentions and the AI's production of the actual works—potentially nullifying any creative input the artist intended to contribute.[147] The AI's autonomous nature could unintentionally result in the "misalignment of interests" between the AI's objective goal—creating a certain number of CryptoBears with certain attributes—and the artist's subjective goal—to create an NFT project that people will want to purchase.[148] While the AI does not intend to act against the artist's wishes, the emotionless component of the technology means it is fundamentally indifferent to the artist's subjective intent for creating the project, which is likely to facilitate the creation of less creative, more sterile images.[149]

2. AI-Generated Protection as a Subset of Human Authorship

From a public policy perspective, granting AI-generated works protection is consistent with the idea that AI's production of unconventional options, sometimes even those that surpass the artist's preconceived ideas for the project, arguably helps to increase public exposure to innovative and creative artwork—directly in line with copyright law's purpose.[150] While it is possible AI can generate an NFT image different than the programming artist intended, copyright case law supports protection in works whose

146. *See* Scherer, *supra* note 107, at 354 ("The increasing ubiquity and rapidly expanding commercial potential of AI has spurred massive private sector investment in AI projects.").

147. *See* James Grimmelmann, *There's No Such Thing as a Computer-Authored Work—And it's a Good Thing, Too*, 39 COLUM. J.L. & ARTS 403, 404 (2016) (listing five reasons why computer-generated works might be considered meaningfully different than human-generated works: "(1) they are embedded in digital copies[;] (2) People create them using computers rather than by hand[;] (3) Programs can generate them algorithmically[;] (4) Programmers as well as users contribute to them[; and] (5) Programs can generate them non-deterministically.").

148. Scherer, *supra* note 107, at 367.

149. *Id.* at 367–68.

150. *See id.* at 365.

conception has been unintended or accidental.[151] It has even been argued that the accidental creation of works embodies the true nature of the creative process.[152] The deciding factor between whether an artist is found to have exercised sufficient creative control could be answered by assessing whether the unintended event was merely an intervening addition to the artist's initial vision, or whether the event was superseding and completely unforeseeable.[153]

One approach to determining whether AI-created works are copyrightable is to focus on two fundamental pillars of authorship: the mental conception of the work and the physical execution of the work.[154] This approach seems to support the assertion that the action of a human programming the AI—like Dickson—or requesting the AI's output—like Shields—provides sufficient involvement in the work's creation to satisfy both the conception and execution benchmarks authorship requires.[155]

An argument can also be made that AI is merely an assistant through which the author's own creative work is generated.[156] When the technology helping to create the work is found to be "merely a tool that helped facilitate the fixation of the author's creativity," courts have granted the work copyright protection.[157] Additionally, the Court has allowed the copyright of a work to vest solely in the lead artist despite help from an assistant,

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151. Time Inc. v. Bernard Geis Assocs., 293 F. Supp. 130, 144 (S.D.N.Y. 1968) (discussing that video of an event accidently captured is protectible unless the use of it was "reasonable or 'fair.'").

152. Ginsburg & Budiardjo, *supra* note 118, at 353 (discussing that the author's conception of the work they are creating can change and morph throughout the creation process and just because they do not know what form the final work will take does not make its conception any less creative or their part in it any less important).

153. *See id.* at 370–74 ("If a putative author's sole execution of a work is uncontested, and if there is no reason to believe that anyone other than the putative author generated the creative plan that guided that execution, then there is no need to investigate whether she adequately 'conceived of' the work.").

154. *Id.* at 343; *see also* Jane C. Ginsburg, *The Concepts of Authorship in Comparative Copyright Law*, 52 DEPAUL L. REV. 1063, 1072 (2003) ("An 'author' conceives of the work and supervises or otherwise exercises control over its execution.").

155. Ginsburg & Budiardjo, *supra* note 118, at 350 (determining that the authorship evaluation should focus on the humans involved in the authorial claims and their preparation or creation of the work that is aided by machines).

156. *See id.* at 433–44; *see, e.g.*, Lindsay v. Wrecked & Abandoned Vessel R.M.S. Titanic, 1999 U.S. Dist. LEXIS 15837 (S.D.N.Y. Oct. 13, 1999) (arguing that a film director who did not physically film the footage is still the author of that footage because he had extensively planned and controlled each shot from the film, and that the "final product duplicates his conceptions").

157. Yu, *supra* note 140, at 1254 (discussing Burrow-Giles Lithographic Co. v. Sarony, 111 U.S. 53 (1884)); *see, e.g.*, Midway Mfg. Co. v. Artic Int'l, Inc., 547 F. Supp. 999, 1014 (N.D. Ill. 1982), *aff'd*, 704 F.2d 1009 (7th Cir. Ill.) (determining that video games are copyrightable despite being primarily machine-operated).

and arguably AI is merely a technological assistant to the inception of the original CryptoBear that Dickson intended to create.[158] Past case law discussing the creation of creative works with computer assistance has focused on the original design's conception and has concluded that "[s]omeone first conceived what the audiovisual display would look like" which establishes adequate authorship.[159]

C. The Rightful Author: Artist or AI?

NFT images should be copyrightable because the AI helping to create these images is the product of human commands and programmed randomness that was intentionally injected into the project to induce the creation of unique NFT images.[160] An artist incorporating AI into digital art creation should be eligible for copyright protection because they are no different than an artist utilizing a computer program to facilitate the creation of an animated cartoon.[161] Although no federal legislation has been enacted regarding the scope of copyright law and NFT images, the United States appears to be taking the approach that AI-created works are not protected by other intellectual property laws.[162] If the default standard in the United

158. *See Burrow-Giles*, 111 U.S. at 61.

159. Stern Elecs., Inc. v. Kaufman, 669 F.2d 852, 856 (2d Cir. 1982) (addressing the copyrightability of visual images electronically displayed by a coin-operated video game); *see Burrow-Giles*, 111 U.S. at 58. *See generally* THE CONSTRUCTION OF AUTHORSHIP: TEXTUAL APPROPRIATION IN LAW AND LITERATURE (Martha Woodmansee & Peter Jaszi eds., 1994) (discussing the malleable and socially constructed concept of "the author" and whether work attribution to a specific individual furthers copyright law policies). "[The U.S. Copyright] Office will not register works produced by a machine or mere mechanical process that operates randomly or automatically without any creative input or intervention from a human author." U.S. COPYRIGHT OFF., *supra* note 128.

160. *See* Ginsburg & Budiardjo, *supra* note 118, at 399–400. We will assume all AI discussed is created solely by the NFT artist attached to the resulting generative digital artwork and NFT. There is a lot more to discuss pertaining to this issue when the AI is created by a third party only connected to the NFT project itself via a contract or agreement between the AI creator and the NFT artist.

161. *See* Andrien v. S. Ocean Cnty. Chamber of Com., 927 F.2d 132, 135 (3d Cir. 1991) (acknowledging there is much more discussion when a third party creates the AI).

162. *See* Susan Decker, *Only Humans, Not AI Machines, Get a U.S. Patent, Judge Says*, BLOOMBERG (Sept. 3, 2021, 7:06 PM), https://www.bloomberg.com/news/articles/2021-09-03/only-humans-not-ai-machines-can-get-a-u-s-patent-judge-rules [https://perma.cc/5QH6-ALRV]. In the case of the REPLICATOR, an NFT artist created a digital printer that would randomly create new NFTs. *MDJ x Phillips: A Multi-Generational NFT*, PHILLIPS, https://www.phillips.com/mdj [https://perma.cc/2CKX-WFMN] ("REPLICATOR is the story of a machine through time. It is a reflection on forms of past groundbreaking

States is that these images cannot meet the authorship requirement and must enter the public domain upon creation, then the copyright principles of innovation and creativity are not upheld.[163] To prevent this inequity, Congress must address how, or if, the AI aspect of original and generated NFT images impacts the authorship requirement.

Digital artists should not be penalized and excluded from exclusive rights in their works simply because they utilize technology in a creative and efficient manner. As mentioned previously, the AI creation requires intense coding experience and an abundance of time and effort.[164] Excluding an artist from copyright eligibility simply for using AI to help create their work would severely hinder creative innovation. Courts should look at several factors when determining whether AI was merely a tool to facilitate the artist's creative expression or the actual creator of that expression. These factors could include an NFT artist's proof of authorship, the NFT project details, and the code implemented within the AI. This would allow Dickson to satisfy the authorship requirement by providing sufficient evidence of both initial conception and adequate creative execution of the CryptoBears. Furthermore, Congress could appoint a qualified board of judges familiar with NFTs and generative artwork to exclusively handle cases concerning the copyrightability of AI-generated creative works.

Given the underlying copyright principles of increasing creative innovation and protecting artistic works, original and generated NFT images should be eligible for copyright protection. There are at least two examples of books written by computers that have been granted copyrights by the Copyright Office.[165] This seems to support a conclusion that at least some

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innovation and serves as a metaphor for modern technology's continuum."). The artist utilized smart contracts to imbed self-generating AI within each NFT that would continue to create new NFTs over the course of one year. *Id.* However, the artist also introduced the element of chance into the work's algorithm through a "self-referential twist"—the printer could jam. *Id.* A jam would stop a generation from continuing to replicate. *Id.* As a multi-generational NFT experience, "the work will ultimately be comprised of seven unique generations each bearing their own defining visual characteristics which illustrate the machine's journey . . . ." *Id.* The unique creation of these pieces ensured their scarcity, but the randomization and inability for the creator or consumer to control the minted image raises questions of authorship. *See id.*

163. *See* Yu, *supra* note 140, at 1265–66 (discussing how the public domain theory is beneficial in some regards, but that the difficulty of enforcement and increased litigation claims cancel out the benefits of such a proposal).

164. *See* Ginsburg & Budiardjo, *supra* note 118, at 397–98 (discussing the process of creating artificial intelligence programs).

165. *See* SCOTT FRENCH, JUST THIS ONCE (1993) (Copyright Registration No. TX-3-633-395); RACTER, THE POLICEMAN'S BEARD IS HALF CONSTRUCTED (1984) (Copyright Registration No. TX-1-454-063).

AI created works can be copyrightable. Maybe the question then becomes: Can AI share ownership rights in the resulting work?[166]

D. The Rightful Owner: Artist or Purchaser?

Even if original NFT images are copyrightable, the question still lingers as to who—if anyone—rightfully owns the copyright in the resulting generated NFT image. There is an argument that the NFT purchaser should have full copyright rights in any generated NFT image because that user is engaging the AI to produce the image.[167] From a purely economic standpoint, granting Shields the full, exclusive copyright in her mutated CryptoBear would enhance consumers interaction with the NFT image market. Giving NFT image purchasers the ability to engage with the original NFT image means the NFT purchaser has a hand in controlling the volume, and thus scarcity, of original NFT images that are available within a given NFT project.[168]

One could argue that Shields is the rightful owner of the mutated CryptoBear because she sufficiently contributed to the creation of that NFT image by clicking the button next to her original CryptoBear. However, Shields did not contribute any level of creativity to the mutated CryptoBear's creation, so giving her full copyright rights in the mutated CryptoBear seems extreme and contrary to equitable copyright principles.[169] This outcome would give

166. *See* Andrew J. Wu, *From Video Games to Artificial Intelligence: Assigning Copyright Ownership to Works Generated by Increasingly Sophisticated Computer Programs*, 25 AIPLA Q. J. 131 (1997) (discussing whether a computer program can itself author a work). *But see* Russ Pearlman, *Recognizing Artificial Intelligence (AI) as Authors and Inventors Under U.S. Intellectual Property Laws*, 24 RICH. J.L. & TECH., no. 2, 2018, at i, 3 (arguing that AI should be capable of achieving the status of author or inventor under current intellectual property frameworks); *see also* Cody Weyhofen, Comment, *Scaling the Meta-Mountain: Deep Reinforcement Learning Algorithms and the Computer-Authorship Debate*, 87 UMKC L. REV. 979 (2019) (introducing an argument that AI should be considered an employee under the work made for hire doctrine); Shlomit Yanisky-Ravid, *Generating Rembrandt: Artificial Intelligence, Copyright, and Accountability in the 3A Era—The Human-Like Authors are Already Here—A New Model*, 2017 MICH. ST. L. REV. 659 (2017) (advocating for the adoption of a work made for hire model that would view AI as a creative employee or independent contractor of the AI's user).

167. Yu, *supra* note 140, at 1259 ("Allocating rights to the end-user seems to make the most economic sense."). *But see id.* ("[T]he end-user of a computer program makes no real decision as to the composition or arrangement.").

168. *See id.* at 1261.

169. *See, e.g.*, Alfred Bell & Co. v. Catalda Fine Arts, Inc., 191 F.2d 99, 102–03 (2d Cir. 1951) (holding that copyright protection only requires that the author contributed something recognizably their own and not a "'mere trivial' variation" (quoting Chamberlin v. Uris Sales Corp., 150 F.2d 512, 513 (2d Cir. 1945))).

Shields rights in a work she did not have to labor over or contribute to at all, while Dickson would be left without any rights in a work he arguably spent significant time and effort creating.[170] This result counteracts one of copyright law's main purposes—incentivizing artists to make creative works.[171] Dickson contributed significant creative input into the generated NFT image, so the mutated CryptoBear's copyright should stay with Dickson. That still leaves us with the question as to what rights, if any, Shields has in the original and mutated CryptoBears.

IV. NFTs AND THE FIRST SALE DOCTRINE

For blockchain and NFTs to build and enhance the inherent value of creative digital works, Congress must amend the first sale doctrine to cover NFT images. Congress has a history of amending intellectual property law to resolve technologically-exclusive issues when it felt the current law was inadequate or applied inconsistently.[172] A first sale amendment would

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170. *See* U.S. COPYRIGHT OFF., *supra* note 128, § 721.6.

171. Yu, *supra* note 140, at 1245 ("U.S. copyright law is grounded in a utilitarian philosophy: authors are granted a limited monopoly to incentivize production of original expressive works for the benefit of society as a whole.").

172. *See* Family Entertainment and Copyright Act of 2005, Pub. L. No. 109-9, 119 Stat. 218 (codified as amended in scattered sections of 18 U.S.C.); Digital Millennium Copyright Act of 1998, Pub. L. No. 105-304, 112 Stat. 2860 (codified as amended in scattered sections of 17 U.S.C.) (dividing technological protection measures (TPMs) into two functional categories: (1) those that control access to copyrighted works and (2) those that permit access but control copying, or some other right, of copyrighted works). Splitting the groups allows for unique restrictions to be imposed on different groups. 17 U.S.C. §§ 1200–1204 (enacting anti-circumvention and anti-trafficking bans while also creating safe harbors for online service providers); *see* Digital Performance Right in Sound Recordings Act of 1995, Pub. L. No. 104-39, 109 Stat. 336 (adding Section 1006(6) because of the Internet and streaming); Fairness in Music Licensing Act of 1998, Pub. L. 105-298, 112 Stat. 2830 (creating a public performance royalty payment exemption for small businesses); *see also* Delimatsis, *supra* note 40, at 86 ("Like with every technological advance, promoting innovation and reducing transaction costs while ensuring consumer protection, respect for privacy and personal data as well as intra-industry competition is the challenge that regulatory authorities have to tackle."); Anticybersquatting Consumer Protection Act of 1999, Pub. L. 106-113, 1136 Stat. 1536 (codified as amended at 15 U.S.C. § 1125); S. REP. NO. 106-140, at 4 (1999) ("[ACPA was enacted] to protect consumers and American businesses, to promote the growth of online commerce, and to provide clarity in the law for trademark owners by prohibiting the bad-faith and abusive registration of distinctive marks as Internet domain names with the intent to profit from the goodwill associated with such marks . . . ."); Sporty's Farm L.L.C. v. Sportsman's Mkt., Inc., 202 F.3d 489, 493 (2d Cir. 2000) ("Due to the lack of any regulatory control over domain name registration, an Internet phenomenon known as 'cybersquatting' has become increasingly common in recent years."). These IP amendments focused on the advancement of technology and were drafted to address the simple and inexpensive nature of the initial infringing action on these platforms and to protect consumers who were likely to fall victim to these actions. *See id.* ("Since domain name registrars do not

ensure consistent, actionable rights are passed to an NFT image purchaser while protecting the remaining copyright owner's exclusive rights.

Blockchain technology and NFT projects focus on the decentralization of formal oversight and encourage users to adopt a pseudo-ownership stake in the project's direction. Despite blockchains reliance on self-governance principles and limited government regulation, its desire to operate outside the reach of federal standards will not prevent blockchain transactions from directly implicating real-world laws governing the transfer and sale of both digital and physical goods.[173] This overlap makes it necessary to create a legal bridge connecting the virtual and real worlds to ensure NFT image transactions are sufficiently protected and governed by uniform copyright standards.

A. Rights Under the First Sale Doctrine

The first sale doctrine is a defensive copyright doctrine that limits a copyright owner's exclusive rights by granting the purchaser of a copyrighted work the right to resell, privately display, or otherwise dispose of the purchased copy of the work.[174] Courts have held that a purchaser of a physical copyrighted work typically gets an implied, non-exclusive license to use that copyrighted material, and if the creator received adequate compensation for that work, the purchaser's license becomes irrevocable.[175]

The first sale doctrine was created to balance the copyright owner's rights with the public's interest in limiting restraints on the alienation of tangible property.[176] To qualify, a purchaser has to show that they have full ownership

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check to see whether a domain name request is related to existing trademarks, it has been simple and inexpensive for any person to register as domain names the marks of established companies."); *see also* Lucas Nursery & Landscaping, Inc. v. Grosse, 359 F.3d 806, 811 (6th Cir. 2004) ("One of the ACPA's main objectives is the protection of consumers from slick internet peddlers who trade on the names and reputations of established brands.").

173. For example, when loan repayment is automatically triggered by the smart contract deadline occurring, but the borrower is bankrupt, the smart contracts actions and the real-world law for insolvency proceedings are at odds. Guillaume, *supra* note 28, at 75.

174. The first sale doctrine provides that a lawful purchaser of a copy of work has the right to sell, privately display, give away, lease, rent, or lend to the public their copy of the work. *See* 17 U.S.C. § 109(a).

175. *See generally* Asset Mktg. Sys., Inc. v. Gagnon, 542 F.3d 748 (9th Cir. 2008) ("We hold that Gagnon granted AMS an unlimited, nonexclusive license to retain, use, and modify the software. Furthermore, because AMS paid consideration, this license is irrevocable.").

176. Victor F. Calaba, *Quibbles 'N Bits: Making a Digital First Sale Feasible*, 9 MICH. TELECOMMS. & TECH. L. REV. 1, 4–5 (2002).

of the copy of the work and that the work was acquired in a legal manner.[177] This doctrine only applies to distribution rights and does not allow the purchaser to reproduce, adapt, or create derivative works of the image.[178] While the first sale doctrine has been crucial in establishing ownership rights in physical copyrighted works, its application to digital works is less clear.[179] For example, while tangible books are bought and sold, e-books are typically only licensed, meaning the limited rights individuals obtain upon physical purchases do not apply to their digital purchases.[180] In order to resell the e-book, the copyright holder would have to grant the purchaser the right to resell the work via a contractual clause or other form of purchase agreement.[181]

The dichotomy between a purchaser's current rights in a physical image as compared to a digital version of that same image is best shown through an example. Let's pretend that Dickson physically hand drew every CryptoBear property before dictating to AI how frequently each of those properties would be applied to 10,000 *physical* CryptoBear canvases.[182] Those properties became fixed in a tangible medium of expression when they were drawn and, if we assume the authorship and originality requirements are satisfied, were capable of copyright protection.[183] This gives Dickson both a copyright in the resulting CryptoBear images and the exclusive rights to publicly display, make copies of, distribute, and make derivative works of those CryptoBears.[184] If Dickson then sold a CryptoBear canvas to Shields, she would have implied rights to resell, privately display, or dispose of the copy under the first sale doctrine. Arguably, minting a digital version

177. *See* 17 U.S.C. § 109(a).

178. *See id.*; *see also* Calaba, *supra* note 176, at 6 (first citing 17 U.S.C. § 109(a); and then citing Keith Kupferschmid, *Lost in Cyberspace: The Digital Demise of the First-Sale Doctrine*, 16 J. MARSHALL J. COMPUT. & INFO. L. 825, 833 (1998)).

179. Vernor v. Autodesk, Inc., 555 F. Supp. 2d 1164, 1169 (W.D. Wash. 2008) (discussing whether the purchase of software through e-Bay should be construed as a license or a sale for copyright and first sale doctrine purposes). *See generally* Daniel Doft, *Facebook, Twitter, and the Wild West of IP Enforcement on Social Media: Weighing the Merits of a Uniform Dispute Resolution Policy*, 49 J. MARSHALL L. REV. 959 (2016) (analyzing the merits of a uniform dispute resolution policy for the enforcement of intellectual property rights on social media).

180. *Reselling eBooks*, BOOKSCOUTER (June 25, 2016), https://bookscouter.com/blog/2016/06/reselling-ebooks/ [https://perma.cc/VM8E-M9KU].

181. *See* Calaba, *supra* note 176, at 5 (quoting 17 U.S.C. § 27 (1977)); *see also* Henry Sprott Long III, Commentary, *Reconsidering the "Balance" of the "Digital First Sale" Debate: Re-Examining the Case for a Statutory Digital First Sale Doctrine to Facilitate Second-Hand Digital Media Markets*, 59 ALA. L. REV. 1183 (2008).

182. For purpose of this Comment, we will assume Dickson digitally created the original CryptoBear.

183. See *supra* note 109 for a discussion on The Painting Fool and other AI-simulated physical art projects.

184. 17 U.S.C. § 106.

of the CryptoBear image does not change the rights Dickson would have in the image, but under current copyright law, it is unclear what rights Shields —as the digital image purchaser—possesses in the NFT image.

B. Arguments Surrounding a First Sale Doctrine Amendment

The first sale doctrine must be amended to address the unique questions surrounding ownership rights in NFT images.[185] When an NFT image is purchased, it is not clear which party has what rights to the underlying work. Is stating "all purchasers will own their purchased works" on the FAQ section of an NFT project's website enough to establish who owns the rights in the NFT image?[186] And what does "owning" the purchased work even mean? While this vague disclaimer attempts to clarify the purchaser's rights, it does not clearly define what the NFT image purchaser has ownership in, nor does it determine if the purchaser has actual rights to the work or just a license to use the copy.[187] Furthermore, if only a license exists, it is unclear what rights are licensed or how these rights apply to generated

185. While owners of copyrighted works can utilize the first sale doctrine to legally resell those works, the digital nature of NFTs only grants the purchaser a license. *See, e.g.*, Sarah Reis, Note, *Toward a "Digital Transfer Doctrine"? The First Sale Doctrine in the Digital Era*, 109 NW. U. L. REV. 173 (2015). Other digital goods (such as apps) have been found to simply be licensed to those who purchase them on the internet. *See Legal Issues in Developing a Mobile App*, TYSON L. (Oct. 6, 2019), https://www.marktysonlaw.com/blog/legal-issues-developing-mobile-app [https://perma.cc/UPQ5-4C98]. Courts have recognized there is a difference between the owner and the licensee of a copyrighted work. *See* Capital Recs., L.L.C. v. ReDigi Inc., 934 F. Supp. 2d 640, 655 (S.D.N.Y. 2013) (holding that the first sale doctrine does not apply to digital music files); *see also* Vernor v. Autodesk, Inc., 621 F.3d 1102, 1110–11 (9th Cir. 2010) (holding that a software purchaser was only a licensee of the software and thus could not transfer or sell the software under a first sale doctrine defense); *see also Andy Warhol: Machine Made*, CHRISTIE'S, https://onlineonly.christies.com/s/andy-warhol-machine-made/overview/2051?sc_lang=en [https://perma.cc/8NBF-2Y2V].

186. *See FAQ*, INBETWEENERS, https://www.inbetweeners.io/#faq-section [https://perma.cc/FW7B-JZ6K] ("Owning an inBetweener will give you . . . the underlying IP and copyright for each inBetweener.").

187. Adobe Sys. Inc. v. Christenson, 809 F.3d 1071, 1078 (9th Cir. 2015) (discussing a three-part test the court used to determine if the licensing agreement over the digital asset actually created a sale) (citing Vernor v. Autodesk, Inc., 555 F. Supp. 2d 1164, 1111 (W.D. Wash. 2008)). *But see* 17 U.S.C. § 106(2); *see also* Jazz Photo Corp. v. Int'l Trade Comm'n, 264 F.3d 1094, 1102 (Fed. Cir. 2001) ("[T]he rights to ownership do not include the right to construct an essentially new article on the template of the original, for the right to make the article remains with the patentee."); 17 U.S.C. § 106(2) (stating that the copyright owner has the exclusive right "to prepare derivative works").

NFT images created from the original NFT image. Some argue the digital nature of NFT images disqualifies them from first sale protection because of the increased piracy and infringement risks digital goods face, while advocates argue blockchain's immutability and transparency nullifies these concerns.[188]

The main question raised by NFT projects is whether the public display or derivative work right is infringed upon when NFT projects request—and even encourage—NFT image holders to take actions that will result in the creation of a generated NFT image. NFT purchasers often display their NFT image as their social media profile picture so they can let others know they are a member of that exclusive NFT project.[189] Membership in these communities also means that, as seen in the examples mentioned throughout this Comment, there is a chance that subsequent projects branching off the original project could encourage NFT purchasers to create derivative works of their original NFT images—like the mutated CryptoBear or MAYC NFTs. Under current copyright law, both actions mentioned above leave the NFT purchaser liable for potential infringement claims, because NFT image purchasers do not currently have the right to publicly display or create derivative copies of their NFT images.

The lack of uniformity amongst NFT projects regarding what default rights are passed to purchasers creates uncertainty and makes determining the rights to derivative works spawned from interaction with the original NFT image more difficult. NFT projects are not always clear as to what rights the purchaser is receiving.[190] Some NFT projects have given extensive information regarding the rights granted to purchasers, with some projects giving all intellectual property and commercial use rights in the work to the first NFT image purchaser.[191] But even if the first NFT purchaser does get all ownership rights in the underlying work, those rights may not be passed on to subsequent purchasers, which could impact the secondary NFT image market.[192]

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188. The transaction in question must also be on-chain for blockchain security to most efficient. See *infra* Sections IV.B.1, IV.B.2 for the arguments for and against digital works receiving first sale protection.

189. See *supra* notes 74–75 for a discussion on PFP projects.

190. It could be argued that ownership of a token differs from ownership of a copyright, but neither is mentioned within the current platform standards.

191. *See* Farah Mukaddam, *NFTs and Intellectual Property Rights*, NORTON ROSE FULBRIGHT (Oct. 2021), https://www.nortonrosefulbright.com/en/knowledge/publications/1a1abb9f/nfts-and-intellectual-property-rights [https://perma.cc/92EF-R7PQ].

192. *See id.*

1. Excluding NFT Images from First Sale Protections

Those who believe the first sale doctrine should not apply to digital works assert that unlike selling a physical painting—which requires the work's owner to hand over the actual work—transmitting a digital work requires that the work's owner duplicate the original copy.[193] The questions currently surrounding the first sale doctrine and digital work ownership create uncertainty for both NFT purchasers and artists as to the rights they possess in the NFT image.[194]

In 1998, Congress enacted the Digital Millennium Consumer Act (DMCA) as an anti-piracy statute addressing the digital circumvention of copyright protections.[195] During this time, Congress discussed whether to extend the first sale doctrine to digital goods; however, major concerns were raised by copyright owners who believed that this expansion would significantly increase the prevalence of digital piracy.[196] As a result, the DMCA did not expand first sale protections to digital goods.[197]

Another issue with digital works has been that the work's seller is not transmitting their actual copy, but rather a duplicated version, to the subsequent buyer. This arguably nullifies the first sale doctrine's requirement that the transmitted work be the owner's particular copy.[198] Additionally, the first sale doctrine's application to digital works could undermine the doctrine's objective to protect the copyright owner's commercial interests.[199] Extending the first sale doctrine to digital goods could cause copyright owners weary of digital piracy to limit distribution of their works to strictly tangible sales which would subsequently hurt all digital works' long-term value.[200]

193. Kupferschmid, *supra* note 178, at 838.
194. *See* CHOWDHURY, *supra* note 22, at 317.
195. Digital Millennium Copyright Act, Pub. L. No. 105-304, 112 Stat. 2860 (1998) (codified as amended in scattered sections of 17 U.S.C.).
196. *See* MGM Studios Inc. v. Grokster, Ltd., 545 U.S. 913, 928–29 (2005) ("[E]very copy is identical to the original, copying is easy, and many people (especially the young) use file-sharing software to download copyrighted works."). *See generally* Reis, *supra* note 185.
197. Robert Rotstein, *The First Sale Doctrine in the Digital Age*, MSK (Mar. 2010), https://www.msk.com/newsroom-publications-1114 [https://perma.cc/2EDJ-BQHY].
198. Calaba, *supra* note 176, at 14–15; *see also* Kupferschmid, *supra* note 178, at 843.
199. Kupferschmid, *supra* note 178, at 852.
200. Calaba, *supra* note 176, at 15 (citing Kupferschmid, *supra* note 178, at 853).

2. Amending the First Sale Doctrine to Include Protections for NFT Images

NFT images are a special exception to the previous concerns of increased digital piracy and copyright infringement. Decentralized blockchains allow digital assets to be managed in a way that was never possible before.[201] Blockchain's transparency and immutability mitigate piracy concerns by providing direct evidence that the actual work was removed from one wallet and transferred to another wallet upon a sale's execution. This ensures no copies are made while mitigating the untracable piracy concerns that occurred when e-books and MP3 files were first introduced.[202] Blockchain and smart contract technology make it physically impossible for a seller to keep possession of a sold NFT image.[203] Additionally, the decentralized node validation

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201. Sam Daley, *What is Blockchain?*, BUILTIN.COM (July 28, 2022), https://builtin.com/blockchain/ [https://perma.cc/X6MC-3SXT].

202. *See* Chris Painter, *Protecting Reputations: Using Blockchain to Mitigate the Scourge of Counterfeit Goods*, TRADEMARKS & BRANDS ONLINE (Feb. 28, 2018), https://www.trademarksandbrandsonline.com/contributed-article/protecting-reputations-using-blockchain-to-mitigate-the-scourge-of-counterfeit-goods [https://perma.cc/WA2K-6VDG].

203. Decentralized networks align the interests of all participating parties because all network participants are working towards a common goal—"the growth of the network and the appreciation of the token." Luis Gallardo, *Web3—Community, Ownership, Decentralization, Utility*, WORLD HAPPINESS FOUND. (Apr. 13, 2022), https://worldhappiness.foundation/blog/happiness/web3-community-ownership-decentralization-utility/ [https://perma.cc/SH6B-8G8B]. Decentralized networks "develop community-owned networks and provide a level playing field for third-party developers, businesses, and creators" bringing back the individualized utility of Web 1.0 while distributing value to all users engaging in this system (not just the major companies running the centralized servers common on Web 2.0). *See id.* Additionally, the risk of a coding error is unlikely because the smart contracts underlying the NFTs and the blocks making up the blockchain are operating on call functions that should be predetermined and run autonomously based on certain actions occurring on the blockchain. *See* Aaron Vick, *Why Community is the Most Critical Aspect of the NFT Space*, ENTREPRENEUR (July 29, 2022), https://www.entrepreneur.com/science-technology/why-community-is-key-in-web-30/430602 [https://perma.cc/43TY-UPLN] ("Web3 is establishing a decentralized, digital highway for people to connect on their own terms to form communities that fit their needs and beliefs."); *see also supra* Section II.B.1. While it is possible that a human could input the wrong data, the decentralization of the nodes ensures that a majority of the validators have to approve the transaction for the data to get logged on the blockchain. Lyle Daly, *What is a Blockchain Node?*, MOTELY FOOL (June 9, 2022, 6:37 PM), https://www.fool.com/investing/stock-market/market-sectors/financials/blockchain-stocks/blockchain-node/ [https://perma.cc/7RCR-Y3SV] ("The fact that every node verifies transactions helps secure the network. An invalid transaction could only be approved if 51% of the nodes confirmed it. In blockchain networks with hundreds or thousands of nodes, it's extremely unlikely that a bad actor would be able to take over 51%."). See *supra* Section II.A.1 for a discussion on how decentralized networks function. To intentionally input false data on the blockchain, the bad actor would have to either hold a majority of the nodes validating that chain—which basically nullifies the decentralization—or they would have to convince a majority of the other validators to help them, and with the high amount of validators most blockchains run on, this just is not likely. *What*

systems in place on the blockchain network increase the threshold requirements for logging transactions on the chain. This not only decreases the risk of a coding error but also hinders bad actors who attempt to engage with these networks.

The concern of NFT image piracy is also substantially mitigated by the fact that the benefits that accompany NFT image purchases only apply to authentic sales and not counterfeit NFT images or unsanctioned copies.[204] As discussed earlier, a key reason people purchase NFT images is to access the exclusive benefits they provide. If a user purchases an NFT image that is not authentic, those exclusive benefits will not be available, which drastically reduces the appeal of—and market for—pirated NFT images.[205]

3. Problems Unique to NFT Images

Unique issues arise when an off-chain NFT image is modified, altered, or destroyed after it is purchased. A first sale doctrine amendment could also address these problems. Previously, legislators were hesitant to grant digital goods first sale protection because of the inability to tell whether the seller's version of a digital asset was destroyed when sold to someone else.[206] The NFT purchaser now faces a similar vulnerability if NFT images are denied first sale protection. Unlike previous digital goods, the smart

is a Bitcoin Node? A Beginner's Guide on Blockchain Nodes, COINTELEGRAPH, https://cointelegraph.com/bitcoin-for-beginners/what-is-a-bitcoin-node-a-beginners-guide-on-blockchain-nodes [https://perma.cc/9FJ2-QHLW] ("The main function of blockchain nodes is to ensure network transactions and blocks are legitimate and follow the protocol rules. [Each node] must guarantee that the data and the network are trustworthy.").

204. The BAYC found itself in the center of a controversy surrounding copycat NFT projects attempting to sell identical versions of the BAYC NFT artwork just flipped so that it looked mirrored. Jamie Redman, *2 Mirrored, Copycat Bored Ape NFT Projects Cause Copyright Infringement Controversy*, BITCOIN.COM (Jan. 1, 2022), https://news.bitcoin.com/2-mirrored-copycat-bored-ape-nft-projects-cause-copyright-infringement-controversy/ [https://perma.cc/JQ37-VM64] ("Yuga Labs, the creators of BAYC have copyrighted the original BAYC artwork and the artists could take legal action and file a DMCA claim."); *see also* Jonathan Schmalfeld, *Copyright Violations Could Crash the NFT Party*, FORTUNE (Aug. 4, 2021, 3:00 AM), https://fortune.com/2021/08/04/nfts-copyright-violations-penalties-non-fungible-tokens-collectibles-nfttorney-jonathan-schmalfeld/ [https://perma.cc/QH23-X288].

205. An example of a non-authentic NFT would be any NFT image that is illegally copied, reproduced, or created by an individual who does not possess the underlying rights to utilize that work and make it into an NFT.

206. See *supra* Section IV.B.1. for a discussion on how the first sale doctrine currently interacts with NFT images.

contract within off-chain NFT images allows the seller to legally and retroactively change the work the purchaser has bought by reminting limited edition NFT images, changing what the NFT image displays, or erasing the NFT image altogether.[207] Due to the lack of clarity on an NFT purchaser's rights in the NFT image, artists can engage in these actions without legal repercussion even if the NFT image's value has been destroyed.[208] It does not further principles of judicial fairness to leave a purchaser without clear guidelines on what rights are being passed upon the NFT image purchase.

C. An NFT Image Exclusive First Sale Doctrine Amendment: 17 U.S.C. § 109(A)—Limited Rights Applicable to Generative and Derivative Digital Images Tracked Using Non-Fungible Tokens

Amending the first sale doctrine to grant certain express rights to NFT image purchasers is the most efficient way to address the ownership issues surrounding NFT images. This amendment should establish the default rights available to an NFT purchaser upon each NFT image purchase and could be titled: 17 U.S.C. § 109(A)—Limited Rights Attached to Generative and Derivative Digital Images Tracked Using Non-Fungible Tokens. Furthermore, the amendment must clarify the rights transferable upon resale, as future copyright-related NFT image infringement claims depend on clear ownership

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207. *See generally* Wendy J. Gordon, *A Property Right in Self-Expression: Equality and Individualism in the Natural Law of Intellectual Property*, 102 YALE L.J. 1533 (1993) (challenging the view that creator's rights are absolute, and no public harm will come if the creation is withheld from public access). The artist who owns the underlying copyright could just remint a new NFT with the same image. The new NFT would have a different code, but the scarcity would decline decreasing the purchaser's asset's value without consequence to the artist facilitating the action. *See Transaction Details*, ETHERSCAN, https://etherscan.io/tx/0x125714bb4db48757007fff2671b37637bbfd6d47b3a4757ebbd0c5222984f905 [https://perma.cc/Z9SS-XAU9]; *see also* Sophie Kiderlin, *Ethereum Co-Founder Vitalik Buterin Destroys 90% of His Shiba Inu Holdings—Almost Half the Coin's Circulation*, MKTS. INSIDER (May 17, 2021, 9:36 AM), https://markets.businessinsider.com/news/currencies/vitalik-buterin-shiba-inu-coin-burn-dogecoin-ethereum-2021-5 [https://perma.cc/E5GW-5U7P]; Peaster, *supra* note 54 (discussing the Raccoon Secret Society and the deletion of all NFT metadata after the NFT images were sold and in the purchasers' wallets).

208. *Banksy Pranksy Scam*, REKT (Sept. 1, 2021), https://rekt.news/banksy-pranksy-scam/ [https://perma.cc/LP62-K9GD] (discussing the Banksy Pranksy NFT Scam in more detail); *see also* Ekin Genç, *Investors Spent Millions on 'Evolved Apes' NFTs. Then They Got Scammed*., VICE (Oct. 5, 2021, 8:44 AM), https://www.vice.com/en/article/y3dyem/investors-spent-millions-on-evolved-apes-nfts-then-they-got-scammed [https://perma.cc/MK4N-Y8M3] ("What has happened is that Evil Ape has washed his hands of the project taking away the wallet with all the ETH from minting that was to be used for everything, from paying the artist, paying out cash giveaways, paying for marketing, paying for rarity tools, developing the game and everything else in between.").

rules regarding who owns rights in the original and generated NFT images. The amendment should include the mandatory provisions detailed in the following sections and include the optional provisions as needed.

1. Mandatory 17 U.S.C. § 109(A) Provisions

a. Right to Resell

Congress could grant an exclusive right to resell to NFT image purchasers without reversing the DMCA decision to abstain from applying the first sale doctrine to all digital goods by specifically addressing original and generated NFT images.[209] A provision outlining that the right to resell is transferred to the NFT image purchaser could read:

> (a) Limited Exclusive Rights in Digital Image.—Subject to section 107 and independent of the exclusive rights provided in section 106, the purchaser of a generative or derivative digital art piece tracked using a non-fungible token (NFT image), which is created for asset collection and designed to be freely alienable without the restrictions accompanying the provisions set out in section 106(3)—
>
> (1) Shall have the right—
>
> (A) to resell that NFT image, or the derivative image created from that NFT image. The purchaser of an NFT image to which this subsection applies is entitled, without the authority of the copyright owner, to sell or dispose of that NFT image at will upon legal acquisition.
>
> (B) Upon the NFT image's sale, any subsequent purchaser shall be entitled to the same rights laid out within this section as well as those listed in section 109(A)(a)(2) and 109(A)(a)(3).

b. Right to Publicly Display

NFT image purchasers should also have the right to publicly display their NFT image online. Creating a provision granting the NFT image purchaser a right to publicly display the NFT image would protect the interest of the

209. Maybe their roadmap encourages this or alludes to this, or the author allows this by inducing purchasers to take actions to create, like Shields and Dickson. While the DMCA eventually declined to extend first sale protection to digital goods, the unique aspects of blockchain's transparency and smart contract's accountability create an argument much stronger than those applicable to the technology available in the late 1990s. See *supra* Section IV.B.2. for a discussion on the arguments in favor of applying the first sale doctrine to digital goods.

NFT purchaser while ensuring the NFT artist can retain other exclusive rights in the image. The statutory language for this subsection could read:

> (C) Notwithstanding the provision in sections 106(4) and 106(5), the holder of an NFT image made under this title, is entitled, without the authority of the copyright owner of the NFT image, to publicly display that NFT image in a manner consistent with the NFT project's purpose and in good faith, such as making the particular NFT image the digital depicter of one's online identity.

c. Right to Make Derivative Works

Section 109(A) should also address the implication of a copyright owner's reproduction rights when a generated NFT image is created.[210] Due to the unique relationship original NFT images have with generated NFT images, a limited right to prepare derivative works of the original NFT image could be granted to both the copyright owner and the current NFT image holder. This could be facilitated by adding the following language to 17 U.S.C. § 109(A):

> (D) Notwithstanding the provision in section 106(2), the holder of an NFT image made under this title, is entitled, within the bounds of the project the NFT image is attached to, to create limited derivative digital works of that image in a manner consistent with the project's purpose and in good faith. This limited right can only be implicated by utilizing an NFT project's own algorithms and instructions to facilitate the creation of an image that is made in the likeness of the original NFT image but has significant changes as to not be an exact replication of that image. This right is limited and only applies to the current holder of the NFT image. This right is also non-exclusive and can be utilized by the owner of the original copyright throughout the duration of the holder's possession.

d. Right to Make Copies and Distribute

Finally, a provision should also be added to clarify what exclusive, unalienable rights in the original and generated NFT images remain with the copyright owner after the NFT image sale.[211] These rights could be solidified in the amendment as follows:

> (2) Notwithstanding the above exceptions, NFT images are subject to the same limitations as other digital works and are restrained by the rights delegated exclusively in sections 106(1) and 106(3).

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210. MENELL, LEMLEY & MERGES, *supra* note 105, at 25 (questioning whether a property right can, or should, exist in a digital network that lacks physical structure or any significant cost of distribution).

211. An NFT artist could always retain all exclusive rights in the NFT image by inserting a provision clause within the NFT's smart contract that states what rights are and are not transferred upon the purchase.

2. Optional 17 U.S.C. § 109(A) Provisions

a. License Appurtenant to the NFT Image

Given the vibrant secondary market and resale rate of NFT images, granting a license appurtenant to the NFT image could strike a fair balance between the NFT image purchaser and copyright holder's interests. A license appurtenant to the NFT image—like an easement appurtenant that attaches a limited right to access a piece of land to the land itself and not the landowner—would grant the current NFT image holder the ability to publicly display, resell the work, and create limited derivative works. Attaching the license to the NFT itself would also preserve the exclusive rights a copyright owner retains by ensuring the licensed rights only apply to the individual currently holding the NFT image.[212] This type of assignment would make the license inseparable from the NFT image and the rights it provides would pass along with the NFT image as it is resold or transferred between digital wallets. A license appurtenant to the NFT would grant the NFT purchaser a license to use the NFT's content while ensuring these rights are transferable to all subsequent image purchasers. This action would sufficiently protect the copyright owner's rights by ensuring the underlying copyright, and the retained exclusive rights in the original NFT image, stays with them unless otherwise specified.[213]

b. NFT-Specific Fair Use Defense

An NFT-specific fair use defense could also protect purchasers who publicly display a legally purchased NFT image as their profile picture, or those who mint a generated NFT image from a legally acquired original NFT image that is directly tied to, and whose creation is encouraged by, the first NFT project. In the past, courts have ruled that the first sale doctrine's right to display did not cover uses involving TV and film projects that featured copyrighted works in the background of the scene; however, they

212. Like the way an easement appurtenant is granted to the land and not the specific owner of the land. *See What Distinguishes an Easement in Gross from an Appurtenant Easement*, SCHORR L. (Jan. 10, 2022), https://schorr-law.com/appurtenant-easement-vs-easement-in-gross/ [https://perma.cc/987B-MTG2].

213. Unless those rights are otherwise assigned differently in the smart contract. *See supra* Section II.B.1. (discussing how cryptocurrency and NFTs use smart contracts to regulate blockchain transactions).

have allowed a *de minimis* use argument or a fair use defense to apply.[214] Courts have historically allowed *de minimis* unauthorized uses of copyrighted work,[215] but when the use is for a long period of time, or the work is recognizably visible or prominently featured, a fair use analysis would be necessary to determine if the use was excusable under copyright law. A discussion on fair use and its applicability to NFT image use is outside the scope of this Comment, but creating this type of defense presents Congress with a potential alternative to a first sale doctrine amendment.

V. CONCLUSION

Amending the first sale doctrine to address how copyright law applies to generative digital art and NFT images will enhance the security and beneficial effects tied to NFTs while minimizing the disruption caused by disputes that arise over NFT image ownership. Ensuring original and generated NFT images are copyrightable would protect artists' interests, while amending the first sale doctrine to apply to NFT images would ensure NFT purchasers know what exclusive and non-exclusive default rights they have in their purchased NFT images.

The defining characteristics of decentralization, immutability, and transparency that underlay all NFTs and blockchain networks must be acknowledged and addressed if these technologies are to become a new method for connecting legal relationships to legal order. Laying a solid copyright framework determining the extent of rights attached to NFT images would provide a guidepost for future technology legislation because the issues underlying NFTs are fundamentally the same regardless of the technological advancement—enforceability and accountability. A fourth industrial revolution is upon us, and the legislative decisions that are made now pertaining to NFT image ownership have the chance to radically change the way copyright law applies to digital goods in the future.[216]

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214. *See generally* Sandoval v. New Line Cinema Corp., 147 F.3d 215 (2d Cir. 1998) ("Because Sandoval's photographs appear fleetingly and are obscured, severely out of focus, and virtually unidentifiable, we find the use of those photographs to be *de minimis*.").

215. *See* Rudkowski v. Mic Network, Inc., 2018 WL 1801307, at *3–4 (S.D.N.Y. 2018) (applying the *Sandoval*'s *de minimis* analysis to a still photograph and determining that the use of the photograph was *de minimis*). The *de minimis* analysis focuses on whether the copying is both quantitatively and qualitatively sufficient to support the legal conclusion that infringement occurred. Hirsch v. Complex Media, Inc., 2018 WL 6985227, at *3 (S.D.N.Y. 2018); *see also* Ringgold v. Black Ent. Television, Inc., 126 F.3d 70, 76–77 (2d Cir. 1997).

216. *Id.* ("Coupled with robotics, artificial intelligence, the Internet of objects, etc., blockchain will profoundly modify the social, cultural, political and legal landscape."); *see* Sporty's Farm L.L.C. v. Sportsman's Mkt., Inc., 202 F.3d 489, 493 (2d Cir. 2000) ("Given that Internet sales are paperless and have lower transaction costs than other types

Now, it is up to Congress to take its head out of the BitCloud and enact that change.

of retail sales, the commercial potential of this technology is vast."). In the early 2000s people were unfamiliar with the entire concept of the internet so courts had to explain what exactly this new technology was in lengthy opinions. *See id.* at 492 ("Although the Internet is on its way to becoming a familiar aspect in our daily lives, it is well to begin with a brief explanation of how it works. The Internet is a network of computers that allows a user to gain access to information stored on any other computer on the network. Information on the Internet is lodged on files called web pages, which can include printed matter, sound, pictures, and links to other web pages.").