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SOUNDS OF SCIENCE: COPYRIGHT INFRINGEMENT IN AI MUSIC GENERATOR OUTPUTS

*Eric Sunray**

ABSTRACT

The music business is no stranger to disruptive technology. The industry's apparent comeback from the devastating downturn caused by illegal file sharing seems to have arrived just in time for what may be an even more disruptive technological phenomenon: artificial intelligence ("AI"). Much has been said about the implications of AI-generated music, ranging from issues of ownership, to rights of publicity. However, there has been surprisingly little discussion of infringement in the AI systems' outputs. By examining the functionality of AI music generators through the lens of de minimis use case law, this paper will explain how the outputs of AI music generators potentially infringe the exclusive reproduction right granted to musical work and sound recording copyright owners. Going forward, courts and policymakers must not ignore AI's capacity to undermine our incentives for human authorship, and craft rules that promote a mutually beneficial AI music ecosystem for technology companies and copyright owners alike.

* J.D., 2021, American University Washington College of Law; B.A., Organizational Communications, 2010, Miami University (OH). I would like to thank Robert Kasunic at the United States Copyright Office for providing invaluable guidance and feedback on this Comment, and Shannon Sorensen at the National Music Publishers' Association for introducing me to the subject of generative AI. I would also like to thank Jonas Anderson and Michael Carroll at the Washington College of Law for helping shape my understanding of copyright law, and everyone at *The Catholic University Journal of Law and Technology* for their assistance with this Comment. Finally, I am endlessly grateful to my parents for always encouraging me to explore my love for music; I could not have written this Comment without their love, patience, and support.

*“Now here we go dropping science, dropping it all over / like bumping around the town like when you’re driving a Range Rover / expanding the horizons and expanding the parameters / expanding the rhymes of sucker M.C. amateurs”*¹

INTRODUCTION

The music industry is no stranger to disruptive technology. Indeed, litigation following the ascendance of illegal file sharing services helped dramatically shape a cornerstone of modern US secondary liability jurisprudence.² However, for the music industry, the damage had already been done.³ Music sales and licensing revenue plunged by more than half in the first decade of the twenty-first century,⁴ making the industry’s rebound⁵ in recent years more cause for cautious optimism than celebration.⁶

The music business’ supposed comeback seems to have arrived just in time for what may be an even more disruptive technological phenomenon: the proliferation of artificial intelligence (“AI”).⁷ As applied to music, AI has been met with intrigue and enthusiasm.⁸ However, courts and policymakers must be careful not to overlook the potentially devastating impacts that this novel technology could have on human authorship.

¹ BEASTIE BOYS, *Sounds of Science, on PAUL’S BOUTIQUE* (Capitol Records 1989).

² See *MGM Studios, Inc. v. Grokster, Ltd.*, 545 U.S. 913, 913–914 (2005) (establishing a rule whereby those who “intentionally induce. . .” copyright infringement may be held secondarily liable); see also *A&M Records v. Napster, Inc.*, 239 F.3d 1004, 1011, 1029 (9th Cir. 2001) (finding Napster liable for contributory infringement and vicarious liability, ultimately leading to the service’s demise in 2002).

³ See Stephen Dowling, *Napster Turns 20: How It Changed the Music Industry*, BBC (May 31, 2019), <https://www.bbc.com/culture/article/20190531-napster-turns-20-how-it-changed-the-music-industry> (describing the peer-to-peer file sharing model as “an industry-destroying genie” that Napster “released. . . from the bottle forever”).

⁴ See David Goldman, *Music’s Lost Decade: Sales Cut in Half*, CNN (Feb. 3, 2020), https://money.cnn.com/2010/02/02/news/companies/napster_music_industry/ (graphing the precipitous loss in music industry revenue from 1999 to 2009).

⁵ See *IFPI Global Music Report 2019*, IFPI (Apr. 2, 2019), <https://www.ifpi.org/ifpi-global-music-report-2019/> (reporting the fourth consecutive year of recorded music market growth in 2019).

⁶ See Bill Hochberg, *The Record Business is Partying Again, But Not Like It’s 1999*, FORBES (Apr. 11, 2019), <https://www.forbes.com/sites/williamhochberg/2019/04/11/the-record-business-is-coming-back-but-its-not-1999-yet/?sh=55811de03257> (“[r]eports of a full recovery by the record business may be exaggerated.”).

⁷ See Gideon Lewis-Kraus, *The Great A.I. Awakening*, N.Y. TIMES MAG. (Dec. 14, 2016), <https://www.nytimes.com/2016/12/14/magazine/the-great-ai-awakening.html> (detailing the evolution of modern AI applications and how they have transformed Silicon Valley).

⁸ See Alex Marshall, *From Jingles to Pop Hits, A.I. is Music to Some Ears*, N.Y. TIMES (Jan. 22, 2017), <https://www.nytimes.com/2017/01/22/arts/music/jukedeck-artificial-intelligence-songwriting.html> (suggesting AI could change the way we listen to music).

Much has been said about the legal implications of AI music generators,⁹ ranging from issues of ownership¹⁰ to rights of publicity,¹¹ but there has been surprisingly little discussion of infringements in the AI systems' outputs. The limited speculation on this question remains largely inconclusive in the popular literature.¹² Accordingly, courts and policymakers will be forced to address output infringements as AI music becomes increasingly sophisticated in the coming years.¹³

By examining the technical workings of AI music generators through the lens of de minimis use case law, this Comment will explain how AI music generator outputs potentially infringe the rights of music copyright holders. Specifically, by up-sampling copyrighted works in finely encoded segments, AI music generators create tapestries of coherent audio from the works they ingest in training, thereby infringing the United States Copyright Act's reproduction right.¹⁴ This moment presents an opportunity for technology companies and the music industry to avoid repeating past mistakes by addressing this new disruptive technology as partners, rather than opponents.

⁹ See generally Ryan Calo, *Artificial Intelligence Policy: A Primer and Roadmap*, 51 U.C. DAVIS L. REV. 399 (2017) (outlining the modern AI policy debate).

¹⁰ See Jane C. Ginsburg & Luke Ali Budiardio, *Authors and Machines*, 34 BERKELEY TECH. L.J. 343, 417–19 (2019) (suggesting the user of a generative machine who supplies “some creative influence over the expressive contents of the resulting work” ought to have authorship of the resulting work with the machine’s designer); see also James Grimmelmann, *There’s No Such Things as Computer-Authored Work – And It’s a Good Thing, Too*, 39 COLUM. J.L. & ARTS 403, 403 (2016) (emphasizing how U.S. copyright law does not recognize computer programs as authors); Pamela Samuelson, *Allocating Ownership Rights in Computer-Generated Works*, 47 U. PITT. L. REV. 1185, 1227–28 (1986) (endorsing vestment of rights in the AI user as being the “most practicable solution” to the issue of AI-output ownership); but see Margot E. Kaminski, *Authorship, Disrupted: AI Authors In Copyright and First Amendment Law*, 51 U.C. DAVIS L. REV. 589, 614 (2017) (explaining how disruption of “romantic [i.e., human] authorship” in copyright and First Amendment law predates the emergence of AI, thereby situating computer-authored works within the bounds of U.S. copyright law); Annemarie Bridy, *The Evolution of Authorship: Work Made by Code*, 39 COLUM. J.L. & ARTS 395, 401 (2016) (arguing that recognition of authorship in non-natural persons is consistent with first principles because U.S. copyright law is predicated on “the protection of economic rather than moral rights”).

¹¹ See, e.g., Bobby Chesney & Danielle Citron, *Deep Fakes: A Looming Challenge for Privacy, Democracy, and National Security*, 107 CALIF. L. REV. 1753, 1788–1804 (2019) (contrasting the costs and benefits of “deep fakes,” and proposing a combination of civil and criminal penalties for abusers of this AI-powered technology).

¹² See, e.g., Dani Deahl, *We’ve Been Warned About AI and Music for Over 50 Years, But No One’s Prepared*, VERGE (Apr. 17, 2019), <https://www.theverge.com/2019/4/17/18299563/ai-algorithm-music-law-copyright-human> (describing challenges facing the legal system with regard to AI music as “a total legal cluster[expletive].”).

¹³ See, e.g., *id.* (discussing AI’s potential ability to work endlessly and mimic current artists).

¹⁴ See 17 U.S.C. § 106(1) (2020) (reserving to the copyright owner the exclusive right to “reproduce the copyrighted work in copies or phonorecords”).

Part I of this paper will offer a primer on AI and machine learning to explain how the technology is currently being applied to music generation. Part II will discuss the two copyrights that exist in every song and the state of the law as it pertains to de minimis use of works protected by those copyrights. Part III of this paper will apply the case law discussed in Part II to AI music generators, arguing that under current law, AI music generators likely engage in pervasive copyright infringement. Finally, Part III will conclude by considering the long-term implications of adopting a permissive stance toward AI music generators, and it will propose potential policy solutions that could engender a more mutually beneficial AI music ecosystem.

I. MACHINE LEARNING & AI MUSIC

AI has the world abuzz. Already, AI has proven itself capable of performing intelligent tasks ranging from language processing¹⁵ to cancer detection.¹⁶ It should come as no surprise, then, that researchers have also been working to refine AI's utility to the creative process – an area that has also seen tremendous progress.¹⁷ Considering the pace of creative AI systems development, courts and policymakers must properly assess how generative AI figures into existing legal frameworks, which first requires an understanding of how AI functions.

Part I.A will describe the subfield of AI research known as machine-learning, and it will explain how it has transformed the prospects for sophisticated AI applications. Part I.B will then discuss how AI music generators employ machine learning to generate new musical compositions and sound recordings.

A. Machine Learning

AI is a broad classification ascribed to several approaches to computer science research on the subject of a machine's capacity to act intelligently.¹⁸ Modern AI research began in the 1950s, inspired by the hypothesis that the

¹⁵ See Lewis-Kraus, *supra* note 7.

¹⁶ See Neil Savage, *How AI is Improving Cancer Diagnostics*, NATURE (Mar. 25, 2020), <https://www.nature.com/articles/d41586-020-00847-2> (describing how AI “can spot subtle patterns that can easily be missed by humans.”).

¹⁷ See *The Quest for AI Creativity*, IBM, <https://www.ibm.com/watson/advantage-reports/future-of-artificial-intelligence/ai-creativity.html> (last visited May 16, 2021) (celebrating IBM Watson's successful creation of a movie trailer).

¹⁸ STUART J. RUSSELL & PETER NORVIG, *ARTIFICIAL INTELLIGENCE: A MODERN APPROACH* 1 (3d ed. 2010).

learning process could be effectively replicated with computers.¹⁹ Early AI research primarily dealt with training computers to make intelligent choices (e.g., moves in a game of checkers) by programming the system with an internal feedback loop that allowed it to independently learn the result of each decision it made.²⁰ However, this approach proved untenable when the vast number of potential outcomes became too great for the system to comprehend on its own.²¹

In the 1980s, machine learning emerged as a subfield of AI research grounded in statistics and mathematics.²² Machine learning represented a vast improvement over prior approaches to AI systems development for its use of multi-layer neural networks.²³ Neural networks are algorithms designed to mirror the human brain's learning processes.²⁴ Two popular neural network-based approaches to machine learning are generative adversarial networks ("GANs") and autoencoders.²⁵

GANs are a relatively new approach to using neural networks in generative AI systems development.²⁶ GANs use two machine-learning models: one that generates output at random to reflect the user's command (the "generator"); the other, a model that uses a pre-programmed dataset to critique the generator's output (the "discriminator").²⁷ This feedback process is conducted reciprocally until the discriminator can better detect the generator's fake outputs, and the generator can reliably pass the discriminator's authenticity test.²⁸ As a result, the GANs become capable of producing highly realistic outputs, but they often fail to capture the full extent of the discriminator's data distribution.²⁹

¹⁹ See C. E. Shannon et al., *A Proposal for the Dartmouth Summer Research Project on Artificial Intelligence*, 27 *AI MAGAZINE* 4, 12 (1955) (proposing the first study into AI systems development on the basis "that every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to simulate it.").

²⁰ M. Tim Jones, *A Beginner's Guide to Artificial Intelligence, Machine Learning, and Cognitive Computing*, IBM: DEVELOPER (June 1, 2017), <https://developer.ibm.com/articles/cc-beginner-guide-machine-learning-ai-cognitive/#machine-learning>.

²¹ See *id.* (using as an example a game of tic-tac-toe: "[a]t the start of the game there are nine possible moves . . . The full tree of moves for tic-tac-toe contains . . . 362,880 nodes.").

²² *Id.*

²³ *Id.*

²⁴ *Id.*

²⁵ Chris Nicholson, *A Beginner's Guide to Generative Adversarial Networks (GANs)*, PATHMIND, <https://wiki.pathmind.com/generative-adversarial-network-gan> (last visited May 16, 2021).

²⁶ See Ian J. Goodfellow et al., *Generative Adversarial Nets*, ARXIV (June 10, 2014), <https://arxiv.org/pdf/1406.2661.pdf> (proposing the GAN as a new framework for estimating generative models in 2014).

²⁷ Nicholson, *supra* note 25.

²⁸ *Id.*

²⁹ Sander Dieleman, *Generating Music in the Waveform Domain*, GITHUB (Mar. 24,

Another noteworthy neural network that takes a different approach to generative modeling is the autoencoder.³⁰ Autoencoders ingest input data, compress them into discrete coded segments, and then attempt to reconstruct the input data through a decoding process.³¹ By examining discrepancies between the input and output layers, the system can refine its encoding process to extract only the input data's most relevant elements.³² The goal is to strengthen the network's ability to independently encode large datasets, such that those encoded segments can be subsequently used to generate unrecognizable, authentic-sounding outputs.³³

GANs and autoencoders represent two promising approaches to using neural networks for creative expression.³⁴ One of the most remarkable uses of neural networks to date is in the creation of deepfakes,³⁵ which have been put to both comical³⁶ and potentially nefarious³⁷ uses. Recent breakthroughs in AI music generator research suggest that neural networks may have a similarly profound effect on the future of music creation and consumption.³⁸ The next subsection will explore the ways that neural networks are being applied to artificial music generation.

2020), <https://benanne.github.io/2020/03/24/audio-generation.html#fnref:pixelcnn>.

³⁰ *Autoencoder*, DEEPAI, <https://deepai.org/machine-learning-glossary-and-terms/autoencoder> (last visited May 16, 2021).

³¹ *Id.*

³² *Id.*

³³ *See id.* (explaining that autoencoders could theoretically generate an image of, e.g., a flying housecat, based solely on the system's refined codes for inputs like "houses" and "flying").

³⁴ *Id.*

³⁵ *See* Grace Shao, *What 'Deepfakes' Are and How They Are Dangerous*, CNBC, <https://www.cnn.com/2019/10/14/what-is-deepfake-and-how-it-might-be-dangerous.html> (last updated Jan. 17, 2020) (explaining that deepfakes are artificial videos made through deep learning processes designed to believably simulate the appearance and vocal characteristics of real individuals).

³⁶ *See* Andy Baio, *With Questionable Copyright Claim, Jay-Z Orders Deepfake Audio Parodies Off YouTube*, WAXY (Apr. 28, 2020), <https://waxy.org/2020/04/jay-z-orders-deepfake-audio-parodies-off-youtube/> (describing videos posted to YouTube containing "Bill Clinton reciting 'Baby Got Back,'" and "JFK touting the intellectual merits of Rick and Morty.").

³⁷ *See* Kaylee Fagan, *A Viral Video That Appeared to Show Obama Calling Trump a 'Dips—' Shows a Disturbing New Trend Called 'Deepfakes'*, INSIDER (Apr. 17, 2018), <https://www.businessinsider.com/obama-deepfake-video-insulting-trump-2018-4> (explaining that widely available deepfake software has already been used to believably mimic the likeness of prominent political figures, and to insert celebrity faces into pornographic videos).

³⁸ *See* Marshall, *supra* note 8 (speculating that AI will change the way we listen to music by eventually enabling computers to compose music responsively while "[playing] a game," or "going for a run,").

B. AI Music

Applying AI technology to music is nothing new. Automatic music generation can be traced back to the earliest days of AI research.³⁹ Further, AI already aides the modern music industry by performing functions ranging from talent discovery⁴⁰ to playlist curation.⁴¹

However, the last few years have constituted a renaissance in machine-learning music generation.⁴² Leading technology companies like Google⁴³ and IBM⁴⁴ have thrown their hats into the machine-learning music space. Even anonymous AI hobbyists have used homemade algorithms to catch the attention of international superstars (or, more accurately, their lawyers).⁴⁵

Among the most novel developments in machine-learning music generation has been the practice of training generative AI models on large corpora of raw audio.⁴⁶ This approach allows the model to account for nuances in recorded music (e.g., timbre, dynamics, etc.) that cannot be discovered in inherently limited symbolic training material.⁴⁷ When trained on enough raw audio, the

³⁹ See L. A. Hiller, Jr. & L. M. Isaacson, *Musical Composition with a High-Speed Digital Computer*, 6 J. AUDIO ENG'G SOC. 154, 154–160 (1958) (reporting on the development of a technique for “writing music by means of automatic high-speed digital computers”).

⁴⁰ See Ryan Middleton, *Industry Focus: ASAI Co-Founder, Austin Chen Talks Using Data A&R Hidden Talent*, MAGNETIC MAG., <https://www.magneticmag.com/2017/10/industry-focus-asaii-co-founder-austin-chen-talks-using-data-a-r-hidden-talent/> (last updated Aug. 22, 2018) (profiling Asaii, a new company that uses AI to discover hidden talent).

⁴¹ See Jonathan Vanian, *How A.I. is Playing a Bigger Role in Music Streaming Than You Ever Imagined*, FORTUNE (Oct. 1, 2020), <https://fortune.com/2020/10/01/sonos-spotify-iheartradio-artificial-intelligence/> (examining AI’s application to listener trend analysis).

⁴² See Andrew R. Chow, *There’s a Wide-Open Horizon of Possibility: Musicians Are Using AI to Create Otherwise Impossible New Songs*, TIME (Feb. 5, 2020), <https://time.com/5774723/ai-music/>.

⁴³ See Aaron van den Oord & Sander Dieleman, *WaveNet: A Generative Model for Raw Audio*, DEEPMIND (Sept. 8, 2016), <https://deepmind.com/blog/article/wavenet-generative-model-raw-audio> (introducing WaveNet, a generative model capable of synthesizing audio signals like human voice and music).

⁴⁴ See Kelly Shi, *Beats By AI*, IBM: RES. PROJECTS BLOG (July 27, 2016), <https://www.ibm.com/blogs/research/2016/07/beats-by-ai/> (introducing Watson Beat, a cognitive technology trained to understand the nuances and characteristics of all thirty music keys).

⁴⁵ See Baio, *supra* note 36 (reporting that Roc Nation filed a takedown notice with YouTube alleging copyright infringement in two deepfake videos created by “training a model with a large corpus of . . . Jay-Z songs and lyrics”).

⁴⁶ See Prafulla Dhariwal et al., *Jukebox*, OPENAI (Apr. 30, 2020), <https://openai.com/blog/jukebox/> (introducing Jukebox, a neural net that generates music as raw audio using a model trained on a dataset of 1.2 million songs taken from the web).

⁴⁷ *Id.* A critical shortcoming of previous generative models was their reliance on symbolic representations like musical instrument digital interface (“MIDI”) files. MIDI is a communications protocol that essentially functions as a digital signal that instructs electronic instruments on which sounds to produce. Like piano rolls that instruct player

model can generate music closely resembling the unique qualities of whichever artist(s) and/or genre(s) the user selects.⁴⁸

This great leap forward is made possible by the use of neural networks called variational autoencoders (“VAEs”),⁴⁹ which compress the cumbersome sequences of raw audio in lower-dimensional spaces where they can be efficiently processed without sacrificing structural perceptibility.⁵⁰ The VAEs allow the audio to be analyzed at multiple compression levels⁵¹ to develop a holistic understanding of what is occurring in the music.⁵²

Once the model has learned about the distribution of musical elements in these compressed spaces, it approximates how they would be arranged in a new sample and rebuilds them from the ground up.⁵³ In other words, the model reacts to the user’s inputs (i.e., artist, style, genre, etc.) by predicting how the respective musical elements should be redistributed, thereby generating a sample that is subsequently refined in stages from low-to-high levels of musical detail (“up-sampling”).⁵⁴ Once the code is up-sampled to its most detailed level of musical abstraction, it is decoded back into raw audio, resulting in a new song containing the user’s desired qualities.⁵⁵

In sum, when a generative model is engaged to make a new work, the audio that manifests as output is merely a tapestry of up-sampled sound recording fragments manipulated to resemble something ostensibly novel.⁵⁶ Thus, characterizing the AI generator’s output as “original” is misleading, because doing so disregards the role that reproduction of copyrighted works plays in generating the sample. Accordingly, we must assess whether the mechanics of machine-learning music generators can be reconciled with the protections

pianos on basic functions such as which keys to strike and for how long, MIDI signals can only provide electronic instruments with basic instructions like pitch, duration, and velocity. *Id.*

⁴⁸ *Id.*

⁴⁹ See Nicholson, *supra* note 25 (explaining that VAEs “are capable of both compressing data like an autoencoder and synthesizing data like a GAN”).

⁵⁰ *Jukebox*, *supra* note 46; see also Devin Coldewey, *OpenAI’s New Experiments in Music Generation Create an Uncanny Valley Elvis*, TECHCRUNCH (Apr. 30, 2020), <https://techcrunch.com/2020/04/30/openais-new-experiments-in-music-generation-create-an-uncanny-valley-elvis/>.

⁵¹ Coldewey, *supra* note 50. At the first compression level (8x), the encoded audio still possesses a relatively high degree of detail. The second compression level (32x) retains less quality than the first, and the third level (128x) only retains the most basic musical information. *Id.*

⁵² *Jukebox*, *supra* note 46.

⁵³ *Id.*

⁵⁴ *Id.*

⁵⁵ *Id.*

⁵⁶ *Id.*

afforded creative authors under the Copyright Act. Part II will describe the two copyright interests attached to every song and how their infringements are adjudicated.

II. COPYRIGHT INFRINGEMENT OF MUSICAL WORKS & SOUND RECORDINGS

The Copyright Act provides for nine distinct categories of copyrightable subject matter.⁵⁷ Section 102(a)(2) sets forth the “musical work” category, which includes a song’s basic structural elements, such as chord progression, melody, and “any accompanying words.”⁵⁸ Section 102(a)(7) provides for the “sound recording” category,⁵⁹ which applies only to fixed sounds (e.g., an artist’s *recorded performance* of a musical work).⁶⁰ Thus, unlike any other form of creative expression, recorded music is unique in that each song necessarily contains two forms of copyrightable subject matter.⁶¹ Despite their interrelated natures, this distinction suggests that assessing alleged infringements of a given song may not entail the same analytical approach for both copyrights, nor will the respective analyses necessarily arrive at the same conclusion.⁶²

Among the most basic rights reserved to the copyright owner is the reproduction right.⁶³ This fundamental feature of our copyright laws constitutes one of the simplest tools we employ to realize the flourishing creative society envisioned under the Constitution.⁶⁴ To find infringement of the reproduction right, a plaintiff must (1) prove ownership of a valid copyright, and (2) establish that the defendant “copied” the work at issue.⁶⁵

⁵⁷ 17 U.S.C. § 102(a) (1990).

⁵⁸ *Id.* § (a)(2).

⁵⁹ *Id.* § (a)(7).

⁶⁰ *See id.* § 101 (defining a “sound recording” as “the fixation of a series of musical, spoken, or other sounds”).

⁶¹ *Copyrightable Subject Matter*, DIG. MEDIA L. PROJECT (Jan. 22, 2021), <https://www.dmlp.org/legal-guide/copyrightable-subject-matter>.

⁶² *See* Oren Bracha, *Not De Minimis: (Improper) Appropriation in Copyright*, 68 AM. U. L. REV. 139, 147 (2018) (explaining that “one cannot infringe the sound recording copyright – as opposed to the copyright in the underlying musical composition – by recording an independent version of the song, no matter how similar to the original recording the new version is”).

⁶³ *See* 17 U.S.C. § 106(1) (providing for the copyright owner’s exclusive right to reproduce his work in copies or phonorecords).

⁶⁴ *See* U.S. Const. art. I, § 8, cl. 8 (seeking “[t]o promote the progress of science and useful arts, by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries”).

⁶⁵ *Sid & Marty Krofft TV Prods., Inc. v. McDonald’s Corp.*, 562 F.2d 1157, 1162 (9th Cir. 1977).

To establish copying by the defendant, the plaintiff must prove not only that his work was copied,⁶⁶ but that the alleged copying constitutes an improper appropriation of the work.⁶⁷ Unfortunately, the improper appropriation aspect of the infringement inquiry is often conflated with the substantial similarity analysis conducted to assess actual copying.⁶⁸ Judge Learned Hand's 1930 "abstractions test" best illustrates the essence of improper appropriation.⁶⁹ The abstractions test explains that, in every work, there is a spectrum of protectable expression ranging from that which is undeniably protected by a copyright in the work (e.g., a uniquely constructed scene in a film, or a particular piece of dialogue), to that which is so general it merely constitutes the author's ideas (e.g., common themes in stories, like overcoming adversity to find love, wealth, etc.), which have never fallen within copyright's purview.⁷⁰ Since 1930, new technologies and categories of copyrightable subject matter have challenged this approach to analyzing improper appropriations based on levels of abstraction, but the analysis nonetheless still attempts to honor this principle.⁷¹

Thus, the reproduction right is not absolute. The Second Circuit has noted that "trivial copying is a significant part of modern life. Most honest citizens in the world engage . . . in trivial copying that . . . would technically constitute a violation of the law."⁷² Additionally, many forms of admitted "copying" fall

⁶⁶ See *Arnstein v. Porter*, 154 F.2d 464, 468 (2d Cir. 1946) (explaining that answering the question of whether the plaintiff's work was copied, in the first analysis, may be shown directly, via admission, or circumstantially, by a sufficient showing of the defendant's (1) access to the plaintiff's work, combined with the existence of (2) substantial similarities between the original work and the alleged copy).

⁶⁷ *Id.*

⁶⁸ See Mark A. Lemley, *Our Bizarre System for Proving Copyright Infringement*, 57 J. COPYRIGHT SOC'Y 719, 720–21 (2010) (explaining that the substantial similarity inquiry conducted to establish improper appropriation is often misunderstood by courts to be a generalized substantial similarity analysis, which misses the purpose of the inquiry, i.e., to ascertain whether *what was copied* was unlawful).

⁶⁹ See *Nichols v. Universal Pictures Corp.*, 45 F.2d 119, 121 (2d Cir. 1930) (explaining that "[u]pon any work, . . . a great number of patterns of increasing generality will fit equally well, as more and more of the incident is left out. The last may perhaps be no more than the most general statement of what the play is about, and at times might consist only of its title; but there is a point in this series of abstractions where they are no longer protected, since otherwise the playwright could prevent the use of his 'ideas,' to which, apart from their expression, his property is never extended.").

⁷⁰ *Id.*; see also 17 U.S.C. § 102(b) (1990) (stating that copyright protection does not "extend to any idea, . . . regardless of the form in which it is described, explained, illustrated, or embodied in such work").

⁷¹ See, e.g., *Computer Assocs. Int'l, Inc. v. Altai, Inc.*, 982 F.2d 693, 706–10 (2d Cir. 1992) (articulating the "abstraction-filtration-comparison" test to assess substantial similarity in alleged software copying).

⁷² *Davis v. Gap, Inc.*, 246 F.3d 152, 173 (2d Cir. 2001).

within the bounds of exceptions that permit innocent reproductions which, if restricted, would not promote the utilitarian purposes of copyright.⁷³

The subsections that follow will focus on an exception to the copyright owner's exclusive rights known as *de minimis* use. *De minimis* is a principle premised on the idea that “the law does not concern itself with trifles.”⁷⁴ To be used sparingly, *de minimis* seeks to avoid the pursuit of trivial claims and enforcement of their potentially disproportionate penalties.⁷⁵ It is difficult to ascertain exactly what “trifles” are when considering the *de minimis* exception.⁷⁶ Applied to music, this has generally meant appropriations of short, unrecognizable musical segments.⁷⁷ However, as the subsections that follow will demonstrate, courts have taken inconsistent approaches to *de minimis* musical work and sound recording uses.⁷⁸

Courts still have yet to weigh in on the legality of AI music generator outputs, but the case law on *de minimis* uses of musical works and sound recordings is instructive.⁷⁹ Subsection A will focus on *de minimis* uses of musical works to explain that there is a well-established *de minimis* exception for unrecognizable musical composition appropriations. Next, subsection B will examine *de minimis* uses of sound recordings to explain that, here, courts are split; however, there has historically been a jurisprudential tendency toward “sound recording exceptionalism.”⁸⁰

⁷³ See, e.g., 17 U.S.C. § 107 (1990) (describing the fair use doctrine—a multi-factor test used to determine whether a particular use, on balance, should be deemed permissible in light of the goals of copyright).

⁷⁴ Bracha, *supra* note 62, at 158.

⁷⁵ See *id.* (explaining that “*de minimis* . . . corrects on the margin, an unfortunate side effect of the generality of legal rules: the fact that in a small subset of cases that fall within the ambit of such rules the cost of enforcement so overwhelmingly outweighs its benefit that enforcing the rules will be clearly detrimental.”).

⁷⁶ See 4 M. B. NIMMER & D. NIMMER, NIMMER ON COPYRIGHT § 13.03[A][2] (2020) (introducing the concept of “fragmented literal similarity”). The leading treatise on copyright explains that, where literal similarities exist, there is no need to consider levels of abstraction, because literal similarities necessarily entail the expression of ideas. Instead, the question becomes whether such similarities are substantial enough to constitute an infringement. *Id.*

⁷⁷ See *Fisher v. Dees*, 794 F.2d 432, 434 n.2 (9th Cir. 1986) (observing that “meager and fragmentary” takings are *de minimis* where the “average audience would not recognize the appropriation”).

⁷⁸ See *infra* Part II.

⁷⁹ See *supra* Part I.B (describing how the process by which AI music generators create new works is necessarily dependent on the reproduction of potentially unrecognizable sound recording fragments).

⁸⁰ See Bracha, *supra* note 62, at 145 (defining sound recording exceptionalism as the proposition that “copyright in recorded sounds is unique because, unlike copyright in any other subject matter, it is infringed upon copying with no additional requirement of improper appropriation.”) (quoting *Bridgeport Music, Inc. v. Dimension Films*, 410 F.3d 792, 800–01 (6th Cir. 2005)).

A. Musical Works

The copyright in a musical work protects the essence of the song. Broadly speaking, just twelve notes constitute the building blocks of every composition we know,⁸¹ from Beethoven to the Beatles. An inherently limited musical palette means that composers must often make use of the same compositional elements, such as chord progressions, rhythms, and common melodic intervals.⁸² Thus, while musical work copyrights will be conferred upon multiple compositions containing many of the same musical themes, protection cannot extend to *every* constituent element of a given song.⁸³

Accordingly, the nature of musical works makes assessing substantial similarity essential to the infringement inquiry. For instance, granting a monopoly to one composer over a three-note melody, without more, would unduly constrain the public's ability to utilize an already limited selection of notes in subsequent compositions.⁸⁴ Therefore, when generic features of a work are used without authorization, the *de minimis* exception would likely serve to permit such uses as non-infringing.⁸⁵ The difficulty is determining where to draw the line between *de minimis* and substantial appropriations.⁸⁶

The Ninth Circuit articulated an approach to *de minimis* uses of compositions that attempts to sensibly capture the intended scope of protection in a musical work copyright.⁸⁷ The rule provides that the *de minimis* inquiry turns on whether the average audience would recognize the appropriation.⁸⁸ In *Fisher v. Dees*, a parodist appropriated six bars of music, constituting the main

⁸¹ ALLEN FORTE, *TONAL HARMONY IN CONCEPT AND PRACTICE* 4–5 (Holt et al., 3d ed. 1979).

⁸² See Alan White, *73 Songs You Can Play with the Same Four Chords*, BUZZFEED (Apr. 29, 2014), <https://www.buzzfeed.com/alanwhite/73-songs-you-can-play-with-the-same-four-chords> (listing dozens of famous pop songs premised on the same chord progression).

⁸³ See *Morrissey v. Proctor & Gamble Co.*, 379 F.2d 675, 678–79 (1st Cir. 1967) (explaining that allowing one party to copyright a “handful of forms” could exhaust all possible future use).

⁸⁴ See *id.* at 679 (refusing to recognize copyright as “a game of chess in which the public can be checkmated.”).

⁸⁵ See *NIMMER & NIMMER*, *supra* note 76, at § 13.03[A][2][a] (explaining that, in the literary realm, “[o]rdinarily, the importance of but one line . . . would be regarded as *de minimis*, not justifying a finding of substantial similarity.”).

⁸⁶ See *id.* (noting that “[n]o easy rule of thumb can be stated as to the quantum of fragmented literal similarity permitted without crossing the line of substantial similarity.”).

⁸⁷ See *generally* *Fisher v. Dees*, 794 F.2d 432, 434 (9th Cir. 1986); see *generally* *Newton v. Diamond*, 388 F.3d 1189, 1196 (9th Cir. 2004).

⁸⁸ See *Fisher* 794 F.2d at 434 n.2 (noting that “a taking is considered *de minimis* only if it is so meager and fragmentary that the average audience would not recognize the appropriation.”).

theme from the plaintiffs' composition.⁸⁹ The court roundly rejected the parodist's de minimis defense, reasoning that the appropriation would be immediately recognizable to those familiar with the original work.⁹⁰ Thus, the appropriated segment, however brief, was substantial enough to disqualify the parodist from de minimis protection.⁹¹

By contrast, *Newton v. Diamond* defined the opposite boundary to the Ninth Circuit's recognition standard.⁹² In *Newton*, the court had to determine whether use of a licensed sound recording sample also required a license for its underlying musical work.⁹³ Defendants were members of the hip-hop group Beastie Boys, who sampled a six-second, three-note segment from a jazz record.⁹⁴ Beastie Boys properly obtained a license to sample the sound recording from the relevant copyright owner (ECM Records), but the plaintiff—jazz flutist James Newton—alleged infringement of his copyright in the underlying musical work.⁹⁵

Conceptually, it is difficult to distinguish between performative and compositional elements. The court could not consider Newton's unique performance style in its analysis, because the sole basis for the infringement claim was Beastie Boys' unauthorized use of the composition.⁹⁶ Ironically, Newton's experts actually undermined his case by focusing on his technique, instead of the song's generic score.⁹⁷ When stripped of Newton's performative contributions, the segment of allegedly appropriated composition merely amounted to two distinct notes, a single scale-degree apart, alternated over a sustained C note.⁹⁸

Having determined the nature of Newton's musical work copyright, the court was left to decide whether Beastie Boys' unauthorized appropriation was substantial enough to sustain the infringement claim.⁹⁹ Quantitatively, very little had been appropriated – the segment constituted just three notes in a score

⁸⁹ *Id.* at 434.

⁹⁰ *See id.* at 434 n.2 (explaining that a parodist's purposes would not be achieved by appropriating anything less than a portion substantial enough to conjure thoughts of the original work in the listener's mind).

⁹¹ *Id.* at 434, 440.

⁹² *Newton*, 388 F.3d at 1190.

⁹³ *Id.*

⁹⁴ *Id.* at 1191.

⁹⁵ *Id.*

⁹⁶ *Id.* at 1193–94.

⁹⁷ *See id.* at 1194 (noting how Newton's experts conceded the point that improvisational styles like jazz often contain simple, sparsely scored compositions, because it is assumed that performers will take creative liberties in their performances).

⁹⁸ *See id.* (explaining that the scope of Newton's copyright extends only to the "elements that he fixed in a tangible medium – those that he wrote on the score.").

⁹⁹ *Id.*

that called for “between 180 and 270 seconds of improvisation.”¹⁰⁰ Qualitatively, the court found that there was nothing distinctive about this segment of the composition relative to the rest of the score.¹⁰¹ Therefore, the court held that Beastie Boys’ use of the composition was *de minimis*, because “an average audience would not discern Newton’s hand as a composer, . . . from Beastie Boys’ use of the sample.”¹⁰²

Fisher and *Newton* nicely delineate the parameters of the Ninth Circuit’s *de minimis* recognition standard as applied to musical works.¹⁰³ However, the copyright law’s long-standing requirement of demonstrating substantial similarities in infringement inquiries makes the foregoing cases more illustrative than controversial.¹⁰⁴ Nonetheless, technological progress routinely calls into question the utility of well-established copyright doctrines.¹⁰⁵ Accordingly, the next subpart will examine the *de minimis* exception’s compatibility with one such development in the narrative of copyright law: digital sampling of sound recordings.

B. Sound Recordings

The Copyright Act has provided for federal protection of sound recordings since 1972.¹⁰⁶ Congress recognized a need to curtail the piracy of phonorecords, which at the time contributed to an estimated loss of approximately one-third of all legitimate tape sales value on an annualized

¹⁰⁰ *Id.* at 1195.

¹⁰¹ *See id.* at 1196 (relying on the Beastie Boys’ expert’s testimony, which concluded that “the compositional elements of the sampled section do not represent the heart or the hook of the ‘Choir’ composition, but rather are ‘simple, minimal and insignificant.’”).

¹⁰² *Id.*

¹⁰³ Compare *Fisher v. Dees*, 794 F.2d 432, 434 n.2 (9th Cir. 1986) (rejecting that six bars of music were *de minimis*: “a taking is considered *de minimis* only if it is so meager and fragmentary that the average audience would not recognize the appropriation”), with *Newton*, 388 F.3d at 1195–96 (establishing that the segment constituted just three notes in a score that called for “between 180 and 270 seconds of improvisation,” which does “not represent the heart or the hook of the ‘Choir’ composition, but rather are ‘simple, minimal and insignificant.’”).

¹⁰⁴ *See* NIMMER & NIMMER, *supra* note 76, at § 13.03[A][2][b] (2020) (explaining that the “traditional standards of copyright law – which, for decades prior to adoption of the 1976 Act and unceasingly in the decades since, has included the requirement of substantial similarity.”).

¹⁰⁵ *See, e.g., Sony Corp. of Am. v. Universal City Studios, Inc.*, 464 U.S. 417, 417–18 (1984) (questioning established notions of secondary liability in the context of a new technology capable of “substantial non-infringing uses.”).

¹⁰⁶ *See* Sound Recording Amendment Act, Pub. L. No. 92-140, 85 Stat. 391 (1971) (amending the Copyright Act to extend protection against “unauthorized duplication and piracy of sound recording, and for other purposes.”).

basis.¹⁰⁷ Further, phonorecord piracy translated into devastating losses for performers, musicians, and those who relied on the tax revenue it displaced.¹⁰⁸

Remarkably, this momentous addition to the copyright laws came barely a decade before the birth of hip-hop music, which made an art form out of sound recording appropriation.¹⁰⁹ By the late 1980s, hip-hop artists were using widely available digital sampling¹¹⁰ equipment to create collages of sound from potentially hundreds of pre-existing sound recordings.¹¹¹ Some have described this practice as born out of necessity.¹¹² Others have questioned digital sampling's artistic merits, arguing it is simply lazy authorship.¹¹³ Regardless of one's personal attitude toward sound recording appropriation as an artform, history has demonstrated that digital sampling is a phenomenon that is here to stay.¹¹⁴

The ubiquity of digital sampling in the 1980s posed new legal challenges that continue to vex courts and legal scholars. As an initial matter, the Copyright Act does not extend the same scope of exclusive rights to sound recordings as it does to other forms of copyrightable subject matter,¹¹⁵ nor does it prohibit third parties from imitating sound recordings so long as the new sounds are independently fixed.¹¹⁶ In other words, a copyrighted sound recording cannot be infringed by imitation, unless it is the actual sounds

¹⁰⁷ H.R. REP. NO. 92-487, at 1–2 (1971).

¹⁰⁸ *Id.* at 2.

¹⁰⁹ See Olufunmilayo B. Arewa, *From J.C. Bach to Hip Hop: Musical Borrowing, Copyright and Cultural Context*, 84 N.C. L. REV. 547, 558 (2006) (defining hip-hop as a musical style that uses rhythmic backgrounds characterized by manipulation of pre-existing recordings).

¹¹⁰ See Mary B. Percifull, *Digital Sampling: Creative or Just Plain "CHEEZ-OID?"*, 42 CASE W. RES. L. REV. 1263, 1263 (1992) (describing "digital sampling" as a process whereby "sounds are taken from a source, either live or recorded," such that "[a] musician can use a library of samples to create virtually any type of recording instead of hiring individual instrumentalists to play each part.").

¹¹¹ Julian Azran, *Bring Back the Noise: How Cariou v. Prince Will Revitalize Sampling*, 38 COLUM. J. L. & ARTS 69, 72 (2014).

¹¹² See Melissa Eckhause, *Digital Sampling v. Appropriation Art: Why Is One Stealing and the Other Fair Use? A Proposal for a Code of Best Practices in Fair Use for Digital Music Sampling*, 84 MO. L. REV. 371, 378–79 (2019) (explaining that artists who digitally sampled often did so because they lacked the resources to obtain instruments, music lessons, and the technical know-how to recreate the sounds they sought to emulate).

¹¹³ See COPYRIGHT CRIMINALS, (PBS 2009) (containing an interview with acclaimed music producer Steve Albini in which he characterizes sampling as "lazy and uncool.").

¹¹⁴ See Robert M. Szymanski, *Audio Pastiche: Digital Sampling, Intermediate Copying, Fair Use*, 3 U.C.L.A. ENT. L. REV. 271, 278 (1996) (describing digital sampling as "so pervasive that many musicians and engineers . . . regard it as being indispensable in the music industry.").

¹¹⁵ See 17 U.S.C. § 114(a)–(b) (1990) (limiting the exclusive rights in sound recordings to "the rights specified by clauses (1), (2), (3) and (6) of section 106").

¹¹⁶ *Id.* at (b).

themselves that are reproduced or manipulated.¹¹⁷ This divergence from the scope of protection granted to other copyrightable subject matter has served to confound understandings of the traditional infringement analysis, which has long been interpreted by courts, scholars, and practitioners as turning on the existence of substantial similarities.¹¹⁸ As the cases that follow will demonstrate, courts have struggled to establish consistent legal standards that satisfy the respective interests of copyright owners and those who rely on digital sampling.

1. *Grand Upright Music, Ltd. v. Warner Bros. Records*

The first case to address digital sound recording sampling was *Grand Upright Music, Ltd. v. Warner Bros. Records* (“*Grand Upright*”) in 1991.¹¹⁹ In *Grand Upright*, the plaintiff sought a preliminary injunction against, *inter alia*, the rapper Biz Markie for his use of three words and a short digital sample of the plaintiff’s song “Alone Again (Naturally).”¹²⁰ The Southern District of New York immediately characterized the defendant’s actions as theft¹²¹ and centered its analysis on establishing the plaintiff’s ownership of the song’s copyrights.¹²² Having found that the plaintiff held a valid copyright in the sampled sound recording, the court admonished the defendant’s actions, going as far as to recommend the matter to the United States Attorney for criminal prosecution.¹²³

The outcome in *Grand Upright* was a stunning vindication of sound recording exceptionalism.¹²⁴ However, many have since criticized *Grand Upright* for its lack of reasoning on the copying prong in the infringement

¹¹⁷ *Id.*

¹¹⁸ See NIMMER & NIMMER, *supra* note 76, at § 13.03[A][2][b] (2020) (noting that influential digital sampling cases have called into question the notion that, “[o]n general principles, . . . digitally sampling prior music to use in a new composition should not be subject to any special analysis: to the extent that the resulting product is substantially similar to the sampled original, liability should result.”).

¹¹⁹ *Grand Upright Music, Ltd. v. Warner Bros. Records*, 780 F. Supp. 182 (S.D.N.Y. 1991).

¹²⁰ *Id.* at 183.

¹²¹ *Id.* (quoting the Old Testament’s prohibition on stealing in the Book of Exodus).

¹²² *Id.* at 183–85 (reasoning that the certificates of copyright and transfer documents, testimony of the acknowledged songwriter and first performer, and the defendant’s unsuccessful prior attempts to secure a license from the plaintiff all served as evidence that the plaintiff held valid copyrights in the works).

¹²³ *Id.* at 185.

¹²⁴ See *id.* (noting that the defendant’s conduct in this case not only violated the laws of the United States, but also the Seventh Commandment).

analysis.¹²⁵ The court did not assess, for example, whether the relatively short sample met the qualitative substantiality requirement for unlawfulness.¹²⁶ In other words, the court conducted its infringement inquiry without contemplating whether the work had been *improperly* appropriated; it was satisfied in its conclusion merely knowing that a portion of the work was used without authorization.¹²⁷

The lack of clear guidance in *Grand Upright* led artists and record companies to assume that negotiating a license was the safest approach to digital sampling.¹²⁸ Cultural historians have lamented the case for how it served to dilute hip-hop's authentic, spontaneous, and transgressive nature.¹²⁹ Another practical effect of *Grand Upright* was that digital sampling became a creative tool reserved only to those who could afford the high licensing fees.¹³⁰

Most digital sampling disputes today are resolved in private settlements, which deny courts the opportunity to provide more meaningful guidance.¹³¹ However, two influential cases in the last fifteen years have revisited the issue and have offered nuanced assessments of what should occur in a sound recording infringement analysis.¹³² Unfortunately, the courts' respective interpretations of the Copyright Act established contradictory legal rules, resulting in a circuit split.

2. *The Circuit Split Between the Sixth & Ninth Circuits*

After *Grand Upright*, de minimis use of sound recordings was not truly

¹²⁵ See Carl A. Falstrom, *Thou Shalt Not Steal: Grand Upright Music Ltd. v. Warner Bros. Records, Inc. and the Future of Digital Sound Sampling in Popular Music*, 45 HASTINGS L.J. 359, 362 (1994) (noting that the *Grand Upright* case had the potential to be a landmark decision but, in reality, is of little precedential value).

¹²⁶ See *id.* Beyond the court's choice to disregard this aspect of the infringement analysis, defendant's counsel may have also contributed to the opinion's lack of reasoning by failing to assert some common defenses. *Id.* Had, for example, fair use been asserted, the court would have had to consider, *inter alia*, the substantiality of the portion copied. *Id.* It is unclear whether a fair use defense would have changed the dispute's outcome, but it would have at least forced the court to tease out its justification for ruling in a manner that effectively pulled the rug out from under digital sampling-reliant artforms.

¹²⁷ *Id.* at 379 (noting that not all appropriation is wrong in the sampling context, and some artists just want to incorporate a particular sound into their music).

¹²⁸ Azran, *supra* note 111, at 73.

¹²⁹ See SIVA VAIDHYANATHAN, COPYRIGHTS & COPYWRONGS: THE RISE OF INTELLECTUAL PROPERTY AND HOW IT THREATENS CREATIVITY 143 (2001) (noting that, "[w]hat sampling did occur in the late 1990s was non-transgressive, nonthreatening, and too often clumsy and obvious.").

¹³⁰ Azran, *supra* note 111, at 73–74.

¹³¹ Percifull, *supra* note 110, at 1285.

¹³² See *Bridgeport Music, Inc. v. Dimension Films*, 410 F.3d 792, 795 (6th Cir. 2005); see also *VMG Salsoul, LLC v. Ciccone*, 824 F.3d 871, 874 (9th Cir. 2016).

reconsidered until 2005, when the Sixth Circuit decided *Bridgeport Music, Inc. v. Dimension Films* (“*Bridgeport*”).¹³³ *Bridgeport* involved the use of a four-second, three-note sample from the song “Get Off Your Ass and Jam,” by George Clinton, Jr. and the Funkadelics, in the rap song “100 Miles and Runnin’,” which was featured on the soundtrack to a film called *I Got the Hook Up*.¹³⁴ The plaintiff record company, claiming ownership over the digitally sampled sound recording, argued that no improper appropriation or de minimis inquiry is necessary where the defendant does not dispute having digitally sampled a sound recording.¹³⁵ The court ultimately agreed with the plaintiff and rejected the district court’s determination that the sample did not “rise to the level of a legally cognizable appropriation.”¹³⁶

The court focused on a literal interpretation of a single word in Section 114(b) of the Copyright Act to support its conclusion.¹³⁷ Section 114(b) states that the exclusive reproduction and derivative work rights in sound recordings “do not extend to the making or duplication of another sound recording that consists *entirely* of an independent fixation of other sounds”¹³⁸ By comparison, the parallel language within the Sound Recording Act of 1971—codified in the previous version of the Copyright Act—did not include the word “entirely[.]”¹³⁹ Thus, the court read the 1976 Copyright Act’s deliberate inclusion of the word “entirely” as suggesting that Congress intended for the sound recording owner to have “the exclusive right to ‘sample’ his own recording.”¹⁴⁰ In other words, the court interpreted “entirely” to imply that Congress never intended exceptions for miniscule appropriations, because nothing short of complete independent fixation would satisfy a literal reading of the statute.¹⁴¹

The thrust of the Sixth Circuit’s reasoning was that, unlike most other forms of copyrightable expression, even a seemingly negligible digital sample constitutes a taking of something valuable and must therefore be licensed.¹⁴²

¹³³ *Bridgeport Music, Inc.*, 410 F.3d at 793.

¹³⁴ *Id.* at 795–96.

¹³⁵ *Id.* at 798.

¹³⁶ *See id.* at 797 (quoting the district court’s opinion, which conducted an improper appropriation inquiry in its analysis, unlike the Southern District of New York in *Grand Upright*).

¹³⁷ *Id.* at 799.

¹³⁸ 17 U.S.C. § 114(b) (emphasis added).

¹³⁹ *See Bridgeport Music, Inc.*, 410 F.3d at 800–01 (noting that the former 17 U.S.C. § 1(f) did not extend the reproduction and derivative work rights to “duplication of another sound recording that is an independent fixation of other [sounds.]”).

¹⁴⁰ *Id.*

¹⁴¹ *Id.* at 801.

¹⁴² *Id.* at 801–02 (explaining that the decision to sample, rather than independently fix the desired sounds, implies that the sample adds value by either saving money on the cost of

The court explained that the essence of a sound recording is not the song, but rather how the various sounds exist within their fixed medium.¹⁴³ Thus, a digital sample can be viewed as akin to a physical taking, because the sounds are lifted directly from the medium itself.¹⁴⁴ In sum, *Bridgeport* further bolstered the notion of sound recording exceptionalism by establishing a bright-line rule: “Get a license or do not sample.”¹⁴⁵

Conversely, the Ninth Circuit announced a different rule regarding de minimis use of sound recordings when it decided *VMG Salsoul, LLC v. Ciccone* (“*Ciccone*”) in 2016.¹⁴⁶ *Ciccone* involved the use of a single horn sample, lasting less than a second, from the song “Ooh I Love It (Love Break),” which was reproduced in Madonna’s hit song “Vogue.”¹⁴⁷ Madonna’s producer, Shep Pettibone, was involved in the recording of both songs.¹⁴⁸ However, the plaintiff owned the copyrights to the sampled work, and alleged infringement against, *inter alia*, Madonna and Pettibone for their unauthorized reproduction of the .23-second horn blast from the plaintiff’s recording.¹⁴⁹ Thus, the court had to decide whether it would adopt the Sixth Circuit’s bright-line rule from *Bridgeport*, or maintain the de minimis exception for sound recordings.¹⁵⁰

The Ninth Circuit’s reasoning involved a close, literal reading of the Copyright Act and its legislative history.¹⁵¹ First, the court noted that neither Section 102(a), nor Section 106 suggest an intent for differential treatment of sound recordings where de minimis copying is concerned.¹⁵² Second, a House Report with respect to Section 114(b) states that “infringement takes place whenever . . . any substantial portion of the actual sounds . . . are reproduced.”¹⁵³ Thus, inclusion of the word “substantial” in the House Report persuaded the court that Congress intended for the de minimis exception to apply to sound recordings, just as it applies to other categories of copyrightable

hiring musicians to recreate the sounds, or by enriching the quality of the new work with sound that can only be captured by reproducing the original recording).

¹⁴³ *Id.* at 802.

¹⁴⁴ *See id.* (distinguishing the concept of a physical taking from an intellectual one).

¹⁴⁵ *Id.* at 801.

¹⁴⁶ *See VMG Salsoul, LLC v. Ciccone*, 824 F.3d 871, 874 (9th Cir. 2016) (holding that the de minimis exception applies to sound recording copyright infringement claims, just as it does to all other categories of copyrightable subject matter).

¹⁴⁷ *Id.* at 875.

¹⁴⁸ *Id.* at 874.

¹⁴⁹ *Id.*

¹⁵⁰ *See id.* at 880 (explaining that the plaintiff urged the court to follow *Bridgeport*’s bright line rule).

¹⁵¹ *Id.* at 881–83, 887.

¹⁵² *Id.* at 881–82.

¹⁵³ H.R. REP. NO. 94-1476, at 106 (1976) (emphasis added).

subject matter.¹⁵⁴

The Ninth Circuit was not persuaded that Congress intended for sound recordings to enjoy a unique scope of protection.¹⁵⁵ The court emphasized that substantiality of the portion copied is a well-established requirement for copyright infringement.¹⁵⁶ Contrary to the Sixth Circuit's view that something of value is taken whenever a sound recording is copied, the Ninth Circuit reasoned that a copier does not benefit from the original artist's expression when the public cannot recognize the appropriation.¹⁵⁷ Further, the lack of cases demonstrating adherence to *Bridgeport* (save for district courts within the Sixth Circuit that are bound to do so) bolstered the court's belief that the de minimis exception should be applied consistently, even to cases of digital sampling.¹⁵⁸

Mindful that circuit splits should not be undertaken lightly, the court issued a fulsome rebuttal of *Bridgeport* in an attempt to justify its departure from the Sixth Circuit's well-established—albeit non-binding—precedent.¹⁵⁹ Contrary to the Sixth Circuit's interpretation of the word “entirely” in Section 114(b), the Ninth Circuit inferred that the abundance of limitative language in the provision (“exclusive rights of the owner of a copyright in a sound recording . . . do not extend . . . do not apply”) did not indicate an intent to expand the scope of protection for sound recordings.¹⁶⁰ Further, the court was not persuaded by the Sixth Circuit's distinction between physical and intellectual takings, which it reasoned could just as easily be applied to other classes of artistic works that have always been subject to the de minimis exception (e.g., photographs).¹⁶¹ Accordingly, the court was compelled to announce its own rule, in contravention of the Sixth Circuit.¹⁶²

The court admitted that an unfortunate effect of contradictory rules between the circuits is that copyright owners will enjoy different degrees of protection

¹⁵⁴ *VMG Salsoul, LLC*, 824 F.3d at 884.

¹⁵⁵ *Id.* at 884–85.

¹⁵⁶ *Id.* at 880–81 (citing 4 M. B. NIMMER & D. NIMMER, NIMMER ON COPYRIGHT § 13.03[A][2][a] (2020)).

¹⁵⁷ *See id.* at 880–881 (explaining that the artist's legally protected interest is intrinsically linked to the public's appreciation for – and recognition of – the work) (citing *Arnstein v. Porter*, 154 F.2d 464, 473 (2d Cir. 1946)).

¹⁵⁸ *See id.* at 881 (noting how *Bridgeport* is an outlier among courts that consistently apply the de minimis rule in copyright infringement cases).

¹⁵⁹ *See id.* at 886 (acknowledging the likely unfortunate consequences of its decision but emphasizing that courts cannot be expected to blindly follow their sister circuits' unpersuasive reasoning).

¹⁶⁰ *Id.* at 883.

¹⁶¹ *Id.* at 885.

¹⁶² *See id.* at 886 (noting that “the goal of avoiding a circuit split cannot override [the court's] independent duty to determine congressional intent.”).

depending on where they are located in the country.¹⁶³ Regrettably, the inconsistent rules established in the foregoing cases divide two of the country's primary music markets, which cannot be easily delinked: Nashville, under the Sixth Circuit's jurisdiction; and Los Angeles, under the Ninth Circuit's.¹⁶⁴ To be clear, this subsection's purpose is not to question the wisdom of *Grand Upright*, *Bridgeport*, or *Ciccone*. Divining congressional intent from statutory language that may not have contemplated the particular activity at issue is no simple task. Nonetheless, in the absence of further guidance from Congress, the inconsistent rules regarding de minimis use of sound recordings provide a shaky foundation upon which we must consider novel technologies that engage in increasingly pernicious forms of digital sampling.

III. ANALYSIS

Although research into AI music generation had already been ongoing for two decades prior to the enactment of the 1976 Copyright Act, it is unlikely that Congress envisioned machine learning as an approach to sophisticated music generation.¹⁶⁵ The courts' apparent inability to settle on a consistent reading of the Copyright Act with regard to digital sampling foreshadows the interpretive challenges that lie ahead in the AI era.¹⁶⁶ Society's tenuous understanding of Congress' intent in Section 114(b) will once again be tested by the peculiarities of algorithm-based music generators, which can be fairly described as engaging in a form of digital sampling.¹⁶⁷ Additionally, the variety of possible approaches to machine learning music creation¹⁶⁸ will make it difficult to develop universally applicable, bright-line standards in this field.

¹⁶³ *Id.*

¹⁶⁴ See Shirley Halperin, *Study: Nashville, New York, L.A. Among America's Most Music-Centric Cities; Detroit, Philadelphia Lag Behind*, THE HOLLYWOOD REPORTER (Aug. 7, 2012), <https://www.hollywoodreporter.com/earshot/study-music-scenes-nashville-new-york-los-angeles-detroit-358889> (finding Nashville and Los Angeles among the top five most music-centric cities, based on an analysis of regional concentrations of "musicians, music venues, and other industry businesses.").

¹⁶⁵ See H.R. REP. NO. 92-487, at 2 (1971) (seeking to curtail the "unauthorized reproduction and sale" of phonorecords) (emphasis added).

¹⁶⁶ Compare *Bridgeport Music, Inc. v. Dimension Films*, 410 F.3d 792, 801 (6th Cir. 2005) (interpreting Section 114(b) as granting the sound recording owner the "exclusive right to 'sample' his own recording."), with *VMG Salsoul, LLC*, 824 F.3d at 883 (interpreting Section 114(b) as a limitation on the copyright holder's rights).

¹⁶⁷ See Madhavi Sunder, *IP³*, 59 STAN. L. REV. 257, 304–05 (2006) (citing Joanna Demers, *Sampling the 1970s in Hip-Hop*, 22 POPULAR MUSIC 41, 41 (2003)) (defining digital sampling as a "process in which pre-recorded sounds are incorporated into the sonic fabric of a new song.")

¹⁶⁸ See Jones, *supra* note 20 (outlining a variety of neural networks-based approaches to generative modeling).

However, even if courts can agree on where AI music generators should be situated within existing legal frameworks, there still remains the more troubling matter of AI's potential impact on human authorship and the creative incentive structure. The technology's near-limitless generative capacity,¹⁶⁹ compounded by an enthusiastic movement advocating for the copyrightability of AI-made works,¹⁷⁰ places human authors and the music industry in a precarious position. Thus, the rapid pace of AI development makes it essential to articulate clear theories of infringement while the technology is still in its nascent stages. In sum, AI's seductive appeal must not distract courts and policymakers from the ramifications of rules that effectively devalue copyrighted works and the significance of human authorship.¹⁷¹

Subsection A will describe how potential infringements in AI music generator outputs would be assessed in light of the *de minimis* use case law outlined in Part II. The subsection will consider GANs and autoencoder-based approaches to AI music generation, demonstrating how application of *de minimis* principles will lead to different outcomes, depending on the approach. Subsection A will conclude by arguing that—regardless of the approach taken—there are sound policy rationales for disapproving the unauthorized reproduction of musical work and sound recording fragments in AI music generator outputs. Finally, subpart B will propose policy alternatives that seek to reconcile the competing interests of AI developers and music copyright owners.

A. Infringement

Every sample used to construct an AI-generated song will implicate both music copyrights. The various sound recording samples that constitute the AI generator's outputs are inextricably tied to their underlying musical works, even if such uses are merely incidental.¹⁷² Therefore, two infringement

¹⁶⁹ See Dani Deahl, *How AI-Generated Music is Changing the Way Hits Are Made*, VERGE (Aug. 31, 2018), <https://www.theverge.com/2018/8/31/17777008/artificial-intelligence-taryn-southern-amper-music> (describing a recording that the AI music app Amper produced within a minute of being instructed to do so, and the “unnerving” thought that algorithms can make songs “in minutes”).

¹⁷⁰ See, e.g., Bridy, *supra* note 10, at 400 (advocating for vestment of ownership rights in non-human authors).

¹⁷¹ See Dani Deahl, *supra* note 169 (speculating on the implications of “AI getting in on creative turf we categorize as distinctly human” to propose the question, “what does [AI music’s progress] mean for human musicians?”).

¹⁷² See *Newton v. Diamond*, 388 F.3d 1189, 1193 (9th Cir. 2004) (noting that the case involved “use of a sound recording of a performance of th[e] composition[.]” indicating that every use of a recorded musical work performance will necessarily implicate the underlying

analyses must be conducted for each sample: one for the musical work and another for the sound recording.¹⁷³

The samples will manifest in the output to varying degrees—some might be obvious, whereas others could constitute even less than the .23-second horn blast at issue in *Ciccone*.¹⁷⁴ Thus, ascertaining which samples are engaged, and whether such uses have been done to an unfair extent will guide the infringement inquiries.¹⁷⁵ As the subsection that follows will demonstrate, the threshold of an unfair appropriation will vary from sample to sample, with several key variables influencing the outcome. Although this analytical framework may be the truest method of assessing AI music in light of established precedent, there is more at stake here than the mere misappropriation of any given musical work or sound recording. In the final analysis, courts and policymakers must also think critically about the future of AI music to ensure that the forest is not missed for the trees.

1. *AI Music Generator Outputs Under De Minimis Use Precedent*

The infringement analysis for musical work samples that appear in AI music generator outputs is consistent with the copyright law's general approach to de minimis inquiries.¹⁷⁶ The musical work samples are assessed for their appreciable compositional qualities,¹⁷⁷ and the inquiry is confined to only those elements covered by the copyright in the musical work (i.e., melodies, rhythms, harmonies, and other structural aspects fixed in the score).¹⁷⁸ Ultimately, if the samples are found to be quantitatively and qualitatively insubstantial—i.e., unrecognizable to an average audience as having been derived from their original sources—then they will be deemed non-infringing

musical work copyright).

¹⁷³ See *id.* (acknowledging that an infringement analysis for a sound recording is distinct from the analysis for a composition).

¹⁷⁴ See *VMG Salsoul, LLC v. Ciccone*, 824 F.3d 871, 879–81 (9th Cir. 2016) (noting the different pieces of the work that constitute infringements, including a .23-second horn blast).

¹⁷⁵ See *Newton*, 388 F.3d at 1193 (noting that “[e]ven where there is some copying, . . . it must be shown that this has been done to an unfair extent.”) (quoting *West Publ’g Co. v. Edward Thompson Co.*, 169 F. 833, 861 (E.D.N.Y. 1909)).

¹⁷⁶ See *Bracha*, *supra* note 62, at 158–69 (tracing the de minimis exception’s history and examining the ways in which courts have come to treat the doctrine as an alternate label for improper appropriation).

¹⁷⁷ See *Newton*, 388 F.3d at 1193–94 (9th Cir. 2004) (filtering out the recording’s performative aspects from consideration in the infringement inquiry, because the composition was the sole basis for the plaintiff’s claim).

¹⁷⁸ See *id.* at 1196 (adjudging the defendants’ use de minimis because the three sampled notes lacked any “distinct melodic, harmonic, rhythmic or structural elements.”).

de minimis uses.¹⁷⁹

Musical works are inherently less dynamic than sound recordings. When an AI generator creates a song, it primarily does so by mining the sound recording for its performative nuances, rather than for the generic compositional structures in the musical work.¹⁸⁰ To be clear, the AI model does analyze the musical works during training, generating valuable insights into how various styles of music are composed.¹⁸¹ However, comparatively little unique musical work value will manifest in the generator's output, because the AI songs are constructed using short sound recording samples, which are by their nature more qualitatively dense than the associated segments of their underlying musical works.¹⁸²

Therefore, it is unlikely that a meaningful percentage of these musical work samples, standing alone, will be recognizable to average audiences. Nonetheless, *Newton* demonstrates that de minimis musical work analyses must be conducted on a case-by-case basis, as the various outcomes will turn on the unique facts of each use.¹⁸³ Indeed, there may be plenty of instantly recognizable musical work segments that would conjure thoughts of the source work, even if the listener is merely provided with a generic rendition of the short sample's notes, rhythm, and/or lyric(s).¹⁸⁴ Simply put, only a holistic assessment of the individual musical work sample can determine the extent to which the original work was misappropriated.

The infringement analysis for sound recording samples is less straightforward and will turn on a number of key variables. First, it is important to determine whether the AI generator fixes its music independently,

¹⁷⁹ See *id.* (finding Beastie Boys' use of *Newton*'s sample to be de minimis because "an average audience would not discern *Newton*'s hand as a composer, . . . from Beastie Boys' use of the sample.").

¹⁸⁰ See *Jukebox*, *supra* note 46 (describing how recent AI music generators correct for prior models' inability to "capture human voices or . . . subtle timbres, dynamics, and expressivity" by "model[ing] music directly as raw audio.").

¹⁸¹ See *id.* (explaining how variational autoencoders encode music at multiple levels, including one which retains "only the essential musical information.").

¹⁸² See, e.g., *Newton*, 388 F.3d at 1194 (highlighting the ways in which the plaintiff went "beyond the score in his performance" to "emphasize the upper partials of the flute's complex harmonic tone," which "is not explicitly requested in the score.").

¹⁸³ See *id.* (failing to establish a bright line de minimis use standard that would negate the need for a holistic analysis based on the facts of a given case).

¹⁸⁴ See *Jukebox*, *supra* note 46 (providing examples of the *Jukebox* app's "completions" function, through which the model generates a novel ending to a given song using the first twelve seconds of the original audio as a primer). For the first twelve seconds in a completion function, the source work is reproduced in its original form; from there, it is manipulated by the model to produce a novel ending, which often requires reproduction of the work's recognizable musical elements to appear authentic. See *id.* (demonstrating the completion function using, e.g., The Eagles' "Hotel California").

or if it relies upon manipulation of the actual copyrighted sounds.¹⁸⁵ For example, GANs-based AI systems entail a generator neural network that independently fixes the music in an attempt to outmaneuver the discriminator neural network's authenticity detector.¹⁸⁶ Alternatively, autoencoder-based approaches entail manipulation of actual copyrighted sounds to generate the music through the encoding and decoding process.¹⁸⁷ In other words, how the AI system uses the copyrighted sound recordings will dictate the course of the analysis.

If the AI system independently fixes the sounds that constitute the generator's output, then there is simply no infringement of the sound recording.¹⁸⁸ The limitation on the copyright owner's exclusive reproduction right in Section 114(b) makes independent fixation a complete defense to a sound recording infringement action.¹⁸⁹ This result may be no less disruptive for copyright owners in the grand scheme, but programming the AI model to somehow independently fix its output audio would ensure that, technically speaking, the AI music generator will not infringe any sound recording copyrights.¹⁹⁰

Conversely, if the AI system reproduces the actual sounds as output, then the analysis would turn on whichever circuit's rule the court opts, or is bound, to follow.¹⁹¹ In the Sixth Circuit, a copyrighted sound recording fragment reproduced in an AI-generated work would be deemed an infringement, regardless of the sample's substantiality.¹⁹² Here, *Bridgeport's* bright-line rule

¹⁸⁵ See 17 U.S.C. § 114(b) (limiting the exclusive reproduction right for sound recordings to "the actual sounds fixed in the recording.").

¹⁸⁶ Nicholson, *supra* note 25.

¹⁸⁷ *Autoencoder*, *supra* note 30.

¹⁸⁸ See *Bridgeport Music, Inc. v. Dimension Films*, 410 F.3d 792, 799–800 (6th Cir. 2005) (noting that the statutory protections do not extend to those materials that are created with wholly independent sounds, even if those sounds imitate the copyrighted sounds).

¹⁸⁹ See *id.* at 800 (noting that "the world at large is free to imitate or simulate the creative work fixed in a recording so long as an actual copy of the sound recording itself is not made.").

¹⁹⁰ See *id.* at 799–800 (emphasizing how copyright protection for sound recordings does not extend to imitations); see also *Midler v. Ford Motor Co.*, 849 F.2d 460, 462 (9th Cir. 1988) (explaining that intent to imitate a sound recording is not relevant to the infringement inquiry, because copyright in a sound recording extends only to duplication of the actual sounds fixed in the recording); *Pharmacy Records v. Nassar*, 572 F.Supp.2d 869, 872 (E.D. Mich. 2008) (granting summary judgment to defendants in a sound recording copyright infringement suit, because the plaintiffs failed to establish that the sound recording was duplicated).

¹⁹¹ Compare *Bridgeport Music, Inc.*, 410 F.3d at 801–02 (holding all sound recording appropriations to be copyright infringements, regardless of their substantiality); with *VMG Salsoul, LLC v. Ciccone*, 824 F.3d 871, 880–81 (9th Cir. 2016) (holding there must be substantial infringement on the copyrighted material for there to be legal recourse for copyright infringement).

¹⁹² See *Bridgeport Music, Inc.*, 410 F.3d at 801–02 (holding all sound recording

would serve to prioritize the interests of copyright owners over AI developers, in recognition of the value derived from the appropriated sound recording.¹⁹³

Alternatively, the Ninth Circuit's rule would require the court to conduct a de minimis inquiry to ascertain whether the appropriation is recognizable to the average audience.¹⁹⁴ The extent to which any given sample will manifest recognizably as output is unclear, because AI music generators could potentially utilize any number of sound recordings from their datasets to construct a single work.¹⁹⁵ However, unlike the .23-second horn blast in *Ciccone*, the source of which was deemed unrecognizable once transplanted into "Vogue," it is possible that AI-generated music could contain substantial samples if, for example, the model over-emulates a particular cross-section of its dataset.¹⁹⁶

Generative AI models that replicate their inputs are said to "overfit" their training datasets.¹⁹⁷ AI developers generally seek to avoid overfitting.¹⁹⁸ However, some AI systems are deliberately developed for emulative purposes.¹⁹⁹ For instance, consider OpenAI's Jukebox app ("Jukebox"), which is designed to "generate[] music, including rudimentary singing, as raw audio

appropriations to be copyright infringements, regardless of their substantiality).

¹⁹³ See *id.* at 802 (explaining how samplers derive value from every appropriation, regardless of substantiality, in the form of cost-savings, efficiency, inimitable artistic quality, or some combination thereof).

¹⁹⁴ See *VMG Salsoul, LLC*, 824 F.3d at 881 (maintaining a de minimis exception for sound recordings based on the notion that a copier does not benefit from another artist's expressive content if the public cannot recognize the appropriation).

¹⁹⁵ See *Jukebox*, *supra* note 56 (describing the Jukebox app's dataset as containing "1.2 million songs (600,000 of which are in English), paired with the corresponding lyrics and metadata").

¹⁹⁶ See *VMG Salsoul, LLC*, 824 F.3d at 883–84 (emphasizing that Congress' intended scope of protection, as set forth in a House Report on Section 114(b), includes "any substantial portion" of the actual sounds) (quoting H.R. REP. NO. 94-1476, at 106 (1976)).

¹⁹⁷ See Tushar Gupta, *Deep Learning: Overfitting*, TOWARDS DATA SCIENCE (Feb. 12, 2017), <https://towardsdatascience.com/deep-learning-overfitting-846bf5b35e24> (defining overfitting as a machine learning phenomenon wherein an AI model learns about the detail in its training data so well that it causes the output to perfectly mirror its inputs); see also Abraham Khan, *Generating Pokémon-Inspired Music from Neural Networks*, TOWARDS DATA SCIENCE (Dec. 14, 2018), <https://towardsdatascience.com/generating-pokemon-inspired-music-from-neural-networks-bc240014132> (describing overfitting in the context of music generation as "caus[ing] the output to sound nearly identical to one or more of the original songs.").

¹⁹⁸ See Gupta, *supra* note 197 (stating that "[o]verfitting is a major problem in neural networks.").

¹⁹⁹ See, e.g., Vlad Alex (Merzmensch), *JukeBox by OpenAI*, TOWARDS DATA SCIENCE (Nov. 6, 2020), <https://towardsdatascience.com/jukebox-by-openai-2f73638b3b73> (highlighting examples of the Jukebox app's impressively accurate AI-generated versions of AC/DC and Nirvana recordings).

in a variety of genres and artist styles.”²⁰⁰ A cursory glance through Jukebox’s sample library reveals thousands of recognizable appropriations.²⁰¹ Indeed, an AI music emulator would not perform its primary function if an average audience could not recognize what has been appropriated.²⁰²

In sum, the outcome of a given infringement analysis will turn on several factors, including which copyright is at issue, whether the new sounds were independently fixed, which *de minimis* rule the particular court adopts, and whether the sample’s source is recognizable to an average audience. Although consideration of the foregoing offers courts a practicable methodology for making sense of the copyright issues implicit in AI music generation, the multitude of consequential variables in each analysis rules out the possibility of establishing bright-line standards regarding generative AI systems. Therefore, consideration of AI music’s broader consequences is warranted to ascertain whether *sui generis* legal standards best serve the goals of copyright in this domain.²⁰³

2. Future Implications

AI music generators are presently advertised as tools to supplement human creativity.²⁰⁴ However, anyone who has observed the pace of technological advance over the past twenty years can envision a future in which generative AI is more than a mere contrivance. AI thought-leaders are already undertaking ambitious initiatives to further embed the technology into our daily lives.²⁰⁵ If taken to its logical extreme, AI could foreseeably produce

²⁰⁰ *Jukebox*, *supra* note 56.

²⁰¹ See *Jukebox Sample Explorer*, OPENAI: BLOG, <https://jukebox.openai.com/?song=787941133> (last visited Mar. 27, 2021) (containing thousands of AI-rendered recordings emulating popular artists and musical styles).

²⁰² Cf. *Fisher v. Dees*, 794 F.2d 432, 434 n.2 (9th Cir. 1986) (explaining how “it would seem contradictory to assert that copying for parodic purposes could be *de minimis*. A parody is successful only if the audience makes the connection between the original and its comic version.”).

²⁰³ See *Twentieth Century Music Corp. v. Aiken*, 422 U.S. 151, 156 (1975) (stating that the Copyright Act must be construed in light of the Constitution’s goal of “stimulat[ing] artistic creativity for the general public good[,]” when technological change renders the Act’s literal terms ambiguous).

²⁰⁴ See *Jukebox*, OPENAI: BLOG (Apr. 30, 2020), <https://openai.com/blog/jukebox/> (describing how OpenAI expects “human and model *collaborations* to be an increasingly exciting creative space”) (emphasis added).

²⁰⁵ See Alex Johnson, *Elon Musk Wants to Hook Your Brain Directly to Computers – Starting Next Year*, NBC NEWS: TECH (July 17, 2019), <https://www.nbcnews.com/mach/tech/elon-musk-wants-hook-your-brain-directly-computers-starting-next-ncna1030631> (reporting on the AI research company Neuralink and its plans to create “symbiosis with artificial intelligence” by implanting neural devices into the human brain).

music more efficiently and intelligently than human authors.²⁰⁶ This prediction has sparked a fierce debate among musicians—some insisting that AI will usher in a golden era of creativity, while others begrudgingly brace themselves for what they believe to be human authorship’s inevitable demise.²⁰⁷

The debate over the future of AI music bears a striking resemblance to the debate over digital sampling. Digital sampling democratized the public’s capacity for creativity and paved the way for an artform that presently generates more revenue for the music industry than any other genre.²⁰⁸ Concurrently, digital sampling served to trivialize the value of musical training and analog recording by allowing non-musicians to cheaply and easily create fashionable, salable music.²⁰⁹ Thus, it is not just shifting musical tastes driving hip-hop to predominance in the market; it is also the ease of production and low transaction costs enabled by digital sampling.²¹⁰

Similarly, AI could be a seed for human creativity. Musicians and non-musicians alike would have unprecedented access to insights from all of recorded music’s history and the means to produce immeasurable quantities of aesthetically pleasing music at the push of a button. However, AI music that can pass for human authorship would likely have a chilling effect on the public’s willingness to pay a premium for human-made works. Even if we concede that there are aspects of the human mind that AI could never fully replicate, an innately cynical market would, on balance, likely prefer AI music for its lower transaction costs.²¹¹ Accordingly, it would be shortsighted to assume that AI will have any less disruptive of an effect on the music industry

²⁰⁶ See Chow, *supra* note 42 (quoting the musician Grimes on her prediction that AI will be “so much better at making art than us.”). This prediction is particularly noteworthy (and somewhat ironic) because Grimes is married to Elon Musk – one of the foremost authorities on AI.

²⁰⁷ *Id.*

²⁰⁸ See Patrick Ryan, *Rap Overtakes Rock as the Most Popular Genre Among Music Fans. Here’s Why.*, USA TODAY (Jan. 4, 2018), <https://www.usatoday.com/story/life/music/2018/01/03/rap-overtakes-rock-most-popular-genre-among-music-fans-heres-why/990873001/> (explaining that R&B/hip-hop surpassed rock as the most popular genre in the U.S. in terms of total consumption in 2017).

²⁰⁹ See Eckhause, *supra* note 112, at 379 (describing how “[t]he way that music is created . . . began to change . . . [i]n essence, anyone with a computer could be a musician.”).

²¹⁰ See *id.* at 380.

²¹¹ See Denise Cummins, *This is What Happens When You Take Ayn Rand Seriously*, PBS: NEWSHOUR (Feb. 16, 2016), <https://www.pbs.org/newshour/economy/column-this-is-what-happens-when-you-take-ayn-rand-seriously> (noting how “[m]odern economic theory” is based on the notion that rational agents are self-interested, and a market is “a collection of such rational agents, each of whom is also self-interested.”).

than digital sampling did in the 1990s and beyond.

The judiciary's patience and musicological acuity will be tested as copyright owners turn to the courts for redress. In the short term, the court system will be overwhelmed by countless infringement actions—reason enough to question the utility of applying case-by-case, fact-specific copyright doctrines to generative AI.²¹² However, once AI music generators evolve to the point that their outputs sound less like their inputs, and more like intelligently composed original works, traditional notions of infringement that focus on an appropriation's substantiality will become insufficient to hold accountable those who make undetectable—but no less violative—use of others' works.²¹³

The unsettled question of whether AI generated works are copyrightable²¹⁴ will greatly influence how humans are forced to adapt. If AI-generated works are deemed protectible, the technology's capacity for unlimited expression could turn composing and recording music into a veritable minefield of potential infringement claims, thereby disincentivizing human authors from creating at all. Even if AI-generated works are not deemed copyrightable, the legions of AI works routinely thrust into the public domain could render human authors uncompetitive in the market.

In sum, AI music's promise veils a host of undesirable consequences. On the surface, AI appears to directly serve the copyright system's goal of expression maximization.²¹⁵ However, the law's low threshold for copyright protection is designed to incentivize creativity that is decidedly human.²¹⁶

²¹² See *Bridgeport Music, Inc. v. Dimension Films*, 410 F.3d 792, 802 (6th Cir. 2005) (arguing for a bright line sound recording infringement rule, because adopting a de minimis analysis for digital samples would require “mental, musicological, and technological gymnastics” across “hundreds of . . . cases involving different samples from different songs”).

²¹³ See *NIMMER & NIMMER*, *supra* note 76, at § 13.03[A] (2020) (quoting *Newton v. Diamond*, 388 F.3d 1189, 1193 (9th Cir. 2004)) (explaining that substantial similarity between the original and allegedly copied works is “an essential element of actionable copying” – “no legal consequences will follow from [copying] unless the copying is substantial.”).

²¹⁴ Compare U.S. COPYRIGHT OFFICE, *COMPENDIUM OF U.S. COPYRIGHT OFFICE PRACTICES* § 306 (3d ed. 2017) (explicitly stating the Office's policy against registering non-human authored works), with *Bridy*, *supra* note 10, at 401 (justifying copyright protection on behalf of non-human authors, because copyright seeks to protect economic rights, not moral rights).

²¹⁵ See David McGowan, *Copyright Nonconsequentialism*, 69 MO. L. REV. 1, 12 (2004) (describing the copyright system's primary aim as “promoting production of expression,” which justifies many fundamental copyright doctrines, including the copyright term, and various limitations on the exclusive rights); see also Sara K. Stadler, *Incentive and Expectation in Copyright*, 58 HASTINGS L.J. 433, 433 (2007) (noting that the “primary way” the Copyright Act achieves its ideal aims is by “providing creators with the incentive to create and to distribute copies of their works to the public.”) (emphasis added).

²¹⁶ See *Burrow-Giles Lithographic Co. v. Sarony*, 111 U.S. 53, 58 (1884) (limiting copyright law and its protections to “original intellectual conceptions of the author.”)

Thus, AI's capacity to supplant human authorship should give us pause to reconsider encouraging its unfettered progress. The next subsection will contemplate ways in which policymakers may strike an equitable balance between the competing interests of AI developers, copyright owners, and society at large.

B. Policy Proposals

If we concede, *arguendo*, that there is scientific and creative utility to AI systems capable of producing music as intelligently as humans, then we must be careful not to unduly restrict AI's progress in the name of safeguarding authors' rights. Equitable doctrines such as the *de minimis* exception were intended to achieve this delicate balance on an analytical level, but appear woefully inadequate to do so in light of generative AI's unique functionality and long-term ramifications.²¹⁷ To be certain, AI developers would also be able (and likely) to assert fair use over their sampling practices.²¹⁸ However, fair use's equally fact-specific nature, and its overlap with factors already contemplated in the *de minimis* inquiry (e.g., substantiality of the portion used), make it unlikely that fair use will yield appreciably different outcomes or thread the needle of competing interests any more effectively.²¹⁹

Musicians typically begin composing and performing at an early age, when notions of their art's commercial viability are often subordinate to the simple desire for a creative outlet. This attitude persists among many musicians who are usually happy—indeed, flattered—to see their styles widely imitated; that is, until the artistic validation fails to yield a proportional financial return.²²⁰ Sadly, recognition is not always tied to pecuniary benefit in the music business, and it cannot sustain the musician who requires financial security to

implying a need for the human element in a copyrightable work).

²¹⁷ Francesco Di Cosmo, *Return of the De Minimis Exception in Digital Music Sampling: The Ninth Circuit's Recent Holding in VMG Salsoul Improves Upon the Sixth Circuit's Holding in Bridgeport, But Raises Questions of its Own*, 95 WASH. U. L. REV. 227, 228, n.12 (2017) ("The *de minimis* defense is applicable when a defendant's copying was so small and trivial that it should be allowed." (internal quotation marks omitted)).

²¹⁸ Jessica Gillotte, *Copyright Infringement in AI-Generated Artworks*, 53 U.C. DAVIS L. REV. 2655, 2684 (2020).

²¹⁹ See 17 U.S.C. § 107 (articulating factors to be considered in fair use analyses, which are closely tied to *de minimis* considerations, such as substantiality of the portion used, and the use's effect upon the potential market for the original work).

²²⁰ See PBS, *Copyright Criminals*, YOUTUBE (Jan. 30, 2021), <https://www.youtube.com/watch?v=5kN8hugndG8> (profiling influential percussionist Clyde Stubblefield, who expressed bewilderment at the disparity between his great musical influence, and the comparatively minimal dividends it has yielded).

continue creating.²²¹ Accordingly, a mere right of attribution over samples used in AI music generation— however merited—would be of little practical value to copyright owners in this context.²²²

Musicians are often deluded by the false belief that monetizing art is at odds with creative ethics and ideals. An irony of the backlash to *Bridgeport*'s exhortation against unlicensed sampling was encapsulated in the Sixth Circuit's insightful recognition that attitudes often "appear driven by whose ox is being gored."²²³ The same rules that samplers bemoan for supposedly inhibiting creativity are amongst the strongest safeguards they may have against exploitation of their own works.²²⁴ Thus, notions of artistic purity and ownership rights need not be viewed as mutually exclusive.²²⁵

Licensing skeptics also argue that the fees are prohibitive, but this is not necessarily the case.²²⁶ The Ninth Circuit noted in its opinion in *Newton* that Beastie Boys licensed the sample at issue for a mere "one-time fee of \$1,000."²²⁷ The Beastie Boys' album *Check Your Head*, which contained the sample from *Newton* on the track "Pass the Mic," peaked at number ten on the US Billboard 200 in 1992, indicating sales figures that would more than justify the \$1,000 expense.²²⁸ Further, licensing rates set according to fair market value reflect the notion that copyright owners merely seek fair compensation for use of their works.²²⁹ Indeed, an author who refuses to license would serve neither the copyright system's nor his own interests. Thus, a workable licensing scheme is, on balance, the best available solution to the AI music dilemma.²³⁰

Nominal rates from work to work notwithstanding, the process of licensing

²²¹ See ANVIL! THE STORY OF ANVIL (2008) (documenting the misadventures of the aging Canadian heavy metal band Anvil, which has struggled for decades to obtain financial success commensurate with the band's influence in its genre).

²²² Deahl, *supra* note 12.

²²³ *Bridgeport Music, Inc. v. Dimension Films*, 410 F.3d 792, 804 (6th Cir. 2005)

²²⁴ See *id.* (noting that "today's sampler is tomorrow's samplee.").

²²⁵ Deahl, *supra* note 12.

²²⁶ See PBS, *supra* note 220 (profiling seminal figures in hip-hop and digital sampling who lament the copyright laws' prohibition against "musical borrowing").

²²⁷ *Newton v. Diamond*, 349 F.3d 591, 593 (9th Cir. 2003), *amended*, 388 F.3d 1189, 1191 (9th Cir. 2004).

²²⁸ *Chart History: Beastie Boys*, BILLBOARD, <https://www.billboard.com/music/Beastie-Boys/chart-history/TLP> (last visited Mar. 13, 2021).

²²⁹ See Jeanne C. Fromer, *Expressive Incentives in Intellectual Property*, 98 VA. L. REV. 1745, 1791 (2012) (explaining that "[e]mpirical work . . . shows that . . . creators are willing to reduce significantly the amount of money they are willing to accept to license their intellectual property rights."); see also *How to Get Copyright Permission?*, COPYRIGHT ALLIANCE, <https://copyrightalliance.org/faqs/how-to-get-copyright-permission/> (last visited Mar. 13, 2020) (stating that payment for copyright permission varies based on factors like usage, type of copyright, and exposure of work).

²³⁰ Chow, *supra* note 42.

hundreds of thousands of works would be expensive, not to mention grossly inefficient. Therefore, one solution is to establish a blanket licensing apparatus for AI music generator training and output. AI developers—as well as other unforeseen parties looking to use numerous works in the future—would have a one-stop shop for securing the rights to any works included under the blanket license. This model has been a longstanding practice in the music publishing industry, which utilizes blanket licensing to grant public performance permissions to various users on behalf of hundreds of thousands of authors.²³¹ Licensees would benefit from the system’s efficiency, and potential licensors would retain the right to control the inclusion or exclusion of their works. On balance, blanket licensing would ensure that neither party’s proverbial ox is gored in the making of an AI song.

Another potential solution is to restrict the AI model’s permissible pool of training data to works in the public domain and those voluntarily pledged to the system by copyright owners. Many musicians have expressed tremendous enthusiasm for AI music and have committed themselves to ensuring the technology is accessible to all.²³² Those who wish to see their works included in the AI system can grant permission through organizations like Creative Commons,²³³ which assist copyright owners with open licensing and dedicating their works to the public domain. Naturally, this would drastically narrow the AI system’s field of possible training data, thereby diminishing the quality of its outputs. Nonetheless, courts and policymakers must again ask whether AI music outputs that can pass for human authorship constitute the type of socially beneficial end that the copyright system seeks to incentivize. In light of the havoc that unchecked generative AI could wreak on human authorship, there are sound utilitarian justifications for not prioritizing the technology’s development over intellectual property rights and the human incentive structure. Perhaps a less authentic-sounding AI music generator in the short term is simply the price society must pay to preserve the dignity of human authorship for the future.

IV. CONCLUSION

AI has captivated the world. Far from Hollywood’s depiction of

²³¹ See, e.g., *ASCAP Music Licensing*, ASCAP, <https://www.ascap.com/> (last visited Mar. 13, 2021) (outlining the various categories of businesses to which performance rights organizations provide blanket licenses).

²³² Chow, *supra* note 42.

²³³ *Open Access to Knowledge is Critical—Especially During a Global Health Emergency*, CREATIVE COMMONS, <https://creativecommons.org/> (last visited Mar. 13, 2021) (creating a platform for artists to share, use, and remix other works).

emotionally intelligent robots, AI is merely a broad classification used to describe the field of computer science research that deals with a machine's capacity to replicate human thought processes. Nonetheless, the technology has tremendous potential to transform the way we think about tasks that have historically been considered innately human. Aesthetically pleasing AI music generation is now possible thanks to advances in the subfield of AI research known as machine learning, which utilizes clusters of algorithms called neural networks to interpret and manipulate music in a variety of ways. This phenomenon has copyright owners rightfully concerned, as AI music generator outputs are veritable collages of fine-grained sound recording samples.

AI music generator outputs are peculiar subjects for infringement inquiries, because the copyrighted works at issue may only manifest to a slight extent, if at all. Thus, courts are likely to interpret potential infringements in AI music generator outputs based on *de minimis* principles, which seek to draw the line between trivial and unfair appropriations. The line of *de minimis* use cases regarding digital sampling is instructive.²³⁴ Digital sampling emerged in the 1980s and proceeded to revolutionize the way music was produced and consumed.²³⁵ Courts have struggled to settle on a consistent interpretation of the Copyright Act with respect to *de minimis* uses of sound recordings, resulting in an unfortunate circuit split between two of the nation's primary music markets.²³⁶ Further, *de minimis* analyses of musical work appropriations, which have become increasingly common in light of digital sampling's ascendancy, entail highly fact-specific inquiries that are sure to test the musicological capabilities of courts and litigants in the years to come.²³⁷

It is unlikely that Congress anticipated digital sampling's ubiquity, much less AI music's variety of digital sampling, when it last overhauled the Copyright Act in 1976.²³⁸ Nevertheless, *de minimis* case law provides a practicable framework in which courts may assess generative AI's outputs. However, *de minimis* principles are insufficient to account for the anti-utilitarian ramifications of permitting this novel technology. Chief among

²³⁴ *VMG Salsoul, LLC v. Ciccone*, 824 F.3d 871, 884, 889 (9th Cir. 2016); *Bridgeport Music, Inc. v. Dimension Films*, 410 F.3d 792, 797–84 (6th Cir. 2005); *Newton v. Diamond*, 388 F.3d 1189, 1192–96 (9th Cir. 2004); *Fisher v. Dees*, 794 F.2d 432, 434 n.2 (9th Cir. 1986).

²³⁵ Dean Garfield, Kembrew McLeod & Hank Shocklee, *Digital Music Sampling: Creativity or Criminality?*, NPR (Jan. 28, 2011), <https://www.npr.org/2011/01/28/133306353/Digital-Music-Sampling-Creativity-Or-Criminality>.

²³⁶ *Compare VMG Salsoul, LLC*, 824 F.3d at 875, with *Bridgeport Music, Inc.*, 410 F.3d at 797.

²³⁷ Bracha, *supra* note 62, at 158–69 (2018) (noting that the history of *de minimis* analyses in copyright decisions “has often been opaque, cryptic or even incoherent.”).

²³⁸ *See* H.R. REP. NO. 92-487, at 2 (1971) (evidencing Congress' rationale for amending the Copyright Act).

these consequences is the chilling effect that AI could have on human authorship. Humans may find themselves helpless to compete in the market against the AI systems of tomorrow, which generate their wealth of musical know-how from the same human authors they are likely to displace. Accordingly, courts and policymakers must consider equitable, licensing-based solutions to promote a mutually beneficial AI music ecosystem for technology companies and copyright owners alike. AI may indeed someday change how music is created and consumed for the better, but we must take care not to disregard the significance of the human element in our haste to realize technology's promise for the future.