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TUNING THE ROLE OF ARTIFICIAL INTELLIGENCE IN MUSICAL WORK INFRINGEMENT

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I. Introduction

Artificial intelligence (AI) is beginning to influence various corners of the music industry including marketing, audio mastering, and music creation.¹ In the legal setting, questions focused on AI authorship² have surfaced because of the capability of AI to independently create³ and the United States Copyright Office’s limitation on authorship to humans.⁴ In circumstances when no human may legally claim authorship of a work, should the work be registerable nonetheless?

Moreover, AI may have a less nebulous role in the context of copyright infringement.⁵ Given advances in AI, it is reasonable to foresee AI used to examine a musical work and compare it to pre-existing works to assess similarities.⁶ Additionally, AI could distinguish between protectable and unprotectable content.⁷

The use of AI in the infringement context is advantageous especially for musical works because authors have struggled with the idea/expression dichotomy as it relates to musical works and suggest that “idea and expression cannot be distinguished.”⁸ Furthermore, authors and

¹ See Bernard Marr, *The Amazing Ways Artificial Intelligence is Transforming the Music Industry*, Forbes (July 5, 2019, 12:33 AM), <https://www.forbes.com/sites/bernardmarr/2019/07/05/the-amazing-ways-artificial-intelligence-is-transforming-the-music-industry/?sh=44c9d7ee5072>.

² See generally Atilla Kasap, *Copyright and Creative Artificial Intelligence (AI) Systems: A Twenty-First Century Approach to Authorship of AI-Generated Works in the United States*, 19 WAKE FOREST J. BUS. & INTELL. PROP. L. 335 (2019).

³ See Andrew R. Chow, ‘There’s a Wide-Open Horizon of Possibility.’ *Musicians are Using AI to Create Otherwise Impossible New Songs*, Time (February 5, 2020, 2:02 PM), <https://time.com/5774723/ai-music/>.

⁴ See U.S. COPYRIGHT OFFICE, COMPENDIUM OF U.S. COPYRIGHT OFFICE PRACTICES §§ 306, 313.2 (2017).

⁵ See generally Shine (Sean) Tu, *Use of Artificial Intelligence to Determine Copyright Liability for Musical Works* (W. Va. U. Coll. L. Rsch. Paper, No. 2020-012, 2020), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3617300.

⁶ *Id.*

⁷ *Id.*

⁸ Debra Presti Brent, *The Successful Musical Copyright Infringement Suit: The Impossible Dream*, 7 U. MIAMI ENT. & SPORTS L. REV. 229, 244 (1990).

practitioners have criticized⁹ infringement tests employed by courts. AI can guide courts to mitigate confusion and promote consistency.

This Article is divided into two parts. Part II examines the two-step infringement test in the context of musical works. Part III examines the role of AI in the two-step test and finds that AI is useful for both steps but should not preempt a jury's overall determination of liability. It proceeds to examine evidentiary considerations for similarity reports generated by AI as well as uses of such AIs *ex ante*.

II. Musical Work Infringement

Copyright infringement tests generally comprise three elements: (1) ownership of a valid copyright; (2) copying of original elements; and (3) substantial similarity between the infringing work and the copyrighted work.¹⁰ Once a plaintiff proves ownership, a court will embark on a two-step inquiry to determine whether a defendant infringed the plaintiff's copyright and should be held liable.¹¹

The first step is to prove copying-in-fact. To satisfy this requirement, the plaintiff must show that the defendant actually copied the work either through direct or indirect proof.¹² Absent direct proof, a combination of "access to the copyrighted work, similarities that are probative of copying between the works, and expert testimony"¹³ suffice. The second step is to prove substantial similarity which acknowledges that even if the defendant actually copied the plaintiff's work, the law will not impose liability unless the amount copied is sufficient to warrant granting relief.¹⁴ Furthermore, liability will only be imposed for the defendant's copying of protectable elements of the plaintiff's copyrighted work.¹⁵

A. Copying-In-Fact

Despite how the first step is framed in different circuits, it requires an analysis of the constituent parts of the works.¹⁶ Dissecting a musical work into constituent parts requires specialized knowledge; accordingly, expert testimony is admissible and typically provided by music theoreticians, composers, musicologists, and forensic musicologists.¹⁷

⁹ See, e.g., Amy Cohen, *Masking Copyright Decisionmaking: The Meaninglessness of Substantial Similarity*, 20 U.C. DAVIS L. REV. 719 (1987); see also Nicole Lieberman, *Un-Blurring Substantial Similarity: Aesthetic Judgments and Romantic Authorship in Music Copyright Law*, 6 N.Y.U. J. INTELL. PROP. & ENT. L. 91 (2016).

¹⁰ Lynn Bayard, *Copyright Infringement Claims, Remedies, and Defenses*, PRAC. L. INTELL. PROP. & TECH. (2020).

¹¹ See Lieberman, *supra* note 9, at 106; see also Alfred Yen, *Copyright Opinions and Aesthetic Theory*, 71 S. CAL. L. REV. 247, 284 (1998).

¹² See Lieberman, *supra* note 9, at 93.

¹³ *Boisson v. Banian, Ltd.*, 273 F.3d 262, 267 (2d Cir. 2001) (quoting *Laureyssens v. Idea Grp., Inc.*, 964 F.2d 131, 140 (2d Cir. 1992)).

¹⁴ Eric Osterberg, *Copyright Litigation: Analyzing Substantial Similarity*, PRAC. L. INTELL. PROP. & TECH. (2020).

¹⁵ See Bayard, *supra* note 10. Unprotectable elements include facts, ideas, concepts, processes, systems, methods, stock characters, character names, undeveloped characters described in words, and *scènes à faire*.

¹⁶ *Three Boys Music Corp. v. Bolton*, 212 F.3d 477 (9th Cir. 2000); *Arnstein v. Porter*, 154 F.2d 464, 468 (2d Cir. 1946).

¹⁷ See Tu, *supra* note 5.

Expert witnesses may identify similarities between the works and present the works in a manner suitable for conveying the similarities to an untrained ear.¹⁸ Moreover, experts may consider, among other elements, melody, tone, and harmony.¹⁹ However, “[t]here is no one magical combination of these factors that will automatically substantiate a musical infringement suit; each allegation of infringement will be unique.”²⁰

Parsing the constituent elements of a musical work is important for assessing similarities sufficient to warrant an inquiry into whether the works are substantially similar, especially because western music “is primarily written in the tonal system” which is “built on a hierarchy of predominate chords and pitches.”²¹ Accordingly, there is a “relatively limited number of compositional choices” as “there are a limited number of possible pitch and harmonic relationships.”²² Yet, even though “there are an enormous number of possible permutations of the musical notes of the scale, only a few are pleasing; and much fewer still suit the infantile demands of the popular ear.”²³ Musical works are multifaceted, and as technological tools advance,²⁴ either the number of constituent elements will grow, the existing elements will expand, or a combination of both. For example, augmented reality audio and spatial audio²⁵ may expand the spatial organization element of a musical work.

B. *Substantial Similarity*

Even if copying-in-fact is established, the plaintiff must demonstrate that protected elements of her work were taken by the defendant in such a way that constitutes a misappropriation.²⁶ The substantial similarity inquiry is a question exclusively for the jury²⁷ and for which “expert testimony [is] irrelevant”²⁸ though some academics disagree.²⁹

Part of the substantial similarity inquiry depends on the test employed by a court, which depends on the jurisdiction.³⁰ Among the tests are the: (1) ordinary observer test; (2) intended audience test; (3) abstraction-filtration-comparison test; and (4) intrinsic test.³¹ The lack of uniformity has, in part, caused academics to criticize the second step. A more compelling criticism arises from the substance of the inquiry, however.

¹⁸ Osterberg, *supra* note 14.

¹⁹ Osterberg, *supra* note 14; *see* Tu, *supra* note 5.

²⁰ Swirsky v. Carey, 376 F.3d 841, 849 (9th Cir. 2004).

²¹ *See* Lieberman, *supra* note 9, at 105.

²² *See* Lieberman, *supra* note 9, at 108; *see generally* Jeffrey Cadwell, *Expert Testimony, Scènes À Faire, and Tonal Music: A (Not So) New Test for Copyright Infringement*, 46 SANTA CLARA L. REV. 137, 157 (2005).

²³ Darrell v. Joe Morris Music Co., 113 F.2d 80 (2d Cir. 1940).

²⁴ *See, e.g.*, <https://sites.research.google/tonetransfer> (last visited Oct. 30, 2020).

²⁵ *See, e.g.*, <https://www.sony.com/electronics/360-reality-audio> (last visited Oct. 30, 2020).

²⁶ *See* Castle Rock Ent., Inc. v. Carol Publ’g Grp., Inc., 150 F.3d 132, 137 (2d Cir. 1998); *see also* Cohen, *supra* note 9, at 732.

²⁷ *See* Shaw v. Lindheim, 919 F.2d 1353, 1358 (9th Cir. 1990).

²⁸ Arnstein v. Porter, 154 F.2d 464, 468 (2d Cir. 1946).

²⁹ *See, e.g.*, Mark Lemley, *Our Bizarre System for Proving Copyright Infringement*, 57 J. COPYRIGHT SOC’Y U.S.A. 719, 737 (2010).

³⁰ Osterberg, *supra* note 14.

³¹ *Id.*

For example, the ordinary observer test of the Second Circuit questions “whether defendant took from plaintiff’s work so much of what is pleasing to the ears of the lay listeners, who comprise the audience for whom such popular music is composed, that defendant wrongfully appropriated something which belongs to the plaintiff.”³² In the Ninth Circuit, the question is “whether the ordinary, reasonable person would find the total concept and feel of the works to be substantially similar.”³³ These tests task juries with garnering a subjective impression of the works and assessing overall similarities to determine if the defendant’s copying “went too far as to constitute improper appropriation.”³⁴

Admittedly, the tests seem a bit arbitrary and vague. Indeed, “[t]he test for infringement of a copyright is of necessity vague.”³⁵ However, understanding the rationale behind these tests uncovers why courts continue to employ them despite academic criticism.³⁶ Accordingly, two perspectives appear appropriate: (1) the personality theory; and (2) economic considerations.

First, the personality theory “posits that property provides a unique or especially suitable mechanism for self-actualization, for personal expression, and for dignity and recognition as an individual person.”³⁷ The personality theory recognizes a societal adjudication of the relationship between a human being and her personal property.³⁸ In the context of intellectual property, the expression of one’s idea, especially through music, manifests one of the strongest relationships, in turn maximizing the justification of affording copyright protection to such expression.³⁹

Music captures a unique character of a human which consequently engenders unique expressive styles. This observation leads to the notion that courts continue to follow precedents without providing concrete tests because determining whether the defendant wrongfully appropriated the concept or feel of the plaintiff’s work may nevertheless be as inexplicable as the connection a human may feel to, for example, her grandmother’s knitting needles stuck in an incomplete scarf.

Second, with regard to economic considerations, the *Arnstein* court presents a starting point, as “[t]he plaintiff’s legally protected interest is not, as such, his reputation as a musician but his interest in the potential financial returns from his compositions which derive from the lay public’s appropriation of his efforts.”⁴⁰ Accordingly, the *Arnstein* court suggests that musicians prioritize economic considerations over personality concerns.

³² *Arnstein*, 154 F.2d at 473.

³³ *Three Boys Music Corp. v. Bolton*, 212 F.3d 477, 485 (9th Cir. 2000) (quoting *Pasillas v. McDonald’s Corp.*, 927 F.2d 440, 442 (9th Cir. 1991)); *see Sid & Marty Krofft Television Prods., Inc. v. McDonald’s Corp.*, 562 F.2d 1157, 1167 (9th Cir. 1977).

³⁴ *Arnstein*, 154 F.2d at 468.

³⁵ *Peter Pan Fabrics, Inc. v. Martin Weiner Corp.*, 274 F.2d 487, 489 (2d Cir. 1960).

³⁶ *See, e.g., Cohen, supra* note 9, at 719 (criticizing the traditional copyright infringement test and underscoring its failures).

³⁷ Justin Hughes, *The Philosophy of Intellectual Property*, 77 GEO. L.J. 287, 330 (1988).

³⁸ *See Ofer Tur-Sinai, Beyond Incentives: Expanding the Theoretical Framework for Patent Law Analysis*, 45 AKRON L. REV. 243, 274-75 (2015).

³⁹ *See generally* Christopher Yoo, *Rethinking Copyright and Personhood*, 2019 U. ILL. L. REV. 1039 (2019).

⁴⁰ *Arnstein v. Porter*, 154 F.2d 464, 473 (2d Cir. 1946).

Furthermore, copyright law offers protection to creators to assuage fears of second-comers offering an expressive work at a reduced price.⁴¹ As ordinary listeners, jurors are also ordinary consumers and can assess market impacts. Inherent to that assessment is “what is pleasing to the ears”⁴² and the “total concept and feel”⁴³ because the connections between eardrum vibrations, auditory nerves, and the brain⁴⁴ engender physical and emotional experiences associated with inflowing sound waves which, together, impact economic factors.

C. Drawbacks of the Current Tests

Despite the foregoing support for the substantial similarity tests, drawbacks are evident. First, academics have noted that too much value is placed on the subjective impressions of the judge or jury⁴⁵ which may interfere with idea/expression dichotomy⁴⁶ and further conflate the confusion jurors encounter between compositional and performance elements.⁴⁷ Second, disregarding expert testimony is not practical as jurors cannot unhear testimony.⁴⁸

Courts deciding infringement cases are loath to overrule precedent.⁴⁹ In view of such reluctance, new technological tools can support the current frameworks while addressing drawbacks of the current tests by mitigating the subjectiveness of the inquiries, incorporating intended audiences for the lay listener, and removing the biases of expert witnesses.

For example, Liebesman considers “(1) objectively mapping a song's many artistic elements; and (2) using the link between the wave motion theory of physics and music to mathematically model a song.”⁵⁰ Expanding upon Liebesman’s approach, this Article discusses the role AI can play in the two-step inquiry,⁵¹ as well as the impact such AIs could have on the music industry.

III. Role of Artificial Intelligence

⁴¹ See generally Shyamkrishna Balganesh, *Foreseeability and Copyright Incentives*, 122 HARV. L. REV. 1569 (2009).

⁴² *Arnstein*, 154 F.2d at 473.

⁴³ *Three Boys Music Corp. v. Bolton*, 212 F.3d 477, 485 (9th Cir. 2000) (quoting *Pasillas v. McDonald’s Corp.*, 927 F.2d 440, 442 (9th Cir. 1991)); see *Sid & Marty Krofft Television Prods., Inc. v. McDonald’s Corp.*, 562 F.2d 1157, 1167 (9th Cir. 1977).

⁴⁴ See, e.g., <https://www.nidcd.nih.gov/health/how-do-we-hear> (last visited Oct. 30, 2020).

⁴⁵ Yvette Liebesman, *Using Innovative Technologies to Analyze for Similarity Between Musical Works in Copyright Infringement Disputes*, 35 AIPLA Q.J. 331, 334-35 (2007).

⁴⁶ Cadwell, *supra* note 22, at 157; Lieberman, *supra* note 9, at 120.

⁴⁷ See generally Jamie Lund, *An Empirical Examination of the Lay Listener Test in Music Composition Copyright Infringement*, 11 VA. SPORTS & ENT. L.J. 137 (2011).

⁴⁸ Michael Der Manuelian, *The Role of the Expert Witness in Music Copyright Infringement Cases*, 57 FORDHAM L. REV. 127, 139 (1988).

⁴⁹ See *Skidmore v. Led Zeppelin*, 952 F.3d 1051, 1069 (9th Cir. 2020) (determining that, “[a]lthough we are cautious in overruling precedent—as we should be—the constellation of problems and inconsistencies in the application of the inverse ratio rule prompts us to abrogate the rule.”).

⁵⁰ Liebesman, *supra* note 45, at 335.

⁵¹ See generally Tu, *supra* note 5.

First, in unsupervised learning, an AI “learns patterns in the input even though no explicit feedback is supplied.”⁵² For musical work infringement, unsupervised learning AI would take as input two works and be tasked with detecting similarities and associations between the two works.⁵³ A more comprehensive AI may be able to detect constituent elements and be tasked with detecting similarities among them.

Second, in reinforcement learning, an AI “learns from a series of reinforcements . . . [and] [i]t is up to the [AI] to decide which of the actions prior to the reinforcement were most responsible for it.”⁵⁴ For musical work infringement, reinforcement learning AI would be trained to understand when similarities between constituent elements of two works exists or when certain elements of a work are protectable.

Third, in supervised learning, an AI “observes some example input-output pairs and learns a function that maps from input to output.”⁵⁵ Supervised learning AI require a training data set which, in the musical work infringement context, could be a set of works known to be similar or dissimilar based on litigation outcomes; after the AI is trained, it could assess the degree of similarity between two unknown input works.⁵⁶

With respect to the two-step inquiry, AI can be used to assess copying-in-fact by dissecting two works into constituent elements, filtering those attributes that are protected from those that are not, and comparing the protected elements.⁵⁷ This process should be granular such that all possible constituent elements are uniquely compared and a similarity score can be generated per element.

However, for the second step, a distinctly trained AI for this purpose is unnecessary. Instead, similarity scores could be modified to encompass subjective impressions from external listeners, particularly those of the intended audience.⁵⁸ For example, the AI could be provided with an “audience impression function,” the output comprising the convolution⁵⁹ of the AI’s results and the audience impression function. Convolution of the AI’s results and the audience impression function may be executed on an element-by-element basis or some combination thereof depending on the complexity of such a function.

Moreover, an AI’s assessment for substantial similarity should not preempt a jury determination of liability because it is an inquiry encompassing human physiological effects, market factors, and subconsciously inherent theoretical personality considerations which simultaneously execute in the mind of a juror. Machines do not have eardrums and have no consideration for their impacts on society. Thus, the convolved version of the analytic comparison of protected elements can aid a jury in its liability assessment.

⁵² Stuart Russell & Peter Norvig, *ARTIFICIAL INTELLIGENCE: A MODERN APPROACH* (3d ed. 2010).

⁵³ *See generally* Tu, *supra* note 5.

⁵⁴ Russell & Norvig, *supra* note 52.

⁵⁵ *Id.*

⁵⁶ *See generally* Tu, *supra* note 5.

⁵⁷ *Id.*

⁵⁸ *Id.* (suggesting that listeners, on services such as Spotify, could be asked to assess similarity of a current track to the previous track).

⁵⁹ Russell & Norvig, *supra* note 52.

A. Similarity Reports

By providing juries with similarity reports generated by AIs instead of expert testimony, most of the drawbacks of the current test become moot; however, there are other considerations. One of the main concerns is that a jury may place too much weight on similarity reports. In this regard, similarity reports are comparable to DNA in a homicide case, for if there is a match (a similarity) the jury is more likely to convict even if “jurors have trouble understanding the fallibility of DNA evidence, especially when conveyed in statistical terms.”⁶⁰ For musical work similarity reports, an overall percentage of similarity could unfairly prejudice the defendant or mislead the jury and, consequently, be excluded from evidence despite its relevance.⁶¹

1. Evidentiary Concerns

In addition to the dangers of unfair prejudice or misleading juries, other evidentiary considerations arise in the context of similarity reports, particularly reliability.⁶² With respect to hearsay, machines have yet to be employed to assess questions of fact in the copyright infringement context; accordingly, reverse engineering concepts related to machine-generated data in the criminal context is an appropriate starting point.⁶³

In general, a machine is not a “person” and therefore not a declarant for purposes of hearsay.⁶⁴ Issues arise, however, when a human is involved in the generation of output data.⁶⁵ When a machine significantly contributes to the output—the resulting “statement”—with minimal human involvement, “most courts have concluded that the machine is the speaker.”⁶⁶ For example, a machine is the speaker when executing relatively simple tasks such as sample analyses after a human operator pushes a button and ceases involvement in the machine’s subsequent processes.⁶⁷ Even though “[t]he progenitors are the source of the assertion,”⁶⁸ such as AI developers, “their contribution is . . . attenuated and nontestimonial.”⁶⁹

In terms of AI, humans involved may include “software programmers, data and feedback suppliers, trainers, [and] system owners and operators.”⁷⁰ However, once an AI, particularly one for similarity assessments, is complete, the only human involvement is the uploading of works;

⁶⁰ See Kimberly Schweitzer & Narina Nuñez, *What Evidence Matters to Jurors? The Prevalence and Importance of Different Homicide Trial Evidence to Mock Jurors*, 25 *PSYCHIATRY, PSYCH. & L.* 437, 444 (2018).

⁶¹ See Fed. R. Evid. 403 (“The court may exclude relevant evidence if its probative value is substantially outweighed by a danger of one or more of the following: unfair prejudice, confusing the issues, misleading the jury, undue delay, wasting time, or needlessly presenting cumulative evidence.”).

⁶² See generally Andrea Roth, *Machine Testimony*, 126 *YALE L.J.* 1972 (2017).

⁶³ See generally Brian Sites, *Rise of the Machines: Machine-Generated Data and the Confrontation Clause*, 16 *COLUM. SCI. & TECH. L. REV.* 36 (2014).

⁶⁴ See Fed. R. Evid. 801(b) (“‘Declarant’ means the person who made the statement.”).

⁶⁵ See Sites, *supra* note 63, at 78.

⁶⁶ *Id.* at 79.

⁶⁷ *Id.* at 81.

⁶⁸ *Id.*

⁶⁹ *Id.*; see also *United States v. Washington*, 498 F.3d 225 (4th Cir. 2007).

⁷⁰ Shlomit Yanisky-Ravid & Xiaoqiong Liu, *When Artificial Intelligence Systems Produce Invention: The 3A Era and an Alternative Model for Patent Law*, 39 *CARDOZO L. REV.* 2215, 2216 (2018).

thereafter, the AI runs autonomously.⁷¹ Nevertheless, the reliability of the AIs employed may be called into question, and “defendants should have the right to ensure . . . that the machine produced a reliable accusation.”⁷²

Ensuring the reliability of similarity AIs may be accomplished by: (1) expert witnesses; (2) authentication; or (3) diversified testing. Initially, the question will be “whether the technology employed by the machine is valid and the data produced by the machine is reliable evidence of the fact it is offered to prove.”⁷³ In that case, expert testimony is required.⁷⁴ However, as such technology is used over time, the question will become “whether the machine is in good working order,”⁷⁵ which equivalently is whether the AI executed a comprehensive, proper, and adequate analysis. In that case, authentication⁷⁶ is required.⁷⁷

Additionally, diversified testing can ensure reliability by offering two or more reports from AIs with differing designs, trained with different training sets, employing different machine learning algorithms, or a combination thereof. Professor Tu contemplates the use of a standard algorithm in the industry.⁷⁸ Additionally, or alternatively, a standard set of requirements should be established for similarity reports in order for such reports to be admissible. For example, no report may provide an overall similarity percentage but rather present such percentages for constituent elements.

B. *Pre-Litigation Utility*

One secondary consideration for similarity AIs is use *ex ante*. Professor Tu contemplates that artists “could run the AI *ex ante* to either change the work to avoid infringement issues or run the risk of copyright infringement.”⁷⁹ However, given that “originality . . . is the touchstone of copyright protection,”⁸⁰ the notion of an AI influencing a creator’s expressive choices does not align with the constitutional goal of “promot[ing] the . . . useful Arts”⁸¹ but rather inverts that goal into one centered around infringement avoidance.

⁷¹ See How Content ID Works, Google, <https://support.google.com/youtube/answer/2797370?hl=en> (last visited Nov. 03, 2020) (though outside the AI context, but within the software realm, Google offers YouTube users the option to generate a fingerprint for their works and have it compared to other works in their database to autonomously sweep for copyright breaches.).

⁷² Brian Sites, *The Future of the Confrontation Clause: Semiautonomous and Autonomous Machine Witnesses*, 22 VAND. J. ENT. & TECH. L. 547, 581 (2020).

⁷³ *United States v. Crockett*, 586 F. Supp. 2d 877, 886 (E.D. Mich. 2008); see Roth, *supra* note 62, at 2021-22 (mentioning that “as machine conveyances become ever more sophisticated and relied upon, factfinders need more information and context to assess machine credibility.”).

⁷⁴ *Crockett*, 586 F. Supp. 2d at 886.

⁷⁵ *Id.*

⁷⁶ See Fed. R. Evid. 901(a) (“To satisfy the requirement of authenticating or identifying an item of evidence, the proponent must produce evidence sufficient to support a finding that the item is what the proponent claims it is.”); see also Fed. R. Evid. 901(b)(9).

⁷⁷ *Crockett*, 586 F. Supp. 2d at 886.

⁷⁸ Tu, *supra* note 5.

⁷⁹ *Id.*

⁸⁰ *Feist Publ’ns, Inc. v. Rural Tel. Serv. Co., Inc.*, 499 U.S. 340, 359-60 (1991).

⁸¹ U.S. CONST. art. I, § 8, cl. 8.

Furthermore, Professor Tu contemplates that the “[u]se of unstructured learning with an industry standard algorithm would create a library of riffs that could be categorized as scènes à faire or functional if found in enough songs that are in the public domain. This would give litigants the knowledge *ex ante* to determine if their songs contained protectable material or material that could be infringing.”⁸² Such a feature is desirable but should be offered to users separate from algorithms used to assess similarities.

Moreover, third-party developers could introduce platforms offering subscribers reports comprising assessments of their copyrighted works. Specifically, copyright owners could upload their works which would be treated as reference works; if any of those works are found to be similar to subsequently uploaded works by third-party artists, the subscriber would be notified. In that case, artists would be deterred from using similarity AIs *ex ante* because they could be inadvertently exposing themselves to liability or to hostile copyright owners with disproportionate negotiating power.

To balance the aforementioned benefits and drawbacks, a third-party platform could be required to include a notice in a terms of use. For example, such language could be, “By using the platform, you agree to permit us to notify our subscribers, at any time or from time to time, when your content is assessed to be similar to that copyrighted content of our subscribers’ determined to be the copyright owner(s),” or language of similar import, where relevant terms are defined in the terms of use.

IV. Conclusion

Vague legal tests can be molded into definite yet flexible forms by machines to increase the consistency in their applications. Upon considering how the vagueness of the two-step infringement test has pervaded infringement suits since at least 1960,⁸³ together with the various proposals for amending the test,⁸⁴ it appears that AI can standardize the test without removing its theoretical foundation.

Particularly in the musical work context, AI can be used in the first step to parse the protected and unprotected elements from a musical work and compare the constituent elements to assess similarity. From such an assessment, the AI can generate a similarity report conforming to a set of industry requirements delineating the similarity percentages of the constituent elements. For the second step, the AI can amend its initial similarity assessment by compensating for the subjective impressions of intended audiences. However, juries should retain the power in deciding whether a defendant should be held liable for infringement.

Offering AI as a supplemental tool rather than a conclusive adjudicator has the potential for courts to consider its role instead of plainly rejecting it. Guidance on the question of liability for musical works will likely be welcomed in view of academic sentiment that “[o]ur rules for

⁸² Tu, *supra* note 5.

⁸³ *Peter Pan Fabrics, Inc. v. Martin Weiner Corp.*, 274 F.2d 487, 489 (2d Cir. 1960).

⁸⁴ *See Lieberman, supra* note 9, at 137; *see also Lemley, supra* note 29, at 741.

proving copyright infringement make little sense.”⁸⁵ The use of AI in the musical work infringement context can offer predictability and certainty for artists and copyright owners alike.

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⁸⁵ Lemley, *supra* note 29, at 741.