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Should creators be compensated for the use of their works in training AI-generated music systems?

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Abstract

This paper examines the legal and ethical implications of using copyrighted musical works to train artificial intelligence (AI) music generation systems, focusing on whether creators should be compensated for such use. It identifies gaps in existing legal frameworks concerning AI authorship and proposes a structured remuneration model to ensure equitable compensation for artists whose works are used in AI training. The paper advocates a hybrid governance approach combining law, technology, and market mechanisms.

Keywords: Artificial Intelligence; Copyright Law; AI-Generated Music; Fair Dealing; Text and Data Mining; Remuneration Scheme; Collective Management Organizations; Postema; Lessig; Canadian Copyright Act

1. Introduction

In the context of the rapid development and deployment of generative AI technologies, the widespread proliferation of their uses around the world and their increasing adoption across various domains, we recognize that there are growing concerns that generative AI may present risks and potential harms to privacy, data protection, and other fundamental human rights if not properly developed and regulated. (Canada, Statement on Generative AI, 2023)

This cited statement on generative AI from the roundtable discussion of the Canadian G7 data protection and privacy authorities is a summary of two issues: 1) How artificial intelligence ("AI") changes and challenges society, and 2) How regulators of the various areas of law need to respond to these challenges to ensure they do not infringe upon essential human rights and capacity. While policymakers are still attempting to foresee the coming challenges in many other areas of AI's application and its potential consequences, a notable area is copyright issues, particularly in the music industry.

The generative AI industry is arguably the fastest-growing market year-over-year right now. Faster content creation, rapid Large Language Model ("LLM") improvements, and new sector adoption are key growth drivers for the generative AI market: As of 2023, the global generative AI market is worth $13.71 billion.

AI-generated music offers numerous advantages, including enhancing human creativity and making musical expression more accessible to a wider audience. However, it also presents significant challenges to the music industry. The livelihoods of countless songwriters and performers are at risk from technologies that could potentially make their contributions unnecessary in the marketplace. Additionally, AI technology could profoundly disrupt the business models of entities that hold music copyrights, such as record labels and publishers, posing a critical threat to the established order of the music industry. More practically, many artists and creators in Canada and around the world have expressed concerns about how AI violates their intellectual property rights through data preparation and

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throughout the remainder of the system's lifespan. For example, Jukebox, a machine-learning model capable of generating music that imitates different styles and arts and incorporates singing in natural-sounding voices. While Jukebox is an interesting research result, musicians do not find it directly applicable to their creative process given some of its current Copyright related issues.

This paper's focus on the implications of AI in the music industry, rather than literal or artistic works is premised on music's inherent ability to transcend cultural and linguistic barriers, deeply influencing human emotions and social connections. This, coupled with the Canadian music industry's significant growth—expanding by 12.6% in 2021 to US$583.6 million and becoming the 8th largest global market—highlights a unique and fertile ground for AI's integration.

2. The use of Machine Learning & Neural Networks in Music Generated AI

The Music industry has navigated a complex journey through various technological challenges, starting with the disruptive emergence of peer-to-peer (P2P) file-sharing platforms like Napster in the late 1990s and early 2000s. This period marked a significant crisis for record labels and artists, as the ease of accessing music for free undermined traditional revenue models based on physical sales and copyrights. The industry's initial response was largely defensive, focusing on litigation to shut down these services or curtail their operations. While this approach had some success in terms of legal victories, it was less effective in addressing the underlying shift in consumer behavior towards digital consumption. The eventual adaptation of the music industry to these challenges came through the embracement and development of new digital platforms and business models, such as iTunes, YouTube, and Spotify. These platforms offered legal, convenient, and user-friendly alternatives to P2P file sharing, generating revenue through subscriptions, advertisements, and licensing agreements that benefit both creators and labels.

As the industry now faces the advent of artificial intelligence (AI), machine learning, and neural networks, it encounters a new set of challenges and questions. AI's impact on the music industry includes the potential for creating music without direct human involvement, raising concerns over copyright, authorship, and the distribution of royalties. The issues AI presents are fundamentally different from those posed by digital piracy, requiring a nuanced approach. Questions such as: What risks do these developments pose? Should the response involve adapting existing private law frameworks or the creation of new public law regulations? Can the music industry address these challenges with the same strategies it employed to navigate past digital evolutions, or is a novel approach required? Moreover, determining liability for the use of sound recordings in AI-generated music presents a complex challenge. In the context of these developments, should AI be regarded as a subject or an object under the law? And finally, how should artists whose works have been used for text and data mining be compensated?

AI (Artificial Intelligence), in a broad sense, refers to a branch of computer science that focuses on enabling machines to exhibit intelligent behavior.

2.1. How do AI, machine network and neural networks work in the music industry?

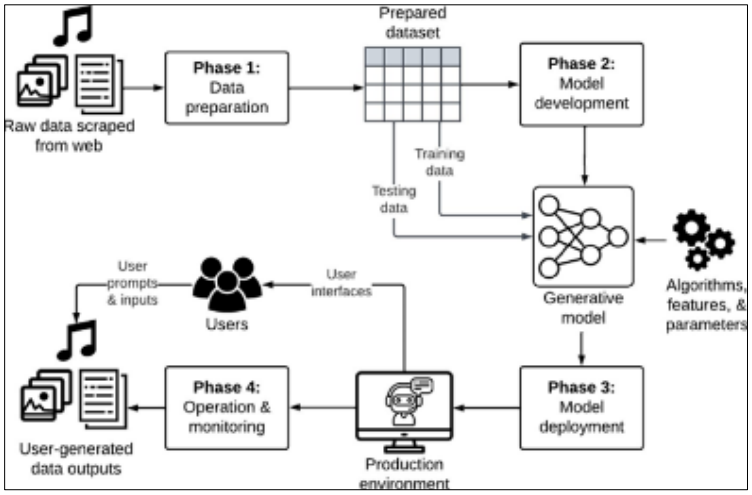

Figure 1 A simplified high-level diagram illustrating the main phases, inputs, and outputs involved in the lifecycle of a generative AI system (adapted from Arsanjani, 2023)

AI Music Generation typically operates in four stages: (a) Data preparation (b) Model development (c) Model deployment (d) operation & monitoring. The initial stage, Data Preparation, involves the systematic collection and processing of a broad range of musical data. This stage is foundational, as it provides the AI with a comprehensive dataset encompassing various genres, styles, and structural aspects of music. The objective is to equip the AI with a diverse set of musical knowledge, enabling it to understand and replicate a wide array of musical expressions.

Subsequent to data preparation, the Model Development phase focuses on selecting and employing specific algorithms optimized for music generation. In this phase, the AI undergoes training with the prepared dataset, allowing it to learn patterns, harmonies, rhythms, and structures intrinsic to music. The training phase is followed by testing and validation, ensuring the generative model's capability to produce music with accuracy and reliability, potentially extending to the creation of innovative musical compositions.

Once the model has been developed and validated, it enters the model deployment stage. Here, the model is made operational and accessible for interaction, integrated into platforms that offer users the ability to specify their musical preferences, such as genre, tempo, and mood. Through user-friendly interfaces, including websites, chatbots, or mobile applications, users can receive music tracks that the AI generates based on their inputs.

The final stage, Operation and Monitoring, focuses on the continual assessment and refinement of the AI's performance in music generation. This stage involves the systematic monitoring of the generated music's quality and the collection of user feedback. Insights gained from this monitoring are used to implement updates, aiming to enhance the AI's creative output and its responsiveness to user preferences.

A comprehension of the operational mechanisms of generative AI in music creation assumes pivotal significance in the context of the aforementioned key issues. In order to find out if AI can be given credit for creative works, we need to take a close look at the stage before pre-stage one, which involves getting raw data from websites. A fundamental question arises: can the data gotten during this preliminary phase be construed as non-infringing on another individual's intellectual property? This stage prompts an examination of whether the extracted data constitutes an act of copying or is a product derived merely from an original work. The legal determination of whether such actions fall within the ambit of fair use under Canadian copyright laws becomes a critical consideration.

Also, once programmers, develop the algorithms and supply the datasets in phase 1 (Data Preparation), are machine generated outputs the creation of a novel intellectual property operation or mere generations using the previously created algorithms?

Giving AI authorship challenges traditional ownership norms in creativity. If the data extraction before the main stage is considered non-infringing, it could change how we attribute intellectual property rights. On the flip side, if preparing data is seen as copying, it raises concerns about how much creators can do on their own and the limits of copyright protection.

These issues were highlighted in what some hoped would become Canada's first AI meets- copyright law suit, *Amal Chamandy v Bassant.* The claimant alleged that Bassanta had infringed copyright in her photographic work, Your World Without Paper, in the production of an image identified as an 85.81% match. In her statement of claim, she alleged that "the process used by the defendant to compare his computer-generated images to Amel's Chamandy's work necessarily required an unauthorized copy of such a work to be made" and sought statutory damages of up to $20,000. Although the parties have reached an agreement, the situation offers an opportunity to consider the copyright concerns that may arise from works generated by AI. This encompasses exploring aspects ranging from the existence of copyright in AI-generated outputs to potential instances of infringement.

This leads to the question of determining whether the results or creations of AI systems qualify as the type of unique authorship eligible for copyright protection, who owns the AI output, and who is held liable for copyright infringement (if any).

2.2. Are the outputs of music AI generators copyrightable?

The creation of AI systems, also referred to as computer generated works (CGW), can simply be explained as those works that are created in the total absence of any human intervention at the time of their creation of the work. It is important to distinguish this from computer assisted work (CAW), which does not warrant specific categorization any more than works systems and technology that assist in the creation, modification, analysis, or optimization of a design or manufacturing process, e.g., (camera films). In almost every manifestation of human creativity, the author is assisted

by or uses a tool that facilitates or improves the task; however, there are instances where works are created without interference from a direct human task. For example, TalkToTransformer is an AI language generator, created by Canadian engineer Adam King using the OpenAI GPT-2 technology, which can write articles when prompted with a headline or complete short stories when fed the first line. For the purpose of this article, the results of the creation of AI systems shall be taken to be Computer generated works (CGW).

Despite the blossoming production of CGW, such issues have received little attention globally and none in Canada. The Canadian legal landscape currently lacks dedicated legislation addressing the specific status of Computer-Generated Works (CGWs), and jurisprudential precedents on this matter are absent. Nevertheless, a discernible framework for evaluating originality has emerged through recent jurisprudential developments, notably exemplified in the Supreme Court of Canada's decision in *CCH v. Law Society of Upper Canada*. This evolving standard, expounded upon within the context of the originality test, may offer instructive insights for navigating the intricacies of CGW classification.

Under the Canadian Copyright Act, just as elsewhere, copyright vests automatically in “every original literary, dramatic, musical and artistic work” once the work has been recorded or preserved in a relatively permanent, tangible format. The copyrightability of Computer-Generated Works hinges on the general criteria for the existence of copyright in any work, particularly concerning the geographical requirement and the duration of copyright subsistence. Although the standards for copyright protection aren't overly strict, it's worth noting that there are substantial barriers to being recognized as the author. In my view, these barriers might exclude Computer-Generated Works from receiving copyright protection.

The first requirement is the **geographical factor**, Section 5(1) of the Copyright Act provides that copyright shall subsist if “the author was, at the date of the making of the work, a citizen or subject of, or a person ordinarily resident in, a treaty country”. The geographical requirement can also be fulfilled through the initial publication or, in the instance of cinematographic works, the corporate headquarters' location of the creator. However, the significance of this provision implies that the author must be a human or natural person, as citizenship, subjecthood, or residence pertain specifically to individuals. The indirect inference is that machines, lacking citizenship, subjecthood, or residence, do not fall under this category, thereby excluding them from meeting the geographical requirement for copyright protection.

The second requirement is the **duration/life span of the copyright subsistence factor**. As required by the Berne Convention (Berne), copyright in Canada subsists for “the life of the author, the remainder of the calendar year in which the author dies, and a period of fifty years following the end of that calendar year”. For works of authorship, the clear implication is again that the author is a natural person-who lives and dies- a category that machines do not belong to.

It may be argued that while machines lack biological life, their "life cycle" in the context of functionality and relevance can be analogous to the lifespan of a creative work. Machines are created, undergo continuous updates and improvements, and eventually become obsolete or "die" when they are no longer in use. In this sense, the concept of life and death can be metaphorically applied to machines based on their operational existence. However, according to the Berne Convention, the creator is vested with a entitlement known as **moral rights**. These rights safeguard the author's dignity and reputation from harm, granting the author the privilege of being linked to the work or choosing to remain anonymous. These inalienable moral rights, transferable through inheritance and enduring for 50 years after the author's death, imply a deeply personal connection between the creator and their original work.

Thus, from this statutory interpretation, it “makes no sense other than in relation to human authors” and suggests that the legal framework seems to presume that it applies primarily to human authors, acknowledging the finite lifespan, inherent dignity, and the personal reputation of individuals that require protection and preservation.

2.3. Who owns AI Musical generated works?

Copyright operates in the contemporary market similarly to other transferable commodities, as it can be freely transferred or licensed for value or other considerations. For example, in Canada, works that are created in the course of employment is owned by the employer-typically a corporate entity- from moment that right vest. The author in fact typically transfers the right to the author in law, however, the underlying problem with AI generated works is that there is no human author in fact.

Again, assuming the authorship element could be given to AI machines, there still lies a bigger problem of determining who such a right should vest in since allocating copyrights in AI works can only take place in cases of justified human authorial claims. This requires a case-by-case analysis of the amount of human intervention related to the original contribution. In the case of pure AI creations, no humans would be involved; only autonomous agents- that cross the

autonomy threshold may be easily met by a programmer of the code on which AI systems run, or the software user who employs the program as a technical tool to assist in production may ultimately reflect skill and judgment. Yet to also be established is whether the criteria for originality can be satisfied by the results produced by an autonomous AI, where the human programmer and user exert minimal influence and possess limited or no control over authorship.

The legal landscape concerning originality in the context of AI-generated works is currently indeterminate, giving rise to an interpretative gap. This ambiguity provokes additional considerations regarding the rightful attribution of copyright ownership. Questions emerge as to whether attribution should be ascribed to the author of the original program, the user employing the program, the possibility of joint ownership, or the potential allocation of AI-generated works to the public domain.

3. Does the use of Text and Data Mining (TDM) for AI Music Generation fall under the exception of fair dealing under the Canadian Copyright law?

Music Generated AI systems are not produced from scratch; they are trained through the process of machine learning with existing data and works. Even if the output produced by an AI music generator does not closely resemble its training data, the reproductions made to assemble the dataset might still be deemed to be potentially infringing intermediate copies.

Jux Box notes that to develop its model, the web is scoured to compile a novel dataset encompassing 1.2 million songs. This collection, paired with lyrics and metadata sourced from LyricWiki, includes crucial details such as the artist, album genre, and release year of the tracks, along with prevalent moods or playlist keywords tied to each song. The training involves the use of 32-bit, 44.1 kHz raw audio.

The emergence of generative artificial intelligence (AI) technologies, particularly those reliant upon copyrighted materials for algorithmic training, necessitates a rigorous reassessment of their compatibility with existing copyright frameworks. Various Copyright statutes have been amended to incorporate exceptions for fair use or fair dealing, including provisions for text and data mining (TDM) as a means to facilitate scholarly and technological advancement. However, the application of TDM within the ambit of generative AI significantly transcends the limitations initially envisioned by these legal frameworks. The expansive use of copyrighted content in training generative AI models raises intricate questions regarding the adequacy of current copyright exceptions designed for TDM. This perspective aligns with Postema's view that large AI music generation companies leverage copyrighted works as data to train their AI systems. According to Postema, this practice is not merely about utilizing existing content but about acquiring digital power over copyrighted materials to generate higher profits. This interpretation emphasizes the strategic use of copyright as a resource for economic gain in the digital age.

In Canada, there is currently some uncertainty regarding the extent to which existing exceptions in the copyright framework apply to TDM activity. A Canadian court applied this fair dealing framework in the context of one type of TDM activity, namely a “web-crawler” that gathered text and photos from websites to populate the defendant’s own website. However, uncertainty remains about whether the same analysis would apply to different TDM activities on Generative AI. Given this backdrop of legal ambiguity, it becomes imperative to meticulously analyze the elements required for the application of the fair dealing exception within the Canadian copyright framework, particularly to ascertain its applicability to various TDM activities in generative AI contexts.

4. How can artists and copyright owners be adequately remunerated for commercial use of their musical work to train music AI generators?

Certain goods exhibit two interconnected characteristics. Firstly, they are "non-rivalrous," implying that one person's consumption does not impede another's ability to enjoy the same good. Secondly, these goods are "non-excludable," meaning that once they are accessible to one individual, they can be made available to others without incurring additional costs. Inventions and recorded entertainment typify these categories. Given these attributes, a pertinent question arises: how can artists and copyright owners, whose works are utilized in new inventions, be adequately compensated? In the Global Music Report published by the International Federation of the Phonographic Industry (IFPI), Micheal Nash addresses a critical concern within the realm of artificial intelligence's impact on the music industry:

“Most of these AI systems acquire the essential base of knowledge from which they develop their ‘own’ IP by essentially training on vast quantities of copyrighted content. And they’re not providing any compensation to the people who produce

that indispensable source material. "The bottom line is, a lot of AI developers are just ignoring the ethics of ingesting the creative work of others, or they're simply justifying it with what we view as a dangerous distortion of the idea of fair use, that is absolutely not going to hold up works are used to train AI, then you're going to see the world's creative community potentially suffering a lot of damage in the evolution of generative AI. I would put that at the top of a list of industry issues because we need people to understand what's going on right now. We need to work very hard to define new models so that we can enable generative AI without looking away from what is essentially going to be wholesale hijacking of the intellectual property of the entire creative community." (Micheal Nash, 2022)

The European Union recently established an AI Act, although not directly focused on Copyright it however has a few provisions on the issue of Copyright. Article 4 of the EU Act allows for the use of TDM for non-scientific and non-research but there is a clause that says that the Copyright holders have an opt-out option but for the longest time there was uncertain as to whether this applied to TDM used in training generative AI. A combined reading of Article 53 (c) and (d) of the New EU AI Act puts a responsibility and obligation for provides of GPA model to be transparent by putting a policy to respect Union copyright law in particular to identify and respect, including through state of the art technologies, the reservations of rights expressed pursuant to Article 4(3) of Directive (EU) 2019/790" and "draw up and make publicly available a sufficiently detailed summary about the content used for training of the general-purpose AI model, according to a template provided by the AI Office". Recital 105 of the EU AI Act further clarifies that TDM exceptions cover AI training by noting that "Text and data mining techniques may be used extensively in this context for the retrieval and analysis of such content, which may be protected by copyright and related rights…" but gives the opt out option to the Copyright holders.

Once the opt-out provision is used by copyright owners, there arises a necessity for AI developers to establish a mechanism through which copyright owners can be compensated for the use of their works in AI training. To streamline this process, collective management organizations could play a pivotal role, acting as intermediaries that represent the interests of copyright owners, facilitating negotiations, and managing the collection of fees. This premise sets the stage for the subsequent paragraph which will delve into a suggested approach through which copyright owners can be adequately compensated, ensuring a fair balance between the advancement of AI technology and the protection of intellectual property rights. I suggest an introduction of a targeted TDM exception in the Act with clear purpose and limits. The exception should be conditional on works or other subject matter reproduced for the purpose of TDM through a statutory remuneration to the benefit of the author for the use of his works in the context of TDM activities for generative AI purposes. The Remuneration Scheme should be subjected to a mandatory collective management organization (CMOs) to make sure it can be rapidly implemented. Managing remuneration independently can pose a significant challenge for start-ups and AI developers looking to engage in creative activities. This challenge could be addressed by adjusting compensation based on the economic dynamics of the sector and potential losses to the original creator, though empirical studies are required to verify this intuition. Training AI on highly successful works in the market could result in commercially successful outputs, such as a song in the style of a renowned artist. It's important to acknowledge that authors are already using, and may increasingly use AI in the future, as a creative tool, similar to how digital art employs software or photography utilizes cameras and filters. Instead of opposing AI systems and authors, it may be wiser to consider their potential coexistence and mutual support in the future.

5. Conclusion

In conclusion, the rapidly evolving landscape of AI-generated music presents both challenges and opportunities for copyright governance. This paper has highlighted the necessity of adapting traditional legal frameworks to the digital age, taking cues from the theories of Postema and Lessig. By employing a multifaceted approach that includes legal, technological, and market-based codes, we can effectively govern the digital domain and ensure fair compensation for creators.

Compliance with ethical standards

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