

Intellectual Property Challenges in AI-Generated Art

Xintang Zhang^{1,a,*}

¹Melbourne Girls Grammar School, Melbourne, Australia

a. Bonnie.Xie@mggs.vic.edu.au

*corresponding author

Abstract: This research undertakes a comprehensive exploration of reproductive rights and abortion within the broader context of gender politics, with a keen emphasis on the influence of radical feminism. Reproductive rights, extending beyond mere health and medical concerns, intersect with societal, ethical, religious, and political dimensions. Through this lens, the study investigates global reproductive policies and the international legal stance on abortion. The ascendancy of radical feminism and its critiques against historically entrenched patriarchal structures form a core component of this discourse. The article further delves into the legal histories and controversies surrounding both reproductive and abortion rights, probing into their evolving legal frameworks, international regulations, and the multifaceted debates linked to their acceptability. Through the interplay of these elements, the research ultimately converges on the broader implications these topics have on global human rights, women's socio-economic standings, and the fluid realm of gender dynamics. The overarching goal is to shed light on these intricate relationships, contributing to a more equitable and inclusive understanding of evolving gender politics.

Keywords: Authorship, copyright, Artificial Intelligence (AI), infringement

1. Introduction

The emergence of AI (artificial intelligence) has ushered in a new era of creative possibilities, transcending the boundaries of human imagination. From composing music to generating paintings and even crafting literature, AI systems have demonstrated their remarkable capacity to produce works of art that challenge our traditional notions of creativity. One of the most fascinating aspects of AI's creative prowess is its ability to replicate and emulate the styles of renowned artists from the past. This phenomenon has led to the development of AI programs capable of producing art that mimics the distinct styles of legends like Rembrandt van Rijn, who is famous for his mastery of light and shadow and his extensive portfolio of portraits developed over four decades. He painted his last masterpiece in 1669, the year of his passing. Centuries later, engineers from the Netherlands developed an AI program capable of emulating Rembrandt's distinct style by utilizing machine learning techniques, producing a portrait bearing striking resemblance to the master's originals. [1] This endeavor underscored the extraordinary ability of AI to craft expressive pieces of art.

Notably, Rembrandt's works, having long surpassed the duration of copyright protection, were available for digitization and use as training data for the AI program. However, this raises intriguing legal questions when considering the use of copyrighted material for training AI. Does such usage constitute copyright infringement, and if so, who bears the liability? The existing copyright

framework provides limited clarity on these complex issues, heightening their relevance and significance in the context of AI's ever-expanding role in artistic creation.

This paper will explore the intellectual property issues within the domain of AI-generated art and offer considerations for potential solutions. It is structured into three main sections. Part one argues challenges related to authorship and ownership, mainly discussing what is AI, whether it can become the subject in the meaning of copyright law, and the copyright ownership of AI products. Part two examines the copyright of AI, whether such products are original, and the relationship between data set, imitation and originality. Part three discusses infringement challenges in AI generated art, the allocation of legal responsibility and approaches addressing infringement. By examining these intricacies and potential solutions, we aim to contribute to a deeper understanding of how society can adapt to the evolving landscape of creativity, ensuring that the rights and responsibilities of artists, AI developers, and society as a whole are adequately addressed in this transformative era.

2. Authorship and Ownership in AI-Generated Art

2.1. Conflict Between Traditional Intellectual Property and AI-Generated Art

In the age of technological advancement, the fusion of art and AI presents a revolutionary intersection of creativity and computation. As AI systems generate music, paintings, and literature independently, the traditional boundaries of creativity are being redefined. Such advancements, however, usher in a plethora of challenges pertaining to intellectual property (IP) rights. The conflict between traditional IP laws and AI-generated art arises from the fundamental differences in the creation and conceptualization of such works.

Traditional IP laws were framed in a context where only humans could be authors or creators, with statutes and doctrines emphasizing human creativity, originality, and expression. The emergence of AI-generated art disrupts this foundation, challenging the anthropocentric assumptions underpinning existing legal frameworks. When an artwork is born through algorithms, a quandary emerges regarding its true author: is it the machine, the software developer, or the end user [2]? Furthermore, is AI capable of “creating” texts, music, paintings, and other works, a human, a humanoid, or a tool of humans? Can the creations generated by AI be considered “works” in the sense of copyright law? What conditions should be met for creations of AI to be regarded as works under copyright law? If the creations by AI are considered works under copyright law, how should the ownership of such works be defined [3]?

This paper delves into these multifaceted inquiries, aiming not only to resolve the current conundrums surrounding copyright ownership for AI-generated works but also to offer invaluable guidance to researchers and institutions engaged in AI law, policy, and ethics. By addressing these intricate questions, we aspire to mitigate intellectual property-related legal disputes in the production of AI products and the generation of works through AI technologies, ultimately paving the way for a clearer understanding of the evolving landscape at the intersection of AI and artistic creation.

2.2. AI as Creators: Does AI-Generated Work Qualify as Authorship?

2.2.1. AI and legal personhood

In the legal sense, the term “author” primarily refers to a natural person. According to Marx and Engels, a natural person is a subject situated within a complex network of social relations; they posited that “the human essence is not an abstraction inherent in the individual, but in its reality, it is the sum of all social relations [4].” During the Italian Renaissance, the philosopher Pico della Mirandola asserted that humans and animals share a common nature, namely the “ability for nourishment and sensation.” Foundational figures of German classical philosophy like Kant, followed by Fichte and

Hegel, approached the relationship between humans and objects from the perspective of human action, proposing and systematically elaborating the philosophical proposition that “humanity is an end in itself.” These scholars posited that human nature is not an abstract concept inherent in individuals but is, in essence, the culmination of all social interactions. According to classical philosophy, humans distinguish themselves from natural objects due to qualities such as rationality, freedom, and self-consciousness. Consequently, they are regarded as ends in themselves, embodying autonomous moral agents with intrinsic value. AI, in contrast, is not a human being but rather a constructed object [4]. It operates through a combination of pre-installed algorithms, software modules, large integrated databases, neural networks, and data information libraries by developers. Consequently, it lacks the essential attributes, such as rationality and self-consciousness, that distinguish humans from inanimate objects. From a legal standpoint, AI cannot attain the status of a rights-bearing entity.

2.2.2. Can AI become a ‘legal entity’?

Unlike natural persons who are born, live, and develop based on natural laws, a “legal entity” is an abstract “person” in the legal sense, designed by legal experts who imbue certain abstract characteristics into a type of subject. The most common “legal entities” include corporations, government agencies, public institutions, and social organizations, which have civil rights and civil conduct capabilities, enjoying civil rights and undertaking civil obligations independently according to law [4]. From this perspective, since organizations like companies, government agencies, public institutions, and social groups can be granted the status of “legal entities” through legal design, can AI also become a legal entity?

Weak AI, in its current form, is primarily engaged in addressing single problems and has not fundamentally altered societal relationships. The corporate system emerged during the development of modern capitalist commodity economy, reflecting the extension and development of the social attributes of natural persons in the economic field [5]. The existence of the traditional corporate system is because organizations typically have abundant financial resources, long-term stability, and far-reaching influence, so they must be endowed with qualifications to undertake responsibilities and obligations. From the current point of view, the development level of weak AI has not yet reached the point of fundamentally affecting social relations, so there is no need to grant such machines the status of “legal entities”.

As for the strong AI that may appear in the future, due to its ability to think, plan, solve problems, think abstractly, understand complex concepts, learn quickly, and learn from experience, it theoretically has the potential to become a legal entity [5]. However, although the law provides a reasonable theoretical basis for legal entities, recognizing their behavioral capacity, responsibility, and even criminal ability, in reality, all decisions and actions of legal entities are ultimately made and executed by natural persons. Moreover, the main way for legal entities to assume responsibilities relies on assets or funding sources, which are also implemented by natural persons.

Strong AI, as a more advanced technology but still under human command, neither possesses the massive scale and corresponding responsibilities of organizations nor exhibits human characteristics such as “sensory ability” and “free labor [4].” Therefore, the necessity of it controlling assets and sources of funds is questionable. Hence, strong AI currently does not meet the conditions to become a “legal entity.”

2.3. Ownership Dilemma: Determining Ownership of AI-Generated Artworks

It is precisely due to the above issues, and the fact that there is no unified legal provision regarding the copyright ownership of AI-generated works, that determining the ownership of such works poses a challenge. Some people believe it should belong to the AI, effectively granting AI a virtual legal

personality. Others advocate for AI programmers to hold the rights, while some contend that AI-generated works should belong to the public domain. Additionally, there are those who posit that ownership should extend to the users of AI technology [2]. While each viewpoint presents valid arguments from its respective vantage point, there are shortcomings in each. However, we firmly assert that AI-generated works are the intellectual creations of humans. Therefore, the copyright of AI-generated works should ultimately belong to human entities. Given the current level of AI development, the relevant rules of British copyright law, which attribute AI works to the users of AI devices, seem to be a relatively prudent approach.

After AI devices produce works, the selection process by the users of AI devices often reflects their value judgment on the AI-generated works, which can be broadly considered a form of creative expression by the users. Moreover, those who use AI to generate works are often practitioners in the field of cultural industry. They tend to have a more sensitive perception of the commercial value in AI-generated works. The selection process is crucial for the commercial application of AI-generated works, facilitating material returns and thereby promoting further development of both the cultural industry and the AI industry. Finally, users of AI devices are often the owners of these devices [6]. Allocating the copyright of AI-generated works to the users supports the operation of the authorship attribution system, preventing discrepancies with the actual situation. This stance of assigning copyright of AI-generated works to the users of AI devices is also supported by current relevant judicial practices.

The user-centric approach to ownership not only acknowledges the significant role of human judgment and creativity but also aligns with the practical realities of AI utilization, ensuring that the rights to AI-generated artworks are placed in the hands of those who actively engage with and contribute to their creation and dissemination.

3. Copyright and Originality in AI-Generated Art

3.1. Fundamental Principles of Copyright Law

Before turning to issues of infringement, it is helpful to understand how other aspects of copyright law apply to AI-generated artworks. Copyright provides legal protection for people who express original ideas and information in certain forms [4]. The most common forms are writing, visual images, music and moving images. Copyright does not protect ideas or information, only the original expression of ideas or information. Copyright does not prevent someone else from independently producing the same work [7].

In the context of copyright infringement, it generally occurs when an individual undertakes one of the exclusive acts reserved for the copyright owner without obtaining the owner's explicit authorization. Importantly, infringement can transpire even when only a portion of a copyrighted item is utilized, provided that the used portion is deemed "substantial."

It is worth noting that U.S. copyright law does not expressly address AI-generated works. Nonetheless, statutory requirements of copyrightable subject matter, codified at 17 U.S.C. § 102, may be applied to a copyright analysis of AI-generated work. To be copyrightable, a work must be an original work of authorship, and fixed in any tangible medium of expression [2]. An original work of authorship must be independently created by the author and embody some minimal amount of creativity. It is important to emphasize that the expression of the work may necessitate the use of machinery or other devices for viewing [4]. For instance, films are considered copyrightable expressions, even if they require projection, a television, a computer, or other devices for viewing.

3.2. Originality of AI-Generated Artworks: Does AI Create Original Content?

In the context of copyright law, originality not only refers to the labor outcome originating from the

worker themselves but also implies that the labor outcome must meet a certain level of intellectual creation [3]. The determination of originality for creations generated by AI can adopt the two elements defined by the United States Supreme Court: that the author “completes independently” and [achieves] a “minimum degree of creativity” as the necessary conditions for judging a work [8]. As long as the work does not amount to a mere reproduction of existing works authored by others and possesses a distinctive expressive form that sets it apart from the works of others while avoiding common expressions found in the public domain, it can be considered genuinely original.

In essence, for a work to be deemed original, it should refrain from being a blatant imitation or act of plagiarism involving existing works. Instead, it should exhibit discernible distinctions from all other works, thus bestowing upon it the status of an original creation—a new “work” in its own right.

3.3. Datasets, Imitation, and Originality: Examining the Relationship

The entwining of datasets, imitation, and originality in AI-generated art poses an intricate web of considerations both in artistic and legal realms. Datasets, often encompassing vast arrays of pre-existing artworks, inform and guide AI creations, embedding particular styles and potential biases into the subsequent outputs, and occasionally muddling intellectual property norms when generated art closely parallels existing, copyrighted works [9]. The act of imitation by AI, whilst remarkable in its ability to synthesize and reconfigure learned styles and patterns, blurs the boundaries between genuine creativity and mere replication, thus prompting ethical and legal dilemmas related to originality and potential infringement. Furthermore, the construct of originality in AI art is notably contentious. AI, devoid of conscious intent or authenticity, raises fundamental questions about the true ownership and rights associated with the “original” works it produces. Often, these AI-generated creations are intricate amalgamations of human-created content, further complicating the determination of authorship and ownership.

As AI-generated art continues to evolve and permeate creative spaces, these intricate relationships between datasets, imitation, and originality will likely remain at the forefront of discussions within both the artistic and legal communities. Addressing these challenges will necessitate adaptive legal frameworks and ethical considerations that align with the evolving landscape of AI-generated artistic expression.

4. Infringement Issues and Legal Responsibility in AI-Generated Art

4.1. Infringement Challenges in AI-Generated Art

AI painting involves collecting a vast array of art materials to establish a dataset, upon which it undergoes training and learning to create AI models, ultimately outputting corresponding content. The creation by AI must be founded on the acquisition and input of data, highlighting the importance of obtaining data for AI creation. Typically, the data utilized by AI painting consists of artworks that copyright holders have publicly released in various media. Importantly, AI operators often proceed without seeking explicit authorization from these copyright holders when collecting this digital data.

In the output stage, AI painting generates images by simulating the creative style of the artworks. The process of AI obtaining others’ works and training models without the permission of copyright holders apparently involves potential copyright infringement. Nonetheless, influenced by the “idea-expression dichotomy”, there is still controversy in both academia and the industry over whether painting styles can be protected by copyright [4].

In judicial practice, the rule of “access + substantial similarity” is adopted for determining copyright infringement [10]. In disputes over copyright infringement of traditional artworks, determining whether the infringing work constitutes “substantial similarity” has always been a focal point and challenge, and applying this rule to disputes involving AI-generated works highlights the

difficulty in identifying infringing activities.

In conventional cases, infringement primarily involves natural persons who violate the copyrights of individual or a few other creators of original works [5]. If a natural person simply appropriates elements from another person's artwork, then the infringing work can be deemed "substantially similar" to the original work, constituting an infringement that should be regulated.

However, AI-generated paintings involve a large number of works suspected of infringement to a wide range of subjects. The amount of use of color, concept, and elements in the content generated by AI painting for each work is relatively low, presenting more scattered and fragmented characteristics [10]. This makes the process of identifying copyright infringement in AI-generated paintings even more challenging. As AI continues to play an expanding role in artistic creation, addressing these complex issues surrounding infringement will necessitate the development of nuanced legal frameworks that are adaptive to the unique characteristics of AI-generated art.

4.2. Allocation of Legal Responsibility: AI Developers, Users, or AI Itself?

While addressing copyright infringement challenges in AI-generated art, the complex issue of legal responsibility allocation emerges as a pivotal concern. At this stage, AI itself does not have legal subject status and cannot assume legal responsibilities. Instead, it is the various human actors—investors, developers, operators, and users—who play integral roles in the development and utilization of AI-generated art. Investors identify the market demand for developing AI painting from a requirement perspective, then request developers to train AI deep learning algorithms and formulate image generation rules. Both investors and developers cannot influence the final image generation of AI painting and, once AI painting is put into use, they cannot know the purpose of its use [2]. Whether AI-generated images are used for personal use, appreciation, or applied to game screen production and other commercial purposes depends on the users of AI painting.

This intricate web of participation and influence begs the question: In cases of copyright infringement by AI-generated art, who should shoulder the responsibility? Should it be the investors and developers, who initiated the AI's creation and may have a limited grasp of its final outputs? Or should it be the users, who wield AI-generated art as a creative tool for various purposes, some of which may infringe upon existing copyrights?

The allocation of Infringement responsibility in AI-generated art poses a formidable challenge, fraught with nuances and potential implications. Placing the burden of infringement solely on investors and developers might deter innovation and research enthusiasm, as they grapple with heightened infringement risks [11]. Conversely, holding users accountable for infringement when they employ AI-generated art as a tool raises questions of fairness, particularly when they may not have been fully aware of the legal complexities involved [12]. Navigating this intricate landscape requires a delicate balance, one that considers the roles and responsibilities of each participant in the AI art creation process. As AI continues to evolve, addressing this conundrum becomes an imperative aspect of ensuring fair and effective copyright enforcement in the realm of AI-generated art.

4.3. The Path to Amend Regulations on Copyright Infringement by AI-generated Paintings

4.3.1. Obtaining authorization from the copyright holder

Faced with the potential risk of copyright infringement during the early data collection stage of AI-generated painting, AI operators can seek and adopt legal methods of obtaining data under the existing legal system to avoid infringement situations caused using copyrighted works without the permission of the copyright holder. AI operators can obtain the authorization of copyright holders by signing contracts through a platform, pay reasonable compensation to the copyright holders to attract creators to join the platform as contracted artists, and let the copyright holders actively upload their works to

the AI painting database, all while ensuring the economic rights and interests of the copyright holders.

For AI painting technologies that are more specialized in image drawing, AI operators should adopt a more meticulous authorization and licensing mechanism, establishing communication platforms between the users and numerous copyright holders, facilitating coordination between them [13]. If the paintings generated by AI painting have high commercial value, then both the users and the platform should pay corresponding compensation to ensure the rights and interests of the copyright holders.

4.3.2. Encouraging collective litigation by the infringed parties

Infringements by AI-generated paintings generally involve numerous copyright holders and their works. In this case, if the infringed parties choose to come together and file a collective lawsuit to protect their legitimate rights and interests, it can consolidate the demands of the infringed parties, comprehensively safeguard the interests of all related parties, facilitate the concentration of litigation materials, and form a complete chain of evidence [13]. On the other hand, it can save the litigation costs of the infringed parties, enhance judicial efficiency, and highlight the advantages of the joint litigation model in lawsuits against AI painting infringements.

In addition, the infringed parties can also leverage the power of copyright collective management organizations. These organizations have authority within the industry and possess more expertise in litigation; they can collect evidence uniformly, consolidate the interest demands of the infringed parties, and undertake direct collective litigation. Compared to copyright holders organizing collective litigation on their own, lawsuits by copyright collective management organizations are more centralized and professional, and they can further reduce the cost of rights protection for the infringed parties and address the issue of their insufficient ability to protect their rights.

However, whether it is a joint lawsuit by a copyright collective management organization or a spontaneous collective lawsuit by the infringed parties, both methods of rights protection have their shortcomings to some extent. For instance, the process of copyright holders discovering infringement facts and initiating collective litigation is time-consuming and laborious. If the litigation results are not as expected, it will significantly dampen the enthusiasm of copyright holders to protect their rights, thereby affecting their creative enthusiasm as creators [13]. Therefore, copyright holders should actively litigate to jointly maintain their rights and interests, and other parties should also adopt effective measures to prevent infringements by AI-generated paintings.

5. Conclusion

AI painting has indeed ushered in a new era, where artistic creation is accessible to all, thanks to its user-friendly interface and impressive output quality. This profound integration of technology and art not only democratizes creativity but also introduces fresh and innovative artistic dimensions. However, amidst this transformation, it is crucial that we remain vigilant in upholding ethical and legal standards, especially concerning the rights of copyright holders.

Human creations are a testament to the vitality of the human spirit, as artists pour their emotions, ideas, and unique perspectives into their work. It is the singular originality that creators bring to their craft that propels artistic development. This originality is the lifeblood of the creative realm, enriching our cultural heritage with each stroke of the brush or pixel of the screen.

In the wake of the rapid expansion of AI painting, it is our collective responsibility to actively engage with and resolve the complex issues surrounding copyright infringement in this new landscape. By doing so, we can ensure the protection of creator's rights, while also stoking the fires of their creativity. In essence, we are fostering an environment where both creators and society at large can reap the benefits of a vibrant and evolving creative sphere. As we navigate this ever-changing

intersection of art and technology, let us remain committed to nurturing originality, artistic integrity, and the profound cultural tapestry we all contribute to and cherish.

References

- [1] Mattei, S. E. (2021, June 23). ARTnews.com. ARTnews.com. <https://www.artnews.com/art-news/news/rembrandt-ai-restoration-1234596736/>
- [2] Ahuja, V. (2020, June 11). *Artificial intelligence and Copyright: Issues and challenges*. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3864922
- [3] Gillotte, J. (2020, June 1). *Copyright infringement in AI-Generated artworks*. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3657423
- [4] Jiali Xu (2023, June). *The Copyright of Works Generated by Artificial Intelligence*. [A] *Jinan Journal (Philosophy & Social Sciences)*. <https://doi.org/10.11778/j.jnxb.20220131>.
- [5] Man Fei (2023, June). *Copyright Infringement Research on Artificial Intelligence Artwork*. [J]. *Communication and Copyright*, 2023(11):121-124.
- [6] Craig, C. J. (2021). *The AI-Copyright challenge: Tech-Neutrality, authorship, and the public interest*. *Social Science Research Network*. <https://doi.org/10.2139/ssrn.4014811>
- [7] Dee, C. M. A. (2018). *Examining copyright protection of AI-Generated Art*. *Delphi – Interdisciplinary Review of Emerging Technologies*, 1(1), 31–37. <https://doi.org/10.21552/delphi/2018/1/11>
- [8] Epstein, Z. Levine, S., Rand, D. G., & Rahwan, I. (2020). *Who gets credit for AI-Generated art?* *iScience*, 23(9), 101515. <https://doi.org/10.1016/j.isci.2020.101515>
- [9] HeinOnline. (2021, March 8). *About* / HeinOnline. <https://heinonline.org/HOL/LandingPage?handle=hein.journals/scripted1&div=33&id=&page=>
- [10] Huang, H. (2009) *Public domain research under copyright law*. [D]. *Chongqing Southwest University of Political Science and Law*. <https://doi.org/10.7666/d.D247374>.
- [11] Fei, M. (2023). *Copyright Infringement Research on Artificial Intelligence Artwork*. [J]. *Communication and Copyright*, 2023(11):121-124.
- [12] Huang, Y. (2023). *The Protection of Copyright for Artificial Intelligence works*. [J]. *Youth Journalist*, 2023(3):92-94.
- [13] Meng, Y., Duan Y, Y., Li.H (2023) *Research on Copyright Protection Mechanisms for Artificial Intelligence Creations*. [J]. *Mu Dan Jiang University Journal*, 2023,32(3):39-46.