Pandora's Pixel Box: The Rise of AI Art and the Ethical Dilemma of Creativity

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Abstract: The emergence of AI-generated art has sparked a debate on the ethical considerations and social impacts of this new form of creativity. This paper explores the current approaches to AI (Artificial Intelligence) art generators, including the ongoing debate on AI art's creativity and the issues of copyright, ownership, and fair use. Meanwhile, it systematically examines the standard procedures of AI art generators, including machine learning models such as GANs (Generative Adversarial Networks) and text-to-image models. Moreover, the psychological views of art are explored, highlighting the importance of novelty and unexpectedness in determining the relevance of stimuli. The paper presents arguments in favor of and against AI-generated art as a form of creativity, considering factors such as the expression of emotions, the uniqueness of the artwork, and the copyrightability of AI-generated content. The discussion delves into the fair use of copyrighted images in AI-generated art and evaluates the four factors of fair use. The differences in copyright laws internationally are also examined, with some countries recognizing ownership of AI-generated content by programmers. Finally, the paper concludes that AI-generated artwork has the potential to be a positive force in the art world while acknowledging the need for further research and discussion on the legal and ethical implications of AI-generated art.

Keywords: AI-generated art, ethical considerations, GANs, machine learning models, legal implications

1. Introduction

In 2022, "Théâtre D'opéra Spatial," an AI-generated painting created using Midjourney, captured the blue-ribbon prize at the Colorado State Fair's prestigious art competition [1]. This achievement sparked a debate about the ethics of AI-generated art. The intricacy and sophistication of the artwork prompted questions regarding the nature of AI's creativity. They raised concerns about the ownership of such creations: Are they attributed to AI, humans, the public, or an enigmatic entity?

Copyrights serve as legal safeguards that bestow exclusive rights upon the creators of original works of authorship, including literary, artistic, musical, dramatic, and software creations [2]. These rights encompass the ability to reproduce, distribute, publicly display or perform the work and create derivative works based on the original. Copyright laws aim to foster creativity by granting creators control over their works and enabling them to derive financial benefits. Fair use, a legal doctrine, permits the limited use of copyrighted material without seeking permission from the copyright owner.

Determining fair use involves assessing factors such as the purpose and character of the use, the nature of the copyrighted work, the amount and substantiality of the portion used in relation to the whole, and the effect of the use on the potential market or value of the copyrighted work. However, evaluating fair use remains subjective and challenging to predict.

This paper will explore the current methods employed by AI art generators, delve into the ongoing debate regarding the creative capabilities of AI in art, and discuss the intricacies of copyright, ownership, and fair use.

2.   Common Procedure of AI Art Generators

Creating AI-generated art involves training machine learning models with extensive datasets of images from the internet. These models then use user input texts to generate desired artwork by learning the underlying features of the images [1].

One prominent type of neural network used in AI art generation is the Generative Adversarial Network (GAN). GANs employ a game-theoretic approach, wherein two networks, the generative and discriminative models, are trained simultaneously to compete [3]. As a result, the generative model produces increasingly realistic images, while the discriminative model becomes more proficient at distinguishing between genuine and generated images. The creative process begins with selecting input images for the algorithms, with specified drawing styles [4]. The GAN model processes these images to generate an output image, curated and selected by artists from the generated images.

The latest AI drawing applications, such as Midjourney and DALL•E, provide users with a user-friendly means of creating art. By inputting descriptions of their desired images, individuals can use text-to-image models like CLIP to produce imagined pictures [5]. This research created images by three different AI art generators: Stable Diffusion, DALL•E 2, and Midjourney, according to the various text inputs and compared their style of drawings [5]. The artworks maintain high aesthetic standards. From the result, DALL•E has a more complex and realistic style suitable for business use, and Midjourney and Stable Diffusion have a more artistic style.

This research replicated experiments using the same three above-mentioned AI generators to test Islam's view and see if any progress has been made. Primarily, this research checked if the current AI model can precisely handle the characteristics of human body clues, like facial details and hands. "A model in Greek city when the sun rises" was used as a prompt to commend the three models. **Figure 1** displays the three images by different AI generators on the prompt. It is shown that MidJourney can currently handle human body clues, with vivid depictions of the models' hands, faces, and even hair. The clothes of the model also present elaborate textures. While DALL•E and Stable Diffusion capture the contours of a model in a Greek city, the details of the face and hands are impaired with low resolution. Moreover, this research conducted another prompt, "Envision a futuristic cityscape where nature and technology coexist harmoniously," represented in **Figure 2**, to check the portrayal of static objects in three AI generators. The three images all picture a future fictitious city in good shape. Still, the one by Midjourney is more exquisite, adding more details of plants, brook, and residents with imaginative, highly tech-based architects. The picture by Stable Diffusion lacks the characteristics of nature in the prompt, and the city structures' details are fragmented. Overall, Midjourney has a more artistic style with sophisticated details and handles fiction well, Stable Diffusion has a more realistic style but cannot depict human body details and imaginative objects precisely, DALL•E are usually given pictures in oil painting styles and cannot picture exact human face.

The creativity of AI in the artistic domain has sparked debates about whether AI-generated artworks should be considered genuine artistic creations or just imitations of human-generated images.
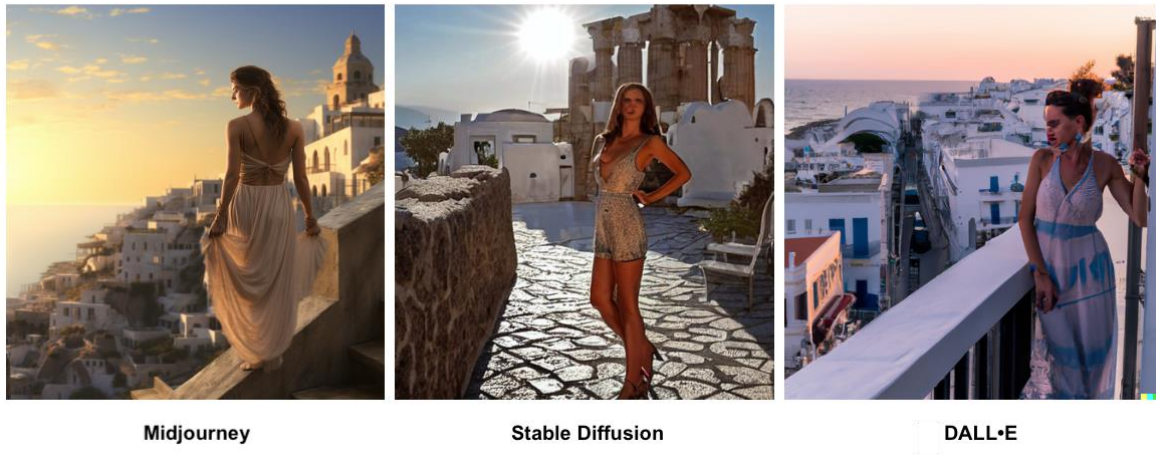
Prompt: "A model in Greek city when the sun rises"

Midjourney   Stable Diffusion   DALL•E

Figure 1: Midjourney, DALL•E and Stable Diffusion drawing for the prompt of "a model in Greek city when the sun rises".

Prompt: "Envision a futuristic cityscape where nature and technology coexist harmoniously"

Midjourney   Stable Diffusion   DALL•E

Figure 2: Midjourney, DALL•E and Stable Diffusion drawing for the prompt "Envision a futuristic cityscape where nature and technology coexist harmoniously".

3.   Views of Defining Art

According to Nanou [6], whether AI generation can be considered art remains unresolved, lacking a consistent conclusion. However, one approach to understanding art from perceptual and psychological perspectives is to examine the principles put forth by researchers in the field. Experimental psychologist Daniel E. Berlyne conducted extensive research on the psychology of aesthetics, focusing on the fundamental principles underlying aesthetic experiences [4]. Berlyne emphasized the importance of novelty, unexpectedness, intricacy, uncertainty, and perplexity in determining the relevance of stimuli when exploring aesthetic phenomena. If an AI-generated artwork exhibits one or more of these features identified by Berlyne, it may be considered art by certain individuals. Another psychologist, Colin Martindale, proposed that artists often strive to challenge existing artistic frameworks and seek novel styles [7]. Martindale considered novelty as the primary

factor in defining art. However, he also introduced the concept of the "least effort" principle, suggesting that while novelty is necessary, excessive novelty may alienate the audience.

By considering these psychological perspectives, we can gain insights into evaluating AI-generated art. The presence of novelty, unexpected elements, intricate details, and an appropriate balance between uncertainty and familiarity might contribute to recognizing AI-generated artworks as art forms. However, the subjective nature of artistic perception means that individual opinions may vary, and people may have different criteria for what they consider art.

Prototype-based categories are an effective means of establishing a sound classification system. In this approach, a prototype represents the typical or characteristic features of a category, serving as a reference point for comparison with other objects or entities [8]. The similarity between an item and the prototypical members determines its classification within the category, with some items being seen as better or worse examples based on their resemblance to the prototypes.

Prototype-based categorization offers flexibility and adaptability in organizing and classifying objects, as categories can emerge based on the specific characteristics of prototypes and the relationships between objects. For instance, in the realm of art, people from Western countries often consider the Mona Lisa as a prototype. When evaluating AI-generated content as art, we would compare its qualities to those of the Mona Lisa, a representative example of artistry. It is important to note that the effectiveness of prototype-based categories relies heavily on selecting appropriate prototypes that accurately represent the category being classified.

Figure 3 compares the typical art prototype Mona Lisa with an AI-generated portrait I created using DALL•E with the prompt "a painting that is a portrait of an aristocratic lady." In this case, this research controlled the style and subject of the AI-generated content to ease the comparison. The two paintings are very similar in composition, centered on a woman sitting with her arms crossed. However, the difference is apparent. The Mona Lisa painting showcases a deeper consideration of the background, techniques, color, and details. Mona Lisa was drawn using earthy-toned pigments to create a serene atmosphere in the painting and has more detailed features, such as the exquisite texture of the clothes and the realistic facial expressions. It is also renowned for its enigmatic smile, which attracted thousands of viewers and captivated many artists. However, the AI-generated portrait is less delicate, with a more blurred contour and fewer details in the clothes and ornaments. In this case, the AI-generated painting is an artwork in a loose prototype-based classification.

Mona Lisa
by Leonardo da Vinci

DALL·E with the prompt "a painting
that is a portrait of an aristocratic lady"

Figure 3: Comparison of Mona Lisa with DALL·E painting with the prompt "a painting that is a portrait of an aristocratic lady".

4.   Argument Claiming AI Creativity in the Case of AICAN

Developed at Rutgers' Art & AI lab, AICAN is an AI system trained on various artistic styles and aesthetics to create unique artworks, making AI-generated art a new artistic expression [7]. Following Martindale's view on art, the design of AICAN utilized Generative Adversarial Networks (GANs) for training its models. It came up with a variance of GAN, the creative adversarial network (CAN). The CAN could give more innovative output from the selected set of images.

To assess the creative abilities of AICAN, researchers conducted Turing Tests, asking people to determine whether the generated images were created by humans or the AI system. Surprisingly, in 75 percent of cases, individuals were unable to distinguish between the two, indicating that AICAN successfully passed the Turing Test. Furthermore, a growing audience that genuinely appreciates the artworks produced by AICAN.

It is worth noting that while the algorithms were designed by scientists, the process of training the AI and generating the output images remains a black box. The scientists had limited control over the specific style, texture, color, and artistic elements manifested in the generated images. This lack of direct human control raises questions about whether AI is capable of thinking or expressing itself. However, the undeniable outcome is that AI can produce unique artworks that are appreciated by audiences, aligning with the essence of art.

In light of these observations, it becomes evident that AI-generated art can exhibit creative characteristics, pushing the boundaries of traditional artistic practices. While the inner workings of AI systems may remain enigmatic, the undeniable artistic output they produce, capable of captivating and resonating with audiences, suggests that AI possesses a creative capacity deserving recognition within the realm of art.

5.   Arguments Against AI-generated Drawing as Art

Opponents of considering AI-generated drawings as art present three main arguments. Firstly, they contend that Artificial Intelligence merely follows instructions given by humans to complete a task and lacks the ability to express feelings and emotions [6]. According to this perspective, art should stem from the artist's imagination, experiences, emotions, and more rather than simply amalgamating relevant features from thousands of images to fulfill a drawing task. The concern lies in the purpose behind the creation process, where AI is directed by human commands, whereas humans are driven by the desire to express themselves.

The second argument against AI-generated art centers around its perceived lack of originality [6]. Critics argue that these images are generated using machine learning algorithms trained on existing copyrighted artwork. They believe that true art should be genuinely unique and revolutionary. However, it is essential to note that many human-created artworks also imitate previous styles and draw inspiration from earlier works. Furthermore, recent advancements in AI have demonstrated the potential for "divergent AI creativity," whereby the generated works deviate to some extent from previous ones, resulting in unique outputs that differ from what the original creators would have produced on the same subject or problem [9]. Systems such as Creative Adversarial Networks (CAN) combine both convergent and divergent AI creativity by learning art styles from examples and intentionally diverging from known styles to enhance the appeal of the generated art. While AI-generated art is indeed derived from an existing image database, it can still produce drawings that are unique and distinct.

The third argument revolves around the notion that AI-generated art is not copyrightable [6]. In the United States, copyrights are granted exclusively to humans for their original works. For instance, Deep AI, an AI art generator, explicitly states on its terms of service page that any content produced through its AI tools is not subject to copyright and can be freely used for lawful purposes, whether

personal or commercial [10]. Due to AI art being generated from existing pieces based on human requests without emotional expression, the question of copyright concerning AI-generated art becomes complex to address.

Considering these arguments, opponents of AI-generated drawings as art raise valid concerns regarding the role of human expression, originality, and copyrightability. However, it is essential to recognize the evolving nature of AI and its potential to create unique and captivating artworks, even if the process and underlying principles differ from traditional artistic practices.

6.   Copyrights of AI-generated Art in the US

The emergence of AI art generators has sparked extensive discussions surrounding the copyrights and ownership of AI-generated art. Society is grappling with determining who can benefit from these remarkable AI creations. A notable example is the portrait "Edmond De Belamy," created by a Generative Adversarial Network (GAN), which sold at an unexpected price of $432,500—40 times higher than Christie's art auction estimate [11]. Similarly, AICAN sold its first artwork for $1,600 in New York in 2017 [7], while individuals like Jason M. Allen have received recognition and awards for their use of AI art generation tools, such as Midjourney, despite lacking formal art backgrounds [1]. As people witness the financial rewards and accolades associated with AI-generated art, questions about ownership and copyrights become increasingly significant.

According to the United States Copyright Office, creations are only copyrightable if they are made by humans. The copyright status of works such as selfies taken by a monkey, as in the case of Naruto, led to a reexamination of the scope of copyrights [12]. The Compendium of the US Copyright Office explicitly states that photographs taken by animals, natural forces, or plants are not eligible for copyright protection. Additionally, the Compendium specifies that works generated by a machine or mechanical process, without any creative input or interference from a human author, cannot be protected.

Copyrights are designed to incentivize human creativity. Animals and algorithms do not require external motivation to perform tasks [3]. They are not driven by economic rewards, concerned with authorship attribution, or possess natural rights. Concepts such as identity, ego, soul, and subjective experience are unique to humans and do not apply to animals or algorithms. Therefore, it is evident that AI-generated art itself is not copyrightable, although the AI generator that produces the art is typically copyrighted.

In summary, while AI-generated art has gained considerable attention and financial value, the existing copyright framework in the United States does not recognize AI creations as eligible for copyright protection. The AI systems' intrinsic motivations and creative processes differ from those of human creators. Therefore, although the AI generator may be copyrighted, the art it generates is not afforded the same copyright protection as human-created works.

7.   Ownership of AI-generated Art

When considering the potential ownership of AI-generated art, there are four plausible parties: the programmer, the computer user, both the programmer and the user as joint authors, or no one at all [13].

The programmer could potentially claim ownership based on the "works made for hire" doctrine, which allows employers to own the copyright to works created by their employees. However, the relationship between the computer and the programmer needs to fit the traditional employment framework. If programmers were to be considered the owners, it would require expanding the definition of employment.

The notion that computer users should own the copyright aligns with the utilitarian theory of copyright law. According to this theory, the purpose of copyright is to incentivize creators to produce works that benefit the public. Granting copyright to the computer user indirectly motivates programmers to create and introduce AI-generated works to the public.

The argument for joint ownership by the programmer and user stems from the collaborative nature of developing AI-generated works. Both parties are integral to the creation process, and neither could have accomplished it alone.

On the other hand, the proposition that no one should own the copyright aligns with the utilitarian theory of copyright law. Art without owners can be freely shared with the public. Buyers and sellers of AI art may be concerned about the ambiguity surrounding ownership, but since AI-generated art is not currently copyrightable, determining ownership is not feasible.

In summary, the question of ownership of AI-generated art remains complex. It involves considerations of employment relationships, the purpose of copyright law, collaboration between programmers and users, and the potential benefits of art without owners. As AI art continues to evolve, legal frameworks and societal norms may need to adapt to address the unique challenges posed by AI-generated works.

8.   Fair Use of Copyrighted Images

Regarding the fair use of copyrighted images in AI-generated art, it is essential to understand that while the AI-generated artwork itself may not be subject to copyright protection, the images used in the dataset to train the AI model are likely to be copyrighted by their original creators or owners. When determining fair use, we need to consider the principles outlined in Section 107 of the Copyright Act [14], which guides us through four key factors:

1. The Purpose and Character of the Use: Fair use is more likely to be applicable when AI-generated art serves non-profit and educational purposes. If AI-generated paintings are used in an educational context to facilitate learning, research, or critique, it has a higher chance of being considered fair use. However, using AI-generated art for commercial purposes, such as selling AI art paintings or products, could be highly questionable and might infringe upon fair use. Some AI art platforms may provide users with licenses specifically allowing commercial use, but it is crucial to check the terms and conditions.

2. The Nature of the Copyrighted Work: The nature of the copyrighted images used in the AI dataset can also influence fair use. Works that are factual or already widely available to the public are more conducive to fair use. In contrast, highly fictitious works, such as artistic masterpieces, are more strongly protected by copyright, making fair use less likely. The training set of the AI generator can be predicted to contain many creative works of art, although their exact training sets are not yet known.

3. The Amount and Substantiality of the Use: Fair use is more likely to be upheld if the AI-generated art uses only a small and insignificant portion of the copyrighted images in the dataset. However, if the AI model incorporates substantial copyrighted works, it could weigh against fair use. It is critical to note that the specific amount of copyrighted artwork used in AI models is often undisclosed, making it challenging to determine fair use definitively. However, as we know so far, a large dedicated model usually takes a large number of pictures to train, which can make this factor oppose fair use.

4. The Effect on the Market for Copyrighted Work: Fair use is less likely to be applicable if the AI-generated art significantly affects the potential market for original copyrighted images. If the use of AI-generated art substitutes or competes with the market for the original works, it may infringe upon fair use. Because AI art is still a novel field, we don't know how it will eventually affect the art market, which makes it unclear for us to determine fair use.

It should be emphasized that each fair use case is unique and depends on its specific circumstances. As AI-generated art is a relatively new and evolving area, applying fair use principles can be complex. If a researcher plans to use AI-generated art, especially for commercial purposes, it is advisable to consult with legal experts to ensure compliance with copyright laws and any relevant licensing agreements.

9.   International Difference in Copyrights Regarding AI-generated Content

There are international differences in the treatment of copyrights regarding AI-generated content. While the US considers AI-generated content uncopyrightable and without ownership, other countries have taken different approaches. In the UK, India, Ireland, New Zealand, and the Hong Kong Special Administrative Region in China, AI-generated content is considered owned by programmers [3]. This approach stems from existing laws that grant ownership of content to the creators of the machines that generate it. The intention is to honor and incentivize the programmers behind the AI systems. However, AI-generated content involves a complex network of stakeholders and contributors beyond programmers. It becomes challenging to attribute the success of AI-generated content solely to one party or even the company itself.

Opponents of this approach, such as Yanisk, have raised concerns and drawn analogies to musical instrument builders not owning the songs created using their instruments. The debate extends beyond ownership and also delves into the legal issues associated with AI-generated content and the responsibility it entails. One proposed theory is the "work for hire" concept, which considers AI as an employee working for the user [15]. According to this theory, the user would own the product and be responsible for both profits and legal risks.

The question of ownership and legal responsibility regarding AI-generated content remains a subject of ongoing debate and exploration, with different countries taking varied approaches. The complexities require a comprehensive examination of the ethical, legal, and societal implications of AI-generated content ownership and usage.

10.   Conclusion

In conclusion, AI-generated art is a rapidly evolving field, and regulations pertaining to it are expected to be updated in response to its societal impacts. AI-generated artwork represents an exciting frontier in the creative industry. While there is an ongoing debate about the extent of AI's creativity, it is evident that AI can produce unique artwork through machine learning.

Currently, AI-generated art is not copyrightable and lacks ownership rights. However, it is vital to note that the AI generator and the images used in the training set are often copyrighted. Using copyrighted images in the training process can be justified as fair use, considering factors such as transformative purpose and a reasonable amount of copying. Nonetheless, further research and discussion are needed to provide more explicit guidance.

While concerns exist regarding the impact of copyright on law and the art market, AI-generated artwork can potentially expand artistic expression and foster creativity. It is crucial to approach this field with thoughtfulness and consideration for all stakeholders involved. By doing so, AI-generated artwork can become a positive force in the art world, offering new possibilities and opportunities for artistic exploration. As the field advances, it is essential to stay informed and adapt regulations accordingly, ensuring a balanced and inclusive approach to the future of AI-generated art.

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