Proceedings of the 3rd International Conference on Software Engineering and Machine Learning
DOI: 10.54254/2755-2721/2025.20940

AI Painting and Innovation: Exploring the Future of Creativity, Ethics, and Enterprise in the Digital Age

Lin Yang[1,a,*]

[1]*Tianjin Huiwen Middle School, Tianjin, China*
a. yllyra@outlook.com
**corresponding author*

Abstract: Artificial intelligence painting technology represents a novel AI tool that aids individuals in streamlining their creative processes. By providing descriptive text, users can prompt the computer to automatically interpret and produce artwork on similar themes but in various styles. This innovation reduces certain repetitive manual tasks, making it appealing to numerous businesses. Presently, AI painting is demonstrating its distinct efficacy and has started to influence the innovation landscape in businesses. The purpose of this paper is to investigate how artificial intelligence painting affects innovation in businesses. This will be done by looking at the creative principles that are behind AI-generated art, comparing the works of humans and AI, examining copyright issues that are connected to AI art, and understanding how society views this technology. Additionally, it will offer several considerations for businesses as they navigate current technological advancements, assisting stakeholders in objectively assessing the future of both AI painting and enterprise innovation.

Keywords: Artificial Intelligence (AI) painting, Creativity, Ethics, Copyright, Enterprise

1. Introduction

As the state has gradually placed greater emphasis on production-type AI, the field of AI writing has witnessed rapid development. Relevant enterprises, such as those in game production and the design industry, have also experienced a certain degree of revitalization as a result of improvements in these areas [1]. Nevertheless, due to the disputes regarding the originality of some production-type AI, such as AI painting, the utilization of these by various enterprises has encountered corresponding obstacles and difficulties. In terms of international macro policies, AI painting has its rationality of existence: it plays an efficient boosting role in the utilization of specific human resources [2]. However, the absence of professional evaluation organizations as third parties constrains the application of AI painting in enterprises to develop in the direction of professionalism and vocationalization. To be more specific, The advent of tools such as DALL-E and Midjourney has brought about a paradigm shift in the fine art industry and the NFT field, with the potential to generate high-quality images based on textual descriptions. To illustrate, a user may input the phrase "anime style, running girl," and the AI will generate a creative image that aligns with the specified prompt. Even those with no prior experience in painting can effortlessly transform an image captured by an AI into a drawing in the style of a renowned manga artist.

Some specific obstacles still remain. First, the use of style migration techniques may result in the replication of the style of another artist's work, which could potentially lead to legal issues pertaining

DOI: 10.54254/2755-2721/2025.20940

to copyright infringement. Furthermore, the current state of style migration techniques is constrained by limitations in terms of the quality of the generated images. In some instances, the input image may be distorted, and the generated image may not align precisely with the desired style. Furthermore, art creation is not solely concerned with style transformation; it is also about expressing emotions and transmitting ideas. It is not possible for AI painting to replicate the creativity and subjectivity of human artists.

There is a discrepancy between the domestic and international levels of certain AI technologies. To bridge this gap and achieve international standards, it is essential to refine algorithms and models to more accurately capture the relationship between style and content. Moreover, both domestic and foreign countries are confronted with the challenge of an accumulation of content of varying quality. In addition to this, there are global obstacles, such as the lack of relevant legislation and ethical issues, which must be overcome. However, in China, the official stance towards AI painting is more explicit, as evidenced by the mascot image generated using AI at the Spring Festival Gala.

Based on this, this research endeavors to investigate the challenges and hardships that enterprises encounter in the process of innovation against the backdrop of the swift development of production-type AI at present, as well as the means to cultivate forward-looking thinking for the future development of this domain. By employing the literature research method, relevant literature materials on AI painting have been collected, sorted, and analyzed. This article will unfold based on the clues of controversies and evaluations of AI painting.

2. The Output Principles of AI Painting

AI painting is a new emerging technology that utilizes artificial intelligence for creation. It is a technology based on deep learning algorithms and computer vision, which uses the processing and recognition technology of large image data to automatically analyze and generate specific themed, style works by the computer. This technology integrates knowledge from various fields, including computer graphics, machine learning, and deep learning. Central to AI painting technology is the deep learning algorithm, which relies on advancements such as convolutional neural networks (CNN) and generative adversarial networks (GAN) [3].

CNN (Convolutional Neural Network) is a machine learning model that employs a set of interconnected neurons, or computational units, organized in a manner that allows it to learn and perform tasks such as image recognition and classification. A deep learning model utilized for image-related tasks, including recognition, classification, and detection. The model employs convolutional layers to capture local features in images, such as edges and textures. CNN models are highly efficient at processing images due to their reduced parameter count and ability to maintain spatial hierarchy.

GAN (Generative Adversarial Network) comprises two networks: a generator that creates fake data and a discriminator that distinguishes between real and fake data. The two networks compete with one another, with the generator improving at creating realistic data and the discriminator improving at detection. Applications like image synthesis and style transfer excel with GANs, which generate various types of data such as images, music, and text [4].

Previous research on artistic creativity has focused primarily on the artist, ignoring the important role of the audience. The cognitive process of art appreciation informs the artist's creativity, and concepts and intelligence are inextricably linked in the fields of design and creativity. Recently, engineering has begun to emphasize user-centered design because of the human factor, and AI painting has become more diverse because of the intuitive creations of amateur artists. From there, artwork builds empathy between the artist and the viewer, and successful AI artwork must maintain this element of empathy [6].

DOI: 10.54254/2755-2721/2025.20940

3. The Role of Artificial Intelligence in Fostering Innovation

Artificial intelligence technologies, including machine learning, natural language processing, and robotics, play a pivotal role in the innovation ecosystem by enhancing multiple facets of the innovation process:

3.1. Process Optimization

This technology has been rapidly developing, and some mainstream AI painting software, such as Sable diffusion, Midjourney, Noble AI, Open Ar, have been widely used in many fields due to their productive features. Particularly prominent in the realm of commercial culture, the application of AI painting holds significant potential for enhancing innovative thinking within enterprises [22].

The collaboration between artificial intelligence and humans has always been a controversial topic [6]. However, from the perspective of sustainable development, artificial intelligence is not a disruptor of the social work and employment system. Even though it has imposed certain employment pressure and caused unemployment for some workers engaged in simple service industries to a certain extent, conversely, artificial intelligence is altering our working patterns at an extremely rapid rate, enhancing the productivity of enterprises and facilitating the development of specific industries [8].

3.2. Enhanced Decision-Making

Artificial intelligence enhances decision-making capabilities by delivering predictive analytics and real-time insights. Research conducted by Davenport and Ronanki [8] demonstrates that AI can substantially improve strategic decision-making, thereby fostering a culture of data-driven innovation. In light of the competitive nature of strategic decision-making and the increasing use of AI in domains such as defense, it is imperative to examine its role in strategic marketing decisions. The integration of AI has substantial implications for all businesses and huge organizations operating in highly competitive industries [9]. Those that fail to adopt AI risk becoming obsolete. More specifically, AI can provide a more comprehensive and intuitive approach to dealing with uncertainty and ambiguity in organizational decision-making by virtue of greater computational information processing power and analytical methods when addressing complexity [10].

3.3. The expansion and exploration of the content

The artistic merit of AI-generated paintings primarily resides in their capacity to inspire creativity, stimulate the development of human aesthetic values, ensure compositional rationality, and achieve innovative breakthroughs [12]. This characteristic arises from the fact that the process of AI painting fundamentally involves patterned processing of data [1]. It is evident that the subject can also play a pivotal role in encouraging creative thinking when individuals are faced with making decisions [10].

3.4. Promote the Aesthetic Perception of the Masses

In the current context of the vigorous development of artificial intelligence, the system of art aesthetic education is also undergoing corresponding alterations [13]. AI painting effectively addresses the issue of the scarcity of personalized education, offering precise learning resources for beginners from diverse perspectives [14]. Based on the data, learners can undertake personalized painting education via this intelligent and efficient learning model and enhance their learning and creative efficiency, thereby effectively elevating their pursuit of aesthetics and enthusiasm for art [15].

DOI: 10.54254/2755-2721/2025.20940

4. Challenges and Risks

As AI painting technology continues to mature and gain popularity, its impact on the professional art illustration field becomes increasingly significant. Leveraging the advantages of AI painting, enterprises should enhance their understanding and mastery of this technology, learning to flexibly utilize its various functions and methods to meet market demands and expectations. However, acknowledging the limitations of AI painting is crucial. The output functionality of AI painting remains relatively unstable. Meanwhile, its copyright issues as well as the disputes regarding the originality of the works have been severely challenged:

4.1. The instability of output

The creativity exhibited by artificial intelligence remains fundamentally dependent on human creativity, and this data processing model that emulates human learning processes is characterized by considerable randomness. In achieving profound creation and addressing real-world challenges, the practical skills and experiences of traditional fine arts practitioners cannot be fully supplanted by AI painting [22].

AI demonstrates significant potential in creative thinking, particularly through generative AI, which is capable of producing novel works across various domains such as art, literature, and music [13]. However, the creativity exhibited by AI fundamentally relies on human creativity; it primarily involves reorganizing and innovating upon existing data and knowledge. Consequently, human practical skills and experiences remain indispensable for achieving profound creations and addressing real-world challenges [6].

4.2. The Limitations of Creation

In evaluating the artistic value of works generated by AI painting, human artists typically exhibit a higher degree of active creativity, drawing from emotional and intellectual dimensions to ultimately construct a cohesive artistic concept [17].

It cannot fully replace human artistic creation and visual expression. Therefore, emphasis should be placed on cultivating aesthetic sensibilities in illustration while utilizing AI technology to generate richer artistic and cultural content as well as more appealing personalized works, thereby showcasing unique strengths and characteristics amid fierce market competition [18].

Currently, addressing the innovative issues confronted by artificial intelligence painting, namely the generation of art that lacks an emotional and cognitive foundation and is incomprehensible, is the crucial point for promoting breakthroughs and transcending limitations in the domain of artificial intelligence art. A robot capable of painting in collaboration with humans is depicted as an extremely significant challenge within the realm of artificial intelligence [19].

4.3. Copyright Controversy

The trend of rising literature research focuses on the legal copyright issues of AI painting, with many people believing that artificial intelligence functions like a suitcase, and this technology is autonomously creating works through neural networks, which can be basically considered "working like a human brain." However, the fact that works must come from humans brings an unignorable obstacle to the copyright protection of AI-generated works, AI-generated artworks are generally perceived as not fully satisfying the criteria for originality. Furthermore, we currently lack a precise mechanism to ascertain the copyright ownership of works produced by AI painting [23].Consequently, the copyright status of AI-generated paintings remains ambiguous.

The majority of literature concerning the legislative framework for AI painting copyright suggests

DOI: 10.54254/2755-2721/2025.20940

that the determination of whether AI-generated artworks constitute copyright infringement hinges on the legality of their data sources and the extent to which they have generated commercial value [24].

5. Conclusion

The advent of AI painting technology has precipitated a paradigm shift within the creative industry, engendering heightened efficiency and innovation through automation, style transfer, and personalised art creation. The repercussions of this technological advancement are pervading diverse sectors, including advertising, entertainment, and design, thereby facilitating the mass production of bespoke visual content that caters to the multifarious demands of consumers. This transformation is met with a challenge to conventional artistic practices and the very concept of authorship. From a societal perspective, the democratisation of creativity precipitated by AI-driven art has the potential to engender a shift in prevailing perceptions concerning art production and aesthetics. It is incumbent upon companies to strike a balance between technological innovation and social responsibility in order to maintain brand value in the context of the cultural impact of AI-generated art. Research into the functionality of AI painting is therefore essential for both enterprise growth and the shaping of contemporary cultural narratives on art and aesthetics.

References

[1] *Yeh, K. L., & Lee, J. S. (2024). Artistic design of virtual characters assisted by artificial intelligence drawing. Shuuping Journal, (8), 23-42.*

[2] *Jiang, H. H., Brown, L., Cheng, J., Khan, M., Gupta, A., Workman, D., ... & Gebru, T. (2023, August). AI Art and its Impact on Artists. In Proceedings of the 2023 AAAI/ACM Conference on AI, Ethics, and Society (pp. 363-374).*

[3] *Jadav, H., & Shchyhelska, H. (2022). Evolution of artificial intelligence painting. Збірник тез III Міжнародної науково-практичної конференції молодих учених та студентів „Філософські виміри техніки “, 33-35.*

[4] *Liu, X., & Hsieh, C. J. (2019). Rob-gan: Generator, discriminator, and adversarial attacker. In Proceedings of the IEEE/CVF conference on computer vision and pattern recognition (pp. 11234-11243).*

[5] *Adner, R. (2006). Match your innovation strategy to your innovation ecosystem. Harvard Business Review, 84(4), 98-107.*

[6] *Sun, Y., Yang, C. H., Lyu, Y., & Lin, R. (2022). From pigments to pixels: a comparison of human and AI painting. Applied Sciences, 12(8), 3724.*

[7] *Petropoulos, G. (2018). The impact of artificial intelligence on employment. Praise for Work in the Digital Age, 119, 121.*

[8] *Davenport, T. H., & Miller, S. M. (2022). Working with AI: real stories of human-machine collaboration. MIT Press.*

[9] *Davenport, T. H., & Ronanki, R. (2018). AI for the Real World. Harvard Business Review, 96(1), 108-116.*

[10] *Jarrahi, M. H. (2018). Artificial intelligence and the future of work: Human-AI symbiosis in organizational decision making. Business horizons, 61(4), 577-586.*

[11] *Stone, M., Aravopoulou, E., Ekinci, Y., Evans, G., Hobbs, M., Labib, A., ... & Machtynger, L. (2020). Artificial intelligence (AI) in strategic marketing decision-making: a research agenda. The Bottom Line, 33(2), 183-200.*

[12] *Leiser, A., & Schlippe, T. (2021, December). AI in art: simulating the human painting process. In International Conference on ArtsIT, Interactivity and Game Creation (pp. 295-308). Cham: Springer International Publishing.*

[13] *Li, J., Zhong, J., Liu, S., & Fan, X. (2024). Opportunities and Challenges in AI Painting: The Game between Artificial Intelligence and Humanity. Journal of Big Data and Computing (ISSN: 2959-0590), 2(1), 45.*

[14] *Chiu, M. C., Hwang, G. J., Hsia, L. H., & Shyu, F. M. (2024). Artificial intelligence-supported art education: A deep learning-based system for promoting university students' artwork appreciation and painting outcomes. Interactive Learning Environments, 32(3), 824-842.*

[15] *Xu, Y., Ji, Y., Tan, P., Zhong, Q., & Ma, M. (2021). Intelligent painting education mode based on individualized learning under the internet vision. In Intelligent Human Systems Integration 2021: Proceedings of the 4th International Conference on Intelligent Human Systems Integration (IHSI 2021): Integrating People and Intelligent Systems, February 22-24, 2021, Palermo, Italy (pp. 253-259). Springer International Publishing.*

[16] *Balmer, J. M., & Greyser, S. A. (2006). Corporate marketing: Integrating corporate identity, corporate branding, corporate communications, corporate image and corporate reputation. European journal of marketing, 40(7/8), 730-741.*

DOI: 10.54254/2755-2721/2025.20940

[17] *Xu, J., Zhang, X., Li, H., Yoo, C., & Pan, Y. (2023). Everyone's an Artist? Exploring User Acceptance of AI-Based Painting Systems.*
[18] *ZHANG, Y. N., & XU, M. (2023). Wang Yi. The Development Progress, Problems and Suggestions of Generative Artificial Intelligence in China, 6(20), 30-33.*
[19] *Cooney, M. D., & Menezes, M. L. R. (2018). Design for an art therapy robot: An explorative review of the theoretical foundations for engaging in emotional and creative painting with a robot. Multimodal Technologies and Interaction, 2(3), 52.*
[20] *White, C., & Matulionyte, R. (2019). Artificial Intelligence Painting The Bigger Picture For Copyright Ownership. Available at SSRN 3498673.*
[21] *Papia, E. M., Kondi, A., & Constantoudis, V. (2023). Entropy and complexity analysis of AI-generated and human-made paintings. Chaos, Solitons & Fractals, 170, 113385.*
[22] *Vovk, E. V. (2022). Methods of artificial intelligence in the educational process of higher school. Problems of modern pedagogical education, (77-1), 109-112.*
[23] *Lan, Z., Yang, S., Fan, R., Zhao, B., & Yan, Y. (2023, July). Innovation or Piracy? Empirically Demarcating AI Painting Copyright Infringement Boundary. In 2023 3rd International Conference on Public Management and Intelligent Society (PMIS 2023) (pp. 1328-1341). Atlantis Press*
[24] *He, J. (2023). The Characteristics and Legislative Thinking of AI Painting Tort. International Journal of Education and Humanities, 8(1), 59-62.*