The Impact of AI Painting on Traditional Painting

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Abstract: This article discusses the challenges that traditional painting faces in terms of market share and creative methods in the era of rapid development of Artificial intelligence (AI) painting technology. Reviewing the development history of AI painting and the style changes and technological progress of traditional painting at different times emphasizes the necessity and importance of conducting this research. In the current era, AI painting includes many fields, and it brings a host of business opportunities, so this article explains why the problem of AI painting is worth studying and the impact of the research results by analyzing the definition, use, working principle, and advantages and disadvantages of AI painting. The main part of the article will analyze the issue from three aspects: the creative efficiency of AI painting, the expansion of creativity, and the inspiration of creativity, fully demonstrating that AI painting has exerted a powerful impact on traditional painting and explaining why this project needs further in-depth research to help traditional painters cope with the challenges and promote innovative development in the art field, and also provide a basis for relevant policy formulation and industry regulation.

1 INTRODUCTION

In the past few decades, the rapid development of Artificial intelligence (AI) intelligent technology has had a profound impact on various fields. In recent years, the rapid development of Al, especially "Deep Learning ," has reshaped many fields of research. Not only the natural sciences and engineering have been changed in new ways (Kelleher, 2019). However AI also has had a deep impact on the development of social sciences and humanities. Among others, the application of deep learning in art is of interest (Hung et.al, 2020). Art has been widely considered as one of the most humanized areas,

Traditional painting can showcase more unique and personalized expressive power, and artists can use various painting techniques and materials to create rich and diverse artistic effects. Secondly, traditional painting usually has higher artistic value compared to AI painting because it is a unique artwork with historical and cultural value and high collection value, especially those works created by famous artists. These works not only have artistic value but also historical and cultural value, so they can become objects of pursuit for collectors.

Compared to traditional painting, AI painting has given new life to art. It can break through the limitations of human imagination and nature, create unprecedented visual images and artistic styles, and provide artists with opportunities to create more innovative works, such as generating new works and adding new elements and styles to traditional artistic expressions. AI painting has also made art more democratic, expanding the channels and scale of artistic creation, and giving more people the opportunity to participate in artistic creation. In specific fields such as film, gaming, advertising, etc., AI painting can be used to quickly generate scene concept maps, character designs, etc., saving a lot of time and costs. Although AI painting still has some limitations at present, its application prospects are still broad. In the future, it is expected to become more mature and popular based on continuous technological progress and algorithm optimization.

This article aims to introduce and analyze the impact of AI painting on traditional painting. By listing the contributions and changes that AI has made in the field of art since its inception, as well as the achievements and significant breakthroughs that AI painting has made in large-scale art exhibitions or important events in recent years, it proves the impact of AI painting on traditional painting. To prove this argument, this article will be divided into five parts: the first part will discuss the birth and origin of AI

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painting; The second part will discuss the significant achievements of AI painting from multiple aspects, including creative efficiency, creative expansion, assisted creation, and artistic exploration. This article will list the changes and breakthroughs of AI painting in the historical process; In the third part, the author will compare AI painting with traditional painting in the same field, so that readers can more clearly feel the impact of AI painting; The last two parts are suggestions and conclusions for the field of AI painting, telling readers how to use AI painting more quickly, reasonably, and efficiently.

2 OVERVIEW OF AI PAINTING

Kurzweil (Kurzweil, 2005) predicts the imminent arrival of the AI era in his famous book named The Singularity Is Near: When Humans Transcend Biology. At the time of the book's publication, AI was limited to the laboratories of a small number of research institutions, but following the widespread application of such AI technologies as AlphaGo to a variety of fields (Wang et.al, 2016) AI research and applications began to rapidly expand and in recent years developments in visual technology have made it possible to analyze paintings by using complex algorithms (Stork & Coddington, 2008, Stork et.al, 2010) that extend the knowledge and capabilities of artists, scholars, and curators (Hinton & Salakhutdinov, 2006). AI refers to the intelligence exhibited by systems manufactured by humans. The field of AI has evolved from a small starting point to a globally influential domain, and over time, the definition of artificial intelligence has changed. Experts in this field joke that artificial intelligence is everything that computers currently cannot do. Although it may seem humorous on the surface, some people believe that developing intelligent computers and robots means creating things that do not yet exist today. Artificial intelligence is a moving goal, and even the definition of artificial intelligence itself is constantly changing (Sun et.al, 2022).

AI can simulate human thinking and behaviour by learning large amounts of data and performing tasks such as problem-solving, decision-making, language understanding and generation, image recognition, etc. It has learning ability, adaptability, and efficiency. AI has advantages such as efficiency, accuracy, and intelligent learning. At present, AI has been widely applied in various fields such as healthcare, finance, transportation, education, entertainment, etc., bringing many conveniences and innovations to people's lives and work.

AI painting refers to the method of using artificial intelligence technology to create artwork. It learns from a large amount of image data to understand different painting styles, color combinations, compositions, and other elements and then generates new painting works based on user input instructions or specific themes.

The working principle of AI painting is divided into three parts: data collection and training, generation process, and optimization and adjustment：

Firstly, the AI painting system will collect a large number of painting works as training data. These data cover paintings of various styles, themes, and artistic periods. Then, deep learning algorithms such as convolutional neural networks are used to train these data. During the training process, the model learns features in the image, such as lines, colors, shapes, textures, and their relationships.

Secondly, when the user provides an instruction or theme, the AI painting system will convert it into a series of digital signals or feature vectors. Then the model will generate a new painting based on these input features, combined with the previously learned painting knowledge. This process typically involves random generation and optimization to ensure that the generated works have diversity and innovation.

Finally, users can evaluate and provide feedback on the generated work, and the system will adjust the model parameters based on this feedback to improve the quality of the generated work.

In short, AI painting is an innovative method of using artificial intelligence technology to create artwork. It can generate highly artistic and innovative paintings by learning and optimizing a large amount of image data.

3 ACHIEVEMENT

3.1 Creative Efficiency

AI painting has high creative efficiency, firstly in terms of rapid generation: the creation time is short, and compared with traditional painting methods, AI painting can generate a work in a very short time. Usually, it only takes a few seconds to a few minutes, while traditional painting may take hours or even days. Secondly, AI painting tools can process multiple requests simultaneously and quickly generate a large number of paintings with different styles and themes. This is very advantageous for projects that require a large amount of images, such as game development, advertising design, etc. AI

painting not only has advantages in generation speed but also provides great convenience in terms of creative threshold. Firstly, AI painting does not require manual skills, greatly lowering the threshold. Traditional painting requires certain painting skills and experience, while AI painting does not. Anyone can generate artwork with simple commands or inputs, even without a foundation in painting. Due to not requiring a significant amount of time in painting techniques, creators can focus more on expressing their creativity and concepts. They can quickly explore various creative possibilities by constantly trying different instructions and parameters. The third aspect is fast iterative optimization, where AI can provide immediate feedback. During the creative process, creators can immediately see the results generated by AI and make adjustments and optimizations as needed. This instant feedback makes the creative process more efficient and allows for quick iteration to produce satisfactory work. In addition, AI painting also has an automated adjustment function. AI painting tools can automatically adjust color, composition, details, and other aspects to improve the quality of the work. Creators can achieve different effects through simple parameter adjustments without the need for tedious manual modifications.

Overall, the creative efficiency of AI painting is much higher than that of traditional painting methods. It can quickly generate a large number of high-quality paintings, providing creators with more creative space and time. However, AI painting cannot completely replace traditional painting, as traditional painting has unique artistic value and handmade charm. In the future, AI painting and traditional painting may merge to jointly promote the development of artistic creation.

3.2 Creative Expansion

AI painting has great potential for creative expansion. Firstly, it can achieve style fusion and innovation, mixing multiple styles to create a completely new visual effect. For example, combining Impressionist colors with realistic details, or blending Eastern ink painting styles with Western oil painting styles. Secondly, it can also draw inspiration from cross disciplinary styles in other fields such as architectural design, fashion design, film special effects, etc. Introduce the stylistic characteristics of these fields into painting and expand the creative boundaries of painting. In terms of theme expansion, AI painting can easily create fantastic creatures, mysterious scenes, and future technological worlds. By combining and transforming various imaginative elements, it provides creators with unlimited space for theme expansion. At the same time, it can also help creators explore abstract and conceptual themes more deeply. By randomly generating and combining colors, shapes, and textures, express complex emotions, ideas, and concepts. When it comes to personalized creation, AI painting is no less impressive: AI painting can generate personalized artwork based on specific requirements provided by users, such as color preferences, theme keywords, style preferences, etc. This enables everyone to become an artist and achieve their unique creative expression. AI painting can also be used for interactive creation: some AI painting tools provide interactive creation interfaces, where users can interact with AI in real-time by adjusting parameters, adding elements, and other methods to jointly complete painting works. This interactive creative approach increases the fun and sense of participation in the creation.

AI painting provides powerful tools and platforms for creative expansion. It can not only help professional artists break through traditional creative limitations but also allow ordinary users to easily participate in artistic creation and unleash their creativity.

3.3 Assisted Creation

In terms of inspiration, AI painting tools can randomly generate images of various styles and themes, providing creators with unexpected inspiration. Creators can discover new ideas, compositions, or color combinations from these randomly generated images, thereby inspiring their creative inspiration; AI can analyze the characteristics of different art styles and provide suggestions for style fusion. For example, combining the colors of Impressionism with the composition of Cubism, or integrating the traditional Chinese ink painting style with modern abstract art style. These suggestions can help creators break through traditional creative ideas and try new forms of artistic expression.

In terms of composition assistance, AI can automatically generate reasonable composition plans based on user input themes and style requirements, and provide composition adjustment suggestions during the creative process. These composition schemes can serve as references to help creators better organize visual elements and enhance the visual effect of their works. During the creative process, AI can analyze the composition of the image

and provide adjustment suggestions. For example, indicate whether the distribution of elements in the picture is balanced and whether the subject is prominent, and provide corresponding adjustment plans.

In terms of color selection, AI can recommend suitable color matching schemes based on different themes and styles. These schemes can help creators quickly determine the color tone of their works, and improve color coordination and expressiveness. During the creative process, AI can analyze the color distribution of the image and provide adjustment suggestions. For example, indicate whether the contrast of colors in the picture is appropriate, whether the colors are too bright or dim, and provide corresponding adjustment plans.

AI can also automatically optimize details, increase details and textures, and enhance the realism and artistic sense of the work. For example, when drawing portraits of people, AI can automatically add skin textures, hair details, and so on. During the creative process, AI can analyze the details of the image and provide adjustment suggestions. For example, indicate whether the details of an object in the picture are rich enough, whether more textures need to be added, and provide corresponding adjustment plans.

AI painting has great advantages in assisting creativity, providing creators with support in areas such as inspiration, composition assistance, color selection, detail optimization, and rapid iteration. With the continuous development of AI technology, it is believed that its role in artistic creation will become increasingly significant.

AI painting has brought a new exploration path to the field of art. It breaks through the boundaries of traditional art and innovates in style, integrating different artistic styles to create unprecedented novel styles. It can combine the delicacy of classical painting with the boldness of modern abstract art, or blend the charm of Eastern art with the realism of Western art, breaking the boundaries of style in traditional art. AI painting is not limited by the real world and can create fantasy creatures, surreal scenes, and future worlds. This enables artists to explore broader and more imaginative subject areas, expanding the possibilities of artistic expression (Sun et.al, 2022).

In short, AI painting has brought new opportunities and challenges to the art field, promoting innovation and development in art. In the future, with the continuous advancement of AI technology, we can expect more exciting AI paintings and artistic explorations.

4 SUGGESTIONS

The emergence of AI painting has sparked discussions about creativity. Some people believe that AI is only imitating and combining existing works of art, lacking true creativity; Others believe that AI can create unique works of art with its creativity. In addition, a piece of art establishes a kind of resonance between the artist and viewer and a successful piece of Al art needs to retain the elements that produce this resonance. Thus, in determining the key differences between Al art and amateur art, it is necessary to identify the factors that affect the viewer's inner feelings and to compare AI art with amateur art (Sun et.al, 2022). This discussion prompts people to rethink the essence and source of creativity in artistic creation, and AI painting also prompts people to consider the relationship between art and humanity. With the continuous development of AI technology, will artistic creation be replaced by AI? What role will human artists play in the AI era? These issues have raised concerns and thoughts about the future of art among people.

AI painting can serve as an educational tool to cultivate students' innovative thinking and creativity. Students can interact with AI painting tools to explore different art styles and themes, stimulating their imagination and creativity. At the same time, AI painting involves multiple disciplines such as computer science, mathematics, and art, providing students with opportunities for interdisciplinary learning. By learning AI painting, students can understand the connections and integration between different disciplines, and cultivate comprehensive literacy and interdisciplinary abilities.

At present, there is no clear legal regulation on the copyright ownership of artworks generated by AI, mainly because their creative process involves complex technology and multiple factors. On the one hand, AI developers have invested a lot of technology and resources in research and development and may claim certain rights to the generated works. On the other hand, users may also make creative contributions during the process of inputting commands and may consider themselves entitled to copyright for their works. In the absence of clear legal provisions, copyright disputes may be difficult to resolve, affecting the art creation market and other issues. At the same time, AI may unconsciously integrate different cultural elements when generating artworks. If this integration is not properly understood and authorized, it may constitute cultural appropriation, causing dissatisfaction and controversy among the nation, leading to cultural

misunderstandings and distortions, destroying cultural diversity and uniqueness, and hindering artistic innovation and market development.

In addition, AI learns through a large amount of data, and the generated works may have similarities with existing works. Although this similarity may not necessarily be intentional plagiarism, it can also easily spark controversy. For example, if an AI-generated painting has a style that is extremely similar to a well-known artist's work, it may be accused of plagiarism. Plagiarism controversies may harm the rights of the original artist, reduce the enthusiasm for artistic creation, and also affect the public's trust in the artwork.

5 CONCLUSIONS

This article starts with the definition, purpose, working principle, and advantages and disadvantages of AI painting, comprehensively introduces and explains the development process of AI from its birth to the future, and demonstrates the impact of AI painting on traditional painting from multiple aspects. For example, AI painting promotes the devaluation of technical skills and changes in creative thinking, greatly increasing the supply of painting works on the market, affecting people's aesthetic experience of art, promoting the reform of the education system, cultivating people's innovative thinking and comprehensive abilities, changing the supply and demand relationship in the market, leading to a change in the way and concept of traditional painting creation. At the same time, in a relatively stable demand situation, the market share of traditional painting works may be squeezed, and their market value will also be affected.

For the suggestion of AI painting, the author believes that it is particularly important to be familiar with tools and algorithms, explore multiple styles and themes, enhance creative ability, cultivate individual aesthetic ability, and use semantic recognition to improve the creativity of artificial intelligence, and at the same time, establish industry standards, clarify the copyright ownership and moral code of AI painting, establish a sound intellectual property protection system, and provide a good legal environment for the development of AI painting.

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