# Discussion on the Application of Artificial Intelligence Image Generation Technology in Art Design

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**Abstract: With the continuous development of artificial intelligence technology, the application of image generation technology in the field of art and design has become more and more extensive. This paper mainly discusses the application of image generation technology integrating artificial intelligence in art design, and analyzes the potential application of artificial intelligence technology in art design, including automatic creation, art style conversion and art generation. In terms of automated creation, artificial intelligence technology can generate new works with artistic characteristics by learning a large number of artistic works. By adjusting the parameters and inputs of the model, works with different styles and themes can be generated, providing more creative inspiration and possibilities for the artist. It provides artists with more creative ways and possibilities. In general, the application of image generation technology integrating artificial intelligence in art design has broad development prospects and potential, bringing more choices and possibilities for the art market, and promoting the application and development of artificial intelligence technology in the field of art and design.**

**Keywords: Artificial Intelligence Technology; Image Generation Technology; Art and Design; Automated Creation**

## 1. The Value of Artificial Intelligence in Art and Design Innovation

The application of artificial intelligence in art design has attracted more and more attention, and the innovation and value brought by it have gradually shown. Through machine learning, deep learning and other technologies, computers can simulate the creativity and imagination of human beings, help designers to realize unique and innovative design works, and bring a broader creative space and possibilities for artistic design. Through the analysis and processing of big data, the user needs and preferences are deeply explored to provide designers with more targeted and personalized design solutions, obtain more creative inspiration and innovative ideas, improve the efficiency and quality of design, and make the design works more diversified and creative. In general, the value of artificial intelligence in art design lies not only in improving the efficiency and quality of design, but also in expanding the space and possibility of design innovation, bringing more inspiration and creative fun to designers, and promoting the development and progress in the field of art and design.

## 2. The Application Status of Artificial Intelligence Image Generation Technology in Art and Design

### 2.1 Image Generation Technology of Midjourney based on Deep Learning

Artificial intelligence image generation technology, as an emerging technology developing rapidly in recent years, is gradually showing its unique charm and important value in art design.

For example, the French art group Obvious (Obvious) used deep learning networks to create a painting called "Portrait of Edmund Bellamy (Edmond de Belamy)", one of ten portraits of the Belamy (Belamy) family created by the Obvious team in Paris. The seemingly mundane portrait was successfully sold at Christie's auction for $432,500, far over 45 times its highest estimate. They provided the system with a dataset consisting of 15,000 portraits drawn between the 14th and the 20th centuries. The generator generates new images based on this dataset, and then the discriminator tries to identify the difference

between a human-painted portrait and the image created by the generator. Through continuous training, the generator continues to learn the characteristics of artistic style, and generates images more and more close to the real portrait painting, while the discriminator continuously improves the accuracy of identifying virtual + and real portrait painting. To achieve the goal of making the discriminator unable to clearly distinguish between the generated image and the real portrait[1].

Midjourney is an image generation tool based on artificial intelligence technology, which generates the corresponding images based on the text description provided by the user. Users can guide the Midjourney to generate the desired image by entering a natural language description. These descriptions can include scenes, objects, colors, styles, and other details, giving users the flexibility to control the content and appearance of the generated image. It learns a lot of image data to master the skills of generating images, so that it can generate realistic, delicate images[2].

Midjourney A variety of different styles and types of images can be generated, and users can interact during the generation process. For example, users can change the style and appearance of the generated image by adding or reducing adjectives, changing the description of the scene, and adjusting the color, etc. Generate a diversity of images until satisfactory results are achieved.

In addition, Midjourney provides some advanced features, such as permutation combination and pad map features. The permutation combination function allows the user to generate a plurality of variant images by inputting multiple descriptions, thus facilitating the user to select the most satisfactory image. The pad map function allows users to combine the existing images as a reference or background with the generated images to create a richer and more unique visual effect.

In September 2022, Jason M Allen (JasonM. Allen) Using the Midjourney AI program to create the intelligent image generation work Space Opera (TheatreD'operaSpatial) (As shown in Figure 1), and won the Blue Ribbon Award in the Emerging Artists Competition of the Annual Art Competition at the Colorado State Fair. It is the first one to be awarded the award[3].



**Figure 1. Jason M. Allen, Space Opera Theater**

The application of image generation technology based on deep learning in art design has great potential and value. In the future, with the continuous progress and improvement of technology, it will play an increasingly important role in the field of art and design, bringing more possibilities and creativity for art and design.

## 2.2 Image Generation Technology based on Goku Image PhotoSir

Wukong Image is the first professional image processing software integrated with AIGC in China. Through deep learning algorithm and a large amount of training data, it can be automatically trained with open large models, which can automatically generate high-quality image works. When using the generation technology of Wukong image, it is first necessary to prepare the basic model and the corresponding text description. These picture and text descriptions are used to train the underlying model to understand and generate images related to the description.

To enter the AI painting function of Wukong image, it is necessary to open the basic model first. CGXL: a general large model obtained by absorbing a large number of models and pictures for independent training can be applied to almost all styles. Realistic XL: In addition to generating the portrait of super realistic real people, the realistic model can also better complete the works of different artists or art forms, such as paper cutting, graphic design, traditional Chinese painting, Picasso, etc., and also suitable for the output of e-commerce posters and materials such as bottles, perfume bottles, C4D commodity background, etc. Quadratic XL: in the picture imagination and richness is very prominent, suitable for the generation of two dimensional,

cartoon, Disney and other styles of works[4].

Once the basic model of the Wukong image has been trained, the user can guide the process of image generation by providing a text description to it. The more specific and accurate the user's description, the more the generated image can meet the needs.

Controlling the process of image generation by adjusting the text description is the core of Wukong image generation technology. Here are some ways to influence the generated image by adjusting the text description:

1. Details: Using specific keywords or phrases can guide the direction of image generation, and providing a detailed description can generate a more accurate image. For example, characters dressed in ancient costumes, cartoon characters, q version image, pure white background ((As shown in figure 2)



**Figure 2. Automatically Generate Cartoon Characters**

2. Raw room effect drawing: using the function of text drawing, the basic model selects the architectural design or realistic XL effect, input the blank room photo into the control network type to select the original draft drawing, and the strength is controlled at 6-10.(As shown in figure 3) model selection: architectural design type: depth of field original | strength: for example: minimalist style, sitting room, high quality furniture, perspective, rendering, indoor photography, 8k, professional lighting, photon mapping, light transfer, physical rendering, unmanned, lamp, pillow, table, table, scenery, indoor, bed, bed, sofa, vase, plants, carpet, carpet, carpet, chairs, painting (object) (As shown in figure 4)



**Figure 3. Raw Room Effect Drawing**



**Figure 4. Automatically Generate Architectural Renderings**

Referring to the size, position, and relative relationship of objects in a description can affect the composition of an image without being confined to the rules of the real world, but by trying to use abstract, unconventional, or creative descriptions to generate unique images. Not all images can be generated with a single description. Try to describe it in steps, adjusting some details each time until satisfactory results are achieved.

Different image generation models and algorithms may differ in their response to the description. If you find a model that doesn't fit your needs, try the others. In short, by carefully adjusting the text description and combining with the characteristics of the image generation technology, you can obtain the image generation results that are more in line with the personal preferences and needs[5].

## 3. Effect Evaluation of Artificial Intelligence in Art and Design Applications

Nowadays, when artificial intelligence technology has gradually penetrated into the field of art and design, its effect in art and design innovation has become an important issue. For the application of artificial intelligence in art design, evaluating the actual effect is an important method to judge its actual value and function. So, how to evaluate the effect of AI in art and design innovation?

It is of common way to comparative the is a common approach. We can adopt the traditional way of art design and artificial intelligence auxiliary art design, contrast two ways in the art design work quality, creative differences, with the method of questionnaire effect evaluation, design questionnaire, let the respondents to evaluate the art design works,

to understand the recognition of this kind of innovative way, and its actual effect in the art design. To evaluate the effect of artificial intelligence in art and design innovation[6].

The effect evaluation of artificial intelligence in art design application involves many aspects, including advantages and disadvantages. Here is a detailed analysis of these aspects:

Merit:

1. Artificial intelligence can automate tedious design tasks, such as image repair, enhancement and background removal, thus greatly improving design efficiency and saving designers' time. Designers can explore more creative options in a shorter period of time.

2. Artificial intelligence can analyze user behavior data, market trends, user preferences and other information, so that designers can make more sensible design decisions based on actual data, and improve the pertinacity and effectiveness of design.

3. AI generative design tools can learn large numbers of design samples to generate new art styles, patterns, and design works. This provides designers with a broader space for creation and stimulates creativity to explore new design directions[7].

Bad point:

1. Although artificial intelligence can provide a large number of design options, its creativity is far less than human beings. Designers can draw inspiration from life and experience. However, artificial intelligence lacks emotional expression in the design process and cannot integrate personal emotion and consciousness into the design like designers. This makes the design works of artificial intelligence lack of emotional resonance and appeal, and it is difficult to arouse the resonance and love of the audience.

2. For example, when generating art works with high resolution and strong sense of reality, there may be problems such as poor picture quality and insufficient details. This requires further improving the accuracy and stability of the algorithm and improving the artistic quality of image generation.

3. Using AI to design requires a corresponding investment of technology and resources, which may pose a barrier to some designers. Skills such as programming and data processing are needed to effectively use AI for design. In addition, expensive software and hardware equipment should be purchased and maintained.

The effect evaluation of AI in art design application needs to consider multiple aspects comprehensively. Although artificial intelligence has many advantages, but we can't ignore some of its disadvantages. Therefore, when using artificial intelligence for design, it is necessary to fully consider its advantages and disadvantages, and make reasonable decisions based with the actual situation.

## 4. Challenges and Impacts of Artificial Intelligence in Future Art Design

### 4.1 Technical Challenges and Application Difficulties

Although the application of artificial intelligence in the field of art and design has brought a lot of innovations and surprises, it also faces some technical challenges and application difficulties. First, AI technology has certain limitations in image generation, and AI design recommendations may be affected by data bias, leading to inaccurate or unreasonable results. If the data is inaccurate or incomplete, AI design recommendations may deviate from the right direction. Furthermore, AI design recommendations may also be affected if there is bias or discrimination in the data[8].

To realize the application of artificial intelligence in the field of art and design, it is necessary to establish large-scale and high-quality data sets of art works, and to improve the performance and artistic value of image generation. Art design is a creative and emotional field, and how to make AI systems better understand and interact with artists is a problem that needs to be continuously explored and improved[9].

There are many technical challenges and application difficulties of artificial intelligence in artistic design. It requires interdisciplinary cooperation and continuous technological innovation to realize the organic combination of artificial intelligence and artistic design and promote the development and innovation of artistic creation.

### 4.2 The Social and Cultural Influence of Artificial Intelligence to Art and Design

First, the widespread application of AI technology may change the way traditional artists create and bring about a certain degree

of career transformation. Some traditional creative links may be automated instead, which requires traditional artists to constantly update their skills and ways of thinking.

Secondly, the application of artificial intelligence in art design will also cause some disputes about the ownership of creation rights and copyright protection of works. Since AI-generated works are often produced by learning and imitating large amounts of data, this raises controversy about whether the creators are human or machine. In this case, how to protect and define the copyright of the works has become a controversial issue.

Finally, the application of AI technology in art design may also have an impact on social-cultural values. As people's acceptance of AI technology increases, more works based on AI may be recognized and respected. In this case, people's understanding and cognition of art and creation will also change accordingly, and it will further influence and shape the development direction of the society and culture.

The combination of artificial intelligence and art design has not only brought about progress in technology and innovation, but also influenced the development of the social and cultural field. In the future, with the continuous development and application of artificial intelligence technology, this impact is bound to be more far-reaching and extensive, bringing more new possibilities and challenges to our culture and society[10].

## 5. Conclusion

In the future, the application of artificial intelligence technology in the field of image generation will be more common and deeper. Through the continuous progress of digital technology, AI can generate more realistic and unique works of art, and AI will become an important assistant and partner in art design. With the continuous development of man-machine collaborative design and intelligent assisted creation, designers will be able to complete the creation and production process of works more efficiently. At the same time, artificial intelligence technology will bring more cross-border cooperation and innovative practices to the field of art and design. By combining it with other fields such as music, literature, architecture, etc., AI can help designers achieve more diverse and cross-

media creation. In the future, we can foresee that more cross-field cooperation and innovative practices will become new trends in the field of art and design.

In general, the future development of artificial intelligence technology in the field of art and design is facing both challenges and infinite possibilities. With the continuous progress of technology and the continuous emergence of innovative thinking, it is believed that artificial intelligence will bring a more colorful future to art and design.

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