A study on the development of computer-aided design in the context of artificial intelligence

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Abstract. With the rapid development of social economy, Internet technology has been widely used, and in this social environment, artificial intelligence has been highly valued by all walks of life, which has brought a great impact on the development of all walks of life, and in this regard, the art and design industry is also the same. This paper does an in-depth study, firstly, it gives a brief introduction to artificial intelligence, then analyzes the artistic expression of artificial intelligence, and the limitations of artificial intelligence design, and finally discusses the application and development of art design in the context of artificial intelligence.

1. Introduction

With the advent of the information age, the concept of artificial intelligence has been highly valued by people, and the controversy of the community over the technological nature of artificial intelligence has never ceased, and the application and development of artificial intelligence and the breakthrough achievements obtained in this environment have always been refreshing human cognition and bringing great changes to people's lives. In this environment, the art and design industry has also been affected to a certain extent. The impact of artificial intelligence on the field of art and design cannot be ignored, which not only promotes the innovation of art and design concepts and the upgrading of technology, but also brings greater convenience to art and design, as well as new worries and challenges to the future development of art. It is necessary to attach great importance to this, to correctly examine the relationship between artificial intelligence and art design, and to better promote the application and development of art design in the context of artificial intelligence.

2. Introduction to artificial intelligence

Artificial intelligence is part of computer science, which involves the study of various aspects such as robotics, speech recognition, image recognition, natural language processing and expert systems, which simply means the scientific creation of human intelligence in accordance with human intelligence. The concept of artificial intelligence was first born in 1956, formally introduced at the Dartmouth Conference, and has subsequently undergone several evolutions and developments that have made it more useful and pragmatic, and widely used in human life and social production. In essence, artificial intelligence is built on the basis of big data technology and cloud computing technology, and currently, in the field of art design, the application about artificial intelligence is mainly based on convolutional neural network, which can easily and quickly realize the design and creation of works for impressionist fauvism, ukiyo-e, pop deconstructionism, etc. By applying diverse artificial intelligence machines, it...
can accurately experience different artists' Works style, and then transform it into a photo, for the development of the field of art and design has brought a great impact and shock.

Figure 1. Changes of artistic design in the era of artificial intelligence

3. Artistic expressions of artificial intelligence
The concept of "art and design" has been developed in China for a relatively short period of time, only 20 years, and originally originated in Western countries, where the English name was "design". This concept is more oriented to industrial production art design, emphasizing the use of performance in the production process of the product, and the artistic components added to the exterior design, with the aim of making the design and production of the product more artistic and humanized. In essence, the concept of artistic design is artistic as well as scientific, mainly because the artistic design process takes into account both the cultural characteristics of the product and the practical functions of the product. Therefore, on the whole, art belongs to a kind of figurative expression of human thought, and the emphasis is on showing people's sense of experience through the form of art. Therefore, art is not only the physical expression form, but also conveys people's ideological connotation and cultural spirit, and artists are accustomed to conveying their spiritual world through diversified art forms and further digging deeper into people's spiritual realm. The advent of the information age has brought with it the concept of artificial intelligence, allowing modern art and design to change dramatically with the progress of the times. There is a close connection between contemporary art and design and the development of the times, so promoting the integration between technology and art is also a top priority for art creation at present. With the continuous development of artificial intelligence as well as its wide application, art design in the new era must be presented and delivered by means of artificial intelligence, so as to promote the field of art design to achieve better development, which is also the main development direction of art design in the coming period.

Figure 2. The application process of artificial intelligence in art design
4. Advantages and disadvantages of art design in artificial intelligence environment

The application of artificial intelligence is mainly in the form of a wide variety of intelligent machines. Applying artificial intelligence to art and design. The first step to be done is to make the intelligent instruments understand the constituent elements of the design, and the process requires manual operations to label the relevant data and to do a good job of classifying the layers of the original design file and clearly labeling the elements in it. A team of professional design experts also needs to operate manually to refine the creative style and approach of art and design, and finally deliver it to the machine in the form of data information, which simply means that the designer's creative experience is transmitted to the smart device through data, and this process requires the use of deep sequence learning algorithmic models.

The second step to be taken is to establish the appropriate elemental centres. Once the smart device understands the designer's design experience and design framework, it needs to collect and stockpile a large amount of information to create a specialized library of design elements. Image features are then automatically extracted by intelligent machines and subsequently manipulated manually to resolve copyright issues while controlling image quality.

The third step is to generate the art design system. The artificial intelligence device builds a virtual canvas, similar to a chessboard, on the initial design framework, and the art design system presents the elements from the element library onto the canvas, and creates and generates the work through continuous experimentation and constant modification and design, and by combining the designer’s design experience and previous creative style.

The fourth step is the evaluation of the work. Art and design works created by smart devices will be valued by professional art and design professionals in both commercial and aesthetic terms, while smart systems can. The number of clicks and views of the work is collected and recorded as a way to analyze the extent to which the author is recognized and the value of being disseminated.

5. Practical applications and developments in art and design in the context of artificial intelligence

With the widespread availability of the Internet since the last few years, the use of artificial intelligence in the field of art and design has become more prevalent, which in turn has an increasing impact on the art field. Artificial intelligence artists are fully capable of creating works and expressing their thoughts through smart devices, as well as generating different paintings through deep learning algorithms, and even more so using artificial intelligence to compose some musical pieces and poems, and the achievements made in these areas can be said to have largely tied art and design to artificial intelligence creation. From the current practical situation, the application and development of artificial intelligence art design is mainly reflected in the following aspects.

5.1. Creating poster artwork using artificial intelligence

In the design and creation of posters, people can use artificial intelligence art design, the whole process is short, high quality, and effective savings in human resources input, a typical representative of Alibaba's "Luban" artificial intelligence system can produce posters, to a large extent to help Taobao designers to reduce the pressure of work It helps Taobao designers to reduce the work pressure, reduce the workload, and more effectively improve the efficiency of designers.

5.2. Selecting design materials using artificial intelligence

In the process of creating art and design, designers are fully capable of selecting diverse design materials through artificial intelligence technology. Sensei is a typical example, the system can store a large number of images and videos, so that designers can find the right materials for their art creation, the process can be filtered quickly according to their own requirements and style, just click a filter to generate their own design materials, and can also recommend the corresponding design solutions to users the whole process is simple and efficient.
5.3. Using artificial intelligence to generate architectural design solutions
In the field of architecture, one can use artificial intelligence to design architectural solutions specifically for the Mall of Art. This platform is designed to serve the architectural needs of users and is easy to understand. The whole process can be completed in just a few seconds, which not only effectively shortens the development time of architectural designs, but also helps designers to reduce their work pressure significantly.

5.4. Using artificial intelligence to provide color schemes for art design
In current technological design, one can also use artificial intelligence technology to provide color schemes, for which the George Hastings system is a typical example. In the application of this system, the user can completely according to their actual needs to choose the color, and then the system can automatically generate the color matching scheme, the overall effect is not only the combination of high precision, and the time consuming, for the subsequent art design work laid a good foundation.

5.5. Designing clothing pieces using artificial intelligence
People can also use AI technology for clothing design today, and in 2017 Amazon launched an AI algorithm for designing clothing, in which the application of this algorithm allows the user to first provide an image of the clothing, which can then quickly generate a clothing design. It is also able to combine the current market data of the clothing industry to predict the future market trend, so as to design some avant-garde fashion clothing in advance.

5.6. Using Artificial Intelligence for Art and Design Education
In addition to artificial intelligence technology can be applied to art and design, it can also be applied to the field of art and design education. In the classroom, teachers are well positioned to achieve this goal through the flexible use of artificial intelligence technology in order to provide students with a better understanding of art and design. From the current actual situation, the most commonly used system in most schools is the Computer Aided Instruction system, which presents some art knowledge to students through multimedia and creates a virtual reality environment. Triple d printing technology can also be used to express students' design thinking and motivate them to learn art and design.

But from the current actual situation, artificial intelligence system also has certain shortcomings and drawbacks, even though it can provide convenience for people's design work, but cannot completely replace human thought, so in the actual application process also appropriate to artificial assistance, through the organic integration of artificial intelligence and human operation to create more shocking works of art, rather than completely rely on artificial intelligence.

6. Concluding Remarks
In conclusion, for the development of modern art and design, the application of artificial intelligence technology plays a value that cannot be ignored. Applying it to art design not only reduces the designers' work pressure but also shortens the working time and provides more convenience for the whole art design process. However, because art and design works are based on human subjective thoughts and feelings, no matter what achievements artificial intelligence has made, it cannot completely replace human subjective thoughts, and only the appropriate play of artificial intelligence can better promote the development of modern art and design.

Acknowledgements
The study was supported by “Research on creative transformation and innovative development of regional culture in Wuling mountain area from the perspective of industrial integration, China (Grant No. 19A393)”.

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