Research on Application and Breakthrough of Artificial Intelligence in Art Design in the New Era

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Abstract. The influence of artificial intelligence on art design is profound and huge, it changes the development pattern of art at an unprecedented speed. With the full involvement of new media and the continuous impact of artificial intelligence, the art field has changed significantly in terms of production, creation, communication channels and acceptance environment. The materials, space, and time required for contemporary art creation are very different from the past, and art creators can no longer treat art problems with the attitude of the past. Therefore, this paper describes the relationship between artificial intelligence and art design, and analyses the changes brought by the application of artificial intelligence in the field of art design. On this basis, this paper discusses the typical application of artificial intelligence in art design, and puts forward some innovative suggestions for the sustainable development of contemporary art.

Keywords: Artificial Intelligence, Artistic Innovation, Breakthrough

1. Introduction

In the thousands of years of human civilization development, the transformation of production tools and production methods often has epoch-making significance [1]. The coming fourth industrial revolution will be another large-scale intelligent wave in the process of modern human civilization after mechanization, electrification. This time, the development and transformation of human civilization will mainly focus on the three fields of new generation information technology, new energy and new transportation technology. In other words, the continuous development of intelligent technology will bring about changes in productivity and lead to breakthrough innovative research in different fields, including the art and design field.

2. Overview of artificial intelligence and art design
2.1. The concept and definition of artificial intelligence

Many people associate artificial intelligence with the robot when they hear it, but these two concepts are not the same. If we think of a robot as a person, artificial intelligence can be seen as its brain or central nervous system. Before analysing artificial intelligence, we must first grasp the concept of "intelligence". The word intelligence comes from Latin, which is understood literally as collection, collection, collection and selection [2]. It is generally believed that intelligence is the ability of humans to express themselves through mental work in activities that recognize and transform the world. "Intelligence" can also be seen as "intelligence" and "ability". The combination of the two has the meaning of intelligence.

Although both human intelligence and artificial intelligence contain "intelligence", they cannot be equated. The difference between human beings and artificial intelligence is that human beings have the subconscious of dreaming. Long ago, human beings dreamed of creating tools or machines to solve all kinds of physical labour [3]. The emergence of the steam engine in the 18th century, the arrival of information revolution in the 1940s and the emergence of artificial intelligence in the 1950s are all based on the unremitting pursuit of human dream.

2.2. Overview of art design

The main body of artistic creation is the artist, and the artist's life accumulation, ideological tendency, temperament and artistic accomplishment are the foundation of artistic creation. Through observing, experiencing, researching, analysing, selecting, processing and refining the real life materials, artists create artistic images and create works of art. For the general public, due to lack of professional skills, it is even more difficult to create such works of art. No matter how professional you are, you can try your hand and finish a simple work. Through some drawing software, we can use the finger touch to guide the digital art program to draw, which is the convenience and innovation of the art form brought by AI intervention in the art field.

3. The changes brought by artificial intelligence to art design

3.1. The influence of artificial intelligence intervention on traditional art design

The influence of artificial intelligence on traditional art is profound and huge. It has changed the development pattern of traditional art at an unprecedented speed, and has impacted all aspects of traditional Chinese art with unstoppable force. Digital media technology and network service technology are building a "virtual real" world with natural directness and presentation. Digital technologies such as image recognition, cloud computing, artificial intelligence, "Internet +", AR / VR, etc. have gradually blurred the traditional art thinking mode of subject and guest separation, and dynamic and interactive media have formed the mutual subjectivity in art communication [4], Chinese traditional art will usher in a profound change in the great challenge. How to face the challenge, adapt to the change and find the direction of sustainable development in the change is an urgent problem that needs to be solved in the art field today.

3.2. The change of artistic language tendency

Under the background of artificial intelligence, new media art, digital art and other new art forms are building a new visual form and narrative mode of contemporary art. Due to the characteristics of the
Internet beyond time and space, Chinese and foreign artists can stand on the same virtual stage and use new data analysis and digital methods to create art. Therefore, the conflict and integration of cultural tradition and ideology, the dialogue and communication between national characteristics and the world trend are gradually changing the traditional artistic expression language and expanding the territory of the art kingdom. The traditional arts of various nationalities are constantly "updated" and "upgraded" in the process of absorbing the nutrition of big data. Various art-sharing platforms transfer the works of major domestic and foreign museums, art galleries and a large number of creators to the cloud content library in high-definition format for public appreciation, realizing the in-depth exchange of national art and world art.

4. Typical application of artificial intelligence in art design in the new era

4.1. Artificial intelligence and artistic inspiration

Art is considered to be an irreplaceable field of artificial intelligence at present, because people still believe that the bursting of artistic inspiration is the result of people's thinking activities and the result of repeated deliberation and constant summary, while computers do not have the ability of subjective thinking. As far as artistic design itself is concerned, art is an abstract reflection of human thought activities and experiences; while design is a purposeful creative behaviour. From the subjective point of view, machines do not think actively, but they can also be generated through "experience" summary Artistic inspiration and creativity.

Art creation has always been the most advanced form of human spiritual activities, which can promote the mutual connection of human emotions. Art works usually give people a sense of beauty that can be understood but not expressed, and this inspiration and innovation are embodied in the form of algorithms and models in artificial intelligence. Artificial intelligence is mainly expressed in two forms in the generation of works of art. The first form is through the participation of artists, using the randomness of machine algorithms and interacting with people, so as to jointly complete the creation of works of art. The other form is to let the machine learn the characteristics of the artist's work and use the algorithm to generate the artwork that matches the artist's style. The former is a combination of designer and machine inspiration, while the latter is the "pseudo-art inspiration" generated by the machine during the learning process.

4.2. Integration of artificial intelligence and design data

At present, the autonomy of artificial intelligence in art inspiration is not strong, and it is used to provide reference for designers in most cases. All of the above cases show that the current weak AI art creation is data-driven. No matter what the form of input data is, a certain amount of input data is needed as a reference. On the one hand, these data can provide designers with more inspiration to conceive and create. On the other hand, through the processing and analysis of a large number of design data, designers are no longer limited to the small-scale impact of art works, but pay more attention to the linkage of works in a large range. Taking the new project of Ali as an example, through sorting and classifying the basic design data, we can manually mark the design structure and elements, and refine design techniques and styles of designers. Then designers can extract key features from high-dimensional information and generate a design element library. After that, the generator will analyse the
task requirements, use the elements in the element library to generate candidate posters, and combine the user rating model to generate target posters. Figure 1 shows an example of data integration for the new project of Ali.

![Design data integration example](image)

**Figure 1.** The example of data integration

### 4.3. The application of artificial intelligence in colour and style design

Colour is the direction mark of design and the primary factor affecting consumption behaviour; style is the representative and unique feature of the whole art works. This paper mainly takes the application of artificial intelligence in colour and style as an example to analyse the application prospect of artificial intelligence in the field of design.

1. **Semantic colour extraction.** Colour is a kind of feeling. People can associate some words or phrases with some colours, which can better convey the emotion that designers want to express in their works. Designers usually use colour palettes to express colour concepts, so letting machines effectively learn the relationship between colour and text can enrich the diversity of design.

![Auto shading example](image)

**Figure 2.** A case of auto shading

2. **Image colouring.** Exquisite colour selection brings stability, unity and individuality to the work, and the subsequent colouring process will consume a lot of time and energy if artificial direct colouring is adopted. On the other hand, recolour the image can inject new vitality into the work on the basis of
maintaining the original shape of the work of art, and enhance the visual perception of the image for design and artistic purposes. Therefore, image colouring plays a key role in enhancing the visual understanding of the audience. According to the way of image colouring, it can be divided into automatic colouring and interactive colouring. Figure 2 shows a case of auto shading.

5. Conclusion

Artificial intelligence is more like a catalyst in design. On the one hand, it promotes the cross integration of computer science and design. On the other hand, it can stimulate designers' creative inspiration in artistic creation. This paper analyses the cross integration of AI technology and art, and proves that AI will bring great changes to art design industry in the future by listing some practical applications of AI in design. Generally speaking, in the era of closer integration of art design and artificial intelligence, technological innovation will also bring about the renewal of tools, which will also produce more creative works of human-computer cooperation, and art design will also get considerable development.

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