Exploration on the application of artificial intelligence elements in Graphic Design

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Abstract—With the development of The Times, graphic design has developed from the original cave murals into one of the most basic art manifestations of human society. In addition, influenced by the development of big data and artificial intelligence, graphic design is no longer an unrestrained imagination, but a new ecological design presented after scientific data analysis. In other words, the application of artificial intelligence can greatly improve the overall quality and ornamental effect of graphic design works. This discusses the specific application of artificial intelligence elements from the background landscape design, plane interaction, plane color matching and plane landscape virtualization. This paper will be conducive to broaden the specific ideas of artificial intelligence elements in graphic design application, and finally provide a direction for the development of graphic design.

Keywords-Graphic design; AI; application and inquiry

I. INTRODUCTION

The progress of The Times and technology, artificial intelligence has been integrated into various industries of social development. As one of the typical representatives of modern science, artificial intelligence forms a form of systematic production by the simulation of human thinking, imagination and intelligence. It includes a variety of human-computer interaction, deep exploration, artificial intelligence algorithms and other technologies, among which modern technologies such as face recognition and intelligent robots have been widely used in many fields. Graphic design is to combine the pictures, words, colors, signs and other basic elements in a plane according to a certain purpose, so as to form a complete design work. Graphic design essentially revolves around people. Because the design concept itself is based on the understanding of people's heart, the observation of human world, the satisfaction of human nature and desire, the graphic design itself also reflects the interaction relationship between people and the environment. Although artificial intelligence cannot completely replace people's thinking and imagination to conduct graphic design, its impact and effect on graphic design is all-round. For example, market analysis, design content and consumer portraits are all inseparable from the role of artificial intelligence. Thus, the application of artificial intelligence elements has a positive role in improving the quality of graphic design and improving the viewing effect of graphic design works. However, in reality, because graphic designers do not grasp artificial intelligence technology, it is difficult to realize the practical application of artificial intelligence elements in the design process. Therefore, this paper starts from all aspects of graphic design, discusses the reasonable application of AI elements in the design process, so as to further improve the overall quality of graphic design and its works, and further promote the overall development of the industry[1].

II. INTRODUCTION OF RELEVANT CONCEPTS

A. Artificial intelligence

Artificial intelligence technology can be widely understood as the ability to use computer systems to solve complex tasks that could have been solved or accomplished only on human intelligence. The concept of artificial intelligence was first proposed in the United States in 1956, following four periods of development. Artificial intelligence has achieved fruitful results in most fields. In this information technology revolution, technicians have been trying to explore the essence of intelligence through the analysis of intelligence. Therefore, during the design and research process of artificial intelligence, researchers have been trying to design an intelligent machine that can respond differently to external stimuli like people. After repeated research and experiments by the researchers, the intelligent machine is finally designed, which can simulate the human thinking and intelligence and achieve the expected research results.

B. Graphic Design

Graphic design has undergone hundreds of years of development, from the early realistic design, to today's diversified design, he has been completely integrated with our life. Graphic design is highly professional and artistic. It is the vision as a way of communication and expression, through vision to convey design ideas. Graphic design tends to take a variety of ways to form new design works by creating or combining different words, patterns, symbols, etc. In this process, the designer actually conveys the design concept and basic information. For example, designers will use color. Fonont, visual art and other design skills to show or convey their own design ideas[2].

The traditional graphic design is designed with points, lines, and surfaces as the core. Through the understanding of point, line, face and color, designers design works that meet customer requirements. Because the application of point, line and surface follows certain rules and skills, so designers always on the existing aesthetic standards and design skills, through the own understanding of the purpose of creation and design. In fact, this process of constantly summarizing and summarizing design rules and skills by predecessors is also the development process of big data. Because with the continuous development of artificial intelligence and technology, this so-called experience summary will serve as a data analysis, quickly generated

through computer formula processing, generating tens of thousands of times that of the human brain.

III. IMPACT OF AI TECHNOLOGY ON GRAPHIC DESIGN

A. Change the design thinking

The development of big data and artificial intelligence makes it possible for any work in the current social field to be replaced by machines. On the one hand, the strong working ability of intelligent machines can greatly reduce the design cost, to the other hand, the development potential of artificial intelligence is huge, which will bring greater growth space to human brain manufacturing, so as to further promote the development and evolution of human brain. With the rapid development of AI technology, graphic designers no longer rely on traditional hand drawing, but began to combine information technology, make full use of computer-aided design systems, greatly improving design efficiency. Such as CAD,PS assisted design software can help designers deliver ideas and enhance performance. In addition, computer-aided systems can help designers escape from traditional design concepts and forming new color schemes or design schemes. In this process, the effective integration of designers and artificial intelligence is realized. As previously stated, any work is possible to be replaced by a machine. Therefore, the application of artificial intelligence in graphic design will also virtually increase the sense of professional crisis of designers. This will slowly transform the relationship between designers and AI from cooperation into competition, a process that will gradually develop the designer's keen observation and imaginative thinking ability[3].

B. Expand the design field

The rise of high-tech technologies such as 5G, big data and the Internet of Things makes the human-machine graphic design gradually develop. This not only opens up a beautiful employment channel for graphic design practitioners, but also brings more and more middle and high-end design products into the market. In the process of scientific and technology development, people are no longer pursuing the shape of the product, but enjoy the service and experience brought by the product. Thus it can be seen that if graphic design works want to seize the market and love by more and more consumers, they must reflect the consciousness of innovation and service. Influenced by the COVID-19, many offline physical stores and commodities have been hit down, while products with novel design concepts and online service functions have been popular by consumers. This also opens the gap between designers and design products. It can be seen that in the information age, only when the product gives the new meaning of data, network or algorithm, can it accurately connect or meet the needs of customers.

C. Artificial intelligence and graphic design to create a new life

It is by seeing the development prospect of artificial intelligence that designers have introduced AI elements into their own design process. The design of artificial intelligence elements will become a brand new way of thinking and creation, which will not only bring product changes, but also innovate people's lifestyle. For example, intelligent interconnected homes, smart cities, intelligent robots, which always convey the changes and convenience brought to our lives by the intelligent era.

IV. APPLICATION OF AI ELEMENTS IN GRAPHIC DESIGN

Artificial intelligence applies many elements in graphic design, among which the more common are intelligent rendering technology, interactive technology, intelligent algorithms and virtual intelligence technology. These four technologies are applied to color design, interactive design, background landscape design and actual landscape virtualization design. Next, this paper will conduct a thorough analysis of the specific application of these four AI elements in graphic design.

A. Intelligent rendering technology

Graphic designers tend to use intelligent rendering technology to make it work on flat color design, with the aim to make the whole design work more rendering. The application process of intelligent rendering technology in graphic design is detailed as follows:

First, the designer should clarify the material and location of the landscape, and fully consider the external influencing factors such as transparency and environmental light. At the same time, designers need to fill in the texture, material of the landscape and other important information into the key entities. In addition, according to the needs of the work, the designer will adjust or modify the above information through the modification tool.

Secondly, the designer should install the location of the target camera, clear the observation Angle. The aim is to highlight the key goals in the design process and thus provide better visual effects.

Finally, in the graphic design and rendering process, the designer can add the appropriate scenery according to the needs of the work. The purpose is to make the design work more realistic, thus completing the whole intelligent rendering process of graphic design[4].

B. AI interaction technology

Interaction is a special performance in graphic design that plays a very important role in virtual graphic design. The virtual platform uses virtual reality technology to appropriately adjust the location and type of products required in graphic design to realize the interaction of graphic design. Interactive technology in realistic graphic design can provide consumers with more real perception and contact effects to help consumers have a comprehensive perception and understanding of the surrounding environment. In addition, consumers can also switch over any scene in the virtual platform at will, so as to realize the consumer interaction with the graphic design content in a three-dimensional environment. Through the conceptual model in AI interaction technology, designers can not only realize the interaction and communication with the platform, but also more accurately obtain all kinds of information in the plane landscape. Figure 1 is a specific flow chart of the AI interaction technology in graphic design.
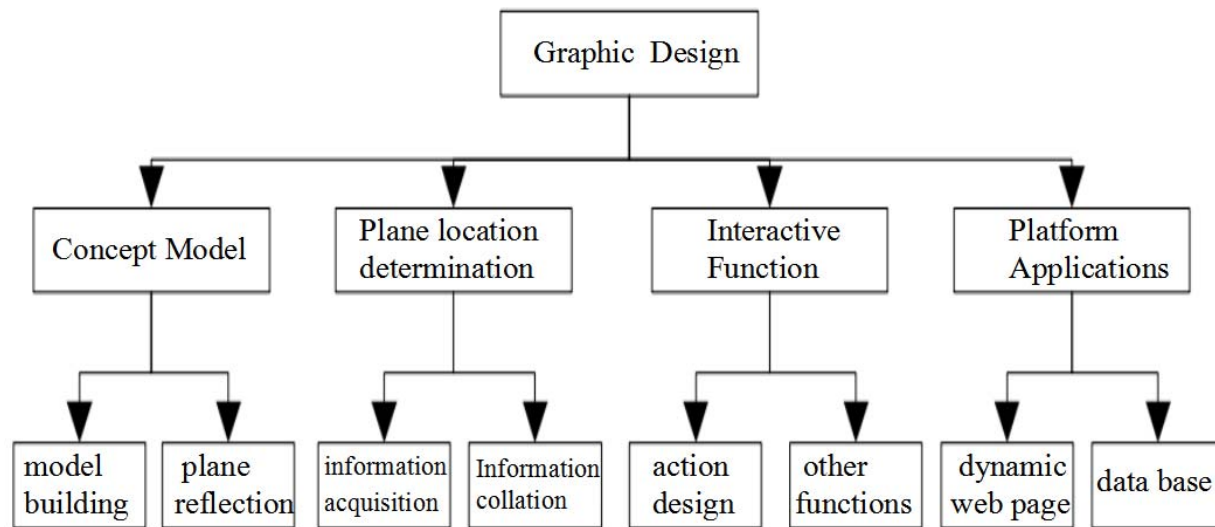
Figure 1. Specific implementation process schematic diagram of AI interaction technology.

The application of conceptual models in graphic design makes information clearer, mapping simpler, and easier for designers to master. When designers introduce the conceptual model, they can send the acceptable information content to the design scene of the virtual plane, thus interacting with the model with the outside world. At the same time, this can also maximize the application scope of virtual platforms, thus providing more resources for graphic design. It is worth noting that the data information contained in these resources has a certain validity and authenticity.

C. Artificial intelligence algorithm

AI algorithms applied to background landscape design can help designers acquire more food landscapes and map them to a flat background. This intelligent element is mainly implemented mainly through a virtual platform. In the virtual platform, the designer determines the specific location of the landscape by obtaining the signals, and the operation process is as follows:

First, the designer needs to create a signal transmitter in the virtual platform to measuring time. The distance is calculated as follows:

$$S=(T-T1) \ V.$$

In the above formula, S represents the distance between the signal transmitter and the receiving device located on the same horizontal line; T represents the time when the signal is transmitted; T1 represents the time when the signal is received; V represents the propagation speed of the wireless signal. Through this distance calculation formula, designers can accurately obtain the positioning of the landscape. However, when the distance between the transmitting signal transmitter and the receiving device is relatively long, it is difficult to obtain the accurate distance between those through the separate signal. Therefore, the virtual platform needs to launch two models. The distance can be accurately determined by calculating the time difference of the both signals. Once the location of the physical landscape is determined, the designer

can save the location data through the virtual platform. At the same time, designers need to build a new plane and save the data from the physical landscape into the new plane. The designer finally generates the plane background map by adjusting the physical image in the plane appropriately[5].

D. 3 D virtual intelligence technology

As a key step in the graphic design, the actual scene virtualization can present the real scene in the graphic design. Traditional graphic design, to achieve the above purpose has a great difficulty. First, designers need to build a digital model that collect real data from the actual scene, including the length, width, size of the actual scene, etc. Second, the designer needs to input this data into the digital model and measure the actual scene. Finally, the designer needs to make a detailed design according to the measurement results. The above process will take designers lot of time.

In fact, the three-dimensional virtual intelligence technology in the artificial intelligence elements can solve the above problems very well. This technique in graphic design can effectively simplify the whole process of actual scene virtualization. First, designers should choose different modeling methods based on different product models. For simple product models such as tables and chairs, designers can use the combination of modeling nodes. For objects with complex structure, designers need to design the model using three-dimensional virtual intelligence technology. This technology can provide relatively simple nodes for the platform, and through the design of the object texture, material and other details, to constantly enhance the authenticity of the object. 3 D virtual intelligence technology uses a modular design concept to save each product in a complete file. In making the graphic design, only the designer can introduce the connection points in the platform into the corresponding scene to complete the corresponding product design. This operation not only greatly simplifies the process of graphic design, but also greatly improves the authenticity of the scene.

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V. Development trend of the plane design under the application of artificial intelligence elements

A. Diversiof expertise

Although AI has achieved remarkable achievements in some fields, AI has some disadvantages in design due to the development itself. For example, some homogeneous or similar products, tend to appear a similar design phenomenon. Therefore, graphic designers should constantly enhance their professional knowledge, master the software of graphic design, theory, and always maintain the mentality of running with the computer.

B. We will cross science and technology

Most designers believe that as long as they have a good aesthetic concept, solid visual communication knowledge and rich experience can complete excellent design works. In fact, the diversity of graphic design requires that the design should achieve technological crossover. For example, a car brand company printed a photo of individuals and cars on the stamp. The design itself is not very difficult. If it is manpower modification one by one, the speed is also faster, but if replaced with thousands of pictures, then the ability modification is difficult to reach. However, designers can skillfully use the programming language function of Excel system, and through writing programs and data operations, they can realize the design and modification of tens of thousands of pictures a day, so as to achieve the purpose of publicity and design[6].

C. Innovative thinking

Whether the technology development of artificial intelligence, or the way and skills of graphic design, all need to constantly cater to the development of The Times and the needs of the market. Only by innovating developers and graphic designers can fully integrate two different things, artificial intelligence technology and graphic design, and finally make the new content of the design superior to the original independent content.

VI. CONCLUSION

In order to explore the specific application of AI elements in graphic design, this paper focuses on intelligent rendering technology, interactive technology, intelligent algorithms, and virtual intelligence technology. This paper further confirms the feasibility and practicability of AI elements in graphic design application by exploring the specific applications of these four technologies in color design, interactive design, background landscape design and practical landscape virtualization design. However, the AI technology itself is still in the development stage, and due to the limited development degree, it still has some drawbacks. Graphic design is also in the process of continuous development and change.Therefore, to achieve the good use of AI elements in graphic design, more researchers need to invest in this field to constantly explore new problems, and finally constantly improve.

Development of workflow platform for simulated Advertising Companies—A case study of "Poster Design" course.

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