On the Concepts of Artificial Intelligence and Innovative Design in Product Design

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ABSTRACT: With the continuous development and wide application of artificial intelligence technology, new opportunities are brought for innovative product design. Artificial intelligence improves the efficiency of product design, so that besides satisfying people's daily needs, the humanization, intellectualization and experience interaction of artificial intelligence technology inject unique sensory experience into products to meet people's spiritual needs. This paper explains the concept of AI, points out the application direction and development trend of AI in the field of design, provides more comprehensive theoretical and practical reference for product design, and promotes the construction and development of intelligent life.

1. Survey of Artificial Intelligence

1.1. Artificial Intelligence
As a new science and technology, artificial intelligence technology mainly develops and studies the theoretical methods and technical means of simulating and expanding human intelligence. Artificial intelligence technology, nano science and technology, and genetic engineering technology are known as the three most advanced technologies in the 21st century.

The development of AI technology can be divided into four stages: gestation stage, formation stage, knowledge application stage and comprehensive integration stage. At present, AI technology in China is in the weak AI stage. That is to say, AI technology in China does not have the ability of independent reasoning, self-thinking and independent problem solving. At present, AI technology in our country does not have self-consciousness. Only when researchers develop appropriate programming language, AI will have the ability of self-thinking, self-perception and self-action.

1.2. History of Artificial Intelligence
In short, artificial intelligence is to make machine equipments have the same wisdom and ability as human beings through artificial methods. At present, because scientists still have doubts about intelligence, there is no precise definition of artificial intelligence in the scientific community. The concept of AI was first proposed by Turing, the father of computer science, and then by McCarthy, the father of AI, in 1956, with the efforts of several generations of scientists. However, due to the immaturity of theory and technology, the research of AI stagnated in the 1970s and 1980s, until the maturity of information technology and theory, AI entered a period of rapid development. Nowadays, more and more AI products come into people's lives, and at the same time, they also inject interest into life.
1.3. development status of artificial intelligence
With China's AI technology attaches great importance to and support, sound policy advantages and development environment to promote the development of China's ai technology. Especially since the 21st century, the rapid development of Internet information technology has provided solid data resource support for China's artificial intelligence technology and laid a stable foundation for the development of China's artificial intelligence technology and industrial chain.

The rapid development of artificial intelligence technology brings opportunities for the development of product design, also faces severe challenges. First, the AI talent reserve is seriously insufficient. Compared with developed countries, China's AI technology talent training system is not sound. Secondly, there is information island in the construction of data platform. Generally, the development of artificial intelligence technology cannot be separated from the support of massive data information. Finally, with the continuous development of artificial intelligence technology, social problems highlighted by artificial intelligence in some fields are increasingly aggravated, which will lead to unemployment in some industries.

2. Overview of innovative design

2.1. concept of innovative design
Innovative design is a systematic transformation process in which information is represented, perceived, concrete, abstract and cognitive in the process of ascending and descending dimensions of 11 dimensions. It is a combination of innovative ideas and design practice. In the design of science, technology, culture, art, society and economy, give full play to creative thinking, design and develop new products with novelty, creativity and practicality.

Product design follows the principle of people-oriented, user experience as the core, to meet the basic needs of users, pay attention to the mining of new functions of products, new USES, at the same time using new materials, new methods, new technology, reduce product costs, improve product quality and market competitiveness.

2.2. influence of artificial intelligence on innovative design
The information and communication technology represented by artificial intelligence not only changes people's life, but also changes people's feeling of getting the real things in the real world. In other words, the value system formed by the application of artificial intelligence technology is sympathetic to the group user experience and individual sensibility, giving birth to new aesthetic concepts and aesthetic consciousness. Under the background of artificial intelligence, it has changed the traditional business model. On the one hand, the service system of mass production in the industrial era has gradually changed to the direction of product and service customization, and from the group user experience to individual sensibility. On the other hand, individual sensibility, based on massive data information of artificial intelligence, gradually forms a collaborative symbiosis between group intelligence and sense of experience, and product design develops towards the direction of high perception, high efficiency, high value, high speed and high appearance level.

In order to make the results of artificial intelligence more consistent with human aesthetic consciousness, it is urgent to use human aesthetic consciousness to carry out innovative design, so as to meet the two basic aesthetic systems of appreciation and identification and value creation.

3. Application of artificial intelligence and innovative design in product design

3.1. change productivity and create new production tools
From the initial imitation of human intelligence to the independent formation of independent thinking mode, artificial intelligence has changed from passive supervision and compulsory to unsupervised active thinking and learning, subvert the traditional intelligent productivity, the winning relationship between artificial intelligence and production creator, and can fully express creative ideas in product
design. The way, expression, presentation and content of art are all embodied by artificial intelligence. Artificial intelligence provides natural conditions for the creation of artistic content and aesthetic forms, as well as new perspectives and approaches for innovative design and aesthetic consciousness. How to use aesthetic consciousness, choose aesthetic dimension and judge aesthetic value in artificial intelligence environment has become the key to the application of artificial intelligence in product design.

3.2. integrate massive information data to analyze public intentions
In the proposal and research stage of product design, artificial intelligence technology is applied to analyze people's intentions through big data, so as to determine the trend of future products and business development direction. For example, WeChat and weibo can provide official reference and referential data. What is the hot spot in the future, changes in user groups, and even what happens in the future will affect product design. Therefore, a sentence of big data and mathematical model can help us develop and make more appropriate decisions.

In the process of product design, the sketch stage is the most focused stage, and the charm of artificial intelligence is mainly shown here. The most creative link is given to the designer to release the designer's productivity, so as to focus on product creative design. By analyzing every sketch, accumulating image learning data, and automatically optimizing the sketch, whether it is a paper sketch or a two-dimensional rendering, artificial intelligence will greatly improve the work efficiency of product design.

With the progress of science and technology, 3d modeling software can be fully applied in product design to transform the ideas in the mind into the created and built models in real space, and then the precise digital models can be generated by the computer to further release the productivity of the creative personnel.

In the product design, the artificial intelligence will automatically check the model, save the model, model everywhere, and form a seamless connection with the renderer. With the development and application of rapid prototyping technology, the virtual product design in one second will become the real product in the next second.

3.3. real-time optimization to achieve optimal product design
At present, artificial intelligence technology in the field of product design emphasizes fast iteration. Without too much courage from the creators, it can conduct real-time review and optimization, closely combine digital model, effect drawing, packaging and production, and automatically generate variable set and animation video.

In the process of product design, production, artificial intelligence will carry out model inspection, surface analysis, assembly inspection, budget analysis and so on. At present, the field of product design in China has entered the preliminary stage of intelligent product design. We do not have to worry about the impact of creative modification on the downstream. Before production or even in the production process, artificial intelligence means and methods can be used to optimize the design scheme in real time and finally achieve the optimal product design.

Image editing and intelligent typesetting are adopted in product design and packaging stage. For graphic design, in the future, artificial intelligence will better reduce the work intensity of designers, and some skilled and repetitive work will be completed by artificial intelligence machine, while design can focus on the thinking innovation of "design" itself.

4. To summarize
Artificial intelligence is the inevitable result of scientific progress and the development of human society. It is also the inevitable trend to adapt to the fierce market competition. The extensive application of artificial intelligence changes human life, improves work efficiency and creates more value wealth. Product design with the advantages of artificial intelligence automation, not only release the designer's productivity, but also inspire creativity, improve design efficiency, make the product
more humane.

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