Development of Graphic Design Based on Artificial Intelligence

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Abstract. Since the emergence of artificial intelligence (AI) in the graphic design field in 2016, it has posed a severe threat to the traditional graphic design industry and designers. In this critical situation, how the traditional graphic design industry will develop in the next step has become the focus of concern in many people, especially practitioners in the graphic design industry. Hence, the future development path of graphic design is analyzed from the perspective of AI in this paper, which mainly includes four aspects as follows: the multi-dimensional performance of graphic design, the integration of new technologies in graphic design, the “interdisciplinary” cultivation of talents, as well as the positioning and promotion of graphic designers. It is expected that the analysis of these four aspects can provide some reference for the future development of the graphic design industry.

Keywords: Artificial Intelligence, Multi-dimensional, Graphic Design, Technological Innovation

1. Introduction
Due to the influence of multiple factors, the communication and expression of visual information are also moving towards a deeper and more meta direction[1]. Meanwhile, it further promotes the applied research of dimension expansion in graphic design, and with the deepening of the subject, it also establishes the practical significance and guiding significance of dimension expansion to a certain extent. Based on this background, new requirements and prospects have been put forward for contemporary designers[2-3]. Designers should continuously improve their professional quality. When conducting multi-dimensional design, they should be committed to breaking through traditional concepts and existing thinking habits, re-examining the contemporary art atmosphere, paying close attention to the multiple needs of the public, mastering the new phenomena and new features of the development of the times in real time[4], and continually exploring the causes of the driving force of the new trend in graphic design, integrate the concept connotation of various disciplines, different
artistic forms and the splicing and combination of various media materials, and combine the latest multimedia comprehensive technology to carry out multi-angle and deep-level innovative thinking, to mobilize the audience's perception of vision, hearing, smell, taste, touch and other systems, and apply the plane multi-dimensional expression to different fields. In the field of design, more interactive and forward-looking works are designed to further promote innovation and development in the field of design[5-6].

In 2016, Google in the US developed the artificial intelligence (AI) applied in the field of graphic design, which undoubtedly poses a great threat to people engaged in graphic design. Currently, human society has entered the information age. On the one hand, it makes our life more convenient than in the past. On the other hand, it is gradually changing the whole design industry. Although AlphaGd can deduce the corresponding design form based on the customer's requirements, combined with the general market consensus and aesthetic knowledge, and reasonably use the design elements such as color and grid. Despite the powerful function of AI, it can only imitate the existing board, but cannot achieve independent innovation. Hence, in the future graphic design industry, designers of AI such as AlphaGd will replace the artificial designers who are lack of innovation consciousness. Hence, how to develop the designers and the whole design industry in the “big design” era is a problem to be considered seriously and addressed urgently.

2. Multi-dimensional expression of graphic design
The so-called plane form generally refers to the essential design elements such as two-dimensional graphics, symbols, and characters. It is the most common in poster design, book design, font design, logo design, web design, interface design, and illustration design, ranging from an icon or a logo to the page design of the whole website. Their essential characteristics are presented in plane form. However, with the improvement of the aesthetic needs of the public and the professional skills of designers, the monotonous planarity cannot follow the pace of the design era, which leads to the “extension” and “expansion” and other three-dimensional design methods, and this “three-dimensional” innovation also brings a touch of fresh color to the design industry, but also brings more visual impact and fun experience to the public.

In recent years, science and technology have developed rapidly in various fields, among which AI technology has also made significant progress, and the emergence of AI has seriously challenged the work of artificial designers and traditional graphic design. Under the influence of the new media, the traditional graphic design began to break through the plane range and develop to the integration of multiple cross-media, and gradually make the multi-level way of expression come true. Thus, the former two-dimensional representation began to transition to three-dimensional representation. For example, in the past, the two-dimensional representation was often used to design the corporate logo, but now the three-dimensional representation is often used to design the corporate logo, which can make the corporate logo show a more three-dimensional and vivid visual effect. Also, the way that graphic design works transmit information has also changed a lot in the Internet information age. In addition to the traditional print, we can also use the Internet, app and other technical means to transmit graphic design information.

In the process of graphic design, the application of various new technologies can play a supporting and promoting the effect in the development of the graphic design industry. The emergence of AI
breaks through the traditional layout design in graphic design. On the one hand, it dramatically improves the speed of layout, which can save a lot of human resources. With the continuous improvement of people's living standards, there are higher requirements for the visual experience, as well as the higher spiritual and cultural pursuits. Hence, the aesthetic and use functions of books, magazines, and other printed materials can fully meet people's needs only with continuous improvement. Hence, the rapid development of the graphic design industry in recent years and the use of new printing technology is also a big deal. The graphic design and printing process are closely linked, which can further expand the development space of the two in the future. From the beginning of black-and-white printing to the current CTP direct plate making, every update of printing technology will promote the development of the graphic design industry. In recent years, 3D printing technology enables fast output from the plane to the three-dimensional. Now many graphic designers begin to use 3D printing technology to design and produce the three-dimensional logo, chest card, and other decorations. With the continuous exploration of people, future 3D printing technology will be further developed and improved for extensive application in various industries.

3. “Interdisciplinary” talent cultivation

Based on the current situation of the graphic design industry, its education concept and education mode pay more attention to the cultivation of basic technical knowledge and basic skills, which is not in line with the requirements of the society today for graphic design talents. Nowadays, human society has entered the information age. For graphic designers, the most important thing is to have new thinking and rich knowledge reserve, only in this way can they adapt to the changes of the times. Hence, for the contemporary graphic design education, it should have three characteristics: comprehensive, complex, and cross. Currently, many colleges and universities have begun to implement the “interdisciplinary” training of graphic design talents. For graphic designers, they should not only master the theory and method of graphic design but also understand and understand the knowledge of other disciplines, so that they can use the knowledge of multiple disciplines to carry out relevant design work. For example: to achieve an excellent visual effect in the packaging design of a product, in addition to reflecting the design elements in the plan, it is necessary to carry out corresponding innovation, and at the same time, the designer should have a full understanding and grasp of the knowledge of materials, printing technology and other related aspects. Therefore, in addition to the narrow sense of “design”, graphic design $V_x(s_1)$.

$$V_x(s_1) = r(s, a_1) + y r(s_{_1}, a_{_1}) + L = \sum_{i=0}^y r(s_{_{i-1}}, a_{_{i-1}}).$$

(1)

However, in the process of virtual maintenance, a virtual human cannot fully foresee the state transition process. For example, if the initial state is a hand-held wrench, the virtual human cannot foresee the next state output. Therefore, the state accumulation return is converted into action accumulation return to improve the unknown problem of state transition in an uncertain environment. The action return process is defined as follows:

Definition set $Q(s, a)$ agent in state $s$ select action below $a$ return value obtained, $Q$ The learning
function is defined as follows:

$$Q(s,a) = r(s,a) + \gamma \max_a (s',a')$$  \hspace{1cm} (2)$$

The Agent only needs to consider each available action that can maximize $Q(s,a)$ the current state $s$.

The action selection probability value $p(a|s)$ is introduced, equation (2) is modified, and the learning function is transformed into the following

$$Q(s,a) = r(s,a) + \gamma p(a|s) \max_a (s',a')$$  \hspace{1cm} (3)$$

Where $p(a|s)$ is the probability that action $a$ is selected at the initial state $s$.

4. Spatial design in graphic design

With the optimization and integration of multiple disciplines, the visual expression forms of other art categories also permeate the graphic design, especially in the spatial environment of the graphic form. Through various techniques, the visual depth is formed, so that the dimensional expression, artistic feeling, and exploration of the graphic design can be properly displayed in the spatial design.

The designer uses the plane spray misperception technique to virtualize the light and shadow, forming a multi-level perspective relationship from deep to shallow, showing the spatial language in the dimension, matching with the environment, creating an amazing three-dimensional effect, as if it can pass through the wall in an instant and enter another space, as shown in Figure 1 below.

![Figure 1](image-url)
5. Conclusions

Although tremendous progress has been made in China’s graphic design industry over the decades of development, continuous self-innovation is required under the challenge of the AI technology represented by AlphaGd. In the future development process, new technologies should be combined to cultivate innovative thinking and train “interdisciplinary” talents vigorously for the sustainable development of the graphic design industry.

References

[1] Liu, Nan Bo, Wu, Zhao Yun, Li, G.Y., & Weng, N. . Research on the cad technology of resin-bonded diamond abrasive tool based on quality control. Key Engineering Materials, 487, 204-208.

[2] Shahnaz Shahbazova, Manfred Grauer, & Musa Suleymanov. (2011). The development of an algorithmic model for object recognition from visual and sound information — based on neuro-fuzzy logic. Annual Conference of the North American Fuzzy Information Processing Society - NAFIPS, 1-6.

[3] Andreja Istenic Starcic, Mara Cotic, & Matej Zajc. (2012). Design-based research on the use of a tangible user interface for geometry teaching in an inclusive classroom. British Journal of Educational Technology, 44(5), 729–744.

[4] Su Lin, & Zhao Ying. (2012). Fault diagnosis of navigation satellite attitude control system based on data-driven combined with artificial intelligence. Lecture Notes in Electrical Engineering, 161, 123-136.

[5] ZHANG Xiaoping, & WANG Junze. (2010). System development of 3-d braided fabrics simulation based on web. Journal of Textile Research, 31(2), 129-133.

[6] H. Jia, & L. Deng. (2018). Oil reservoir water flooding flowing area identification based on the method of streamline clustering artificial intelligence. Shiyou Kantan Yu Kaifa/Petroleum Exploration and Development, 45(2), 312-319.