



# Exploring the Application and Influence of Artificial Intelligence AIGC Technology on Logo Design

Yiyi Zhao

Shijiazhuang University of Applied Technology, Shijiazhuang, China

e-mail: 2013010678@sjzpt.edu.cn

**Abstract.** The purpose of this study is to explore the impact of AIGC (Artificial Intelligence in Graphic Design) technology on logo design, focusing on its role in enhancing creativity and efficiency. By using AIGC technology, designers can get automated logo design solutions and generate diverse creative designs through machine learning and deep learning algorithms. This study uses empirical research methods, combined with quantitative and qualitative data, through the AIGC technology to generate logo design and manual design comparison, to assess the effectiveness of AIGC technology in improving the creativity and efficiency of logo design. At the same time, the user's perception and feedback, as well as the practical application of AIGC technology in the design process are also considered. The results of the study will contribute to a deeper understanding of the potential and limitations of AIGC technology in logo design, and provide practical advice and guidance for professionals in the field of design. This study is of great significance to promote the application of AIGC technology in the field of graphic design and explore the way of design innovation.

**Keywords:** component; artificial intelligence, AIGC technology, deep learning, creativity, automatic generation

## 1 Introduction

In today's highly competitive business environment, brand logo design is critical to the success of a business. Logo design is an important element to shape brand image, convey core values and attract target audience<sup>[1]</sup>. However, the traditional logo design process usually requires a lot of manpower and time, and there are limitations in creativity and efficiency. Therefore, it is urgent to find an innovative way to improve the process and quality of logo design.

AIGC technology is an innovative technology based on machine learning and artificial intelligence algorithms, which can imitate human creativity and design thinking, and automatically generate graphic designs with artistic sense and visual appeal<sup>[2]</sup>. In the field of logo design, AIGC technology can generate logo designs of various styles, shapes and colors by learning a large amount of logo design data and visual elements. It can automatically adjust design elements according to the brand's positioning and needs, and provide multiple design options for designers and brand owners to choose

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and modify. The purpose of this study is to explore the application of artificial intelligence generated graphic design (AIGC) technology in logo design and evaluate its impact on creativity and efficiency<sup>[3]</sup>. By introducing AIGC technology, we can use machine learning and algorithms to automatically generate logo designs, thereby increasing the efficiency of the design process and exploring its impact on creativity and brand image. This has important implications for designers, brand owners and marketers, providing them with more creative possibilities and opportunities to liberate productivity<sup>[4]</sup>.

## **2 Application of AIGC technology in logo design**

### **2.1 The Importance and Influence Factors of Logo Design**

The key role of logo design in brand building and market communication Logo design plays an important role in brand building and market communication. Brand logo is one of the core logos of an enterprise, which carries the values, personality and identification characteristics of the brand. Through a well-designed logo, businesses can establish an emotional connection with consumers and create a unique brand image<sup>[5]</sup>. Logo design can highlight the uniqueness of the brand in the fierce market competition, attract the attention of the target audience, and establish brand awareness and recognition.

### **2.2 Factors Affecting Logo Designs**

Logo design is influenced by a number of factors that need to be considered during the design process. These include target audience, industry characteristics, brand positioning, design principles and market trends. The target audience is an important reference object for logo design, and designers need to understand the preferences, needs and cultural background of the target audience in order to ensure that the logo design can resonate with them<sup>[6]</sup>. Industry characteristics relate to the requirements and restrictions of logo design in different industries, such as the preference of fast moving consumer goods industry for simple and easy to identify logo design. Brand positioning is the basis of logo design, logo needs to convey the core value of the brand and personality positioning. Design principles such as color, shape, font, etc. will also have an impact on logo design. In addition, changes in market trends need to be taken into account to ensure that logo design can keep pace with the times.

### **2.3 Application of AIGC Technology in Logo Design**

In logo design, AIGC technology can be used to assist in the process of generating logo designs<sup>[7]</sup>. Designers can use the algorithms and models of AIGC technology to automatically generate creative logo designs<sup>[8]</sup>. Commonly used generation tools include stable-diffusion, prodia, dream studio.ai, which include the use of generative adversarial networks (GANs) to generate diverse logo design solutions, or the use of

deep learning models to learn and predict trends and styles in logo design. Use the following tools to design a clothing brand logo. Description: Red and gold with Chinese elements: You can use Chinese characters, China patterns or traditional clothing elements such as fans, embroidery, cloud patterns, etc. in the logo to show the brand's Chinese style.

(1) Stable-Diffusion is a graphic design software that utilizes advanced algorithms to generate unique and visually appealing designs. It provides a range of tools and effects to create custom logos and artwork. The generated 4 designs can be further customized and adjusted according to your own needs. Stable-Diffusion provides visualization tools that allow users to preview and modify designs in real time. Stable-Diffusion may not have specific Chinese elements or templates and may require users to add or adjust design elements themselves. The following is an auto-generated flag as described in detail, Figure 1.



Fig. 1. stable-diffusion (3D grid)

(2) Dream Studio.ai is an AI-driven design platform that provides automated logo generation and customization. It uses artificial intelligence technology to quickly generate multiple design options, saving time and effort. At the same time, it provides a variety of styles and elements to choose from, which can be customized and adjusted according to the brand demand. It can preview and generate 1-8 designs in real time. At the same time, designers can modify and adjust 1-8 designs according to their own design literacy to ensure that they meet the style requirements of the brand logo. Dream Studio.ai template is rich, designers make reasonable use of the driving platform, it can become a tool and assistant for designers to create a more humane and beautiful logo design, Figure 2.



Fig. 2. Dream studio.ai (3D style)

(3) Prodia is a design software designed specifically for creating professional logos and branding materials. It provides a variety of tools and features to customize the design. It can customize the design according to your needs and add elements such as text, shapes and effects. Prodia may have a learning curve for beginners, requiring some time and experience to become familiar with its features and workflow. In addition, it can only generate 1 pattern at a time. The following is an auto-generated flag as described in detail, Figure 3.



Fig. 3. Prodia generation

In short, designers can choose the right design tool or combine multiple tools to create the logo design of each brand according to their own needs and preferences<sup>[9]</sup>. Adjust and optimize according to brand characteristics and style to ensure that the design matches the brand image and attracts the attention of the target audience.

### 3 Research Design and Evidence

#### 3.1 Research question

(1) Research question: What is the impact of AIGC technology on logo design?

(2) Empirical research methods: experimental research reasons: Through the experimental study, we can control variables and compare the difference between the logo design generated by AIGC and the manual design, thus obtaining more reliable and accurate results.

(3) Data collection and sample selection. Data collection method: Design and distribute an online questionnaire to professional designers and relevant industry experts to understand their application and views of AIGC technology in logo design.

(4) Sample selection: random sampling, participants are selected from design professionals in school-enterprise cooperation enterprises. Sample size: 50 design professionals.

#### 3.2 Research evidence

##### Comparative analysis of logo design generated by AIGC technology and manual design.

a. Independent variables: Design Method: AIGC-generated design vs. artificial design

b. Dependent variables:

Aesthetics Score: Use a scale of 10, ranging from 1 (very unaesthetic) to 10 (very aesthetic)

Innovative Score: Use a scale of 10, ranging from 1 (Very unoriginal) to 10 (very innovative)

Brand Expression Score: Using a scale of 10, ranging from 1 (very inaccurate) to 10 (very accurate)

SPSS analysis was performed on the collected data (Table 1):

**Table 1.** Mean and standard deviation

Name	Sample Size	minimum value	Max	Mean	Standard deviation	median
Aesthetics Score Artificial Design	50	7.300	7.900	7.600	0.303	7.600
Creative Score Manual Design	50	8.300	8.800	8.550	0.253	8.550
Brand expression score artificial design	50	8.600	8.900	8.750	0.152	8.750
Aesthetic score AIGC	50	8.500	9.100	8.770	0.252	8.800
Innovation Score AIGC	50	6.500	7.600	7.110	0.437	7.200
Brand Expression Score AIGC	50	6.800	7.200	6.950	0.171	6.900

Aesthetic score:

AIGC design mean score: 8.770, standard deviation: 0.252. Artificial design mean score: 7.600, standard deviation: 0.303.

Innovation score:

AIGC design mean score: 7.110, standard deviation: 0.437. Artificial design mean score: 8.550, standard deviation: 0.253.

Brand Expression Score:

AIGC design mean score: 6.950, standard deviation: 0.171. Artificial design mean score: 8.750, standard deviation: 0.253.

These data can reflect that the logo design generated by AIGC technology has a higher score in terms of aesthetics as a whole, but there are also some differences. AIGC technology has advantages in aesthetics, and artificial designers have strengths in professional ability and judgment in unique brand image, but most of the automatic generation of AIGC technology can be manually modified and edited. The combination of AIGC technology and artificial design can achieve breakthrough in innovation and brand expression<sup>[10]</sup>.

**Qualitative analysis of user perception and feedback.**

User feedback data collected through questionnaires. The user perceptions, preferences, and opinions on the AIGC technology-generated logo design and the artificial design are summarized to understand the user's views on the two design methods.

Qualitative analysis results: Through the content analysis or theme analysis of user feedback, some important themes or viewpoints are extracted to support the in-depth understanding of the application effect of AIGC technology in logo design. Results of qualitative analysis of user perception and feedback (Table 2):

**Table 2.** Performed on the collected data

Sample	User opinions and feedback
1	"The designs generated by AIGC are very innovative and impressive. "
2	"Artificial design is more personalized and can better express the characteristics of the brand. "
3	"The design generated by AIGC lacks personality and feels more universal. "
4	"The AIGC design is fast and versatile, giving us more options. "
5	"Artificial design is more emotional and better resonates with the audience. "
6	"I found the logo design generated by AIGC to be very attractive, with good color combinations and shapes. However, some designs seem to lack uniqueness. "
7	"I like the simplicity and modernity of the logo design generated by AIGC. They give me an impression of professionalism and innovation. "
8	"The logo design generated by AIGC is still lacking in brand expression. I think they need more professionalization and customization. "
9	"I think the logo design generated by AIGC is very efficient. In contrast, manual design requires more time and effort. "
10	"The logo design generated by AIGC looks somewhat template. They lack a sense of uniqueness and individuality. "

Text analysis is conducted based on user opinion and feedback data, and sentiment analysis is used to help determine the user's emotional orientation towards the logo design generated by AIGC, that is, to determine whether their feedback is positive, negative or neutral. Suppose we use a model based on a sentiment lexicon that contains both positive and negative words. User comments are sentiment analyzed and given sentiment polarity labels (positive, negative, or neutral).

Below is the result of sentiment analysis on an example comment and giving a sentiment polarity label Figure 4:

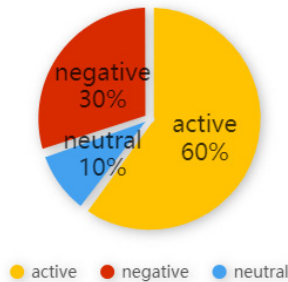


Fig. 4. Sentiment polarity label

Through sentiment analysis, the sentiment polarity of each comment can be derived, and the proportion of positive, negative, and neutral comments can be calculated. From the results, we can see that there are 50 comments, of which 30 comments are judged as positive, 15 comments are judged as negative, and 5 comments are judged as neutral. We can conclude that the proportion of positive comments in the total number of comments is 60%, negative comments account for 30%, and neutral comments account for 10%.

## 4 Conclusions

The purpose of this study is tantamount to study the application of AIGC technology in logo design. Through the exploration and analysis of AIGC technology, the application value and influence of AIGC technology in logo design are deeply understood. At the same time, the user's perception and feedback are also seen as, as well as the practical application of AIGC technology in the design process. The results of the study will contribute to better understand the potential and limitations of AIGC technology in logo design, and provide practical advice and guidance for professionals in the field of design. The data collection and analysis of this study are based on distinctive logo design cases and subject populations, and there may be certain sample preferences and limitations. Future studies may expand the sample size and scope to improve the generalization and reliability of the findings.

## References

1. Ji Tie, Min Xiaolei & He Renke. (2019). Innovation and design participation in modern service industry integrating culture and technology. *Packaging Engineering*, 45-57. DOI: 10.19554/j.cnki.1001-3563.2019.14.009
2. Wang Ling, Tian Baohua & Zhang Yuchen. (2023). A survey of the application of digital technology in design. *Packaging Engineering*, 9-17+453. DOI: 10.19554/j.cnki.1001-3563.2023.04.002
3. Chen Guoqiang, Xu Li, Yu Lei, Tu Weilong & Yang Zhiwen. (2023). Review on the current situation and development trend of design evaluation of artificial intelligence products in China. *Packaging Engineering*, :16-28. DOI: 10.19554/j.cnki.1001-3563.2023.12.002
4. Pu Zihan & Yang Bin. (2023). Application of Artificial Intelligence Aided Technology in Packaging Design. *Packaging Engineering*, : 273-281. DOI: 10.19554/j.cnki.1001-3563.2023.12.030
5. Sun Jing. (2023). Algorithm empowerment: the "generation map" of artificial intelligence artistic creativity and its significance. *Contemporary artists*, :72-78. [https://kns.cnki.net/kcms2/article/abstract?v=3uoqIhG8C44YLTIOAiTRKu87-SJxoEJu6LL9TJzd50IECeE0eYlykfvCH9WekX0XoiEQE6EU0S-Zkq1XiAdAnu\\_Ld9opWJaV&uniplatform=NZKPT](https://kns.cnki.net/kcms2/article/abstract?v=3uoqIhG8C44YLTIOAiTRKu87-SJxoEJu6LL9TJzd50IECeE0eYlykfvCH9WekX0XoiEQE6EU0S-Zkq1XiAdAnu_Ld9opWJaV&uniplatform=NZKPT)
6. Huang Xiaojie, Song Wenxuan, Zhang Hengsheng, Xu Fangmin & Zhao Chenglin. (2023). Challenge and design of computing power network for AIGC new computing business. *ICT and Policy*, : 7. <https://kns.cnki.net/kcms2/article/abstract?v=3uoqIhG8C44YLTIOAiTRKu87-SJxoEJu6LL9TJzd50lx3HvtCn-v75xdK3zix0iRVKGEEnDL6FWtEYadDn3nt6YrB2cbESzGr&uniplatform=NZKPT>
7. Zou Cunwei, Cao Xianguo, Zhou Lin & Tang Weilong. (2021). Application of Human-Computer Interaction in Electronic Product Design. *Popular standardization*, :174-176. [https://kns.cnki.net/kcms2/article/abstract?v=3uoqIhG8C44YLTIOAiTRKibYIV5Vjs7iy\\_Rpms2pqwbFRRUtoUImHdiag\\_LwffAzz4ICHT-CYwtbpPakP0qUV2TIFzrtx9fc&uniplatform=NZKPT](https://kns.cnki.net/kcms2/article/abstract?v=3uoqIhG8C44YLTIOAiTRKibYIV5Vjs7iy_Rpms2pqwbFRRUtoUImHdiag_LwffAzz4ICHT-CYwtbpPakP0qUV2TIFzrtx9fc&uniplatform=NZKPT)
8. Meng Ranyi & Xie Liangchen. (2023). New exploration of modern installation art construction--taking 3D printing construction technology as an example. *Accommodation*, :177180. [https://kns.cnki.net/kcms2/article/abstract?v=3uoqIhG8C44YLTIOAiTRKibYIV5Vjs7ioT0BO4yQ4m\\_mOgeS2ml3UO-qOAZuk\\_1PBzLhYAW6bvTgFyc2sRGz9q0zYA7FMhzh&uniplatform=NZKPT](https://kns.cnki.net/kcms2/article/abstract?v=3uoqIhG8C44YLTIOAiTRKibYIV5Vjs7ioT0BO4yQ4m_mOgeS2ml3UO-qOAZuk_1PBzLhYAW6bvTgFyc2sRGz9q0zYA7FMhzh&uniplatform=NZKPT)
9. Tang Tianle, Zhu Shiyuan, Dong Lingyi & Cheng Ziyue. (2023). Deep learning in the generation of art visual design applications. *Science and technology communication*, :5. [https://kns.cnki.net/kcms2/article/abstract?v=3uoqIhG8C44YLTIOAiTRKu87-SJxoEJu6LL9TJzd50k4wb14RcPVZE9\\_t9XpZPaVPE1A9d8taln1HADnZvt-BagHr2fLZgY0&uniplatform=NZKPT](https://kns.cnki.net/kcms2/article/abstract?v=3uoqIhG8C44YLTIOAiTRKu87-SJxoEJu6LL9TJzd50k4wb14RcPVZE9_t9XpZPaVPE1A9d8taln1HADnZvt-BagHr2fLZgY0&uniplatform=NZKPT)
10. Tang Yu. (2023). A Summary of the Academic Forum "AIGC: The Future of the Digital World". *Art Studies*, : 5-7. DOI: 10.13318/j.cnki.msyj.2023.03



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