Research on Graphic Design Image Processing Technology Based on Reference Relation

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Abstract. At present, with the rapid economic progress, some emerging technologies have emerged. Processing and designing various images with the help of computer software has been widely used in the field of graphic design. With the wide popularization and in-depth application of computers, the application of computer graphics and images in print advertisement design is deepening day by day. Graphic is one of the basic elements of graphic design. As a visual symbol, graphics play a role in carrying and disseminating information and expressing thoughts and emotions. Using computer system for graphic design and production has become the international and domestic development trend, which is the requirement of the times, modernization and the development of the industry itself. Based on the reference relationship, this paper expounds the choice of graphics in graphic design, the role of graphics in graphic design and the relationship between graphics and layout in graphic design. The exploration of graphic elements in graphic design is conducive to the understanding and application of graphic elements in graphic design and the effective transmission of information.

Keywords: Graphic Artist Designer, Image processing, computer

1. Introduction
With the continuous development of Internet technology, China has entered the information age, and image processing technology has been further developed and applied, especially in the field of graphic design [1]. At present, the continuous progress of economy and society, coupled with the continuous improvement of science and technology, makes all kinds of computer software gradually integrated into people's daily life [2]. Nowadys, in the graphic design industry, the image software in the computer has been widely used [3]. Image processing technology is an effective combination of computer technology and painting, which provides a digital creation method for graphic design, and can obtain the creation with high similarity to the graphic designer's hand-painted works in a short time [4]. Graphics, text and color are the three important elements of graphic design. If you want to express graphic design vision well, you should pay attention to the three elements [5]. As the basis of graphic design and the core content of graphic creativity, these three elements can not only effectively enhance the visual expression of graphic design, but also more accurately and clearly express the information.
that the design wants to express [6]. As a non literal symbol, graphics, with its vivid, lifelike and intuitive artistic characteristics, accurately and effectively disseminate information in today's fast-paced modern life and fierce communication competition [7]. Graphics are widely used in advertising design, packaging design, poster design and other fields, it can be said that graphics and graphic design has a close relationship [8].

With the development of modern science and technology, computer technology has been more and more close to our life, and gradually penetrated into every corner of our daily work and life [9]. The same is true of art design. The computer frees people from the complicated labor and can realize all kinds of creativity very conveniently [10]. Graphic creativity is also an extremely important content in graphic design. The focus of graphic creativity is creativity. Graphic creativity requires designers to have enough imagination, so that the designed graphics can attract more attention and make the work more aural [11]. Accurate use of the image software in the computer to carry out graphic design has become a technology that all designers must master. The use of this kind of software during the design period provides a better design platform, more diverse design methods and more specific design embodiment for relevant workers [12]. In graphic design, the application of graphic creativity is more common. As a research subject of visual communication art, graphic design and graphic creativity have a great correspondence, so understanding the relationship between graphic creativity and graphic design plays a very important role in the continuous improvement of graphic design [13]. Based on the reference relationship, this paper expounds the selection of graphics in graphic design, the role of graphics in graphic design and the relationship between graphics and layout in graphic design. The exploration of graphic elements in graphic design is conducive to the understanding and application of graphic elements in graphic design and the effective transmission of information.

2. The influence of computer graphics and image processing technology on graphic design

With the further development of computer graphics and image processing technology, the style of graphic design is no longer the mainstream style dominating the whole country, and the graphic design is varied, showing the scene of a hundred schools of thought contending and a hundred flowers blooming. In the original graphic design, due to the limited embodiment of manpower in color, theme, etc., the designer's point of view can not be fully reflected, and it has corresponding constraints. Only when the graphic design is creative can it attract public attention and achieve the goal of graphic design. With the rapid development of economy, people's requirements for quality of life are getting higher and higher, not only for quality, but also for visual enjoyment. Graphics are more intuitive and understandable than words, so they are often used to illustrate complex information, especially abstract, conceptual or information that needs to be explained step by step. The use of graphics can guide readers' attention and help readers understand the design concept. Generally speaking, people's vision is often attracted by large elements or bright colors in the layout. When the layout is composed of many design elements, people's vision will first search for the most attractive images in the layout. For example, the layout is composed of many squares and a circle, and this circle will become people's visual focus. Figure 1 shows the structure of digital image analysis system.

With the popularization of digital technology, people begin to re-examine the utility and shortcomings of computers, and gradually avoid the rigidity of computers and break the oneness of computer design. The appearance of individual design will certainly promote the birth of various design styles, and at the same time, new computer graphic design software will emerge at the historic moment to meet the individual needs of designers. Excellent color display can make people have a lot of imagination, and some with unique colors can arouse consumers' attention and arouse their desire to buy. Therefore, in graphic design, color is one of the parts that need to be emphasized. With the help of scientific use of computer technology, the display effect of color in graphic design can be better improved [14]. During the design with the software of computer graphics, many complicated steps of manpower during the design are reduced, the tools used are simpler, the material loss in the original design is reduced, and the cost is reduced to some extent. At the same time, part of the design plan can also be saved in the computer, which can be viewed from time to time when it is used, which is
convenient for the designer to change and use, and greatly improves the work efficiency. Graphic creativity and graphic design seem to be quite different, but to a certain extent, their meanings are similar. Graphic creativity and graphic design are similar in form. They all use graphics, words and other factors to design creative works with creative thinking. Graphic design works with graphic creativity can reasonably connect seemingly unrelated things through visual effects, and obtain unexpected expression effects.

Fig.1 Digital image processing and analysis system structure

Image segmentation is defined as follows: Let set R represent the entire image area. According to the selected consistency criterion P, R is divided into non-overlapping non-empty subsets: \( \{R_1, R_2, \ldots, R_n\} \). These subsets must meet the following conditions:

1. \( \bigcup_{i=1}^{n} R_i = R \).
2. For \( i = 1, 2, \ldots, n \), there is \( P(R_i) = \text{True} \).
3. For all \( i \) and \( j \), \( i \neq j \) and \( R \cap R_j = \text{null set} \).
4. For \( i \neq j \), there is \( P(R_i \cap R_j) = \text{False} \).
5. For \( i = 1, 2, \ldots, n \), \( R_i \) is a connected area.

See table 1 for performance parameters of image segmentation before and after optimization. The simulation comparison of topology reliability optimization of image segmentation is shown in Figure 2.

Graphic innovation has the characteristics of creativity and design at the same time, which can be used by graphic design. The characteristics of graphic creativity can make the works designed by graphic design conform to the development of the times and meet the consumption needs of the public. Graphic creativity can make the created works more energetic and creative, and be accepted by most people in society, and indirectly improve the status of graphic design society. As long as some processing software does not have the help of other software, it will produce distortion and deformation, which will reduce the quality of graphic design. Therefore, during the use of the computer graphics software, all the software should be used jointly to make the graphic design show better results. The most fundamental purpose of modern graphic design is to realize the transmission of information. Modern graphic design is not only a simple image or a simple logo, but also a simple decoration for aesthetic purposes. Instead, it takes the design concept as the central idea, deeply refines and fuses one or more elements, and emphasizes the unique information and profound connotation of the graphic itself. Creative thinking strengthens the theme of the work, endows the work with deeper connotation, breaks the boundaries of realistic thinking, breaks the limitations of time and space, and creates a more
perfect, ideal and diversified artistic image.

**Table 1** Performance parameters of image segmentation image structure before and after optimization

|                        | Before optimization | After optimization |
|------------------------|---------------------|--------------------|
| Number of rows         | 45                  | 68                 |
| Number of columns      | 97                  | 115                |
| Monitoring points      | 4365                | 7820               |

![Fig.2 Simulation comparison of image segmentation filtering optimization](image)

3. Application of image processing technology in graphic design

3.1 Deepen the creativity of graphic design

In graphic design, besides color, graphics are also a key visual effect. Beautiful graphics can broaden people's imagination and are the visual key of graphic design. During the design of graphics in graphic design, designers usually highlight the role of graphic lock itself to ensure that the design viewpoint is consistent with the graphic features. Therefore, graphics is a key issue in graphic design. With the help of the software of graphics in computer, graphics can be processed in all directions. Image processing technology can not only be used for clipping pictures, but also be applied to the category of web page design and packaging design. Through the related operation of image processing technology, the overall effect of pictures can achieve the expected effect. During the development of graphic design, attention should be paid to the details and distribution during the adjustment of design. Excellent layout design can make the design highlight the aesthetic feeling, and the design in detail can enrich the design content and integrate the two, which can improve the quality of graphic design and attract consumers' attention, so as to achieve the goal of graphic design. Original photos can be processed by image processing technology, which can achieve effective results. From a commercial point of view, images can be processed according to the requirements of enterprises, thus giving the audience a new feeling and a different effect from the visual point of view.

In the later stage of graphic design, it is necessary to print the whole image. In addition to applying the "four-color mode" based on the existing mode, it is also necessary to use image processing technology to color the whole work, and adjust the color difference and brightness of the image in a short time, so as to adjust the purity and hue of the image, so that the whole image can finally achieve the desired effect of advertising design. The application of graphic creativity in graphic design is mainly fractal graphics and regular and irregular graphics. First, we will introduce fractal graphics, because
there are many algorithms and types of fractal graphics. Designers can choose different algorithms, build different models and types according to specific requirements, and finally select works according to specific projects. Therefore, fractal graphics are mainly used in the design of print advertisements. This software contains tools such as circle and polygon, which makes it very convenient for designers to use computer to design, especially in the process of text layout, and provides many layout modes for designers to choose. The software contains various special effects such as transformation and special effects, which provides a broad design platform for designers to design according to their own views, making graphic design more artistic.

3.2 Sort out the layout and connotation of design
As the cell of print advertising design, computer graphics and image system promotes the formation of print advertising life system. All kinds of complicated or simple, calm or restless graphics and images together constitute rich print advertising personality, and under these graphics and images, the development image and emotional expression of this era are hidden. For print advertising design, the presentation of different styles and structures needs the support of computer graphics and images, which tell different emotions and thoughts with the help of silent expression, just like notes, leaping out the sense of rhythm and rhythm, and running through the movement. As for the art of graphic advertisement design, as an art of transforming literary language into graphic image language, it is necessary to establish visual codes corresponding to design content and theme during the transformation, and then realize the change from literary language expression to graphic image expression. As far as computer graphics and image system is concerned, it belongs to a set of significant graphics and image codes, which convey the characteristics of modernization, innovation and contemporary aesthetics. In order to occupy an important position in the fierce advertising market, it is necessary for graphic design to follow the principle of relative simplicity. The so-called simplicity means that the design can go straight to the theme, occupy a certain weight in the audience's heart, make it have a certain impression, and transmit it among different audiences, so that the graphic design can be considered successful and effective.

When shooting an advertisement, it will be affected by various factors such as shooting environment and shooting place, and also by factors such as photographers. There may be some incomplete places. In order to present an advertising product to the audience, certain image processing must be done after shooting the advertisement, that is, editing the image. The editing method mainly includes appropriately enlarging the emphasized part of the image and effectively adding colors, so that the picture content can be fully realized. At the same time, the designer can weaken the image for the image that does not need excessive processing. Light is the main source of color and the necessary condition for people to discover color. Figure 3 is a three-dimensional schematic diagram of color.
Graphic creativity is a kind of technology with both creativity and design, which can only be called graphic creativity. Only by applying innovative thinking to graphic design can the works produced by graphic design not only attract people's attention, but also show the characteristics of the whole works vividly. When using the software of computer graphics, the designer can design the layout to show the excellent publicity effect of graphic design, so that consumers can get better visual impact in this layout and achieve the goal of graphic design. In the design of print advertisement, the application of computer graphics and image system is also reflected in the narrative function structure and the communication of concept theme. In order to further deepen the spiritual and cultural connotation of the designed print advertising works, designers often need to expand and extend by means of the meanings of graphics and image symbols, and then better express the core concepts and appealing themes of advertising works.

4. Conclusions
In today's print advertising design, the application of computer graphics and images successfully plays the role of commercial advertising, while maintaining its own unique artistic beauty, and realizing the mutual matching of image and product, maximizing the presentation of product information, and bringing unlimited visual enjoyment and experience to the audience in the process of promoting products. The choice and arrangement of graphics in graphic design is determined by the theme of design and the overall atmosphere of layout. Therefore, when designing, we should first consider the theme of design, and then decide to choose the content, form and arrangement of graphics. Graphic creativity plays a vital role in graphic design. With the help of graphic creativity, graphic design work can be carried out more smoothly, attract customers' attention and show the soul of the work in front of everyone. Computer design requires designers to constantly strengthen social and cultural knowledge, enrich artistic theory accomplishment, enhance modern consciousness and embody the spirit of the times. Only under the premise of self-cultivation and continuous improvement of technology, designers can enrich the design and innovate good design works when they are engaged in computer design.

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