Plane Visual Communication Design of User Experience Effect Based on Computer Simulation

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Abstract. With the development and popularization of computer simulation technology, its application in all walks of life has become more and more extensive, and it has also effectively promoted the development of all walks of life. This article analyzes the elements of flat visual communication design, and it decomposes the multi-level structure of user experience effects in flat visual communication design. In addition, the design of plane visual communication requires the aid of a three-dimensional reconstruction system, so this paper also studies the hardware design and software design of the three-dimensional image virtual reconstruction system.

Keywords: Simulation Technology, User Experience Effect, Graphic Visual Communication Design

1. Introduction
Computer simulation technology combined with virtual technology will show the work to users in a more realistic three-dimensional form. This will not only make the product more clear and three-dimensional, but it can also effectively enhance the user experience. Applying this technology to graphic visual communication design can effectively reduce the designer's workload and improve the designer's work efficiency [1].

2. Analysis of the elements of graphic visual communication design

2.1. Graphic design and value
Graphic design based on visual communication is very practical. People understand the development of the times by analyzing the species graphics and text information transmitted in the process of human civilization. Everyone has a different understanding of images, so they focus on different points when describing images and what they describe. Therefore, through text information, it is understood that the development of the times is not as clear as the image, and the form of graphic information does not change the information content, so that people can accurately grasp the information content. The image conveying information is a convenient way of information presentation, and it is also convenient for people to identify and analyze. At the same time, the form of graphic information transmission can build a bridge of communication in people's minds. When people get information, they can also understand the ideas that designers want to express [2].
2.2. Application of text design in corporate graphic design
Although the form of image information can effectively retain the original information, each person's understanding direction and depth of understanding are different. Therefore, the use of image information in graphic design cannot enable users to understand the core content expressed by the designer. At this time, corporate propagandists can join the design of text information, and they can display the core content expressed in the image in the form of text. This not only greatly enriches the promotional content, but also allows users to see the core content of the image at a glance. In order to improve the packaging level of their products, many businesses are often constantly innovating text designs and attracting consumers' attention through more fashionable words. This is also a process of text design innovation. Concise and generous text information expression is the current mainstream design direction. Text design and unique outer packaging enhance people's understanding of products, which also realizes the innovation of text design [3].

3. Multi-level structure decomposition of user experience effects in graphic visual communication design
In the graphic visual communication design, designers need to make continuous improvements based on user experience effects. Among them, boundary feature detection and multi-level structure decomposition are required, and then three-dimensional image construction is performed. The neighbor [Ni] of the three-dimensional information distribution feature point [i] is obtained as shown in formula (1):

\[ [Ni = \{ i \in S[\text{dist}(i, i)] \leq r, i \neq i \}] \]  

(1)

In graphic design, it is necessary to construct a chromatic aberration fusion model of the planar image according to the visual transmission image. In the color difference fusion processing, there is a multi-color hierarchical decomposition model shown in formula (2). The modeled structure distribution of the plane visual communication design is shown in formula (3). Therefore, the decomposition result of the multi-level structure of the user experience effect is shown in formula (4):

\[ [Ri = \sum_{ij \in \text{gid}} (i - j_2)](gi - gj1) \]  

(2)

\[ [fs \subseteq T(t) = sf(s(t - T))] \]  

(3)

\[ [fi(t) = Kt0 - t, t \leq T2] \]  

(4)

4. Hardware design of 3D image virtual reconstruction system

4.1. The overall structure of the system hardware
The overall structure of the hardware of the 3D image virtual reconstruction system is composed of three parts, and its specific structure is shown in Figure 1 [4].
Figure 1. Block diagram of the overall system structure

4.2. Expansion design in system hardware

In order to ensure that the timing of the system can be kept within the standard range at all times, relevant researchers have expanded the design of its clock module in the original hardware structure [5-6]. The specific signal connection is shown in Figure 2.

Figure 2. Clock extension signal diagram
5. Software design of 3D image virtual reconstruction system

5.1. Presidential design of system module
After completing the improvement and perfection of the hardware structure of the system, the developers began to design the system software [7-8]. The specific module design is shown in Figure 3.

![Module framework diagram of 3D image virtual reconstruction system](image)

**Figure 3.** Module framework diagram of 3D image virtual reconstruction system

5.2. Three-dimensional image feature extraction
The most important thing in this system for image reconstruction is to extract the main feature information of the image and cut it out [8]. The specific operation is shown in Figure 4.

![Image physical coordinate system diagram](image)

**Figure 4.** Image physical coordinate system diagram
The code for processing the collected two-dimensional image sequence in the system is as follows:

```bash
{
    -num<image_file_name>
    -bgcolor<background_color=0>
}
```

5.3. 3D image visual interaction based on visual communication technology
After the system collects the characteristic information data of the image, the designer needs stereo vision communication design technology to complete the virtual reconstruction of the three-dimensional image [9-10]. The specific situation is shown in Figure 5.
5. Visual interaction process of virtual images

6. Conclusion
In the design of flat visual communication, the use of a three-dimensional reconstruction system can effectively enhance the user's sense of experience and realism. Compared with two-dimensional images, three-dimensional images have stronger visual impact, more intuitive information transmission, and more prominent performance capabilities. It can be applied to various fields. Therefore, the combination of 3D reconstruction system for plane visual communication design can effectively promote the development of related industries.

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