



# Analysis of Computer Graphics and Image Design in Visual Communication Design

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**Abstract.** In the process of visual communication design, graphics and images are the most basic elements. Computer graphics and images using the relevant hardware equipment and processing technology, software, etc. can further improve the level of visual communication. At present, graphics and image design has gradually become an important part of the visual communication design process, and also presents significant information characteristics. In order to study the related contents and main design methods of computer graphics and image design in visual communication design, this paper mainly analyzes the main contents, application advantages and design methods of computer graphics and image design. The results show that computer graphics and image design can consolidate the effect of visual communication design. Computer graphics and image design have significant advantages of visual communication design, such as easy to modify, product preview, unique image and so on. Computer graphics and image design are widely used in visual communication, such as text design, illustration design, packaging design, etc. Therefore, in the future, we should continue to maintain this advantage in the process of computer graphics and image design, so that the design methods of computer graphics and images can be further optimized and its practical value can be improved.

**Keywords:** Visual communication · Computer graphics and image design · Analysis

## 1 Visual Communication Design and Computer Graphics Design Related Content Analysis

In today's society, the relevant requirements for graphic image design are gradually improved, and taking computer as the design carrier adds new vitality to graphic image design [1, 2]. However, in the process of computer graphics and image design, many designers only focus on computer design technology, but ignore the graphic and image design art itself [3].

### 1.1 Basic Contents of Visual Communication and Computer Graphics Design

#### Overview of Visual Communication Design

Visual communication is an important way to spread information in human society [4–8]. People mainly use visual symbols to transmit, and ultimately achieve the purpose

of information sharing and communication. The main purpose of visual communication design is for people to appreciate, so the design content also has the role of visual communication. Visual communication design contains a wide range of related content, in addition to printing art, commercial design, advertising design, display and politics and other related content. Vision in the concept of visual design includes two aspects: first, a subjective feeling produced by human sensory organs under the action of light; second, it represents a special meaning of image design.

### **Computer Graphics and Image Design Content**

The design process of computer graphics and images needs to be guided by specific design objectives and created in color information, graphic image information and other aspects by using relevant computer technology [9–11]. From the point of view of computer graphics design, the designer can fully use the computer graphics technology in the design process, so long as it can fully use the computer graphics technology in the design process. At present, there are many kinds of graphic and image design softwares commonly used by computer graphic and image designers. For different application fields, the image processing software used is also different. 3D Max, flash, Auto CAD, PS are common computer graphics and image processing software.

### **1.2 Advantages of Computer Graphics in Visual Communication Design**

In the process of visual communication, computer graphics and image design has a very significant advantage, mainly in the following aspects: (1) integrating the visual communication effect into the computer graphics and image design process, we can re plan and calculate the graphic image design content from the perspective of visual communication, so that the designed graphics and images have unique characteristics. (2) Designers can express their own unique thinking in the process of computer graphics and image design. Even if there are design errors, they can also use software to make timely changes. There is almost no design waste phenomenon, not to mention the consumption of paper. (3) Computer image graphic design can preview the finished product. After previewing the design works, designers can change the previous design content with the help of computer software. At the same time, pay attention to the simplicity of the design, and compare the works before and after the modification on the same interface.

## **2 Analysis of the Application of Computer Graphics Design in Visual Communication Design**

### **2.1 Application of Text Design Related Technology**

In the process of computer graphics and image design, text belongs to the most simple visual communication factor. Computer related technology is used to design and process visual communication text. Photoshop is a common graphics and image design software, referred to as PS. The software for text design tools, including size, color instructions, can be customized according to user needs. For example, designers can use PS software to make diversified changes to the text, adjust the word spacing, so as to enhance the effect

of visual communication. From the perspective of visual communication, computer graphics design can improve the performance of the text, consolidate the artistic effect of the text, and avoid being too monotonous.

## **2.2 Application of Illustration Design Related Technology**

The image resources of visual communication include illustration, illustration and drawing, etc. if the picture is not processed, it will be dull, monotonous and inactive. In order to further strengthen the application effect of illustrations in visual communication, the original state of pictures is changed by means of computer graphics and image design method. For example, in the illustration design, the illustration designer needs to use the computer graphics and image design software to color the illustrations, use the pencil to draw the basic structure of the illustration, and then combine with the computer graphics and image software to fill the colors in the drawing.

## **2.3 Application of Packaging Design Related Technologies**

In our daily life, packaging design is the most common visual communication factor. Various packaging designs can be seen everywhere in shops and shopping malls, such as clothing, video packaging, etc. consumers generally see packaging design first. The attraction of packaging design itself will stimulate consumers' interest in consumption. On the shelves of shopping malls, there are a variety of goods that have been designed for packaging, and many of them need to use computer graphics and image software to deploy images.

# **3 Analysis of Computer Graphics Design Technology in Visual Communication Design**

## **3.1 Hardware Equipment Required for Computer Graphics and Image Design**

### **Output Device**

The output device includes display and output devices, such as display and liquid crystal display, which are respectively represented by CRT and LCD; the printer includes color printer, color light printer, plotter, etc. The display card is a necessary device in the process of computer graphics and image design and processing. It processes the image into the format that the display can display, and displays it on the screen to form the image finally. The display card selected in the process of graphic image processing must be equipped with special memory and corresponding graphics and image processing acceleration chip, so that it has a certain image preprocessing ability, and is not just a simple display interface device.

Graphics and image display card generally consists of different parts, such as graphics chip, RAM DAC, interface and so on. Therefore, the processing of graphics and image data must go through the following steps, and finally the designed graphics image will be presented on the display screen:

First, the line enters the graphics card chip and sends the image to the graphics card chip to carry out the corresponding processing; second, the video chipset enters the video RAM, which is the process of displaying and storing the image processed by the graphics card chip. Third, fresh run needs to enter the DAC, display memory, take out data, and then to ram DAC to carry out data conversion related work. Fourth, the DAC enters into the display and displays the converted pictures directly on the display screen.

### **Acquisition Equipment**

The acquisition equipment includes scanner, camera, camera, etc. The types of scanners include flat-panel scanner, negative scanner and roller scanner. At present, digital cameras and cameras are commonly used. Digital camera is a kind of special camera which can take pictures, convert the captured scenery directly through internal processing, and finally store the pictures in digital format. Compared with ordinary cameras, digital cameras do not need to use film, but use removable or fixed semiconductor memory to save the acquired images.

## **3.2 Analysis of Computer Graphics and Image Design Technology**

### **Image Representation and Storage Technology**

The main function of image acquisition equipment is to convert the optical signal in the real world into digital signal which can be recognized by computer. The image output device is the optical signal that can be recognized by human eyes by converting these digital signals. Palette is an important part of image representation and storage technology. The palette uses three basic colors: blue, red, and green, each color is divided into 25 to 255 different categories. Different color values need to have hue, brightness, saturation and other attributes.

Digital image can be divided into dot matrix image and vector image. The so-called dot matrix image is an image composed of points. The point itself has different colors, and its specific color is determined by the gray value of three primary colors. The common formats include PSB format, BMP, tiff, PEG/PG, EPS format, GIF format, PDF format, PNG, etc. Vector graphics are also known as drawing images or face-to-face images. Lines are generally used to depict graphics, the elements of vector graph are generally lines, polygons, circles and arcs. Common vector image formats include: swf format, WMF format, SVG format, EMF format and so on.

### **The Related Technology of Plane Digital Image Processing**

If you want to process a plane number, it is usually applied in two cases. One is the image that processes the image, that is, the whole process of image to image. The other is to convert an image to a non image. Digital image processing involves computer digital technology, so the range of images involved must be far beyond the traditional sense of images, including invisible physical images, digital images and digital images.

The common design methods in the process of computer graphics image design include the following: first, sharpening processing method, to increase the clarity of object contour in the image, the image needs to be sharpened. In the process of processing, the gray value of the point needs to be increased. Firstly, the gray value of the processing

point and the value of the surrounding 8 points are processed, and then the result and the gray level of the original image are processed. The value is added, which gives the gray value of the point to be processed. Second, flat processing is to process the flower points in the image. This processing method needs to sort the points to be processed and the eight points around them, and then the value of the middle position is taken as the gray value of the point. Third, compression change processing. The purpose of image compression is to make the subjective visual feeling and data in the image, and finally realize the purpose of compressing the image by changing the image description mode. Image compression includes lossy compression and lossless compression, in which the lossy compression method ignores the visual insensitive parts, so as to improve the compression rate. The compression rate of lossless compression is usually not high compared with the former. The following are the processes of lossy compression and decompression:

Compressed image flow: original image - DCT transformation - divided by quantization coefficient - rounding

Decompress image flow: compress image - multiply quantization coefficient - DCT inverse transform - rounding

## 4 Conclusion

With the continuous development of computer technology, graphics and image design methods based on computer technology can provide better visual experience for people. In the process of visual communication design, computer graphics and image design technology with its own unique methods and characteristics shows greater advantages, not only to improve the effect of visual communication, but also to enhance the practical value of graphic image design, with obvious feasibility. In the process of visual communication design, computer graphics and image design should give full play to the advantages of computer technology, so that its advantages in all aspects of visual communication can be maintained, and finally the expression level of graphics and images can be improved.

## References

1. Wen, J.Q.: Computer graphics and image design and visual communication design. *Electron. Technol. Softw. Eng.* (07), 85 (2016)
2. Wang, Y.S.: On computer graphics and image design and visual communication design. *Digital Technol. Appl.* (11), 160 + 162 (2015)
3. Hu, B., Chen, X.D., Liu, X.Y.: Research on computer graphics and image design and visual communication design. *Comput. CD Softw. Appl.* **17**(18), 213 + 215 (2014)
4. Zhu, J.X., Wang, X.Y., Chen, M.C., Wu, P., Kim, M.J.: Integration of BIM and GIS: IFC geometry transformation to shapefile using enhanced open-source approach. *Autom. Constr.* **106**, (2019)
5. Liu, Y.X., Yang, C.N., Sun, Q.D., Chen, Y.C.: (k, n) scalable secret image sharing with multiple decoding options. *J. Intell. Fuzzy Syst.* **38**(1), 219–228 (2020)
6. Yutaka, W.: Three-dimensional center of gravity detections for preventing rollover accidents of trailer trucks hauling containers. *Open J. Mech. Eng.* **1**(1), 11–14 (2017)

7. Liu, Z.Y., Sun, Q.Q., Li, J.: A matrix mining method with FP-tree for generation of frequent patterns. *Open J. Mech. Eng.* **1**(1), 01–03 (2017)
8. Wang, C., Zhao, W., Zhang, K.: The strategy of process innovation based on AHP and TRIZ. *Open J. Mech. Eng.* **1**(1), 08–10 (2017)
9. Chu, Z.Q., Jiao, Q., Teng, L.Z.: Aroma characteristics of *Osmanthus fragrans* leaves. *Open J. Chem. Eng.* **2**(1), 23–31 (2019)
10. Wu, Z., Liu, Y.N., Jia, X.X.: A novel hierarchical secret image sharing scheme with multi-group joint management. *Mathematics* **8**(3), 448 (2020)
11. Wang, L.S., Chen, J.T., Ni, C.Y.: Molecules and functions of rosewood: *Dalbergia odorifera*. *Open J. Chem. Eng.* **1**(1), 15–20 (2018)