The Application of Computer Technology in Art Creation

Ying Wang(✉)

College of Arts and Information Engineering, Dalian Polytechnic University, Dalian 116499, Liaoning, China
1135629050@qq.com

Abstract. The application of computer technology in art creation is a research field that pays attention to the application of computer in art. It is used to produce works of art such as music, visual arts and movies. Like all research fields, it has its own history and development. In 1956, John McCarthy coined the term "artificial intelligence" at Stanford University; However, it was not until 1959 that alanturing proposed the famous Turing test of machine intelligence (Turing 1960). The computer provides a new technical means for the development of traditional art, expands the field of art design, facilitates art design methods, improves work efficiency, and enriches art creation.

Keywords: Computer technology · Artistic creation

1 Introduction

With the development of science and technology, computer technology is getting closer and closer to people's life. In the 1960s, Ivane Sutherland of Lincoln Laboratory of Massachusetts Institute of technology published a doctoral thesis entitled "Sketchpad", in which the word "computergraphics" was used for the first time, which laid the theoretical foundation of computer graphics, and thus determined the independent status of computer graphics as a new discipline. In order to explore the surface of the moon to help Apollo successfully land on the moon, NASA has perfectly combined computer digital technology with photos and images, opening up the way for computer art. In 1961, the American magazine "computer and automation" organized the world's first computer painting competition. Since 1965, computer has gradually become the performance medium and creative tool of artists [1]. In 1966, the hqwaro wis Gallery in New York held the first worldwide exhibition of computer painting. In 1968, the United Kingdom held the "cybernetic treasure" computer painting exhibition, and formally accepted computer painting works in the Venice Biennale in 1970, opening up the perfect combination of computer art into the palace of art, and opening up the way for computer art.

At the end of the 1970s, computer art design was introduced into China. First, it developed and expanded rapidly in Colleges and universities. While computer art design developed, it also brought great impact to the art industry. The habits formed over

J. C. Hung et al. (Eds.): IC 2023, LNEE 1045, pp. 486–492, 2023.
https://doi.org/10.1007/978-981-99-2287-1_69

thousands of years were almost destroyed overnight. People who are used to painting brushes have to pick up a mouse completely different in shape and mode of use to create art [2]. It is really difficult for the habits formed over the years. In the late 1980s, three-dimensional animation software was introduced into China, and began to use it to make TV program titles and advertisements. In the 1990s, 386 or 486 microcomputers were used for plane or three-dimensional visual art design. In recent years, the development and application of various practical design software have presented a splendid new world in front of all designers: Windows2000, coreldraw8.0, Photoshop 3DMAX, PageMaker, founder Feiteng, wending font library, language input, etc. all kinds of software are constantly upgraded to bring forth the new [3]. With the rapid development of computer software technology, the combination of computer technology and art will become closer and closer, which will have a profound impact on the future development of art.

2 Related Work

2.1 The Convenience of Computer Technology and Art Design

From the perspective of social function, fine arts can be divided into practical fine arts and appreciative fine arts. With the rapid development of computer technology, it was first applied to practical art in the art field. Computer has become an effective tool and working partner for practical art designers, which is obviously reflected in its ability to greatly improve work efficiency and design colorful pictures. Many scholars have discussed the computer as a high-tech product to improve the development of art design [4]. Xubangyue emphasized in his article thinking about computers that the functions of computers provide artists or designers with a variety of production ways and creative spaces. Designers or artists can easily change the color and style of the design by simply moving the mouse. Computers can quickly capture the instantaneous ideas of designers; Computer modification is fast, WYSIWYG, easy to delete, convenient to restore, accurate size and other functions, so that designers can modify repeatedly, expand and strengthen their own design creativity, and greatly shorten the time from creative design to the completion of works [5]. Pan Li further showed the convenience of computer in art design activities in his essay computer art essays. The paper points out that in the art design activities, repetition is a high proportion of content, such as the massive reuse of signs and standard fonts in the enterprise integrated design system (CIsystem). It can be easily copied by using the computer graphics design function, and the commonly used graphics, hues and other data can be stored in the computer to establish a personal graphics database for repeated use in the future. In addition, in the traditional design process, after the design scheme is passed, the production drawings must be drawn, which is heavy and boring. After the computer graphic design is adopted, once the scheme is determined, the whole set of high-quality design drawings can be output by the printer or plotter, thus the design cycle can be greatly shortened [6]. Here, the traditional drawing tools, materials and performance techniques have retired. Only designers rely on their own aesthetic thinking to design creativity through computers to create ideal creativity and the best visual effects. “Compared with the freehand drawing system, the computer processing of images and words is simple and accurate, and it can also timely convert the screen effect into printed matter. The computer provides a visual means to express

and reflect the designer's creativity. When the designer skillfully master and operate the computer, using various graphic software and tool stunts, some unexpected graphic changes will occur on the screen, and So that designers can get inspiration from it and create ideal works." In his article art in the era of science and technology, leqihong said that in a broad sense, computer technology has enabled computer art workers to skip technical training and directly enter creative work. So as to give play to greater creativity and greatly improve the efficiency of work, which is unprecedented. No matter what step the staff are creating, even the most complex composition, such as the change of lines and the choice of structure, can be modified and adjusted in the modeling software. Due to the accuracy of the computer, in addition to directly observing the display with the naked eye, the color judgment in the creation process can also judge the description with specific numbers in a specific color mode, so as to achieve an accurate and standardized effect.

2.2 The Impact of Computer on Traditional Painting Language

The preservation methods of various artistic works are also different, and they all have relatively strict and scientific preservation methods, and they are also different in the display of works. It is limited by the type, size, display space, light and environment of works, and the preservation of works has also been damaged due to the change of time. When the computer is used in art activities, the situation is different. The painting tools are replaced by the host, keyboard, mouse, display and application software. The works are accurate digital graphics, and can be copied in a large number according to needs [7]. Because they exist in digital form, they are much more convenient to store, and there is no worry of deterioration and damage. The display can convey the communication between the media and people through a wide variety of visual display sizes. Works can be stored in different memories and can be carried around with a large amount of storage, such as floppy disk, removable hard disk, CD, etc. His works can be accessed into the square inch rooms of thousands of families through the Internet, which provides great convenience for people to understand art. In terms of techniques, traditional painting techniques are the experience summarized by painters after a lot of practice and understanding, and the maturity of a technique is often the result of years of painstaking efforts by the author. In computer art, the understanding of a technique is only the understanding of the results that can be produced by a certain command program. For example, in the perspective method of traditional painting, in order to draw an accurate perspective with various contents, the author must master a lot of perspective knowledge and practical experience, and spend a lot of time and energy [8]. However, in the computer, as long as you know the program command of making perspective, it is a matter of flicking your fingers. The change of color in traditional painting also needs to master a lot of color theoretical knowledge and practical experience. Of course, in the computer, as long as you select the desired color to make the result command, no matter how complex the color is, you can achieve the desired effect through multiple rendering commands. It has high accuracy in operation and does not need a lot of time-consuming and laborious training. The development of computer has found a new way out for those difficult problems in traditional painting, and simplified some complex techniques. Through the above comparison, the article points out that computer art is very different from traditional painting in terms of tools and

techniques. Each has its own creative design. It should combine artistry and technology, and use computers to express the creativity of works more perfectly.

3 Art Creation Based on Computer Technology

3.1 Computer Art Creation Medium and Its Characteristics

The simplification of creation tools and materials is one of the important differences between computer art and traditional art. The computer art medium is mainly computer software and hardware, and the mouse, keyboard, display, scanner, digital camera, printer and plotter are indispensable tools. The works produced are accurate digital graphics, which can be copied in large quantities according to needs. It is very convenient to store, and there is no worry of deterioration and damage, as shown in Fig. 1. Works can be stored in a variety of memories and carried around. They can also be displayed and communicated with viewers through a wide variety of high-tech media systems. From this point of view, the creation tools of computer artists have been greatly simplified. The main convenience lies in the fact that they are all used for "traditional Chinese painting", "oil painting", graphic design and 3D modeling [9]. A "drawing board" is a computer screen, and a pen is a mouse or a stylus. Computer software provides various strokes, lines, pigments and materials, and the printer outputs the final work. Throughout the creative process, artists use "electronic" tools and materials provided by computer software. There is no need to spread paper, pens and pigments on a table and pile them up in a room full of spots and colors everywhere. The simplification of tools and materials enables artists, especially designers, to concentrate on conception and creativity and free themselves from the tiring production work.

Although the creation tools and materials of computer art have been simplified, its means of expression are more diverse and more powerful, which is beyond the reach of traditional art creation. Art is visual art. Computer technology has many advantages in visual expression for art. For example, by inputting various materials into the computer and combining them with graphics and fonts, the tactile texture can be introduced into the visual communication, associating with the specific experience of materials, producing a feeling of soft and hard, thick and thin contrast, or the visual features of shiny and dark, transparent and opaque, making the works more appealing. People have long simulated the three-dimensional effect in the two-dimensional space, trying to produce an illusory sense of space or visual depth. Graphic design software has given these methods to express the sense of space through overlap, size change, tilt change, curve change, texture thickness change, projection and penetration change, and face-to-face connection, so as to make the picture have richer levels and quickly and effectively increase the visual depth. Modern painters can not only draw new images by themselves, but also directly use ready-made images for "grafting" or adaptation. They can also deform, arrange and intersperse images to create novel works with visual dislocation.

3.2 Application of Computer Technology in Art Creation

As a complex information processing system, computer and application environment constitute a system, as well as developers and users. Hierarchical relation is a basic

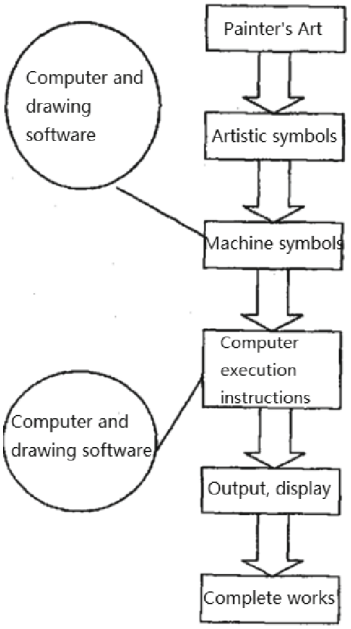

Fig. 1. Computer technology art creation process

concept for computer systems. Its establishment helps users to make clear which level of system resources it is dealing with, so as to explore how to enter this level, how to use the resources at this level, and how to communicate with other levels through this level. It is precisely because of the principle of dividing the system into different levels of hierarchy that the system design method can be implemented and unified in the way of thinking and working. Designers working in such a system environment can not only give full play to the advantages of the system in solving problems, but also improve their own work efficiency. In the traditional division of labor, from concept conception to implementation modeling is divided into multiple levels, and designers should participate in the work of each stage. The introduction of computer-aided design system makes the work that can be described in a certain language and reflected in a certain rule be replaced by the computer [10]. In another sense, it highlights the designer's creative ability, and the creation, evaluation and organization of design become the main work of the designer. Design bid farewell to the hardware era and entered the human era after the software era. The needs of users have become the main factor of product performance. Enterprises have injected more life factors into products, making technology more intelligent and flexible for users with different cultural backgrounds. For this reason, many companies employ sociologists to work with their own product designers. Instead of engaging in professional research, they employ them to make use of their own qualities to contribute to product design, because they must understand people before making any product. In Japan's high-tech industry, people without technical background will not participate in technical research. The reason why they are allowed to participate in the work is that the company's executives hope that they can solve problems with an open mind, rather

than from the aspects of technology or computer science. For design, more and more generalists are needed. This development direction shows that the traditional design training is not suitable for the design work in the information society. The penetration of computer into design makes the designer's knowledge structure, professional skills, work procedures, design management and other aspects have to be adjusted.

4 Conclusion

In the 21st century, information has become a powerful productivity, and the torrent of information is changing rapidly. If a designer does not have this information in time, he will be far behind in this era. The greatest advantage of contemporary designers is that they enjoy the same information resources as the world's top designers at the first time. All kinds of media, magazines, the Internet, forums, lectures and exhibitions, we should pay attention to and participate in them in time, which can not only bring infinite skills and creative nutrition to a designer, but also ensure that you will always be the most advanced. Computer art is the product of the combination of computer technology and art, and its production is highly technical. The future art works will continue to develop and innovate under this high-tech technical means, showing the characteristics of high technology, popularization, diversification of artistic styles, and mass production and collectivization of works.

Acknowledgements. Research on Fine Arts Practice and Innovative Talent Training in Universities, JFYB2557.

References

1. Feng, L.: Research on the application of computer technology in software technology talents training system in higher vocational colleges. In: Journal of Physics Conference Series, vol. 1915, no. 3, p. 032035 (2021)
2. Chen, W., He, Y., Pei, Q.: Research on the design of electrical automation control system based on the application of computer technology. In: Journal of Physics: Conference Series, vol. 1992, no. 3, p. 032139 (2021)
3. Shen, H., Wang, J.: Research on application of computer technology in the optimization of department information system. In: Journal of Physics: Conference Series, vol. 1982, no. 1, p. 012139 (6 pp) (2021)
4. Li, H.: Research on the application of computer statistics technology in the educational information management system of colleges and universities (2021)
5. Zhang, B.: Research on the application of speech recognition in computer network technology in the era of big data. Int. J. Speech Technol. **26**, 259 (2023). https://doi.org/10.1007/s10772-021-09936-7
6. Li, M., Li, Y., Guo, H.: Research and application of situated teaching design for NC machining course based on virtual simulation technology. Comput. Appl. Eng. Educ. **28**(3), 658–674 (2020)
7. Sinclair, R.K.: The application of computer technology to the logistics process. In: 20th Annual Canadian Transportation Research Forum, Toronto, Ontario, 28–31 May 1985. Canadian Transportation Research Forum (CTRF) (2020)

8. Hao, T., Chen, X., Song, Y.: A topic-based bibliometric analysis of two decades of research on the application of technology in classroom dialogue. J. Educ. Comput. Res. **58**(7), 1311–1341 (2020)
9. Shi, X., Tang, K., Lu, H.: Smart library book sorting application with intelligence computer vision technology. Libr. Hi Tech **39**(1), 220–232 (2021)
10. Jia, Y.: Research on the application of computer aided technology in graphic design visual aesthetics. In: Journal of Physics Conference Series. JPhCS (2021)