

Expression and Application of Watercolor Art in Computer 3D Animation Design System

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Abstract: Watercolour takes water as the medium to convey the emotion and thought of the work through different materials, colours, textures and textures. With the more and more extensive application of computer technology in 3D animation, people have higher and higher requirements for colour. Therefore, this paper mainly studies the performance of watercolour art in computer software aided design and 3D scene rendering. Firstly, this paper introduces the definition and style characteristics of watercolour art, then expounds the application of watercolour art in computer 3D animation design system, then studies the application of 3D animation technology, designs the frame diagram of computer 3D animation design system based on this, and investigates the application scene of watercolour art in 3D animation design. Finally, the survey results show that most people believe that the most application scene of watercolour art in computer 3D animation is three creative scenes, namely, artistic conception creation, virtual reality combination creation and space level sense creation. This is because watercolour has the characteristics of transparency, nature and obscurity. In animation creation, its unique language forms and techniques can be used to express the artistic form and atmosphere needed in the scene.

Keywords: Watercolour Art; Computer 3D; Animation Design; Design System

1. Introduction

In the creation of computer 3D animation, watercolor art is a very important and special application field with broad prospects. It can be applied not only to some simple modeling design such as plane and stereo photography, but also to lighting production [1-2]. Because in this era, people pay more and more attention to spiritual and cultural needs, and pursue fashion, personalization and diversification in terms of aesthetic taste [3-4]. Therefore, we should apply the concept of computer three-dimensional animation design to the computer to make it a new style and unique feature.

Many scholars have done relevant research on 3D animation. With the rapid development of computer technology, 3D animation has been widely used in many fields, especially in computer watercolor art. Domestic watercolor art research started late, but developed rapidly, especially in computer three-dimensional animation. At present, China has a group of excellent watercolor designers and artists [5-6]. Famous brands such as Shanghai Oriental Pearl, Beijing east garden water lamp and so on have rich and influential professional design team to complete the work creation. Some well-known universities have also set up relevant courses to study and study the technology and application fields of water-based color painting. Famous Chinese painters believe that the creative thinking and creative way of three-dimensional space can be realized by planarization and three-dimensional cutting of their works. At present, many excellent artists in China have applied their 3D models to computer software. Photoshop is a computer painting software with good painting tools [7-8]. The above research has laid a research foundation for this paper.

In computer 3D animation, watercolor is an important role design element. It can make the picture vivid and interesting, rich and changeable colors, and also reflect the unique texture of watercolor painting. This paper will discuss how to achieve better results through software rendering and how to apply two-dimensional hand-painted performance techniques for post production from two aspects of software and hardware.

2. Discussion on Watercolor Art Based on Computer Three-dimensional Animation Design

2.1 Watercolour Art

2.1.1 Definition

With the progress and development of the times and the improvement of people's aesthetic consciousness, a variety of painting themes and decorative forms with distinctive style have been produced. In traditional Chinese painting and modern art, watercolor art takes water as the medium to express various paintings in various forms. It can not only be used as material in real life, but also be used to make all kinds of art works. Watercolor painting itself is a very attractive and modern art form. At the same time, it plays an important role in using color to express the painter's inner feelings and changes of thoughts and feelings. It can be said that it is an organic combination of new technology and old things, expresses the creator's inner emotion through different materials and expression methods, and shows it to the audience in rich, varied and diverse forms [9-10]. It has high ornamental value. Making good use of these elements in computer 3D animation can make the picture more vivid and interesting, enhance the rendering effect and improve the visual effect, so that it has attracted more and more attention and acceptance.

2.1.2 Style Characteristics

Watercolor art style has the following characteristics:

(1) Distinctive color contrast. Watercolor painting has a strong visual impact. It is a unique kind of painting. In the form of expression, it can create the relationship between the sense of space and the strength of hierarchy through different colors or hues. For example, it can render a calm atmosphere under the black and white background, and a strong tension effect can be produced in the dark part of gray.

(2) The diversity of plastic art processing techniques. In watercolor painting, the modeling of watercolor art is to make it have different forms of expression and form a special style through the comprehensive processing of various materials and colors, so as to achieve the rendering effect. The modeling characteristics of watercolor art style are diverse, so various factors need to be considered in the design and integrated with animation combine body effect to complete creation. For example, the color matching, composition and expression of the picture can reflect the different characteristics and unique charm of watercolor painting [11-12].

(3) The way of expression is flexible, changeable and highly changeable and creative. Watercolor art, as a means of expression, is based on the color and structural characteristics of nature, and organically combines color, composition and modeling elements. It has a strong visual sense and strong creativity. It uses rich, diverse and highly changeable and creative in computer animation To express the emotional connotation given by the picture. It is flexible and flexible to use various colors, making the watercolor art style more vitality and more in line with people's visual effects and aesthetic needs, which is one of the directions that modern designers need to learn.

2.2 Application of Watercolour Art in Computer 3D Animation Design

The application of watercolor art in computer three-dimensional animation design is mainly through the combination of watercolor painting techniques and modern technology to show the designer's innovation in picture style and expression methods. Firstly, it should be drawn by computer software. Secondly, it is to use computer for painting modeling. Finally, it can be made with different materials according to needs, so as to achieve the characteristics of rich and colorful work content, rendering effect and enhancing visual effect. There are many application methods of watercolor art in computer three-dimensional animation design, mainly including: (1) the combination of virtual and real. Combine reality with virtual reality. (2) Rendering technology. Through the analysis, research and treatment of the relationship between various elements, a watercolor painting with distinctive style and consistent with the picture effect is formed. (3) Color matching skills. The picture effect of watercolor art has the characteristics of strong, rich and diverse, diverse expression methods and flexible changes. These characteristics make it show strong vitality in computer three-dimensional animation design.

2.3 Computer 3D Technology

Three dimensional technology mainly uses computer software to realize the production of

animation. It can be operated by computer, so that the whole watercolor art can be better displayed in the two-dimensional plane. At the same time, it can also make watercolor painting have more forms of expression. In watercolor art, watercolor painting expresses the picture content in the form of line and color. Through reasonable arrangement of line, color and other factors, surf algorithm is used in the production process. Surf algorithm is a common three-dimensional animation technology. It draws in two-dimensional space, and then draws it to the computer through the computer. Surf algorithm uses the approximation method based on Hessian matrix to detect feature points, and the detection of feature points is based on the theory of scale space. Surf algorithm uses integral image technology to improve the computing speed. It combines graphics, text and color to build a visual three-dimensional space in the computer, so as to present rich and colorful picture effects for the audience. First, the integral image is calculated, which can be used to accelerate the calculation of arbitrary rectangular operation. For image I and points (x, y), the integral image I2 adds the brightness values of all points within the range from the origin to this point.

$$I(x, y) = \sum_{i=2} \sum_{j=3} I(x, y) \quad (1)$$

Therefore, for the calculation of the sum of the brightness of any rectangular area, the four vertices on the corresponding 14 can be directly used. This calculation time does not change with the size of the image, so a fast speed can be obtained in the calculation of large-area convolution. Surf algorithm uses fast Hessian operator to detect feature points. This operator uses the determinant of Hessian matrix as the discriminant to find the maximum value. For the point u = (x, y) on the image, the scale is σ Hessian matrix H (x, σ). It is defined as follows:

$$H(x, \sigma) = \{L_{xx}(x, \sigma)L_{yy}(x, \sigma)\} \quad (2)$$

L (x, o) is the convolution of the second derivative of the Gaussian function and the image at point U. L (u, o) has the same meaning as l (x, o). The determinant of Hessian matrix is:

$$\det(H) = L_{xx} * L_{yy} - L_{xy} \quad (3)$$

Use the above formula to detect feature points. When the determinant is negative, the point is not a local extreme point; When the determinant is positive, the point is a local extreme point.

3. Experiments

3.1 Framework of Computer 3D Animation Design System

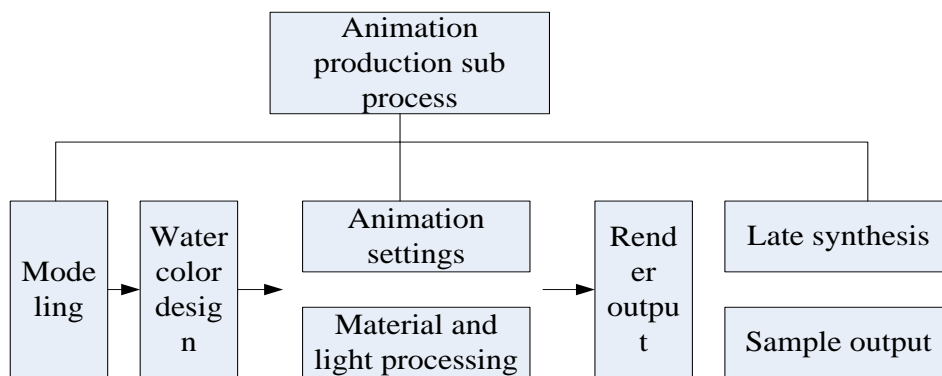


Figure 1: System framework

The application of watercolor art in computer is to use animation as the medium to express the creator's thoughts, emotions and artistic conception through elements such as picture and sound. With the development of the times, the progress of science and technology and the improvement of people's aesthetic consciousness. More and more new materials have been applied to 3D animation design, and these technologies have gradually matured into an independent system project for operation and management control. For watercolor painting, the most important thing is its material characteristics and style characteristics, which affect its application effect in computer. The framework of watercolor art in computer three-dimensional animation design system is as follows: (1) watercolor model and

two-dimensional space picture, as shown in Figure 1, form the scene, background and model with a simple and clear line. It can be drawn by line segments, or different sample works can be made according to different materials. At the same time, there will be problems such as various effect changes and change range in the rendering process. (2) All elements in the animation should be arranged and combined according to certain rules, such as watercolor character modeling design, animation color design according to the characteristics of watercolor painting, output the rendered model drawing, and then synthesize the sample later to check whether there are defects. After everything is checked, output the sample and submit it to the user.

3.2 Principles of Watercolour Art in Computer 3D Animation Design

In computer three-dimensional animation, watercolor painting has a unique form of expression, which can fully reflect the creator's creative intention and make the expression of works more vivid, interesting and colorful. At the same time, it can also convey the characteristics of variety and variety through the picture to improve the visual effect. The design principles are as follows. (1) When designing the picture, we should consider the characteristics of different materials and choose the colors that match the materials. (2) conform to the modeling elements and performance skills. Watercolor painting is one of the traditional painting forms. It has the characteristics of strong and profound color sense and three-dimensional effect, has distinct rhythm and rhythm, and can bring people the enjoyment of visual beauty. (3) Follow the rules and principles, and pay attention to the details in the production process to adapt to the design style.

3.3 Investigation on Application Scene of Watercolour Art in 3D Animation Design System

Through the investigation of the application environment of watercolor art in computer three-dimensional animation design, this paper analyzes the impact of different types of elements on modern social life, so as to meet people's spiritual and cultural needs. Watercolor art is produced under the development of computer. It is very different from computer animation design, because computer technology has the advantages of high efficiency and rapidity. So we can analyze it from the following aspects. The first is to investigate and analyze the environment. Through the investigation, we know that there are some problems of noise and too many colors in many watercolor painting software on the market. The second is to find a lot of information about the materials and colors used in the pictures from the web page and mobile phone. Finally, these materials and technologies are combined in the process of computer animation, and finally used in the design.

4. Discussion

4.1 Investigation and Analysis of Watercolor Art Application Scene in 3D Animation Design System

Table 1 shows the survey data of watercolor art application scenes.

Table 1: Apply the scenario survey data

Investigation group	Creation of artistic conception	Creation of the combination of virtual and real	The creation of a sense of spatial hierarchy
A	85%	94%	87%
B	94%	84%	74%
C	86%	75%	89%
D	89%	80%	85%
E	93%	78%	90%

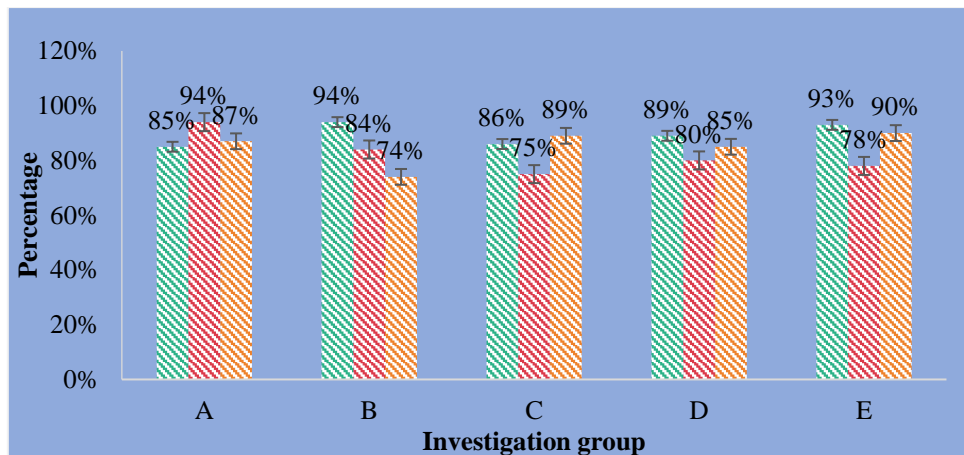


Figure 2: Watercolor art application scene survey

The application of watercolor art in computer three-dimensional animation is mainly through the analysis and research of watercolor style and picture layout. First, grasp the whole design scene as a whole. Through the feeling of the viewer and watching the film, we can understand what the picture wants to express. Secondly, we can decide whether to apply it to the scene by combining the characters, lights, background and other factors. Finally, we need to consider the problems and solutions of watercolor effect processing in the post production process, so as to achieve the best or best state, so as to improve the quality and visual effect of animation works. As can be seen from Figure 2, most people believe that the most application scenes of watercolor art in computer three-dimensional animation are artistic conception creation, virtual reality combination creation and spatial hierarchy creation. This is because watercolor has the characteristics of transparency, nature and obscurity. In animation creation, its unique language forms and techniques can be used to express the artistic form and atmosphere needed in the scene.

5. Conclusion

The expression and application of watercolor art in computer animation is mainly to meet the needs of modern people for visual appreciation and sensory enjoyment. Therefore, we can realize the characteristics of watercolor painting itself through some methods. It includes the effects of different colors, proportions and color matching. Then, it can also use computer software technology to convert these information into graphics or images to display the picture content, etc. it can be applied to the three-dimensional spatial expression in computer animation to complete the creation, so as to achieve the perfect sense of visual experience.

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