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A Brief Analysis of the Fusion and Application of 2D Animation and 3D Animation

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Abstract: This paper aims to explore the fusion and application of two-dimensional animation representation and three-dimensional animation representation. Firstly, the characteristics, advantages and disadvantages of 2D animation and 3D animation are analyzed, as well as their applications in different fields. Then it introduces the fusion of 2D animation and 3D animation, including embedding 2D elements into 3D scene, rendering 3D elements into 2D style, and using 3D software to make 2D animation. Then, the difficulties and technical challenges of these fusion methods are analyzed, and the corresponding solutions are proposed. Finally, through the analysis and comparison of several cases, the conclusion is drawn that the integration effect of 2D animation and 3D animation is better, and the future research direction and development trend in this field are discussed. The purpose of this paper is to provide reference for animation producers and related practitioners, and to promote the development and progress of animation production technology.

Keywords: Two-dimensional animation; 3D animation; Form of expression

Introduction

In recent years, animation production technology has developed rapidly, and various styles have emerged in an endless stream. The fusion design and production of 2D animation and 3D animation has become a relatively successful new technology, creating huge economic and social benefits. The integration of 2D animation and 3D animation can complement each other's strengths and weaknesses, which not only has innovative artistic charm and obvious technical advantages, but also can effectively reduce the pressure on the 2D animation market, guiding an innovative road for the development of modern animation.

1. Research status at home and abroad

In his Research on the Fusion of 2D Animation and 3D Animation, Chen Zheng pointed out that the technology of new animation is constantly updated and keeps up with the development of The Times. More and more animations use the techniques of the integration of 2D and 3D, and display in various forms of movement, so as to enrich and enrich the picture. In recent years, more and more cartoons are produced by the integration of 2D and 3D, and the fusion of various technologies in many large-scale cartoons has appeared, giving the audience a multi-level, multi-dimensional and brand new visual feeling. Au, Kristin C's Animation: 2D versus 3D and their combined effect argues that 2D animation is defined by elements built in a 2D environment, while 3D animation is defined by elements built in a 3D environment. In order to achieve artistic effect, speed up production and general convenience, modern animated films mix the two forms together. In recent years, the foreign animation market also attaches great importance to the application of two-dimensional animation and three-dimensional integration, and produces many classic animation works. For example, the early American classic cartoon "Who framed Roger Rabbit" and Dreamworks produced "Prince of Egypt", "Pony King", Japan produced "Spirited Away" and so on. In 2002, Disney Animation produced Star Silver Island, which for the first time used a new fusion of 2D and 3D animation technology to produce a "5D" character design. In 2003, France produced "Crazy Date Beautiful City", the film has very little dialogue, and uses the body language and expressions of the characters to interpret the story. Simple and vivid composition lines are matched with 3D models of flat effects, creating a typical artistic style of French illustration.

2. Two-dimensional animation and three-dimensional animation form analysis

2.1 Artistic expression of two-dimensional animation

Two-dimensional animation refers to the animation production on the plane, and the commonly used expression methods include hand-drawn animation, paper-cut animation, sand painting animation, ink animation and so on. In recent years, more and more animation production adopts digital technology, can use computer animation, through a variety of software and tools to achieve painting, stroke, color, rendering and other work. You can use Adobe Flash, Toon Boom and other software to draw and edit animations, you can also use Photoshop, GIMP and other tools for drawing and special effects processing. In addition, there are methods to generate animation using artificial intelligence technology, and the style transfer algorithm based on machine learning can transfer the style of an image to another image to achieve the unity of animation style and improve production efficiency. As an important form of artistic expression, the diversity and innovation of two-dimensional animation's expression techniques and technical means constantly promote the development of animation art, and also bring us more diversified visual experience.

2.2 Technical performance of 3D animation

3D animation involves a lot of professional software, such as Maya, 3ds Max, Blender, etc. It is also necessary to master some basic knowledge, such as human anatomy, photography, painting skills, etc., in order to better model, map, render, animation, editing and other production links; There are also many auxiliary tools and technical means, such as physics engines, particle systems, fabric simulation, etc., can add more detail and realism to 3D animation; It is also necessary to apply some basic mathematical and physical knowledge, such as vectors, matrices, optics, mechanics, etc. In terms of animation production, commonly used techniques include bone animation, physics simulation, cloth simulation, etc.

3. Research on the fusion of 2D animation and 3D animation

3.1 Differences and advantages and disadvantages of two-dimensional animation and three-dimensional animation in expression form

There are many differences between 2D animation and 3D animation. Two-dimensional animation is a traditional hand-drawn animation that mainly consists of flat graphics, including elements such as lines, colors, and shapes. It is often used to represent simple plot and character action, and is appreciated for its bright, clear, and artistic graphics. The production process of two-dimensional animation usually requires one or more artists to draw each frame by hand, edit and synthesize it through computer software, and finally form a continuous animation sequence. In contrast, 3D animation is a digital form of animation, which is composed of three-dimensional graphics, which can more realistically represent the details and movements of characters and objects. 3D animation is often used to create large-scale scenes and special effects, such as science fiction films and games, as well as various visual effects in modern film production.

Both 2D animation and 3D animation have their own advantages and disadvantages. In the form of expression, two-dimensional animation usually has a more concise and abstract style, which is suitable for the expression of flat and symbolic emotions and ideas, and can create a unique atmosphere and rhythm through the change of lines and colors, and often has more visual impact and artistic appeal. Three-dimensional animation is closer to the real world, with higher detail and fidelity, and can express richer emotions and actions.

3.2 The choice of software tools and technology for the fusion of 2D animation and 3D animation

Software tools for 2D animation and 3D animation fusion, the most popular choice is to use Adobe After Effects software to combine and synthesize 2D and 3D animation elements. With After Effects, you can create 3D objects and cameras through plug-ins and scripts and combine them into 2D animations, and you can also make the conversion between 2D and 3D elements smoother.

Another commonly used software tool is Maxon Cinema 4D, which is a software specifically designed to create 3D animations and effects. Cinema 4D makes it easy to create and render 3D models and animations, and can be combined with 2D animations by exporting 2D sequence images.

There are a number of other software tools and techniques that can be used for the fusion of 2D and 3D animation. For example, using the Unity engine, you can create and render 3D models and animations, and combine them with 2D elements. It is necessary to select the most appropriate tools and technologies according to the needs of the project, and adjust and modify them according to the actual situation to achieve the best results.

3.3 Necessity of fusion of 2D animation and 3D animation

3.3.1 Integration to improve picture performance and visual effects

2D animation can create a unique hand-drawn style and good expression, while 3D animation can present more realistic physical simulation and natural light and shadow effects. The fusion of 2D animation and 3D animation can create more abundant, realistic and vivid picture effects, and bring more possibilities and expressiveness to animation works. Therefore, the integration of 2D animation and 3D animation can give full play to the advantages of both and improve the picture performance and visual effect.

3.3.2 Fusion solves the respective problems of 2D animation and 3D animation

Two-dimensional animation is difficult to show the sense of reality and three-dimensional because of the limitation of rendering, while three-dimensional animation can show the sense of reality and three-dimensional, but the production cost is high, and there may be "stiff", "distortion" and other problems. In order to solve these problems, it is possible to consider the integration of 2D animation and 3D animation. By using plane painting in 2D animation and stereo rendering technology in 3D animation, a more natural, smooth and real animation effect can be achieved. Adding 3D elements, such as buildings and roads, to the 2D animation can increase the realism of the scene; Adding the hand-drawn elements of two-dimensional animation to the three-dimensional animation can increase the spirit and vividness of the character. Through the integration of 2D animation and 3D animation, we can overcome their respective problems and improve the efficiency and quality of animation production.

4. Conclusion

In the current field of animation production, the fusion and application of 2D animation and 3D animation has become an obvious trend. Traditional 2D animation has a unique style and charm, but it often requires a lot of manpower and time investment in the production process, while 3D animation can show complex objects and scenes more efficiently through the technical means of computer graphics. Therefore, the combination of 2D animation and 3D animation can make full use of the advantages of both and improve the efficiency and quality of animation production. Moreover, with the continuous progress and innovation of technology, the breadth and depth of this integration will be further expanded in the future, presenting more wonderful animation works to the audience.

References:

[1] TANG Yinping. Discussion on the fusion technique of 2D Animation and 3D Animation [J]. Curriculum Education Research, 2019(33): 231-232.

[2] Chen Zheng. Research on the fusion of 2D Animation and 3D Animation [D]. Shijiazhuang: Hebei Normal University,2014.

[3]Au,Kristin C.Animation: 2D versus 3D and their combined effect[D].Massachusetts Institute of Technology, Department of Architecture, 2014.