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Research on the Application of Virtual Reality Technology in Film and Television Post Production Practice

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ABSTRACT
Introducing virtual reality technology into post production practice can help enhance audience immersion and interactive experience, while reducing production costs and improving production efficiency. To promote the practical application of virtual reality technology in film and television post production, more complex and realistic visual effects can be created based on virtual reality technology, and scene simulation can be carried out to optimize the preparation work of photography and scenery; Virtual reality technology can also be used to enhance the accuracy of editing and color grading, and to simulate sound design and spatial sound effects.

KEYWORDS
Virtual reality technology; Film and television post production; Practical application

1 Introduction

In the modern film and television industry, technological innovation promotes unlimited expansion of creativity; Especially virtual reality technology has brought revolutionary changes to film and television post production. This paper will delve into the value of introducing virtual reality technology into post production practice in film and television, and specifically explore its application path, in order to provide theoretical support and practical guidance for post production in film and television.

2 The Necessity of Introducing Virtual Reality Technology in the Film and Television Post Production Practice

2.1 Helping to Enhance the Audience's Immersion and Interactive Experience

Introducing virtual reality technology in post production practice can enhance audience immersion and interactive experience. By constructing a three-dimensional virtual environment, this technology empowers viewers to experience film and television content in a completely new way. Virtual reality technology can reproduce extremely realistic natural and urban landscapes, as well as exotic spaces such as the universe; These are all areas that traditional technologies find difficult to reach. In such a virtual environment, the audience can not only move freely, but also interact directly with environmental elements, greatly enhancing the attractiveness and infectiousness of film and television works. The animation production team of *Nezha: Birth of the*

Demon Child utilized virtual reality to create captivating battle scenes, greatly enriching the visual and sensory experience of the audience and significantly enhancing their satisfaction. In addition, the interactive function of this technology allows the audience to deeply participate in the plot and potentially guide the story, thereby enhancing the multidimensional viewing experience and redefining the way the audience interacts with the film. This new experience of participation and control promotes the artistic sublimation of post production technology in film and television, and also makes works more attractive on both artistic and technical levels.

2.2 Helping to Reduce Film and Television Production Costs and Improve Production Efficiency

The introduction of virtual reality technology into film and television post production has greatly promoted the reduction of production costs and the improvement of efficiency. Virtual reality technology enables production teams to shoot and edit in virtual environments without the need to physically build complex or distant scenes. This environment can accurately simulate the physical characteristics of the real world, such as light, color, and spatial layout, significantly reducing dependence on outdoor scenery and related logistics costs. In China, especially in film and television projects with limited budgets and high creative demands, virtual reality technology has been considered an effective tool for cost control. [1] For example, the movie *The Great Wall* extensively utilized virtual reality technology to construct complex visual effects such as ancient Great Wall and battle scenes. The use of this technology allows production teams to create convincing visual effects without actually building huge scenes, significantly reducing costs and shortening the entire production cycle. Because the modification of virtual scenes is much cheaper and faster than the construction and photography of actual scenes. In addition, the application of virtual reality technology in post production has greatly improved work efficiency. Traditional post production steps such as adding special effects and color correction typically require a significant amount of manual operation and time investment. However, in virtual reality environments, most effects can be directly adjusted and previewed in real-time on the virtual model, greatly reducing rework and adjustments in the actual synthesis and rendering process, thereby accelerating the post production process and improving the final quality of the product. The application of virtual reality technology in China's film and television post production effectively solves the problems of high cost and low efficiency in traditional production processes, and is a technological innovation and optimization of the entire industry's production mode.

3 Application Path of Film and Television Post Production Practice Based on Virtual Reality Technology

3.1 Creating More Complex and Realistic Visual Effects Based on Virtual Reality Technology

Firstly, a comprehensive and accurate 3D scene database should be created. The team should obtain data through 3D scanning of actual locations, or a virtual environment built from scratch by 3D artists based on project requirements. For example, if you want to reproduce the scene of ancient Chinese palaces in a film or television work, you can first scan the existing palace buildings in 3D, and then import this data into a virtual reality system for further detail enhancement and optimization to meet specific film and television shooting needs. Secondly, dynamic capture technology should be introduced. The production team can install dynamic capture devices and sensors on the actors to accurately capture every action and expression of the actors, even small

body movements, and convert this data into real-time movements of digital character models, thereby enhancing the character's vitality; This makes it more convenient and efficient to adjust character actions during the post production process. When making large-scale fantasy and science fiction films such as the *Wolf Warriors* series, motion capture technology is widely used to capture complex combat scenes and stunt actions, ensuring the stunning and realistic visual effects of the scenes. Thirdly, in order to further enhance the authenticity and complexity of visual effects, advanced light and shadow rendering techniques, especially physics based rendering (PBR) techniques, must be applied to ensure that the material and lighting effects are highly consistent with the real world. [2] In the movie *The Wandering Earth*, the production team used advanced light and shadow technology in virtual reality to carefully create scenes of the universe and outer space; These scenes are not only vivid, but also full of artistic sense. It can be seen that virtual reality technology has played an important role in promoting the development of visual arts in film and television. It is not only a technological advancement, but also an innovation in artistic expression, greatly expanding the imaginative space and expressive power of film and television creation.

3.2 Scene Simulation Based on Virtual Reality Technology to Optimize the Preparation of Photography and Scenery

The team should use virtual reality technology to carefully construct a detailed environment; The environment must strictly correspond to the requirements of the shooting script, including all details such as terrain, architecture, interior decoration, and lighting. During this process, the technical team should model accurately, and there should be close collaboration between the art director and the director to ensure that the virtual environment is consistent with the overall style of the film in terms of authenticity and artistic effects. [3] In the production of the movie *Red Cliff*, virtual reality technology was used to first construct the battlefield scene of the Red Cliff War. Before using a large number of actors and props, the director and photographer first try shooting in the virtual environment to find the optimal shooting angle and scene layout. This improves shooting efficiency and significantly reduces costs and time losses caused by on-site adjustments.

3.3 Enhancing the Accuracy of Editing and Color Grading Based on Virtual Reality Technology

The editing and color grading stages are crucial for the visual effects and emotional communication of a film; The application of virtual reality technology can enable production teams to explore every image in depth, achieving more detailed and accurate editing and color adjustment. Firstly, virtual reality technology provides a comprehensive visual environment for production teams; The team can view the original shooting materials here to more accurately grasp the subtle emotional fluctuations and visual details of the film, and make more refined editing decisions. In addition, by using 3D views in virtual reality, editors can examine the same scene from multiple angles and different distances, thereby better understanding the layout of the scene and the flow of timelines, and optimizing the selection of editing points. Taking *The Three Body Problem* as an example, its post production team utilized virtual reality technology to edit complex sci-fi scenes. Editors use virtual reality headsets to watch scenes and experience real-time transitions from Earth to outer space, ensuring natural and emotional coherence in each transition during the editing process. This makes the editing process more intuitive and precise, significantly improving work efficiency and product quality. [4] At the same time, in the color grading process, colorists can directly observe and adjust the color effects of the film in the virtual reality environment, which is more intuitive and comprehensive than the traditional two-dimensional screen operation method.

Colorists can experiment with different lighting and color combinations in a fully controlled virtual environment, accurately adjusting the color tone, saturation, and contrast of the film to ensure color consistency and authenticity. They can also create personalized color creations based on the director's artistic vision and the emotional needs of the film. As a result, the application of virtual reality technology in editing and color grading has completely revolutionized the traditional post production process, promoting the continuous progress of film and television post production technology.

3.4 Simulation of Sound Design and Spatial Sound Effects Based on Virtual Reality Technology

By applying virtual reality technology, sound designers can accurately place sound sources in simulated three-dimensional spaces, simulate the propagation and reflection of sound in various environments, and locate it in space. In specific operations, sound designers can apply virtual reality technology to hear in real-time how sound interacts with visual elements in a controlled virtual environment, thereby improving the efficiency of sound design. In addition, sound designers can also apply virtual reality technology to simulate the absorption and reflection characteristics of different materials for sound.

In China, with the popularization of virtual reality technology, sound design in film and television production has begun to adopt this technology to enhance the realism and immersion of sound effects. In the production of the science fiction movie *The Wandering Earth*, the production team used virtual reality technology to design and simulate the sound environment of outer space. [5] Due to the lack of traditional sound propagation media in outer space, sound design faces the challenge of how to transmit sound in a vacuum.

The team simulated different sound propagation scenarios in a virtual environment, creating scientifically reasonable and artistically exaggerated sound effects, greatly enhancing the sci-fi feel of the movie and the immersion of the audience. In addition, sound designers can apply virtual reality technology to more flexibly handle the synchronization of sound and pictures in post production, such as adjusting the positioning and volume of sound in a virtual environment to ensure the perfect match between sound effects and visual events, so as to obtain the best audio-visual effects. As a result, virtual reality technology has improved the professionalism and accuracy of sound design, and has also brought richer and more dynamic auditory experiences to film and television works.

4 Conclusion

Virtual reality technology has a wide range of applications in film and television post production. Virtual reality technology has improved the efficiency of film and television post production, while also enhancing visual effects, improving the accuracy of scene design, and enhancing the audience's visual and auditory immersion experience. In addition, virtual reality technology also simulates spatial sound effects, increasing the overall immersion of the work. Looking ahead to the future, the application of virtual reality technology will make post production more flexible and promote the expansion of the boundaries of film and television creation. Film and television producers and audiences will work together to explore more diverse and creative ways of artistic expression driven by technological innovation. With the continuous advancement and application of technology, future film and television works will be more captivating, providing audiences with a more immersive experience.

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